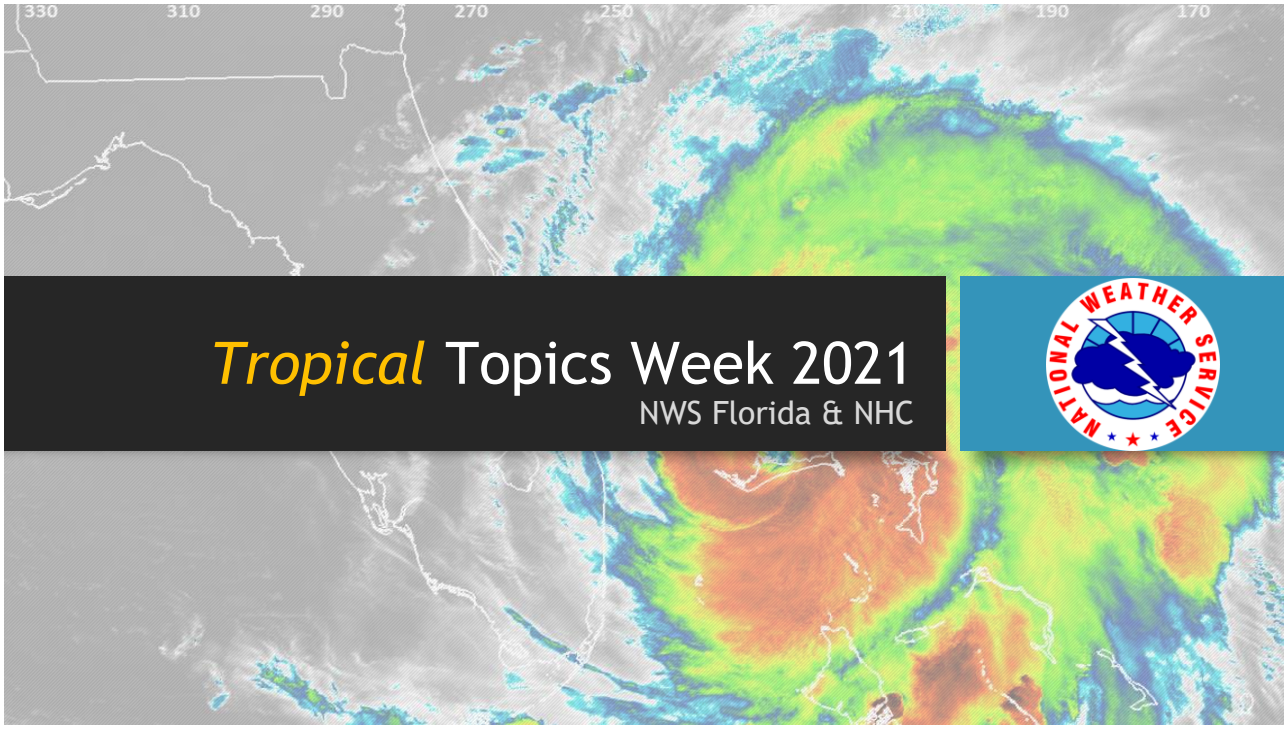


Tropical Topics Week 2021

NWS Florida & NHC

Tropical Topics Week

Daily Webinars @ 2 pm ET

NHC & FDEM
National Messaging, FDEM Director & NHC Director Ken Graham

Monday
May 17

Wind Threat
Threat Recognition, Impacts & Messaging

Tuesday
May 18

Surge Threat
Threat Recognition, Impacts, Messaging & Vulnerability

Wednesday
May 19

Rainfall Threat
Threat Recognition, Impacts & Messaging

Thursday
May 20

Tornado Threat
Threat Recognition, Impacts, Messaging

Friday
May 21

What we'll discuss today

- Storms Noted for Flooding Rains
- Rainfall Forecasting
- Available Tools

Poll Question

Have you experienced a past tropical system that impacted your region with significant inland flooding from heavy rain?

a. Yes

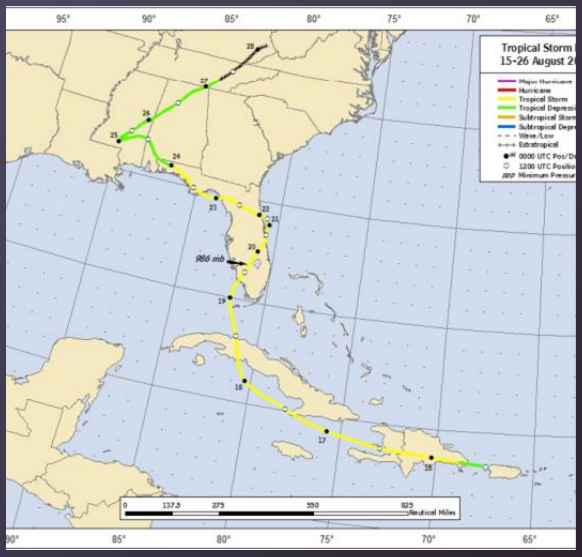
b. No

In the questions box, type in the name of this impactful storm.

Tropical Storm Fay

August 18-23, 2008

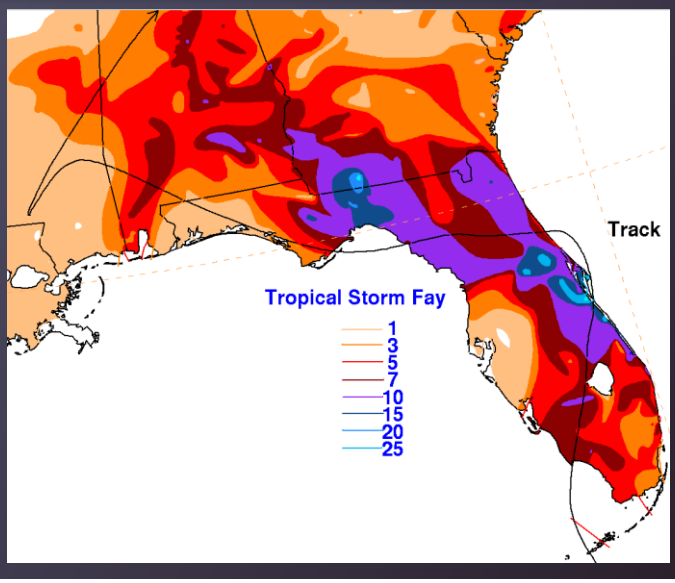
- Fay remained at tropical storm strength as it zig zagged across the State of FL. It actually reached peak intensity over land near Lake Okeechobee.
- Fay was a very slow moving storm that produced extreme rainfall across much of the state and also parts of South GA.
- Fay produced widespread flash flooding and riverine flooding.



Tropical Storm Fay

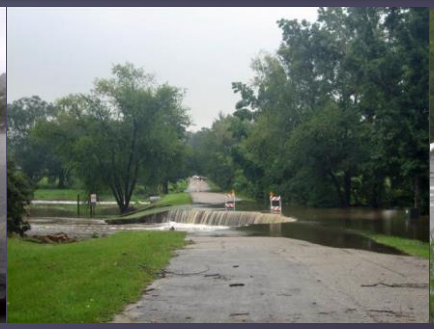
August 19-24, 2008

- Fay made four landfalls in Florida, initially in The Keys, then Southwest FL, Northeast FL and finally the western FL Big Bend
- Rainfall totals exceeded 10 inches across much of East Central and Northeast FL, as well as the FL Big Bend and Southwest GA.
- Maximum rainfall totals of 25+ inches occurred locally in East Central FL and Southwest GA.
  - 27.65" at Melbourne, FL
  - 27.50" near Thomasville, GA
    - new GA state record



Tropical Storm Fay

Big Bend Flooding Impacts

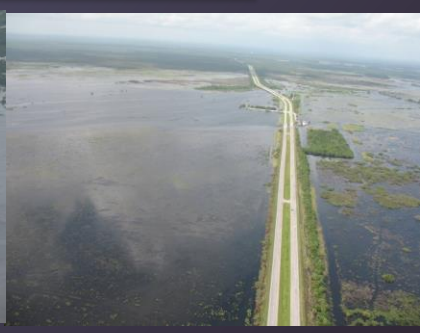




- Lake Ella in central Tallahassee nearly reached Monroe St.
- Road in Wakulla County was washed out.
- Major flooding occurred on the Ochlockonee River in Havana and Bloxham (pictured).
- Flooding on the Suwannee River

Tropical Storm Fay

East-Central FL Impacts



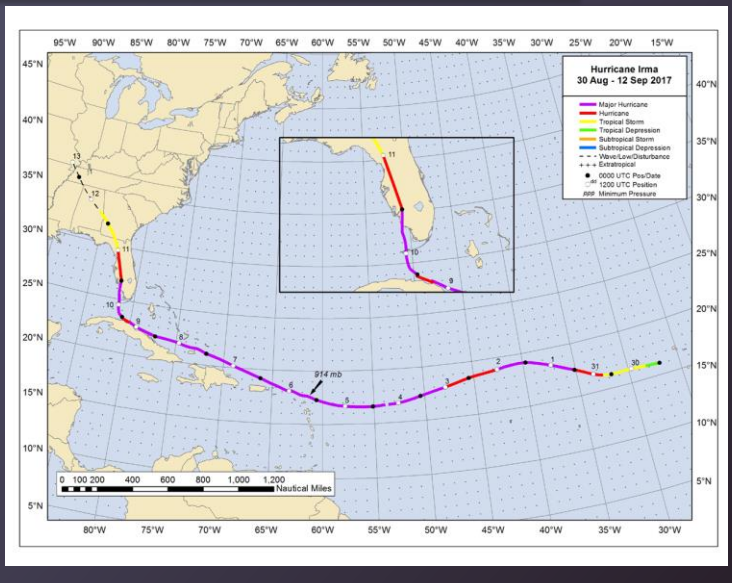


- Flooding in a Melbourne neighborhood (left)
- Record flooding on the Upper and Middle St. John's River (center and right)

Hurricane Irma

September 10-11, 2017

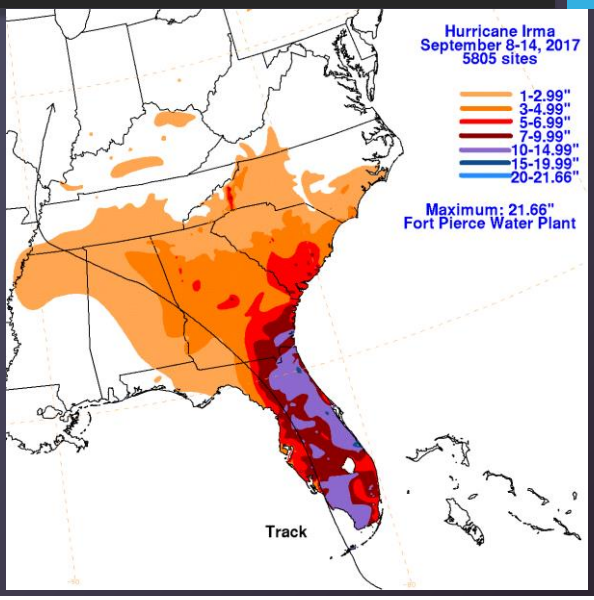
- Irma was a long track Cape Verde Hurricane that spent most of its life as a major hurricane.
- Irma made two FL landfalls, one in The Keys and another in far Southwest FL. Irma then traveled up the Peninsula roughly along I-75.
- While wind, surge and tornadoes were primary impacts, flooding was also a problem.



Hurricane Irma

September 10-11, 2017

- Rainfall totals exceeded 10 inches across much of the FL Peninsula east of the track.
- Maximum rainfall totals of 15+ inches occurred locally in East Central and Northeast FL.
  - 21.66” at Ft. Pierce, FL



Hurricane Irma

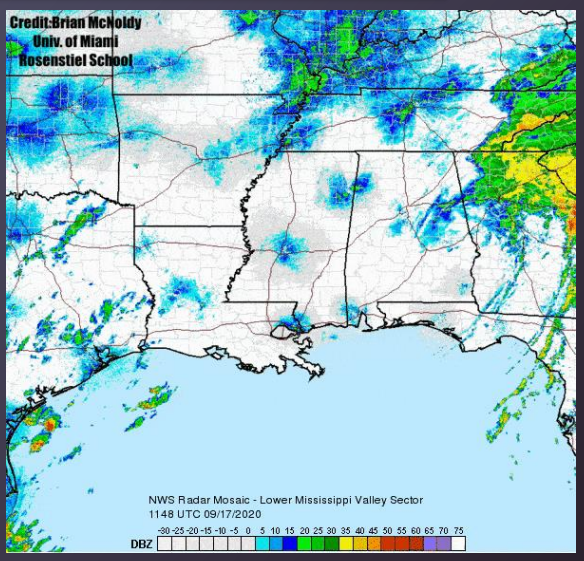
Flooding Impacts

- Flooded parking lot in Callahan, FL (left).
- Combination of surge and flooding from heavy rains in Jacksonville, FL
- Record river and steam flood stages set including the Santa Fe River which nearly forced the closure of I-75. U.S. route 27 was closed due to flooding.

Hurricane Sally

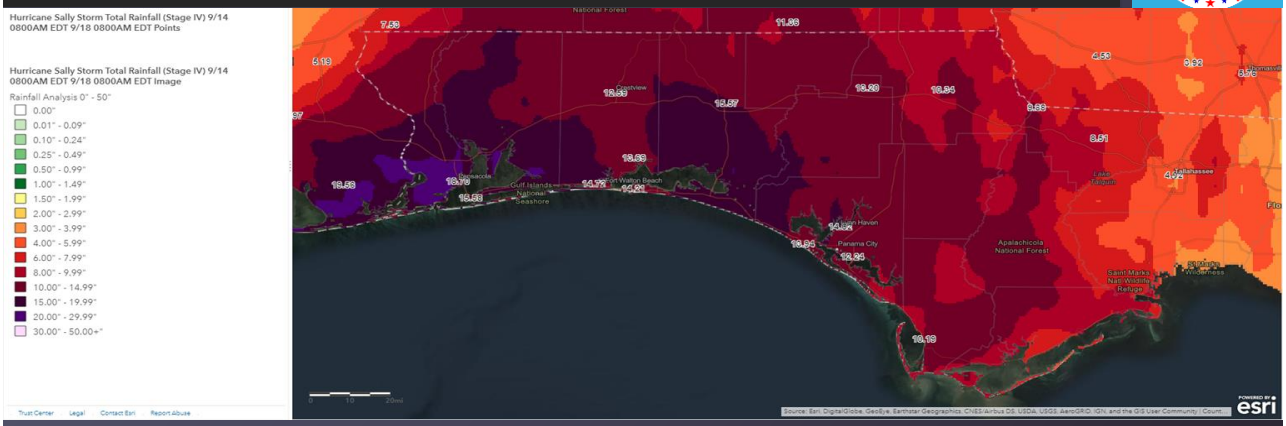
September 16, 2020

- Sally made landfall in Gulf Shores, AL early in the morning on Wednesday, September 16th as a strong Category 2 hurricane.
- Sally was a very slow moving hurricane that produced prolonged and significant impacts across coastal AL into northwest FL and further inland into south Alabama.
- Damage was widespread and significant.
- 15-30" of rain produced major and widespread freshwater flooding (this also exacerbated an already significant storm surge)



Hurricane Sally

Rainfall Totals



- 15-25” of rain occurred along coastal portions of the western FL Panhandle.
- The highest rainfall total recorded with Sally was 29.99” in Orange Beach, AL just west of the AL/FL line.
- The Pensacola metro area recorded between 20-25”.

Hurricane Sally

River & Flash Flooding

- River flooding reached major flood to record levels across numerous western and central FL Panhandle Rivers.
  - Shoal River
  - Blackwater River
  - Wright’s Creek
  - Holmes Creek
  - Bruce Creek
- Downtown Pensacola was especially hard hit hard by flash flooding, as the excessive rain had nowhere to drain given the incoming storm surge.
- This was a scenario repeated all across the western Florida Panhandle.

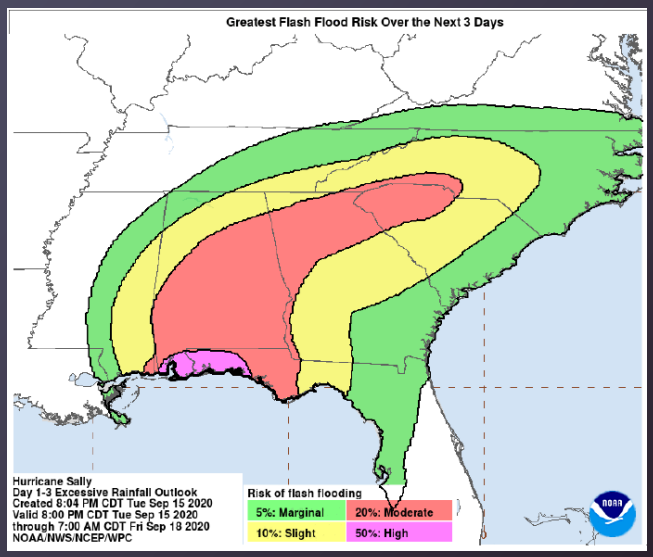
Flooding in Pensacola metro neighborhood.

Rising Water Along the Blackwater River

Hurricane Sally

Rare High Risk Excessive Rain Outlook

- A rare "High Risk" of excessive rainfall was issued by the Weather Prediction Center.
- This indicated that widespread, severe flash flood was expected with flooding impacting areas that normally don't experience flash flooding.



Poll Question

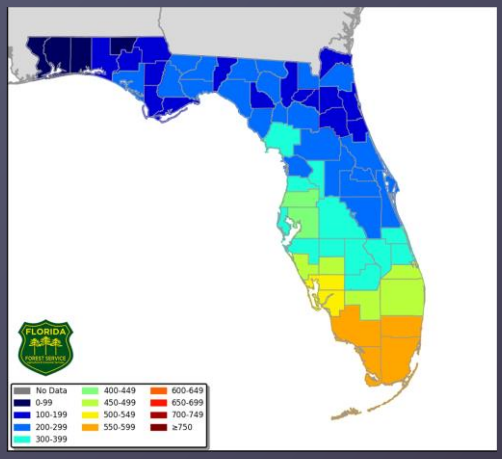
What do you think is an important method to educate the public about the threat from floods?

a. Broadcast media
b. Social media
c. Preparedness websites
d. Turn Around, Don't Drown campaign
e. Spotter training

Rainfall Forecasting

Antecedent Conditions

Keetch-Byram Drought Index (KDBI)



Florida Drought Monitor

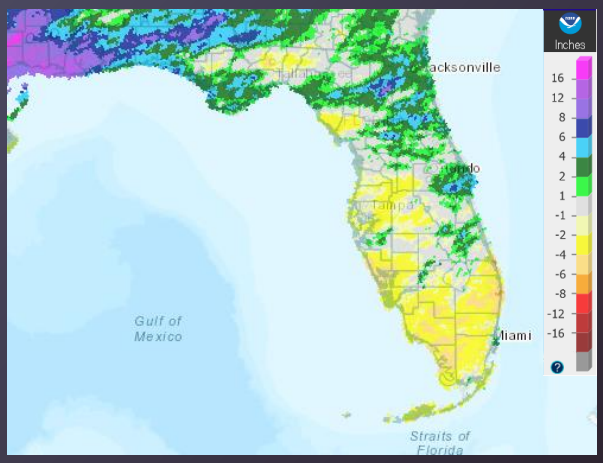
How dry are the soils?

Rainfall Forecasting

Antecedent Conditions

- How much or little rainfall has occurred over the area over the last week/month/season?
- Take all of these antecedent conditions into consideration when determining how much rainfall and over how long of a timeframe the area can reasonably handle
- Also look to see conditions on area rivers and controlled lakes

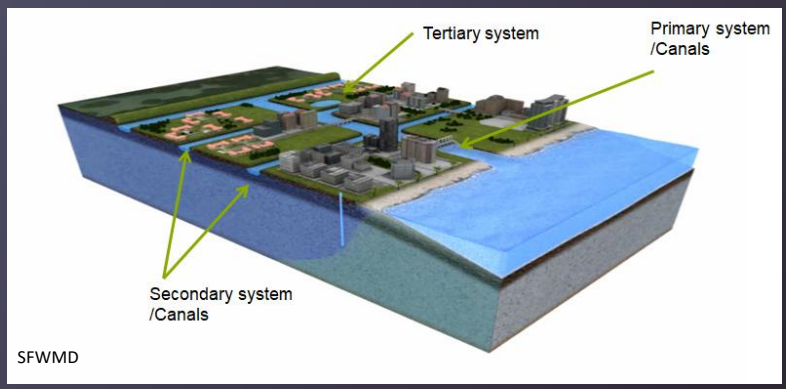
Last 90 Days Rainfall Departure from Normal



Rainfall Forecasting

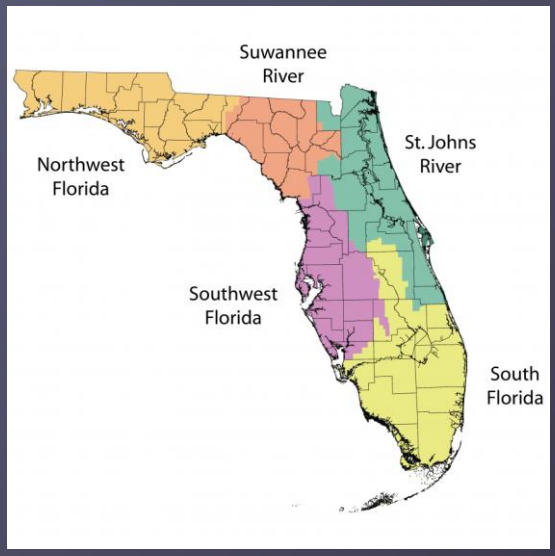
Water Management Coordination

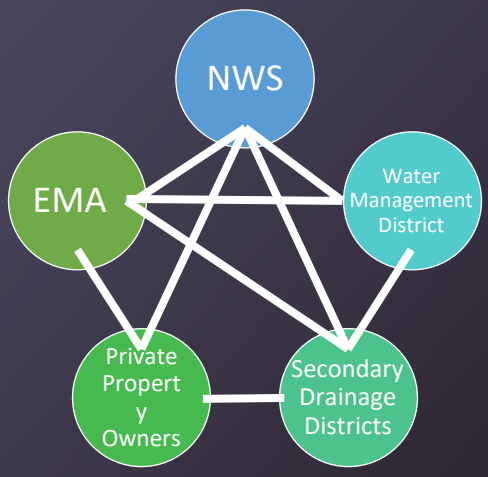
- Three-tiered Drainage System
  - Primary
    - Water Management District
    - USACE
  - Secondary
    - Local governments
    - Special Districts
    - Tribal governments
  - Tertiary
    - Homeowners Associations
    - Private Landowners



Rainfall Forecasting

Water Management Coordination

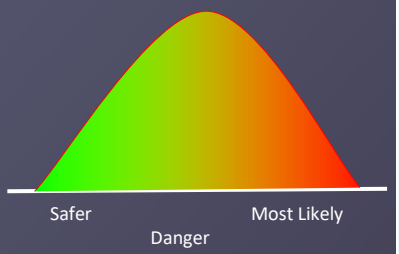


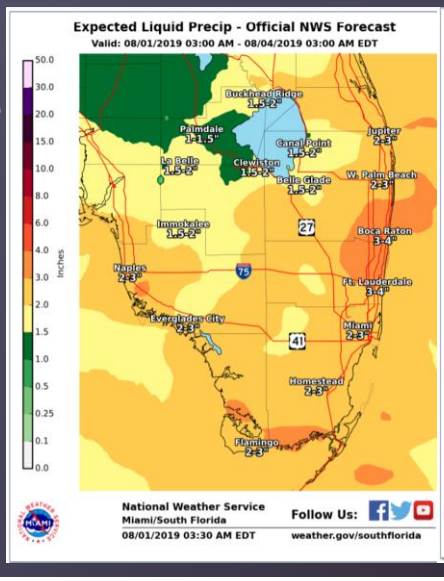


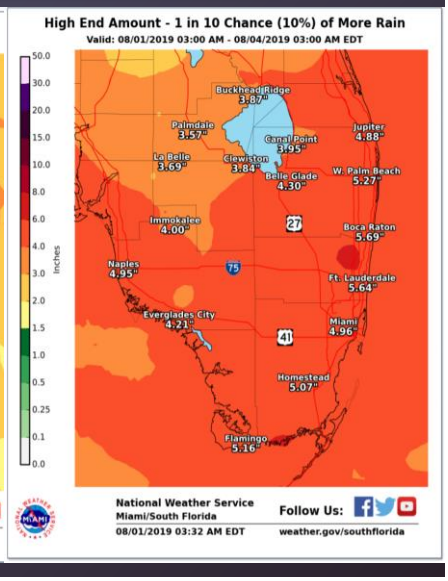
Rainfall Forecasting

Probabilistic Forecasts

- Providing a forecast to account for a range of possibilities and impacts



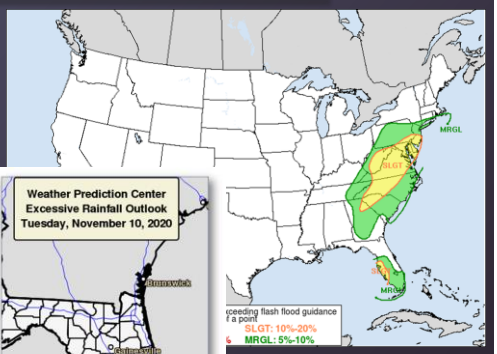


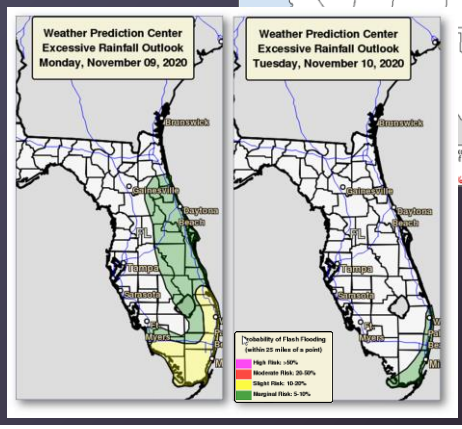


Rainfall Forecasting

Excessive Rainfall Outlook

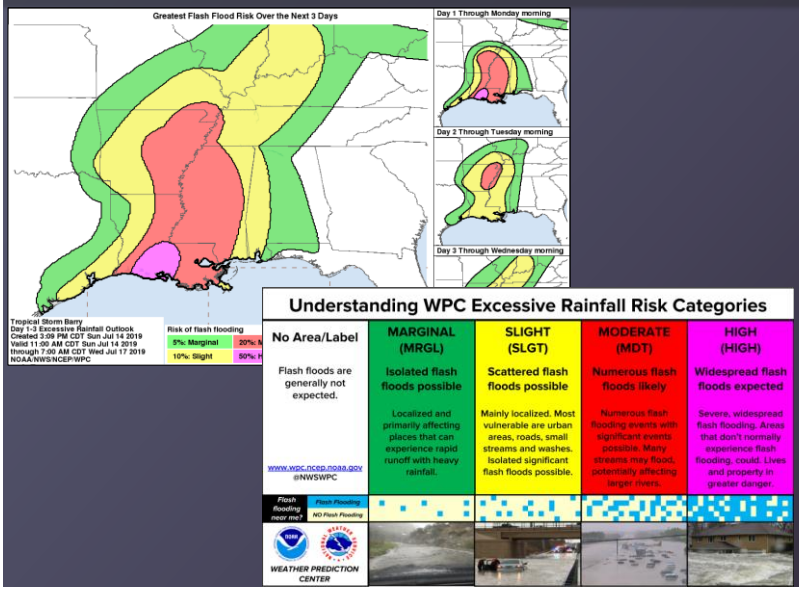
- Examples from TS Eta with the national look and the localized state view
- ERO is valid for 24 hour period expressing the risk for rainfall exceeding the flash flooding guidance
- Remember too that a 10% risk of extreme event is huge - think of it like the Severe Weather Outlook/Tornado Risk





Rainfall Forecasting

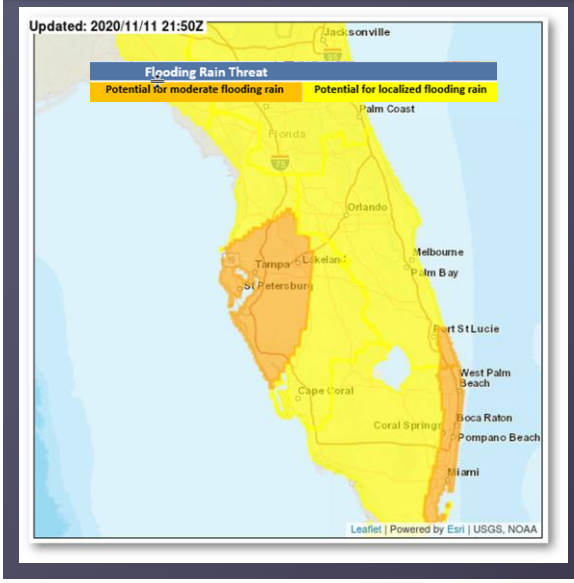
Excessive Rainfall Outlook



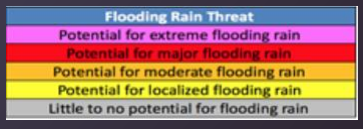
- New this season for tropical cyclones will be these multi-day "Greatest Flash Flood Risk Over the Next 3 Days" Graphics
- Displays the maximum flash flood risk at a given location during any of the next 3 days
- Timing thumbnails shown on right side of graphic for Days 1-3
- A quick look at the definitions for the risk categories

Rainfall Forecasting

Flooding Rain HTI



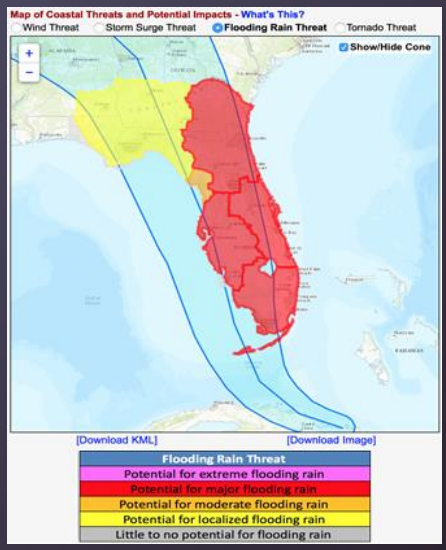
- Compiles all of the rainfall forecast information along with forecaster expertise into an easy to understand Potential Impact Map
- Highlights the areas with the greatest potential for flooding rain for the entire event



Rainfall Forecasting

Flooding Rain HTI

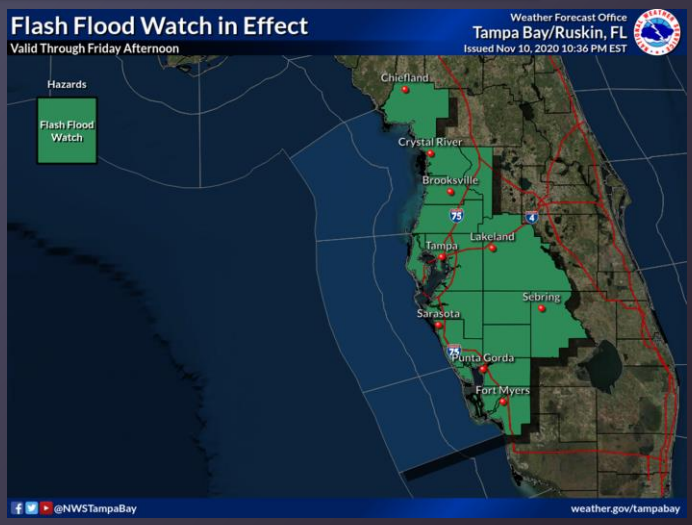
- Accessed through https://www.weather.gov/srh/tropical (and select your local NWS office)
- Can click on the map much like the point and click forecast and get the detailed reasonable worst case scenario forecast information for that point - the what, where, when, how much, how long, and what to prepare for
- Unlike ERO (24 hour), it is the overall potential threat for flooding rain throughout the event



Rainfall Forecasting

Flood Watches and Warnings

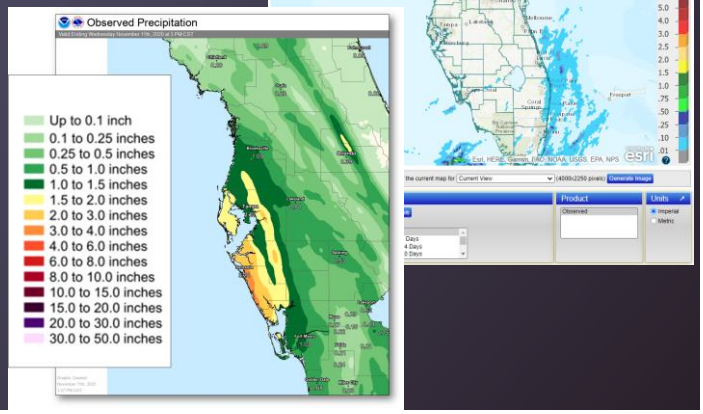
- Can begin well ahead of the other impacts from the tropical system
- Can continue well after the other impacts have subsided
- Often transitions into River Flood Warnings as the flood waters drain into river basins



Rainfall Forecasting

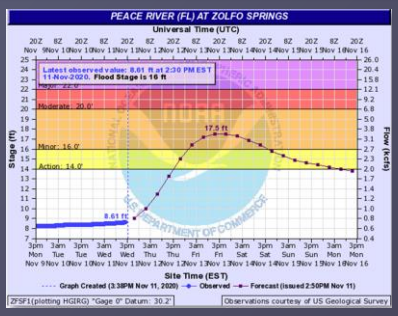
Flood Watches and Warnings

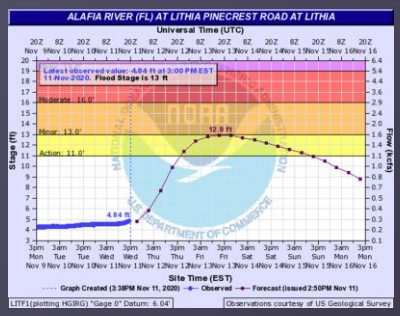
- Rainfall totals are monitored throughout the event and can be tracked through the Precipitation Tab in AHPS
- Based on how much has fallen, we will adjust when needed to potential totals, watch areas, and the HTI levels

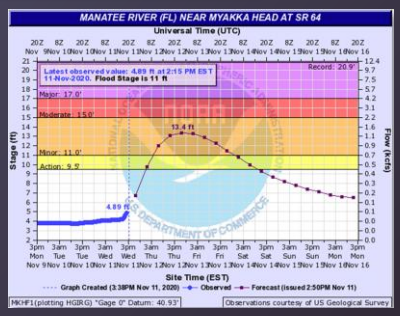


Rainfall Forecasting

AHPS and River Flood Warnings



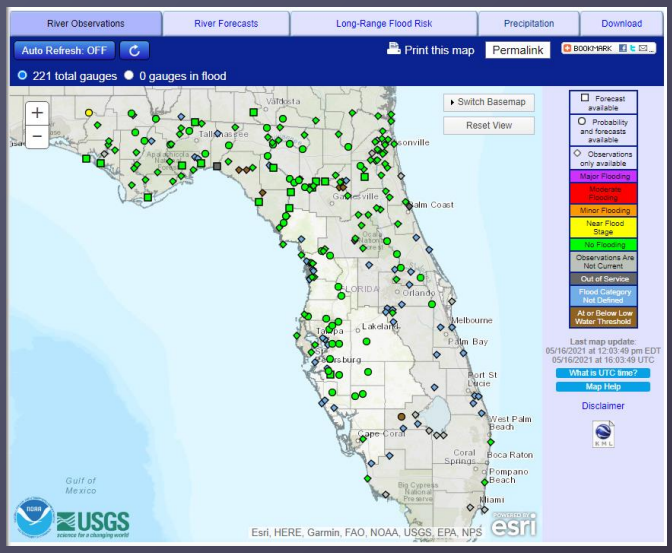




- Monitor local rivers also via AHPS webpage: https://water.weather.gov/ahps/region.php?state=fl
- Provides observed water levels with predicted levels and Action/Minor/Moderate/Major stages are highlighted/color-coded
- During a tropical event, it can sometimes take weeks for the rivers to fall below flood

Rainfall Forecasting

AHPS and River Flood Warnings

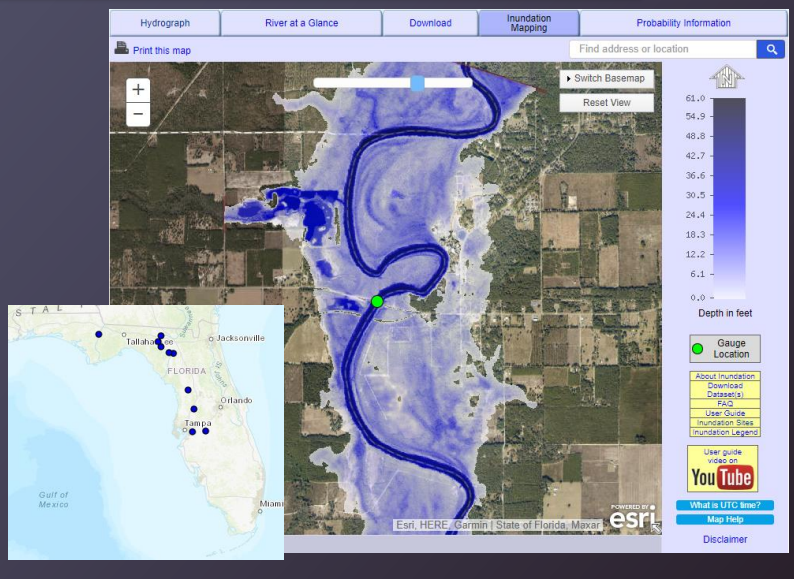


- Select a site to see previous slide stage information
- Can hover over and get a pop-up to switch between sites quickly or click for new page
- Some coastal locations also have tidal gauges and surge information

Available Tools

Flood Inundation Maps

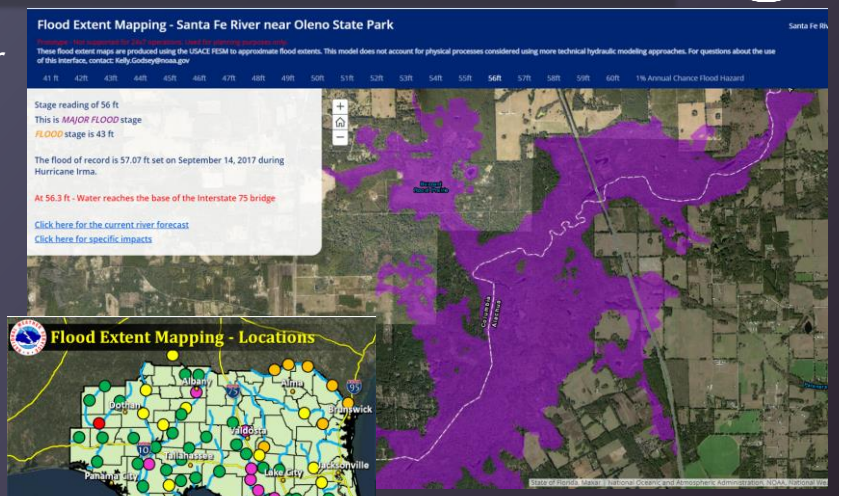
- Flood Inundation Mapping through AHPS page.
- Only exists at specific locations across Florida.
- Static maps that depict flood area and water depth at specific river stages.



Available Tools

Flood Extent Maps

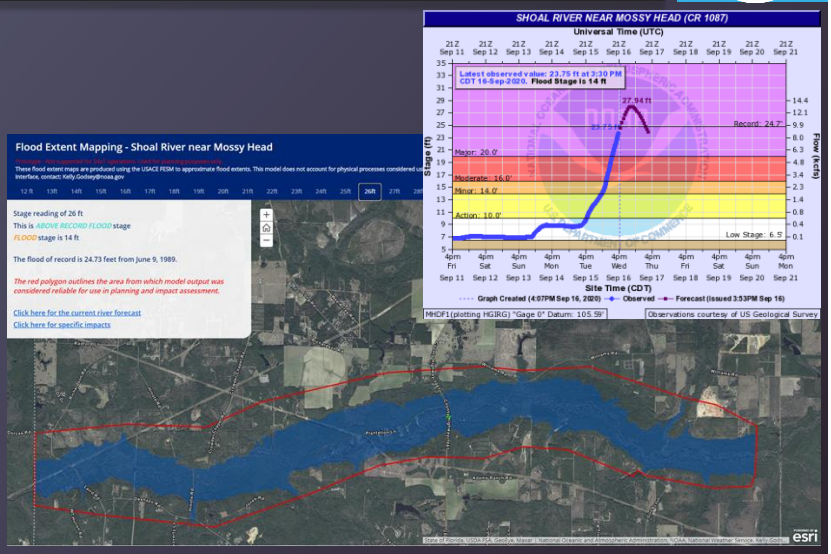
- Flood Extent Maps may be available through your local forecast office.
- In North and Northeast Florida, all river forecast points have extent mapping. More maps can be developed by request.
- Like flood inundation maps, these are static maps that depict flood area, but they **do not** depict water depth.



Available Tools

Flood Extent Maps

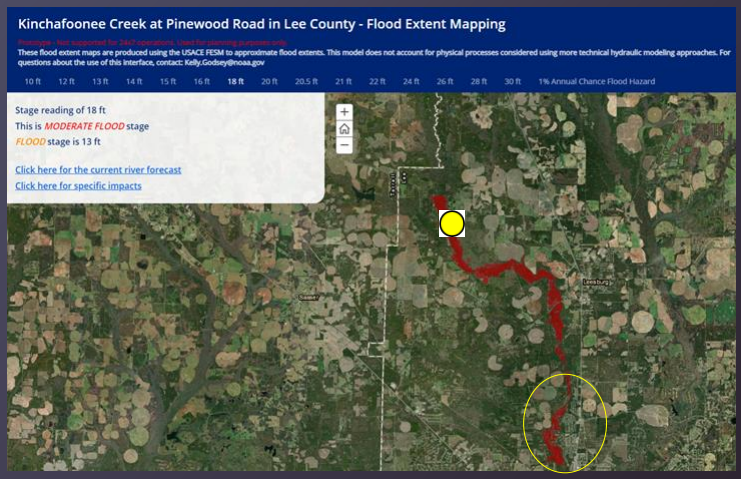
- Record river flood event during Hurricane Sally
- Flood Extent Map published 1 week before hurricane
- Included flood extents up to 28 ft (crest was 25.65 ft)
- Goals for use:
  - Visualization of flood impacted areas.
  - When validated, provides information on impacted bridges (FDOT/Road Dpt)



Available Tools

What are static flood maps?

- Most of the mapping you have access to today are static maps – meaning it is based on model output throughout the defined reach. It doesn't include new event data.
- This can introduce problems, especially in long map reaches.
- In this example, it can take the flood wave over 18 hours to go from the gauge (yellow dot) to where the flooding impacts homes. (travel time varies river to river)
- Important - Understand that a static map depicts areas expected to flood within that specific event!



Available Tools

National Water Center Guidance

- The National Water Center can also provide flood mapping in two separate forms.
- Replace and route technique utilizes forecast flow conditions between forecast points to produce a flood map.
- The National Water Model can also provide flood mapping in areas where replace and route may not be possible (smaller creeks and streams).
- To access this output, work with your local office during flood events.

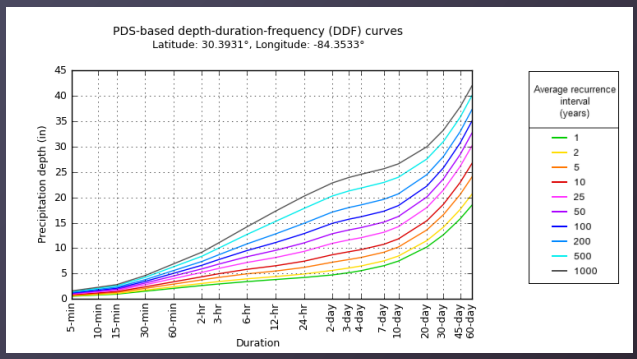
National Water Model Flood Mapping

Available Tools

Return Period

- Annual Recurrence Interval explains rainfall rate, accumulation, or flood relative to a number of years.
- Exceedance probabilities relate to the chance of a specific event occurring over a given period of time.
- It is strongly suggested we utilize exceedance probabilities.
- This removes the frequency terminology from the event - consider this table:

Recurrence Interval	Exceedance Probability
5 year event	20% chance
20 year event	5% chance
50 year event	2% chance
100 year event	1% chance
500 year event	0.2% chance
1000 year event	0.1% chance



Recurrence intervals for Tallahassee from NOAA Atlas 14

Poll Question

- Can you get two 100 year floods in the same year?
  a. Yes
  b. No

Poll Question

- Which tool or product looks most useful to you?
  a. Inundation Maps
  b. Flood Extent Maps
  c. Return Interval Graphs
  d. Flooding Rain HTI
  e. Multi-day Excessive Rainfall Outlook

We appreciate your partnerships!

Tropical Topics Week 2021

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