2018 FloodWarn Training

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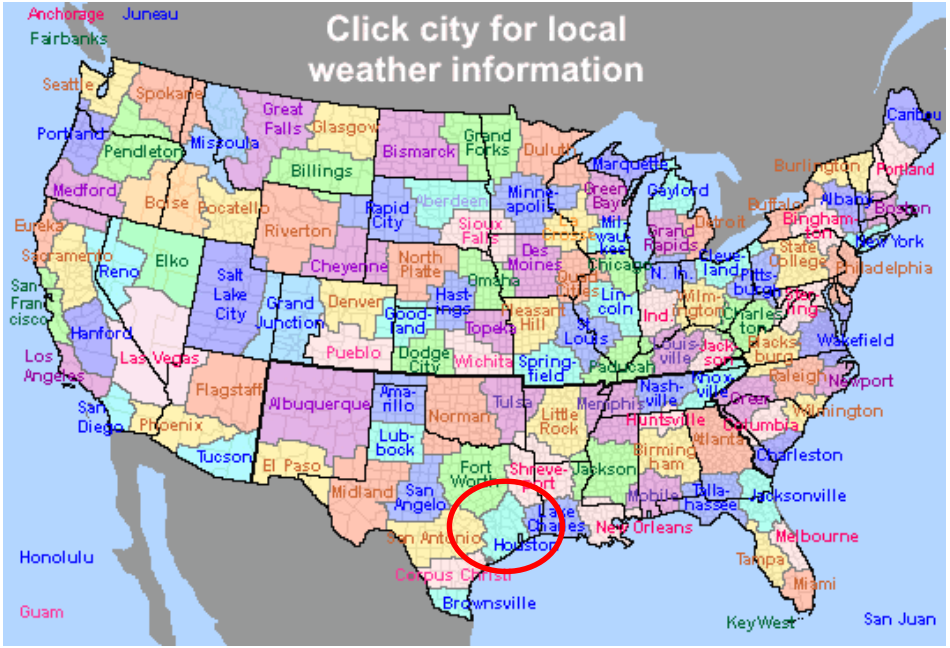
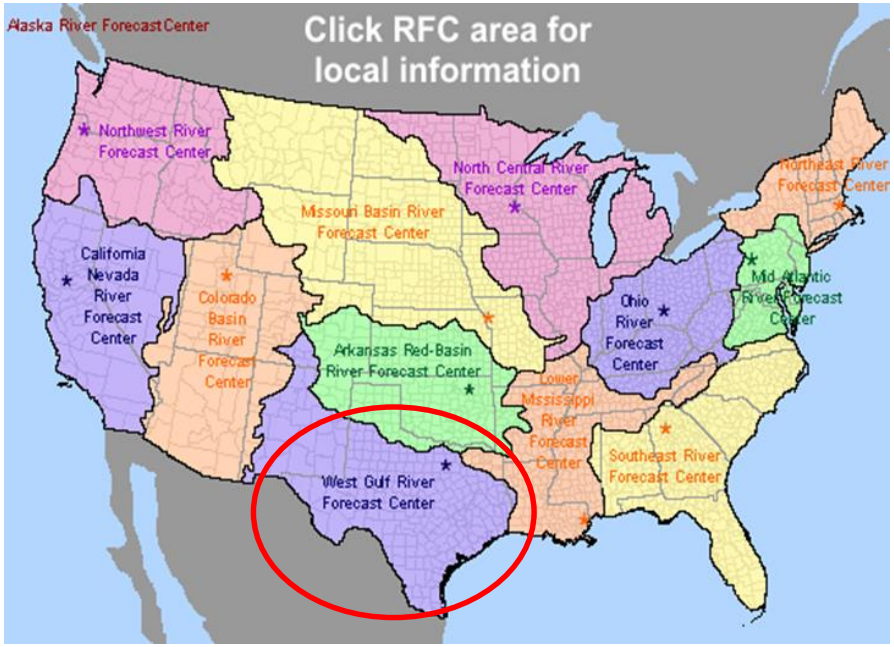
Senior Service Hydrologist/Meteorologist
National Weather Service- Houston/Galveston, TX

National Weather Service

Weather Forecast Offices



River Forecast Centers



Outline

Flooding Importance

Flooding Types and Causes

Flood Products

River and Coastal Flooding

Partners

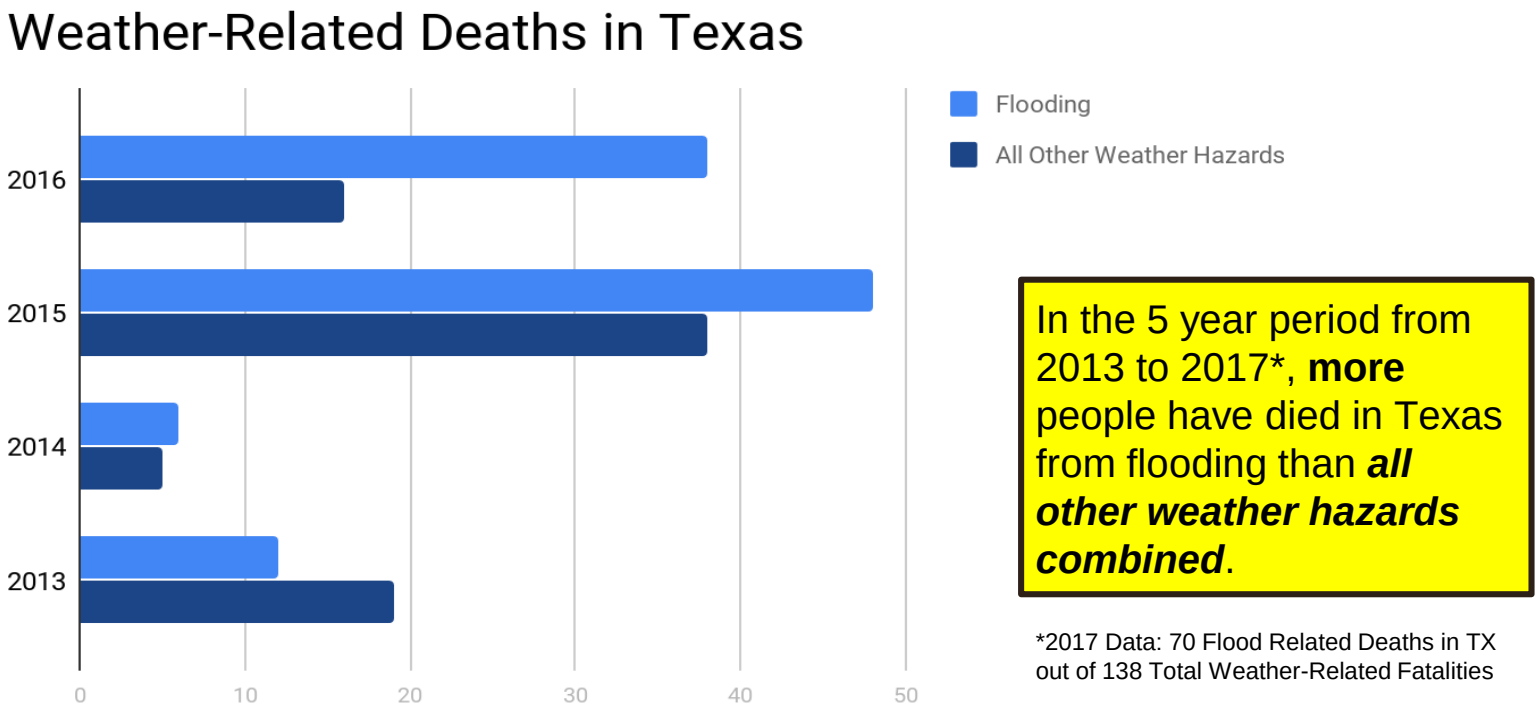
Flood Risk

Flood Safety

Reporting Flooding

Flooding Importance

Flooding is Deadly!

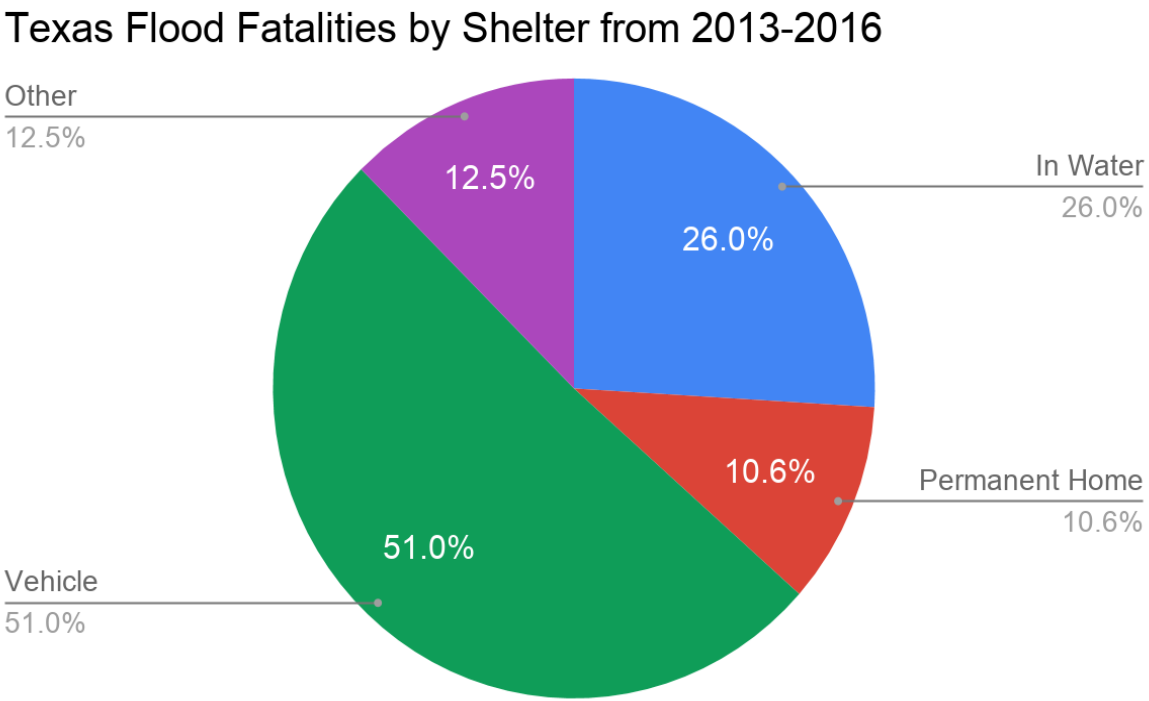


In the 5 year period from 2013 to 2017*, **more** people have died in Texas from flooding than ***all other weather hazards combined***.

*2017 Data: 70 Flood Related Deaths in TX out of 138 Total Weather-Related Fatalities

Data from NWS National Hazard Statistics

Flood Fatalities



Over half of the flood fatalities in Texas occurred while people were in their car.

Data from NWS National Hazard Statistics

Houston Floods: April 18, 2016

Recent Big Floods…

Memorial Day 2015

Tax Day 2016

Brenham 2016

Harvey 2017


Tax Day 2016


Brenham 2016


Harvey 2017

And other historic floods…

Tropical Storm Allison

1994 Flood

Tropical Storm Claudette

Ike 2008

Flooding Types and Causes

What Causes Flooding?

- Intense rainfall
- Rain over several days
- Dam/levee failures
- High tides or storm surge
- Snowmelt
- Ice or debris jams

Types of Flooding

Ponding & Sheet Flow Flooding

Flooding that occurs gradually over time, usually 6 hours after the rain begins or longer (longer duration)

Flash Flooding

Flooding that develops quickly (typically 6 hours or less) either from heavy rainfall or dam/levee failure (shorter duration).

River Flooding

Flooding that occurs from water escaping river banks.

Coastal Flooding

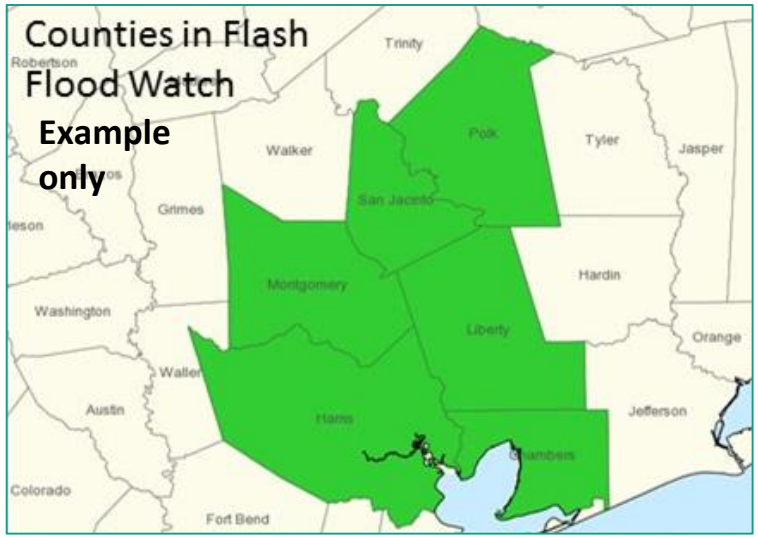
Flooding along a coastline either from high tides or storm surge during a tropical storm or hurricane

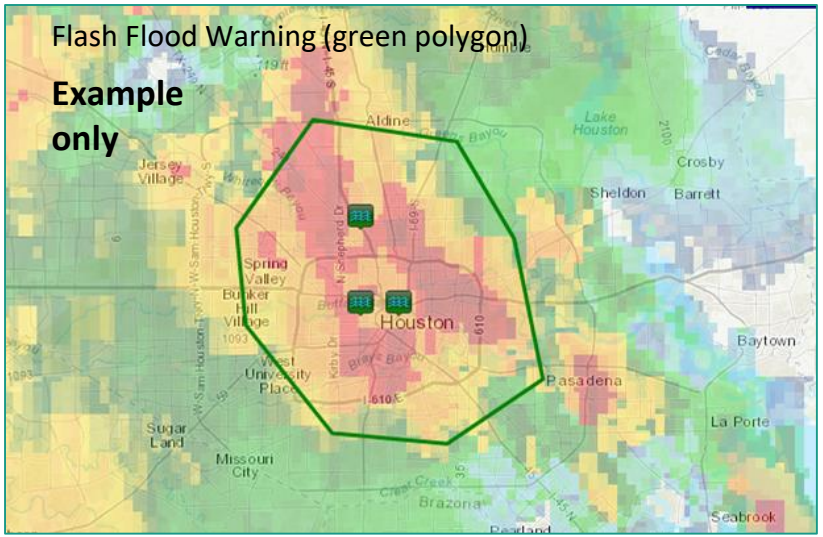
Flood Products

Watch vs Warning

A Watch is issued when conditions are favorable to occur.

A Warning is issued when the threat is *occurring or imminent*, threatening life or property.





Flood vs. Flash Flood

A **Flood** is an overflow of water onto normally dry land likely caused by rising water in a river/bayou or poor drainage. Flooding is a longer term event than flash flooding. It may last days or weeks.

A **Flash Flood** is a flood caused by heavy or excessive rainfall in a short period of time, typically 6 hours or less. Flash floods are defined as:

- ≥ 3 feet of standing water (less if threatening life or property), and/or
- ≥ 6 inches of fast flowing water across a road or bridge, or
- Water in a stream or bayou flowing rapidly out of its banks, or
- A dam break (even on a sunny day)

Understanding Flooding

Urban / Small Stream/Coastal Flood Advisory	*Flood Watch*	*Flash Flood Watch*	*Flood Warning*	*Flash Flood Warning*	*Flash Flood Emergency*
WHAT IS IT? Flooding of small streams, streets and low-lying areas. **WHAT TO DO?** Stay away from areas that are prone to flooding and stay clear of rapidly moving water	**WHAT IS IT?** Flooding is possible – typically within a 6 to 48 hours before rain is expected to reach the area. **WHAT TO DO?** Stay tuned to local river forecasts; prepare for areas near rivers to spread towards nearby roads and buildings	**WHAT IS IT?** Flash flooding is possible –typically 6 to 48 hours before rain is expected to reach the area. **WHAT TO DO?** Have a way to receive local warnings, expect hazardous travel conditions and have alternate routes available	**WHAT IS IT?** Flooding impacts are occurring or imminent. **WHAT TO DO?** Stay ***alert*** for inundated roadways and follow all local signage! Additional impacts include homes and structures could become flooded and need to be evacuated	**WHAT IS IT?** Flash flooding impacts are occurring or imminent. **WHAT TO DO?** Conditions will ***rapidly*** become hazardous! Do not cross flooded roadways or approach inundated areas as water may still be rising	**WHAT IS IT?** Flash flood situation that presents a clear threat to human life due to extremely dangerous flooding conditions **WHAT TO DO?** ***Immediately*** reach higher ground by any means possible

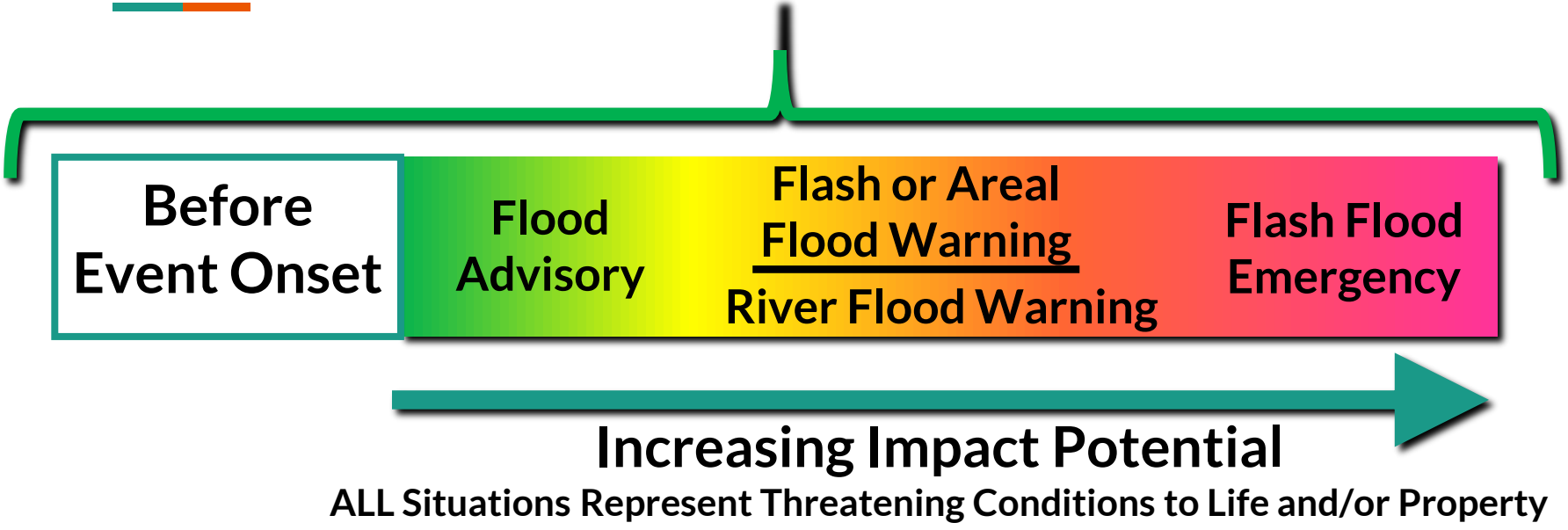
Urban / Small Stream / Coastal Flood Advisory

Flash Flood Warning

Flash Flood Emergency

Flood Warning (Areal/ River/ Coastal)

Flood Timeline



Note: Flooding can (and does) occur without a Flash Flood Watch!

Ways to Receive a Warning

NOAA Weather Radio

Wireless Emergency Alerts and Weather Apps

TV and Radio

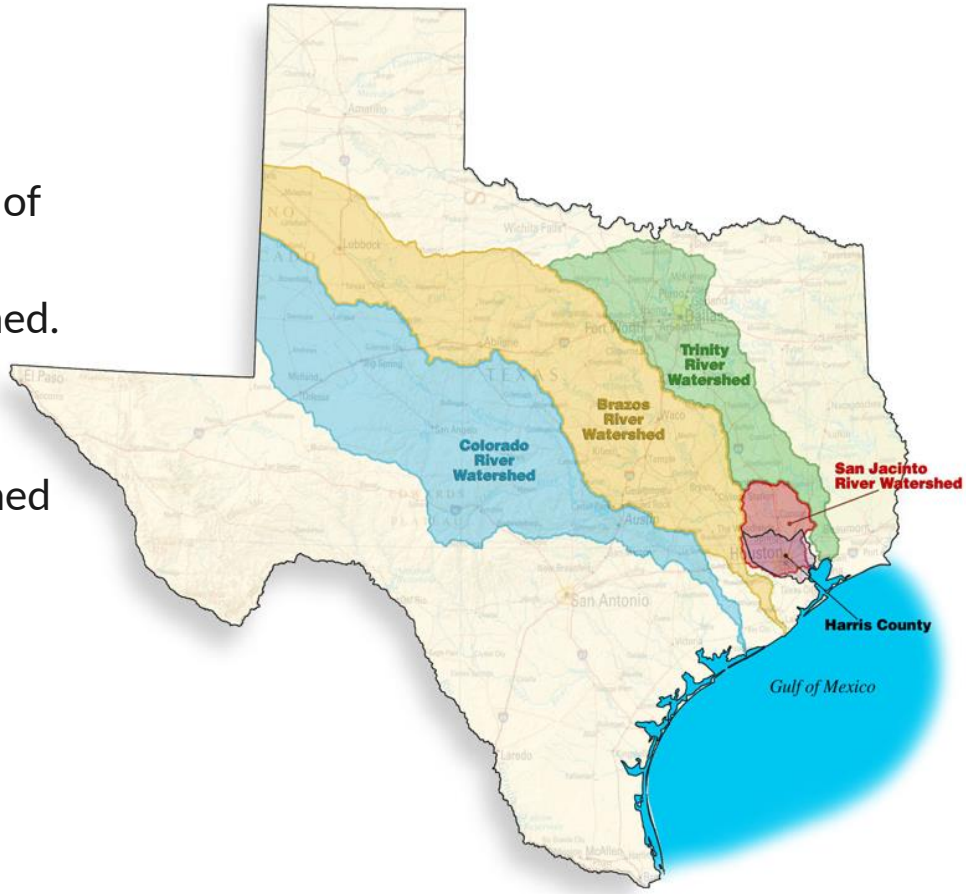
Social Media

NWS Website: https://www.weather.gov/hgx/

River Flooding

Watershed

- A watershed is an area of land that drains runoff from rainfall (stormwater) to a body of water, either a river, bayou, creek, or lake.
- A watershed can flow into another watershed.
- Watersheds vary in shape and size which ultimately lead to unique challenges.
- Topography plays a big role in how watershed boundaries are defined.



Watershed

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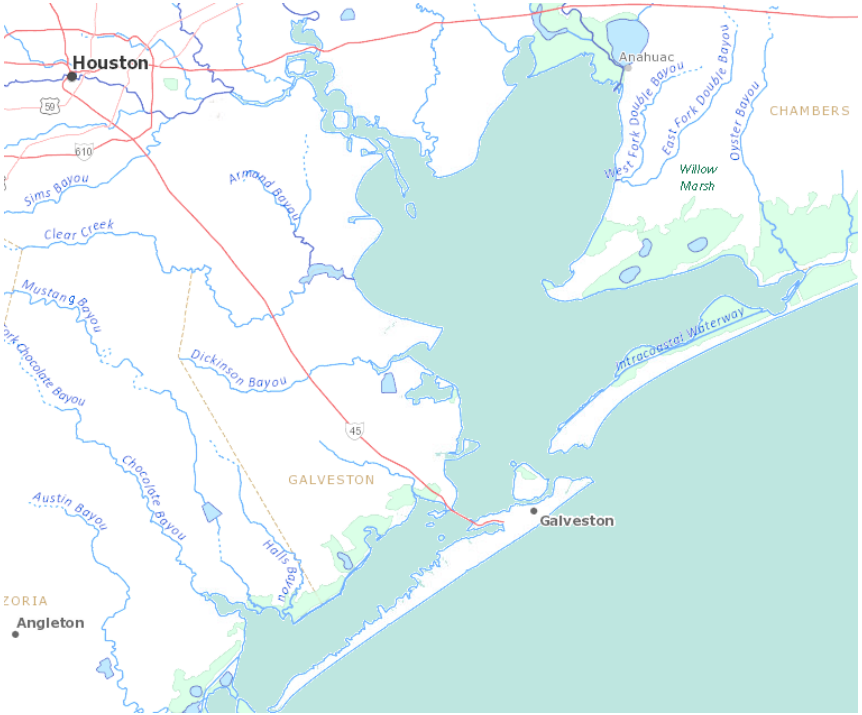
- A watershed can flow into another watershed.
- Watersheds vary in shape and size which ultimately lead to unique challenges.
- Topography plays a big role in how watershed boundaries are defined.
- Galveston County deals with watersheds such as Clear Creek, Dickinson Bayou, and Highland Bayou
- NWS issues site specific river forecasts for 1 site in Galveston County.

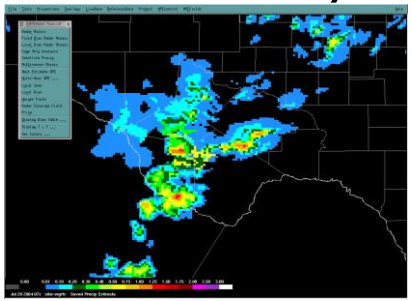


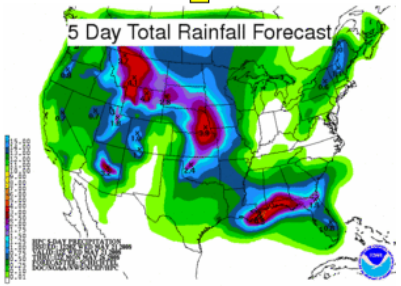
River Flooding

River flooding occurs when water escapes the river banks. There are different thresholds for river flooding: action, minor, moderate, major and record flooding. This image depicts what a river flooding looks like.

River Forecast Process

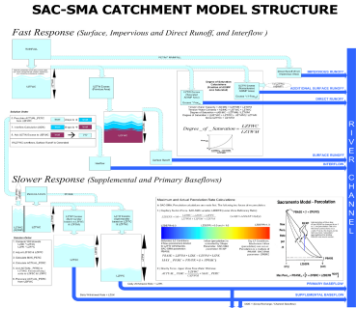
Rainfall Analysis

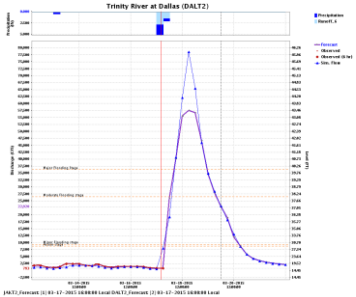




Rainfall estimates and forecasts merged into continuous dataset

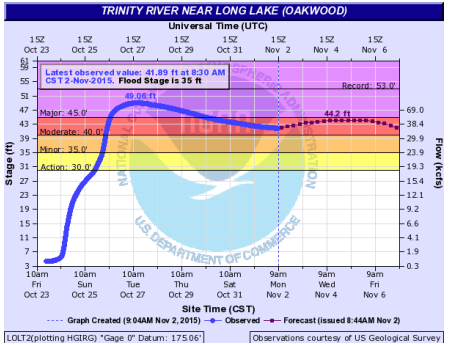
Hydrologic Modeling





Rainfall ingested into hydrologic model. Forecasters adjust model parameters in real time

Forecast



Warning

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FLOOD WARNING
NATIONAL WEATHER SERVICE HOUSTON/GALVESTON, TX
926 PM CDT THU MAY 26 2016

...The National Weather Service in Houston/Galveston has issued a flood warning
for the following rivers...

Brazos River In Richmond affecting the following counties in Texas...Austin
and Fort Bend

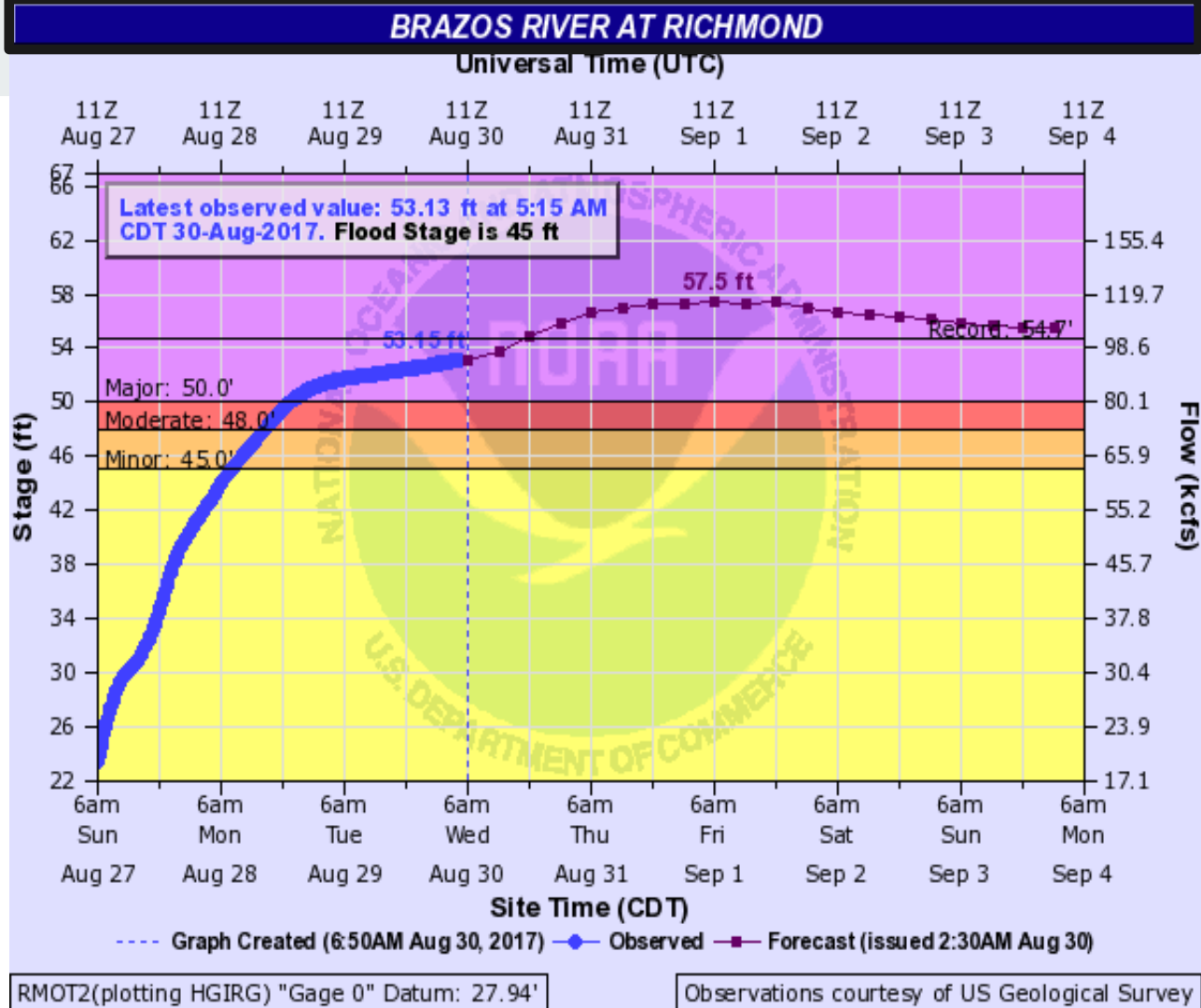
TXC015-039-157-473-271425-
/O.NEW.KHGX.FL.W.0149.160529T0730Z-000000T0000Z/
/RMOT2.1.ER.160529T0730Z.160531T0600Z.000000T0000Z.NO/
926 PM CDT THU MAY 26 2016

The National Weather Service in Houston/Galveston has issued a

* Flood Warning for
  The Brazos River In Richmond.
* from late Saturday night until further notice...or until the warning is
  canceled.
```

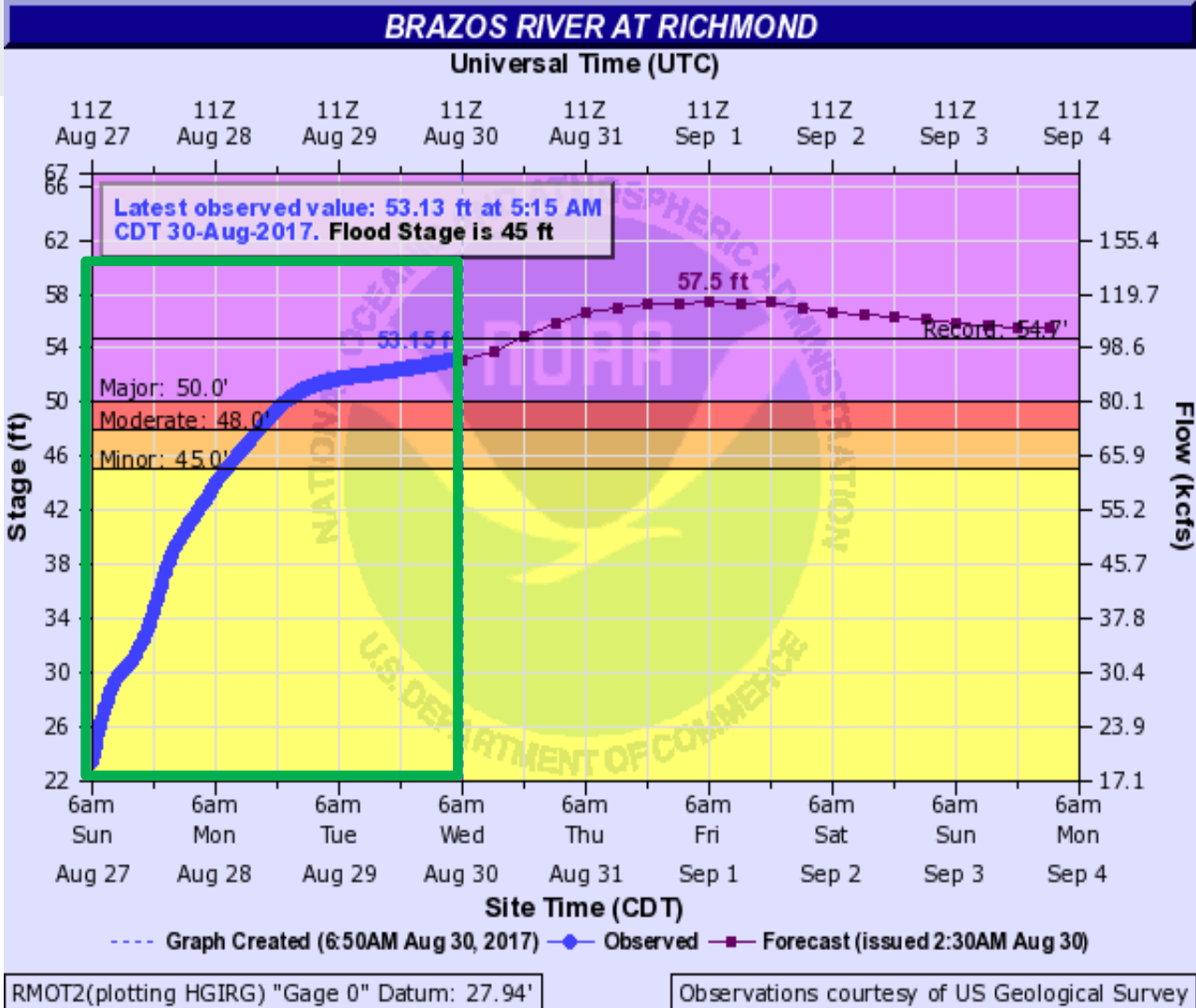
Hydrograph Basics

LOCATION:
Of the gage the forecast is made, AT means the gage is in the limits of the town/city, NEAR or NR means that town/city has the closest post office



Hydrograph Basics

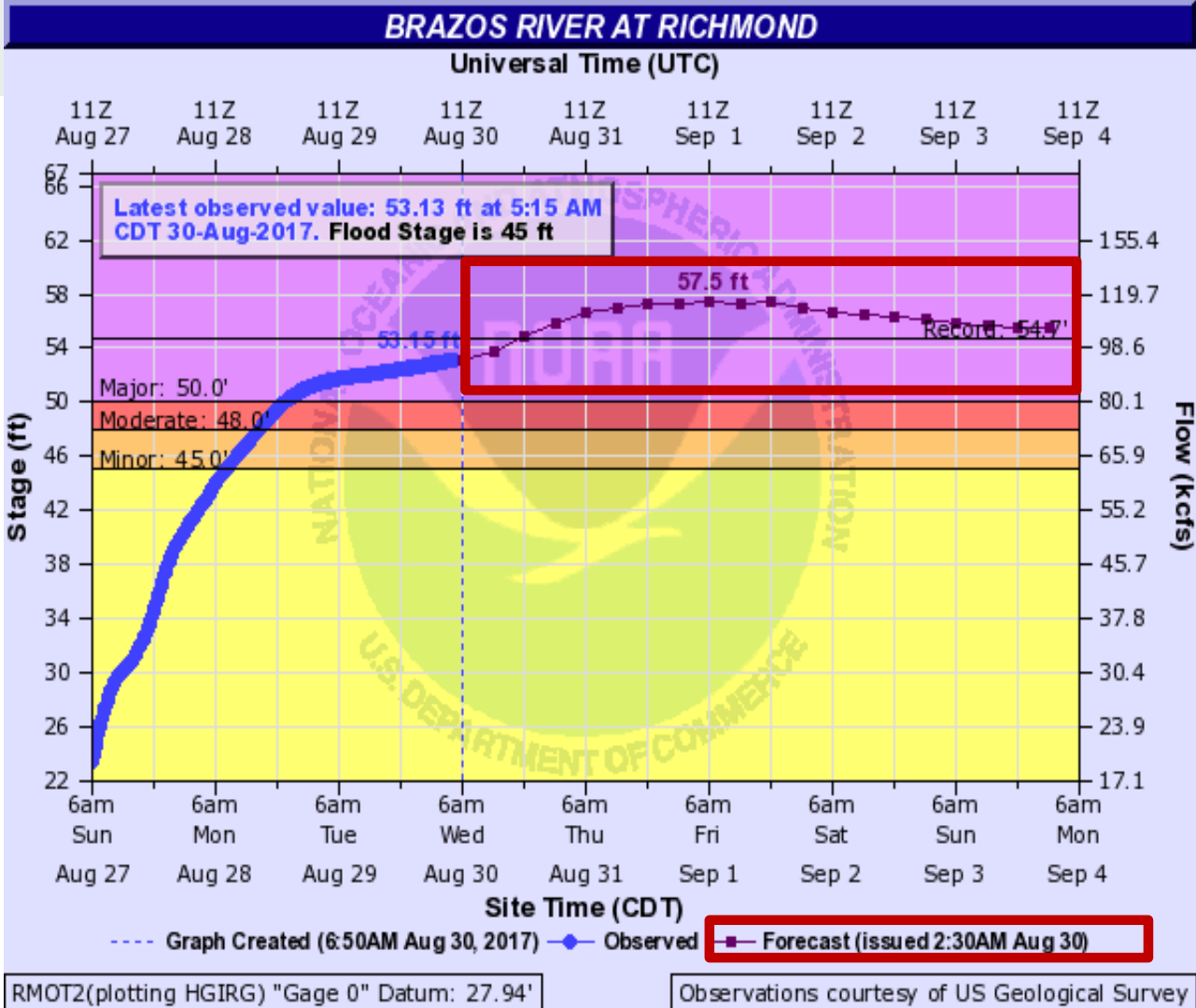
OBSERVATIONS:
Past river stages



Hydrograph Basics

FORECAST:
Forecast River Stages

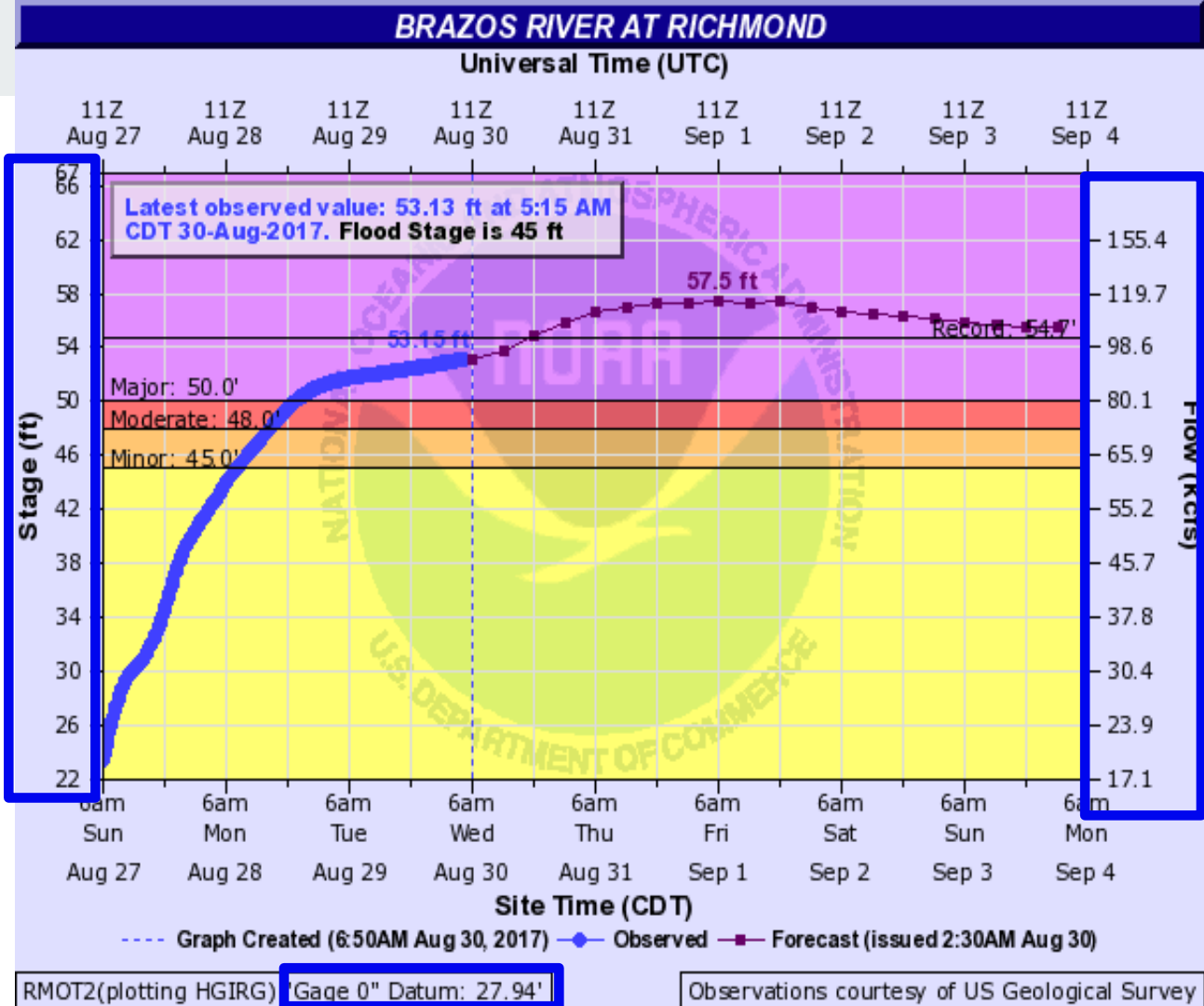
CREST:
Peak Stage



Hydrograph Basics

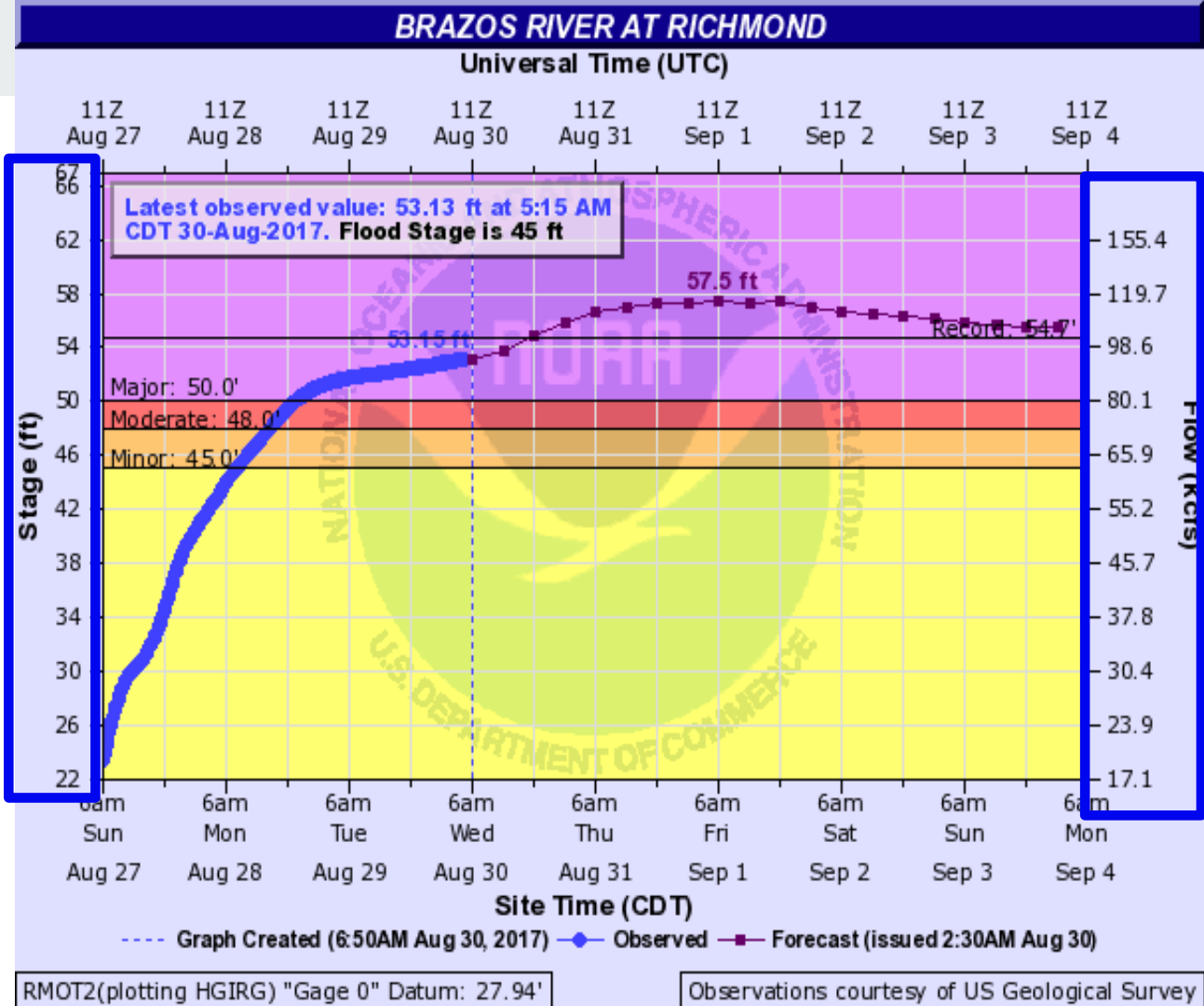
STAGE VS FLOW: Hydrologists, models, reservoirs work in flow. Emergency managers, media, general public work in stage.

What is flow or a cubic foot per second?



Hydrograph Basics

A basketball is roughly a cubic foot, so 20,000cfs is 20,000 basketballs of water passing the gage every second.



Understanding River Criteria Levels

BELOW CRITERIA

Impact: Water is within the banks of the river with no impacts to the surrounding area. Flow speeds may still be high during rainfall or releases which could impact recreational activities

ACTION

Impact: Water is over the banks and into the flood plain, but not a threat to structures or roadways. Some action may be required such as moving farm equipment or increasing awareness

MINOR

Impact: Typically water is impacting areas inside of floodplain which can vary by location. Some low water crossings covered by water, agricultural flooding, water approaching public areas (parks, sidewalks etc.). Areas frequently flooded can expect to be impacted

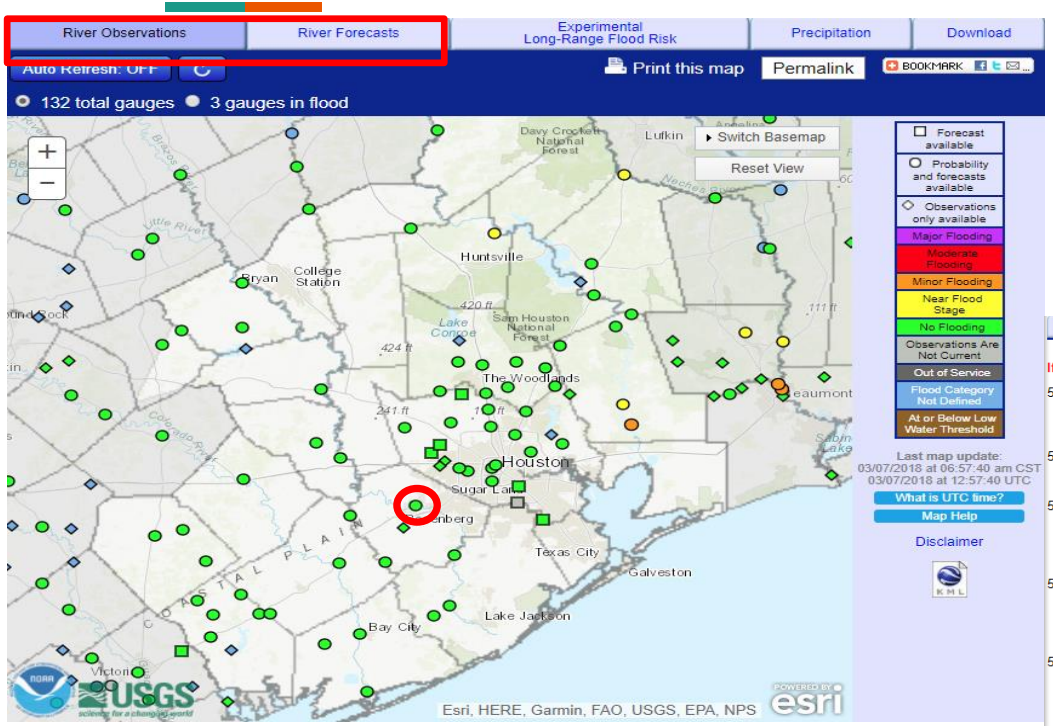
MODERATE

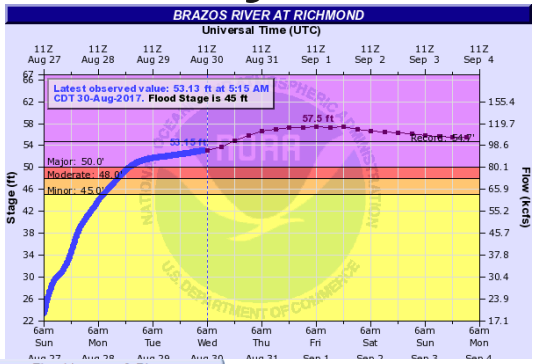
Impact: Water now reaching areas only impacted by significant rain events. Structures can be inundated, several roads covered with water, water may cut off certain areas, widespread agricultural flooding.

MAJOR

Impact: Water is near the highest it's ever been representing rare flooding and significant widespread impacts. Most roads will be covered by water in the area cutting off if not completely flooding subdivisions, rivers can be several miles wide in areas. Homes and structures underwater, bridges inundated and in danger of being hit by debris. Impacts may be greater than ever experienced.

Advanced Hydrologic Prediction System





Flood Categories (in feet)

Major Flood Stage:	50
Moderate Flood Stage:	48
Flood Stage:	45
Action Stage:	20
Low Stage (in feet):	0

Historic Crests

(1) 55.19 ft on 09/01/2017
(2) 54.74 ft on 06/02/2016
(3) 50.30 ft on 10/21/1994
(4) 50.01 ft on 06/03/2015
(5) 49.68 ft on 01/01/1992
Show More Historic Crests

(P): Preliminary values subject to further review.

Recent Crests

(1) 55.19 ft on 09/01/2017
(2) 54.74 ft on 06/02/2016

Flood Impacts & Photos — Collapse

If you notice any errors in the below information, please contact our Webmaster

54.74 Major flooding continues with significant home flooding in the following areas: Valley Lodge near Simonton, Bar Rd, Baker Rd/Cumings Rd/Rio Brazos area north of Rosenberg, Edgewood/Baudet Rd in Richmond, and FM 2759 near Thompsons. Low lying homes in Grand River, Rivers Edge, Pecan Estates in Thompson, and Pecan Bend flood as well.

54 Major flooding continues with US90A eastbound lanes inundated and impassible between Harlem Rd and New Territory. Pitts Rd is impassible between US90A and Savannah Dr.

53 Major lowland flooding continues with FM 359 impassible between US90A and the Pecan Grove levee near Southern Place Dr. The intersection of FM 359 and Mason Rd is impassible. FM 2759 is completely inundated east of Agnes Rd. Street flooding occures along Sienna Parkway between McKeever Rd and Steep Bank Trace. Street flooding occurs along McKeever Rd between Sienna Parkway and SH6. Miller Rd near Arcola is inundated.

52 Major lowland flooding continues with homes near intersection of Sixth St. and Avenue B in Rosenberg beginning to take on water. FM 1489 is inundated south of Simonton to Johnson Rd. FM 723 is inundated north of Rosenberg to FM 359, making the Kingdom Heights and Riverside ranch subdivisions inaccessible. FM 359 between US90A and Pecan Grove begins taking on water. Thompson Ferry Rd south of LJ Parkway is inundated outside of the leveed area.

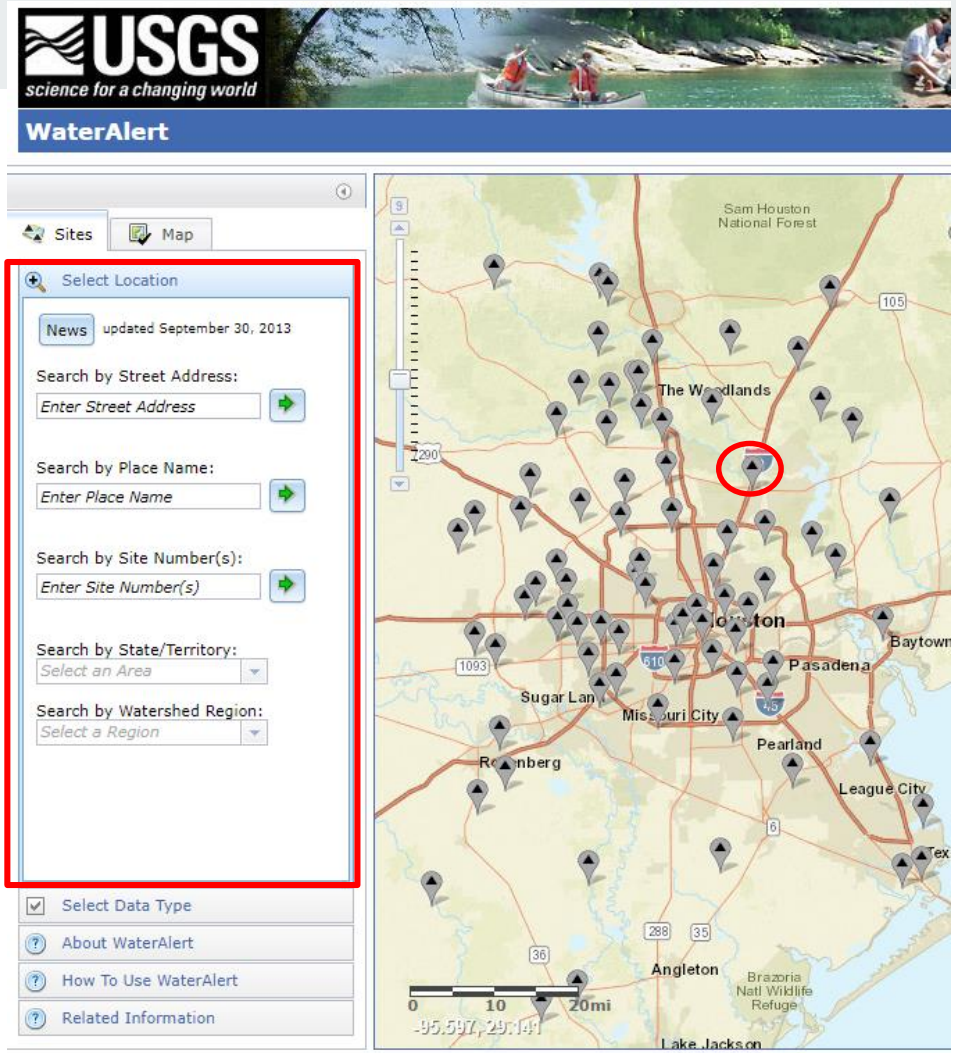
51 Major lowland flooding continues with homes flooding along Cumings/Baker Roads and in Rio Brazos north of Rosenberg. FM 1093 is inundated to Stansberry Rd in Simonton. Underpass at intersection of SH36/90A west of Rosenberg is inundated/impassible. Fort Bend County flood fight operations in Simonton are exceeded and cease. Low lying streets on west side of Quail Valley take on water. Feeder roads along SH6 near intersection of FM 521/McKeever Rd are inundated. Low lying areas along Knights Ct take on water.

50 Major lowland flooding begins as homes in Richmond begin flooding and many homes in Simonton and Thompsons have water in them. FM 1458 near FM 1093 remains inundated and closed. Homes along Carrol and McKeever Roads near FM 2759 in southeast Fort Bend County are close to taking water. Strange Drive...Greenwood Drive...and Second Street in Richmond and Sixth Street...Avenue B...and River Road in Rosenberg and Pittman Road in Thompsons are inundated with over one foot of water.

http://water.weather.gov/ahps2/index.php?wfo=hgx

USGS Water Alerts

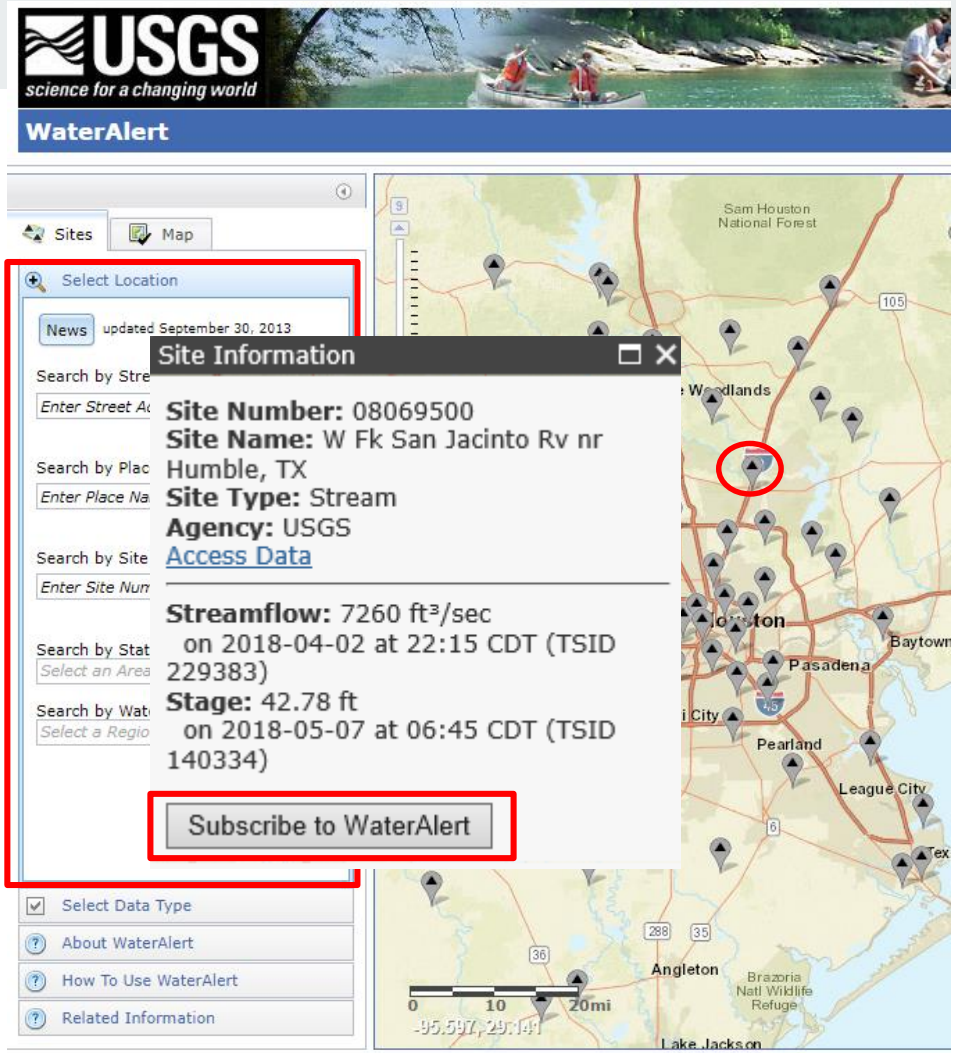
- Set alerts when a gauge reaches certain water surface elevations.
- Identify the gauge nearest you
- Click on the gauge



USGS Water Alerts:
https://maps.waterdata.usgs.gov/mapper/wateralert/

USGS Water Alerts

- Set alerts when a gauge reaches certain water surface elevations.
- Identify the gauge nearest you
- Click on the gauge and select “Subscribe to WaterAlert"



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USGS Water Alerts

- Set alerts when a gauge reaches certain water surface elevations.
- Identify the gauge nearest you
- Click on the gauge and select “Subscribe to WaterAlert"
- Define how you want to receive the information:
  - Email or phone
  - Frequency
  - Stage or Discharge
  - Stream Elevation(s)
- Note: Use Internet Explorer

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:	08069500	
Name:	W Fk San Jacinto Rv nr Humble, TX	
Agency:	USGS	
Transaction ID:	stsCN	
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, in ft3/s	◉	7260 [peak chart]
Gage height, in ft	○	42.78 [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 Disclaimer.

Submit Reset Cancel

Related Information

0 10 20mi

-95.597, 29.144

Natl Wildlife Refuge

Lake Jackson

USGS Water Alerts:
https://maps.waterdata.usgs.gov/mapper/wateralert/

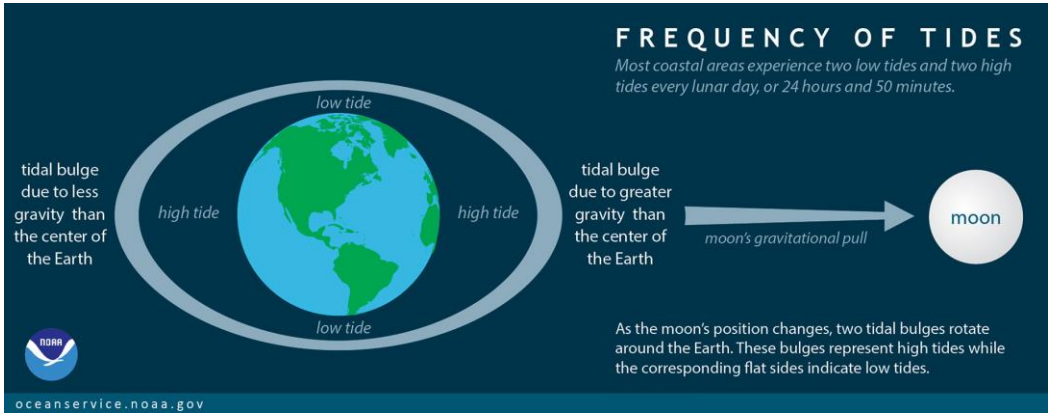
Coastal Flooding

Coastal Flooding

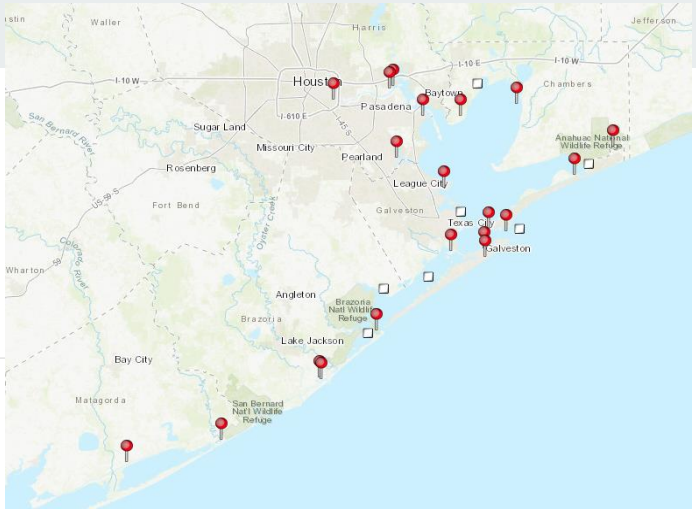
Flooding along a coastline either from high tides or storm surge during a tropical storm or hurricane

Tides

- Tides are waves that move through the oceans in response to the forces exerted by the moon and sun.
- Tides originate in the oceans and progress toward the coastlines where they appear as the regular rise and fall of the sea surface.
- When the highest part, or crest of the wave reaches a particular location, high tide occurs; low tide corresponds to the lowest part of the wave, or its trough.
- The difference in height between the high tide and the low tide is called the tidal range.
- Winds, weather patterns, and coastal characteristics all affect the astronomical tides.

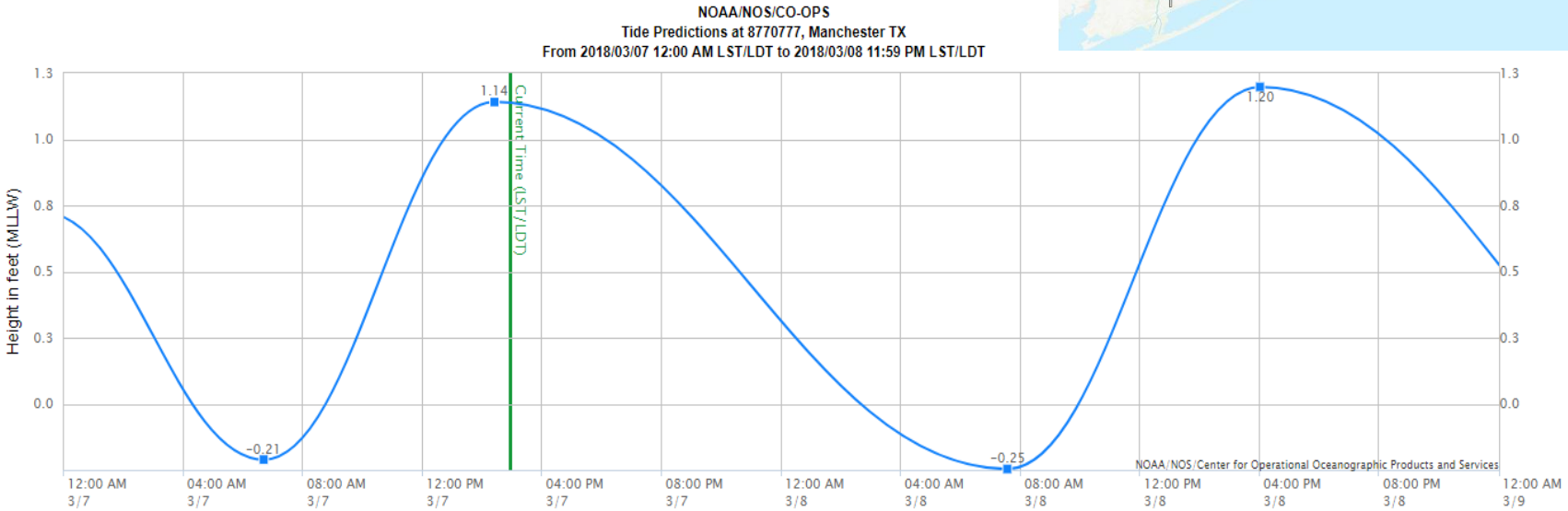


NOAA Tide Predictions

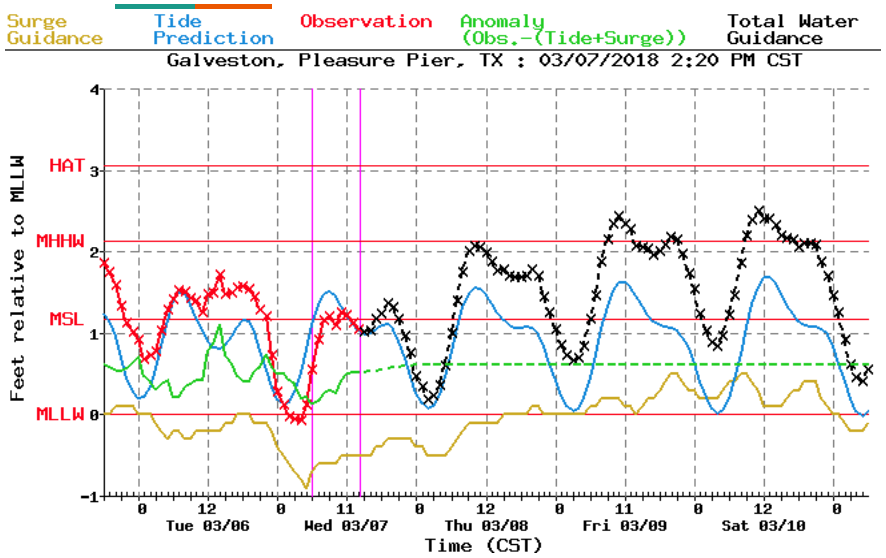


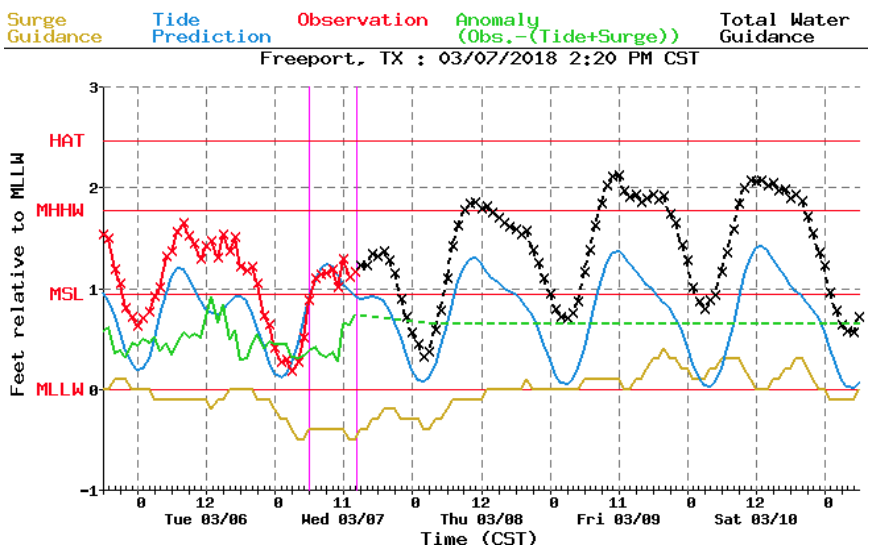
Station Info | Tides/Water Levels | Meteorological Obs. | Phys. Oceanography

Back to Station Listing | Help



Extratropical Water Level Guidance

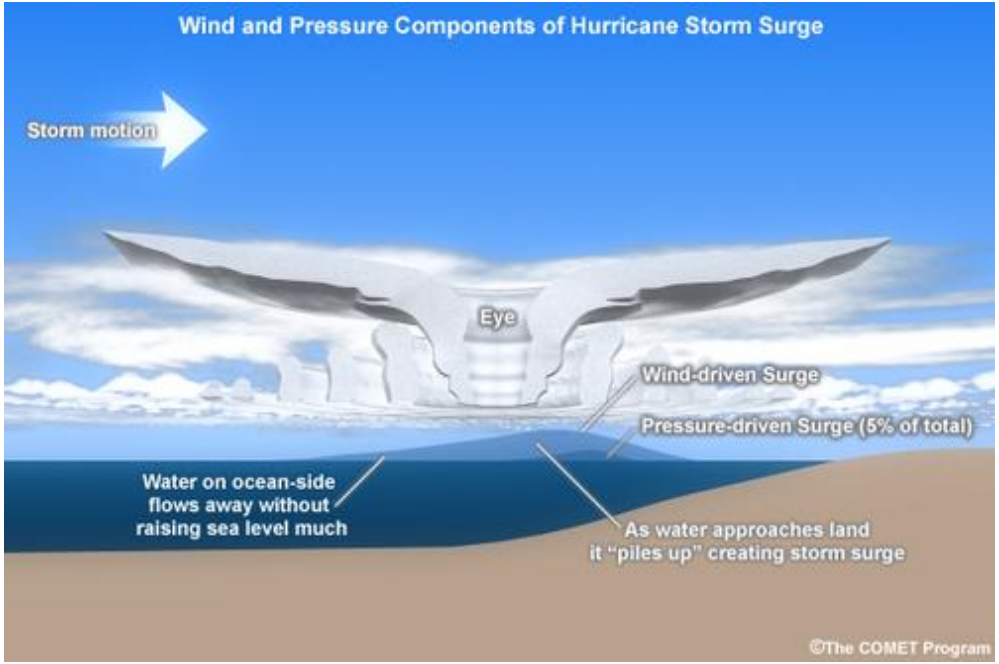




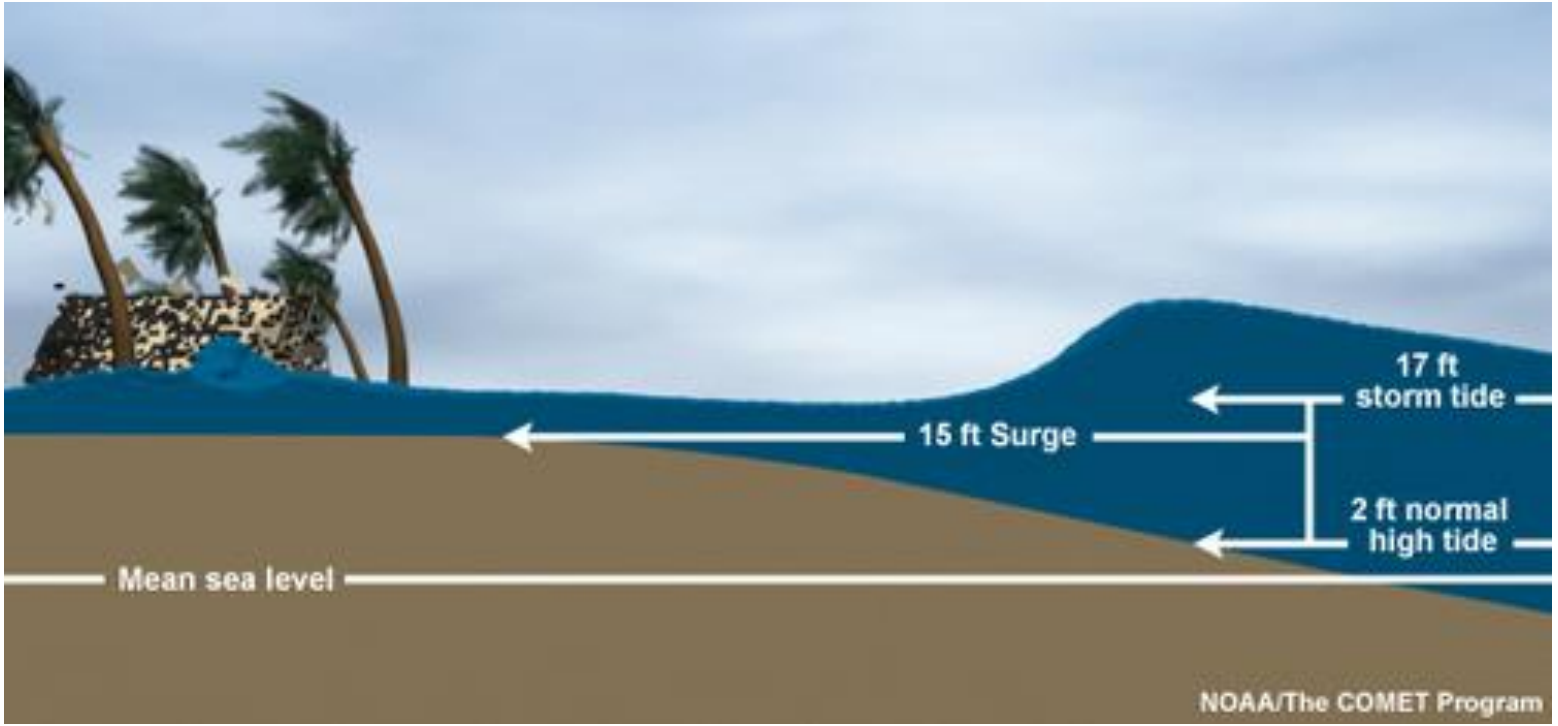
Several data sources are used to produce total water level prediction. Start by calculating the anomaly between observed water levels and predicted tide+surge before the current time. The anomaly is then averaged over 5 days and added to future predictions of the tide+surge for total water level prediction.

Storm Surge

- Storm surge is produced by water being pushed toward the shore by the force of the winds.
- Storm surge is sensitive to the slight changes in storm intensity, forward speed, size, angle of approach to the coast, central pressure, and shape and characteristics of the coast, including the width and slope of the continental shelf.
- Currents created by tides, combined with the waves cause additional damage (i.e. eroding beaches and coastal highways, and weakening building foundations.
- Hurricane Ike in 2008

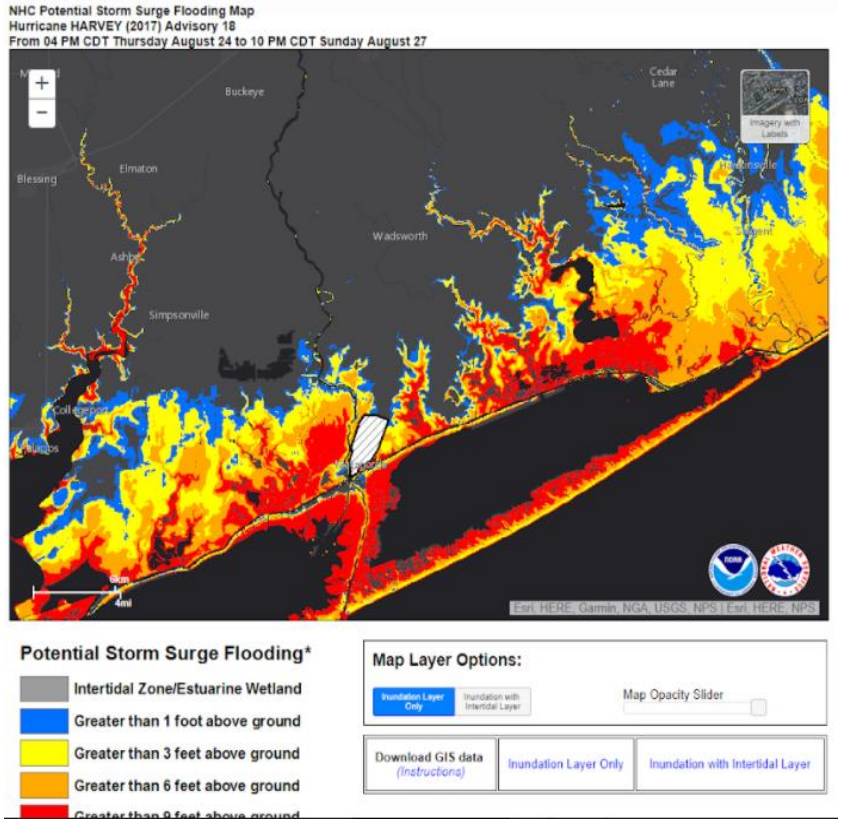


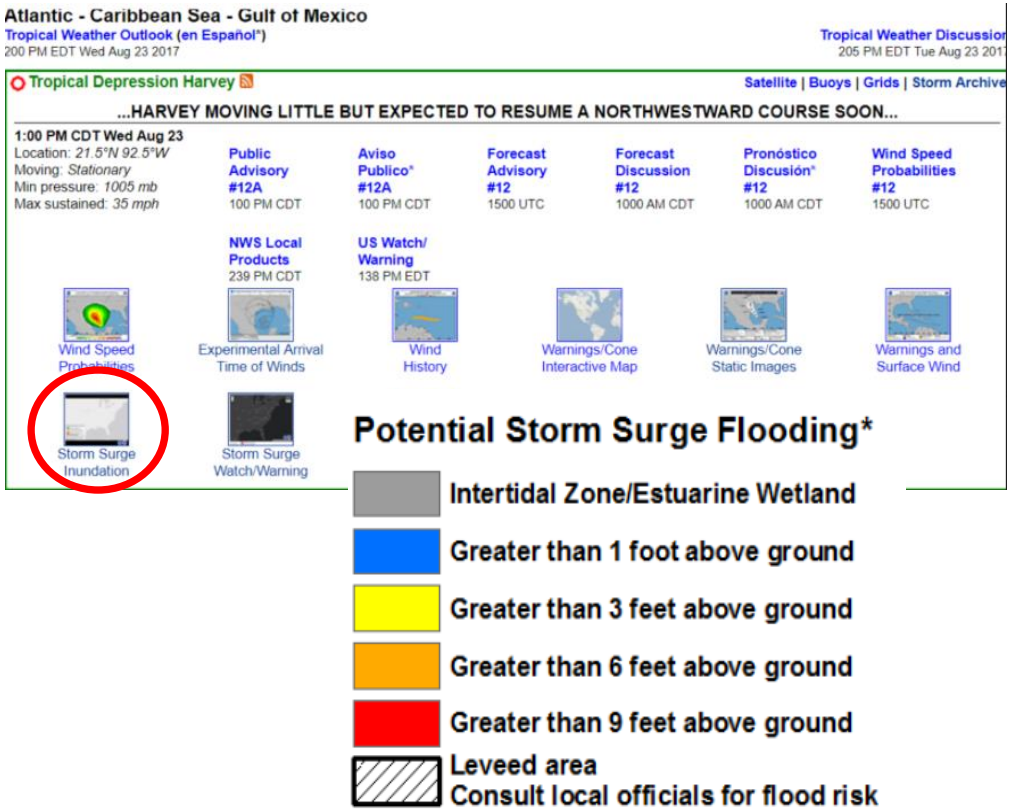
Storm Surge vs Storm Tide



https://www.youtube.com/watch?v=kfjKsfbLitY

Potential Storm Surge Flooding Map

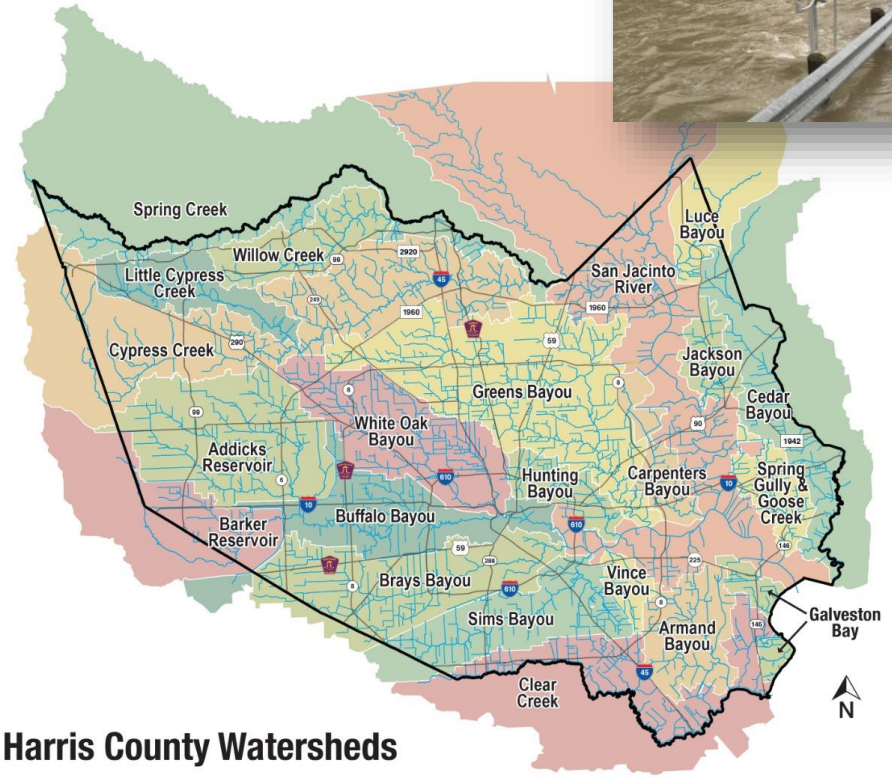




Partners

Harris County Flood Control District

- HCFCD's mission is to provide flood damage reduction projects that work, with appropriate regard for community and natural values.
  - Devise flood damage reduction plans
  - Implement the plans
  - Maintain the infrastructure
- Flood Warning System
- Public Website: www.harriscountyfws.org



HELP

MAP VIEW OPTIONS

- Watersheds
- Channels
- Inundation Map
- 0.00 Rainfall
- Channel Status

Mouse over map label for more information

RAINFALL DATA

Current | Historical

Rainfall in the last 24 Hours

Refresh Data

GAGE SELECTIONS

Gages by Agency: ALL

Gage by Location: (Select Gage)

ADDRESS SEARCH

Find

e.g. 9900 Northwest Fwy., Houston 77092

Clear Search

An interactive map of the Harris County Flood Control District

Disclaimer

Showing rainfall for the last 24 Hours (before 10/10/2018 10:37 AM CDT)

Road

HELP

MAP VIEW OPTIONS

- Watersheds
- Channels
- Inundation Map
- 0.00 Rainfall
- Channel Status
  - Channel Status not Defined
  - Water in Bank
  - Near Top of Bank
  - Out of Bank

Mouse over map label for more information

SURFACE LEVEL DATA

Current | Historical

Showing the latest surface levels
Refresh Data

GAGE SELECTIONS

Gages by Agency
ALL

Gage by Location
(Select Gage)

ADDRESS SEARCH

Find

e.g. 9900 Northwest Fwy., Houston 77092

Clear Search

An interactive map of the Harris County Flood Control District

Disclaimer

Showing channel status at 10/10/2018 10:37 AM CDT

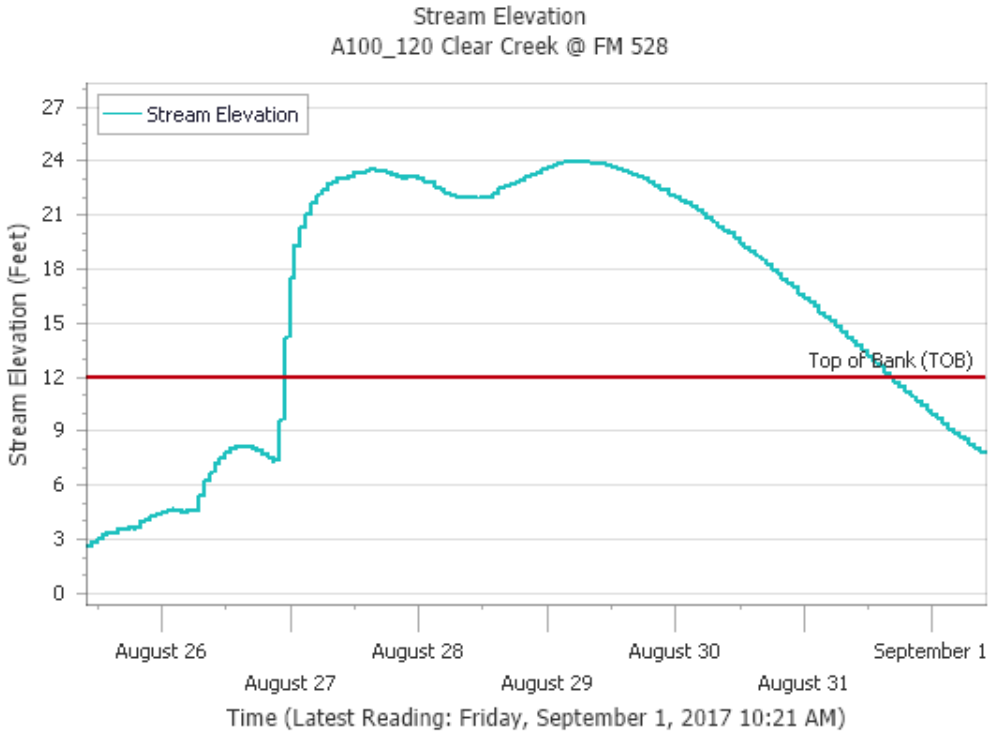
Road

Hudson, Sheldon, Fannett, Hankamer, Winnie, Stowell, Brookshire, Anahuac, BELTWAY, Sabine Pass, Mission Bend, Pecan Grove, Wallis, Trinity Bay, Oak Island, Tavener, Rosenberg, Fresno, Galveston Bay, High Island, Bacliff, East Bay, Caplen, Bowell Point, Pleak, Manvel, Dickinson, Goat Island, Needville, Alvin, Texas City, Santa Fe, La Marque, Hitchcock, Cochridge, Chocolate Bayou, Newgulf, Danbury, Lane City, Danciger, Angleton, Magnet, West Bay, Mims, Mud Island, Sweeny, Brazoria, Lake Jackson, Van Vleck, Clute

Bing

5 miles 10 km

Flood Warning System



Flood Frequency	Elevation
10% (10-year)	17.50'
2% (50-year)	20.10'
1% (100-year)	21.00'
.2% (500-year)	23.10'

Date	Event	Elevation
6/20/1973		16.88'
9/20/1979		18.48'
5/3/1981		13.78'
8/18/1983	Alicia	14.38'
8/1/1989	Chantal	18.78'
10/18/1994		15.98'
6/9/2001	Allison	18.28'
10/16/2006		15.40'
8/16/2007	Erin	7.20'
4/18/2009		14.80'
8/27/2017	Harvey	24.20'

High water mark elevations are approximate.

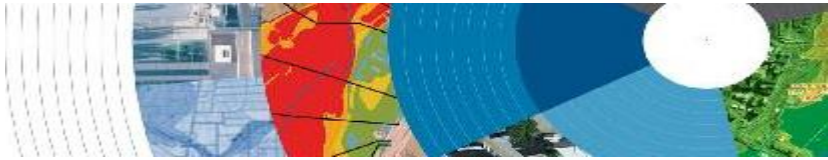
Flood Risk

FEMA

FEMA

FloodWarn Workshop

Topics



- What is Flood Risk?
- Flood Hazard Mapping and FIRMs
- NFIP – National Flood Insurance Program.

FEMA

Flood Risk?

Any situation involving exposure to a Flood danger, harm or loss.

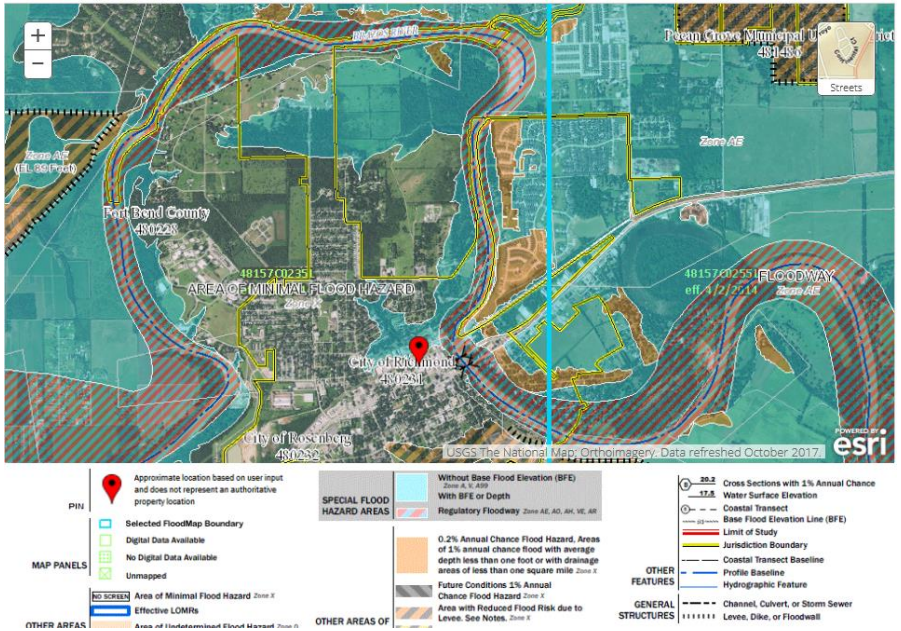
"While levees can help reduce flood risk…they do not eliminate the risk."

FEMA

What is a FIRM?

Flood Insurance **Rate** Map

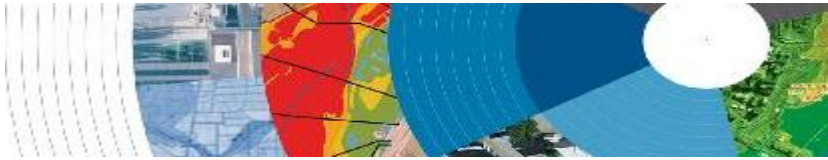
- Identifies the Special Flood Hazard Area (SFHA) and Non-SFHA's
- Used for rating flood insurance policies
- Mandatory purchase requirement if property is in SHFA **AND** is a federally backed mortgage.



FIRM's show Coastal and Riverine flood risk.

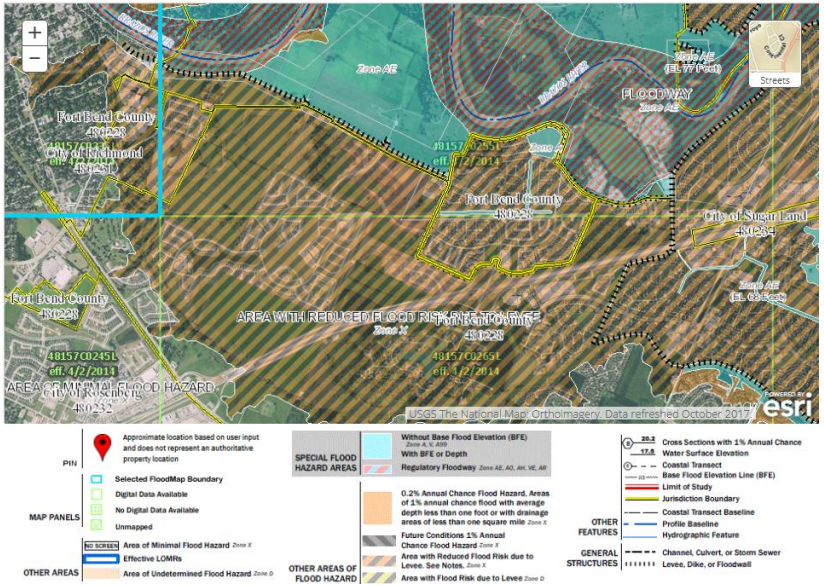
FEMA

What is a Flood Zone?



Zones on a FIRM:

- SFHA (high risk)
  - A, AE, AO, AH, VE, V etc. (Aqua)
    - 1% annual chance flood
    - 26% chance of flooding in a 30-yr mortgage
- Non-SFHA (low to moderate risk)
  - B, C and X (Shaded – orange or gray color & non-Shaded)
    - Orange/Gray area – outlines areas protected by Levees
    - Even the non-shaded is a flood zone – a minimal risk.



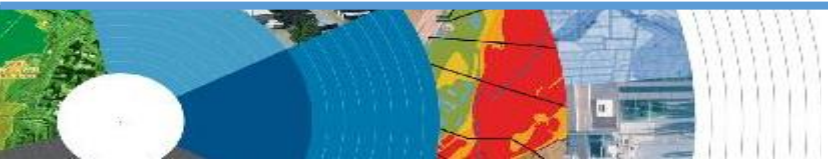
Find your zone at https://msc.fema.gov/portal

FEMA

Flood Hazard Mapping

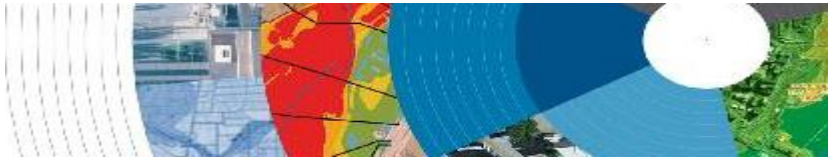
- The maps are **NOT** a prediction or forecast.
- Flood waters are not confined to the at the 1% risk line (aka 100yr flood) on the FIRM.

"Yes, this is a beautiful river. But it wasn't here when we purchased the land. Maybe we should've checked to see if it was in a flood zone before investing in it."

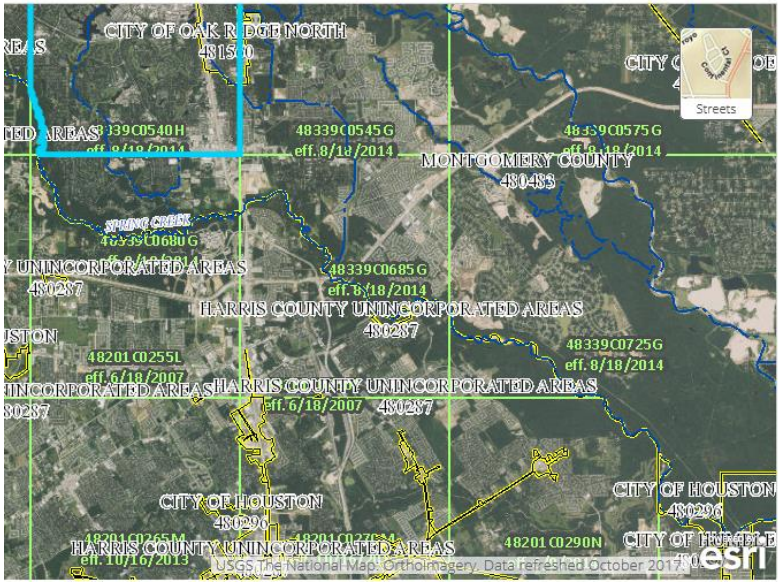


FEMA

Flood Hazard Mapping

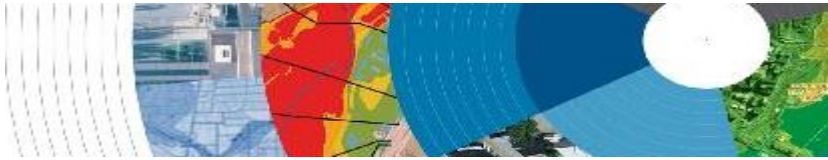


- FIRMs are subdivided by panels to cover a jurisdictional boundary (each has a unique panel number.)
  - Each panel has a specific code and effective date. (effective date
- FIRMs are a single snapshot for one scenario.



FEMA

Flood Hazard Mapping



- Assumptions are made in the river modeling
  - Precipitation input the 100 year/24 hr. design storm *(actual events rain intensities vary - not consistent rate over a 24 hr. period.)*
  - Assumptions about the vegetation in the flood plain – do NOT differentiate dead vs growing vegetation (increased friction during growing season)
  - Snapshot of land use when the models were developed – a challenge in rapidly developing areas
- One event is never the same as another, FIRMs will not exactly match an individual event.

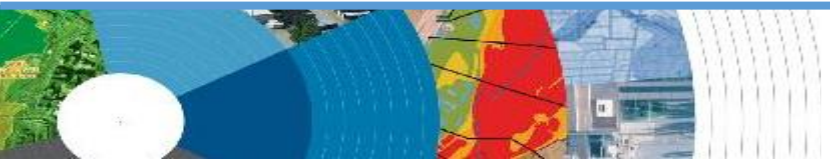
FEMA

Misconception: Only 100yr Floodplain is at Risk

- **Misconception:**

  "I don't live in a flood zone."

- **Facts:**
  - Floods are the #1 natural disaster in the United States.
  - If it can rain, it can flood.
  - FIRMs do not show localized flooding from drainage ditches/sewers/road ponding.
  - To some degree overland flooding…but not property to property drainage problems.



FEMA

Misconception: Homeowners Insurance is Enough

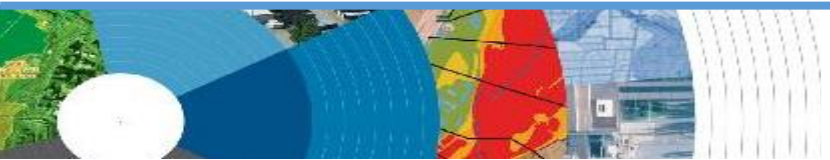
- **Misconception:**

  "I'm already covered—my homeowners policy covers flooding."

- **Fact:**

  Most insurance policies do not cover flooding; only flood insurance covers flood damage.

  Renters and Business owners should also consider flood insurance for contents.



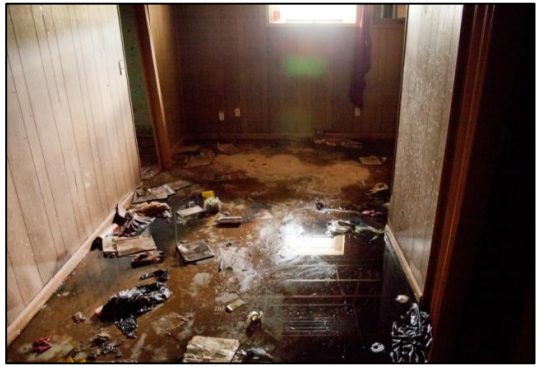
FEMA

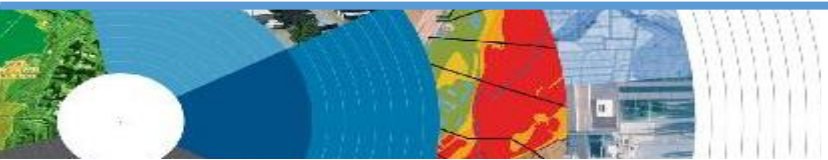
Flood Insurance

A tool for individuals to manage risk.

- Everyone is at risk for flooding.
  - *For most events 26% of NFIP claims are outside the SHFA.*
- A few inches can cause tens of thousands in damage.
- If you mortgage company “forced” you to buy flood insurance, check that structure and CONTENTS are covered. Most cover structure only.

NATIONAL FLOOD INSURANCE PROGRAM





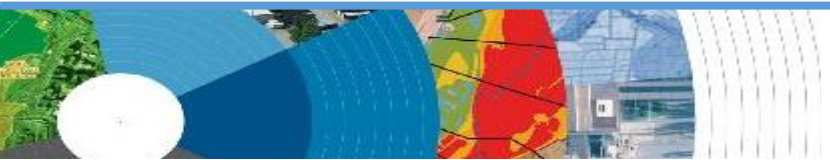
FEMA

A Flood Defined (NFIP)

What Is Covered

Inundation of 2 or more acres of normally dry land or of two or more properties (one of which is your property) from:

- Overflow of inland or tidal waters;
- Unusual, rapid accumulation or runoff of surface waters from *any source*;
- Mudflow; or
- Collapse or sinking of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated levels that result in a flood.



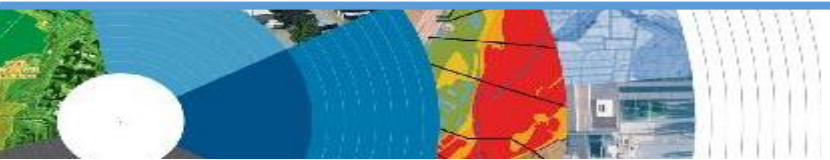
FEMA

NFIP Flood Insurance Facts

- **Structure Coverage**
  - Replacement Cost on single-family, primary residence (structure) if insured to at least 80% of replacement cost.
  - Max coverage $250,000

- **Contents coverage**
  - Contents is an optional addition, except for Preferred Risk Policy.
  - Max coverage $100,000 coverage for Actual Cash Value (depreciation applies.)

- **Wait Period**
  - Typically - 30-days from purchase until effective.
  - Exceptions:
    - Flood Insurance required by a federally regulated and insured lender—0 days.
    - Wildfire 30-day waiting period exception—0 days.
    - Initial purchase of flood insurance as the result of a map revision—1 day.

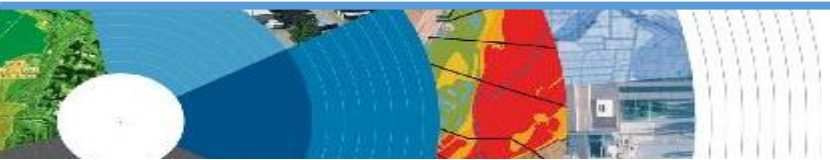


FEMA

Cost of Flood Damage?

2,500 sqft, one-story home with possessions worth $50,000

Interior Water Depth (Inches)	Cost to Home	Cost to Personal Property	Combined Loss Potential
1"	$23,635	$3,172	$26,807
2"	$23,720	$3,172	$26,892
3"	$24,370	$4,917	$29,287
4"	$31,345	$7,207	$38,552
5"	$31,425	$13,914	$45,339
6"	$37,260	$14,777	$52,037
7"	$37,691	$17,700	$55,391
8"	$38,122	$20,624	$58,746
9"	$38,553	$23,547	$62,100
10"	$38,983	$26,470	$65,453
11"	$39,414	$29,394	$68,808
12"	$39,845	$32,317	$72,162
24"	$44,325	$43,001	$87,326
36"	$47,905	$46,633	$94,538
48"	$53,355	$50,000	$103,355



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Structure Elevation Impact Insurance Rates

High Risk = $$$

Medium Risk = $$

Lower Risk = $

The elevation is just one factor, others include: when was the structure, has it flooded in the past, etc.

EVERY Structure has a risk…

generally the higher the structure the less the risk.

EMA

Group Flood Insurance Policy (GFIP)

IF in the 1% risk area (100yr floodplain)

AND received FEMA Individual Assistance(IA),

A GFIP policy was purchased

(if they did not have flood insurance.)

GFIP is a 3 yr. abridged Flood Insurance Policy. The policy is paid for from the IA funds.

You can purchase the standard NFIP policy to increase your coverage. *(GFIP cancels)*

Group Flood Insurance Policy (GFIP)

FEMA Group Flood Insurance Policy
Making Survivors More Resilient

Requirement *- property owner MUST purchase and maintain a traditional NFIP policy when GFIP expires.*

If not…they are not eligible for IA that would cover the replacement of real or personal property for the damaged location with a future event.

The insurance requirement is forever – including new homeowners.

FEMA

Harvey Numbers

Insurance claims

- Harris Co (includes cities such as Houston) – all claims 55,570**
- Galveston County (unincorporated only) – 371 (Losses over 125K)

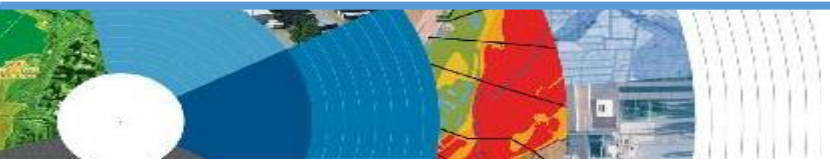
New GFIP's Due to Harvey

- Galveston –107

Harris County Numbers**

- 154,170 Homes 48,850 in 1% Risk Area (100-yr)
- 34,970 in 0.2% (500-yr) floodplain
- **68% OUTSIDE of the 1% Risk Area.**

**Data HCFCD Finale Hurricane Harvey Storm and Flood Information – https://www.hcfcd.org/media/2678/immediate-flood-report-final-hurricane-harvey-2017.pdf



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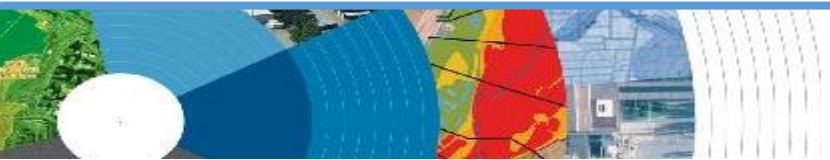
Summary

- Living in Texas means we have a flood risk even with heavy rain.
  - Tax Day 2016 and Memorial Day 2015 – not with a tropical system
- Flood Risk is from multiple sources.
  - FIRMs focus on river flooding and some overland flow.
- Flood insurance allows individual property owners to manage their risk.
  - **Buy policies that cover the structure AND contents**.



FEMA

Contact Information

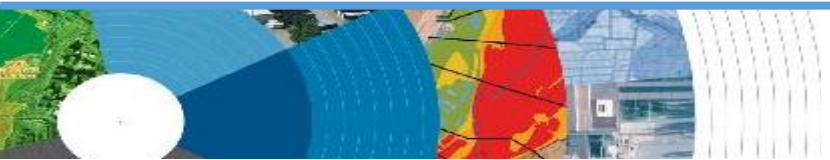
NFIP Hotline
1-800-427-4661
www.fema.gov/nfip

Angela Harrison, Insurance
Cell 470-557-2794 | Angela.Harrison@fema.dhs.gov

Yho-Meka Conway, Insurance
Cell 470-572-0803 | Yho-Meka.Conway@fema.dhs.gov

Lauren Schmied, PE, Floodplain Management
Cell 202-812-6164 | Lauren.Schmied@fema.dhs.gov

Larry Fordham ANFI, CFM, ACA
Acting Senior Regional Insurance Specialist, FEMA Region 6
Phone: 940-383-7253 | Cell: 202-394-4483
|Larry.Fordham@fema.dhs.gov

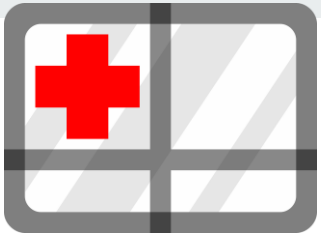


FEMA

Flood Safety

What to do before, during, and after a flood?

Safety Before a Flood



- Prepare a family disaster plan.
- Check if your insurance covers flood damages. If not, get flood insurance.
- Keep insurance and other important documents, such as copies of driver's licenses and credit cards, and other valuable items, in a safe location.
- Assemble a disaster supplies kit. Be sure to include prescription medications, food, and water.
- Find out where you can go if ordered to evacuate.
- Arrange to keep in contact with relatives and friends.
- Know your resources.

Knowing what to do when a flood occurs will increase your family’s safety and possibly its survival.

Safety During a Flash Flood

- Turn around, don’t drown when encountering flooded roads.
- Be especially cautious at night when it is harder to recognize the dangers of flooding.
- Stay away or be swept away. River banks and culverts can become unstable and unsafe.
- You should monitor the latest forecasts and be prepared to take action should additional Flash Flood Warnings be issued.
- Have multiple ways to receive weather information (cell phone, NOAA weather radio, television, etc.)

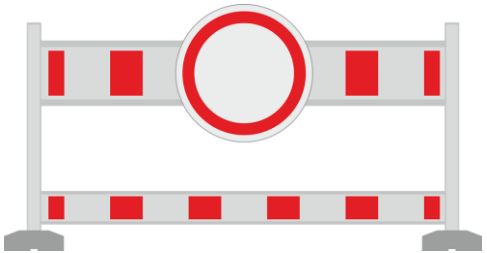
Turn Around, Don't Drown!

- Most flood deaths occur in vehicles.
- It only takes six inches of water for a vehicle to lose contact with the road surface.
- Most vehicles can be swept away in just 18 to 24 inches of water!
- Flooded roads may have hidden dangers, such as washed out road beds or underwater obstructions.
- If your vehicle is caught in rising water, leave it immediately and seek higher ground.

Minnesota road damaged by flood waters, courtesy of FEMA.

Safety During a Flood

- Have multiple ways to receive weather information (cell phone, NOAA weather radio, television, etc.)
- Do not sightsee!
- Evacuations are ongoing and first responders are working hard to get people to safety. Do not get in their way!
- Flood waters from creeks, bayous and rivers will be swiftly moving. *Do not go near the flood waters!* They will sweep you away if you go in the water.
- Roads may still be closed as they could be damaged or still under water. Barricades are for your protection; do not drive around them!



Safety During a Flood

- Stay out of the flood waters!
- Floodwaters can contain chemicals, sewage, disease, and animals
- Unseen underwater debris can be sharp and cause injury
- Downed power lines under the water could lead to death or injury from electrocution
- Water depth can change unexpectedly (storm drains, washed-out roads)

Safety After a Flood

- Don’t put yourself in danger.
- Return home only when authorities indicate it is safe.
- Stay away from damaged areas unless your assistance has been specifically requested by police, fire, or a relief organization.
- Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations.

weather.gov/flood

Safety After a Flood

- Don’t leave lit candles unattended
- Cut power to flooded areas of your home
- Only use generators in well-ventilated areas—never in a closed garage!
- Take breaks and drink plenty of fluids
- Do not use power tools while standing in water
- If you smell or hear gas, call the Fire Department.

Reporting/Wrap Up

What to Report

Flash Flooding

- Underpasses filling with water
- Impassible roadways
- Any fast-moving water greater than 6 inches in depth

Any River or Bayou Flooding

Flooding, Washington County (2016)

Formatting Reports

Reports should include the following information:

WHO is calling

WHERE the flooding is located

WHAT type of flooding is occurring (flash, river, or bayou)

WHEN the flooding occurred (is it ongoing?)

HOW deep is the water (if you can *safely* evaluate this)

The Good

"I'm a storm spotter located in Sealy at the intersection of Meyer and FM 2187. Water is flowing over curbs; it's at least 6-8 inches deep in some locations on the road."

The Bad

"Hey, we got some flooding here a few minutes ago!"

The Ugly

"My sister-in-law said the bayou got really closer to her house, did you have a warning out for that?"

How to Report

Call us!

Spotter line: 1-800-846-1828

Report via amateur radio

Call sign WX5HGX

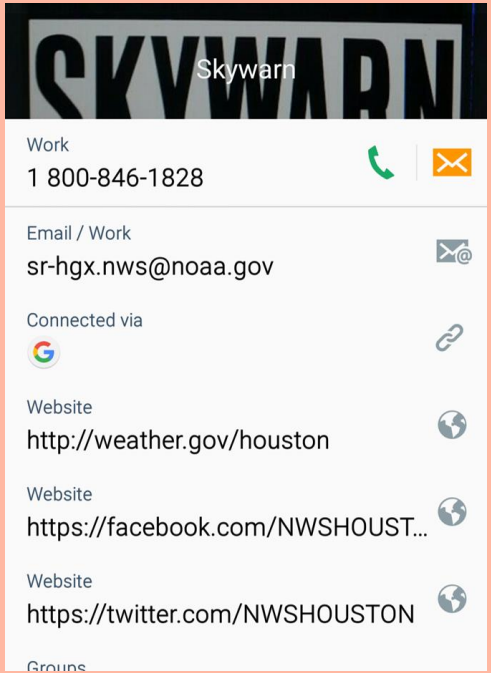
Email

sr-hgx.nws@noaa.gov

Social Media

Twitter: @NWSHouston

Facebook: NWSHouston



Spotter Tip

Set up SKYWARN as a contact in your smartphone

Questions

Katie Landry-Guyton
NWS Houston/Galveston
Senior Service Hydrologist
Katie.landry@noaa.gov

Links

- NWS Houston/Galveston: https://www.weather.gov/hgx/
- West Gulf River Forecast Center: https://www.weather.gov/wgrfc/
- Advanced Hydrologic Prediction Center: https://water.weather.gov/ahps2/index.php?wfo=HGX
- National Hurricane Center: https://www.nhc.noaa.gov/
- NOAA Tides Predictions: https://tidesandcurrents.noaa.gov/tide_predictions.html?gid=1413#listing
- Extratropical Surge Guidance: https://slosh.nws.noaa.gov/etsurge/
- Harris County Flood Control District Flood Warning System: https://www.harriscountyfws.org/
- FEMA Flood Map Service Center: https://msc.fema.gov/portal/home
- USGS Water Alerts: https://maps.waterdata.usgs.gov/mapper/wateralert/
- NWS Flood Safety: https://www.weather.gov/safety/flood