

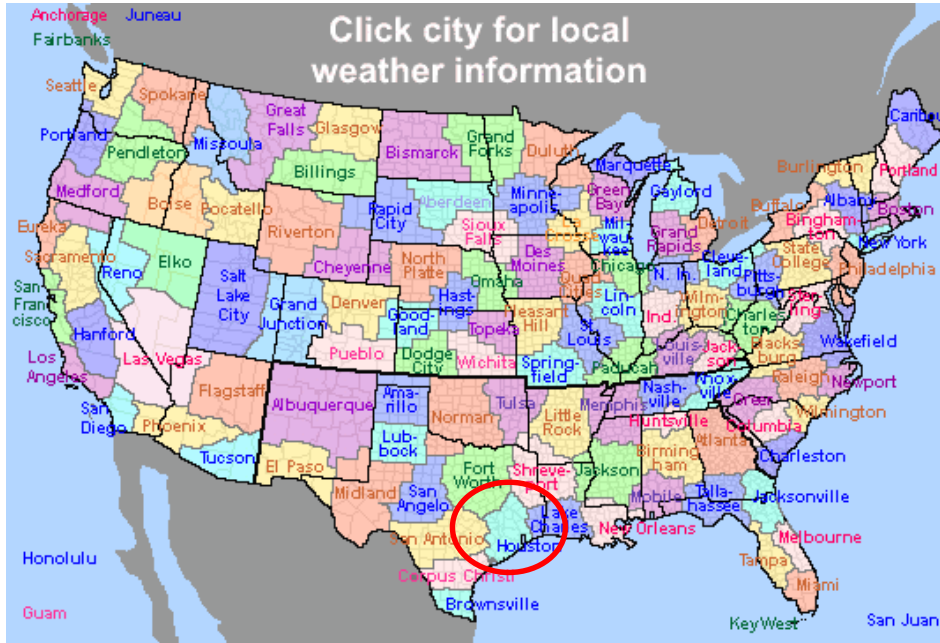


# 2019 FloodAware Training

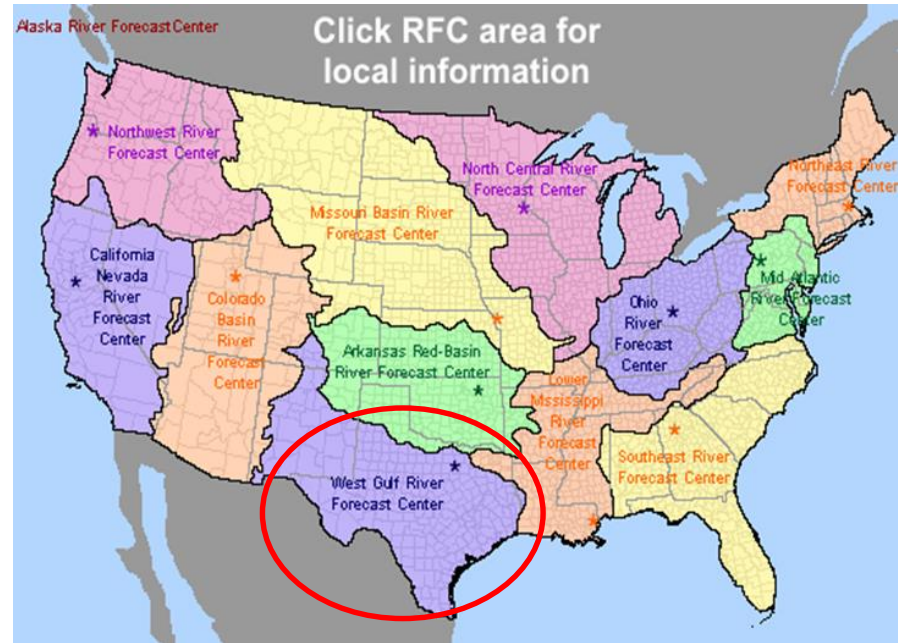
Katie Landry-Guyton  
Senior Service Hydrologist/Meteorologist  
National Weather Service- Houston/Galveston, TX

# National Weather Service

## Weather Forecast Offices



## River Forecast Centers



# Outline



Flooding Importance

Flooding Types and Causes

Flood Products

River Flooding

Partners

Flood Safety

Reporting Flooding

Flood Risk



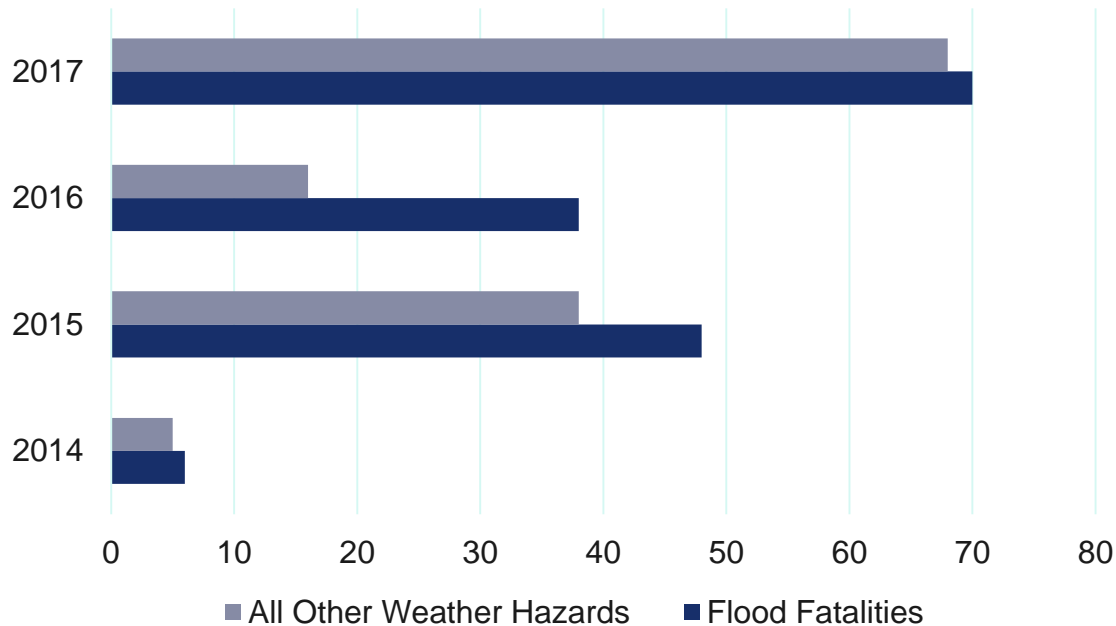
(REUTERS/Richard Carson)



# **Flooding Importance**

# Flooding is Deadly!

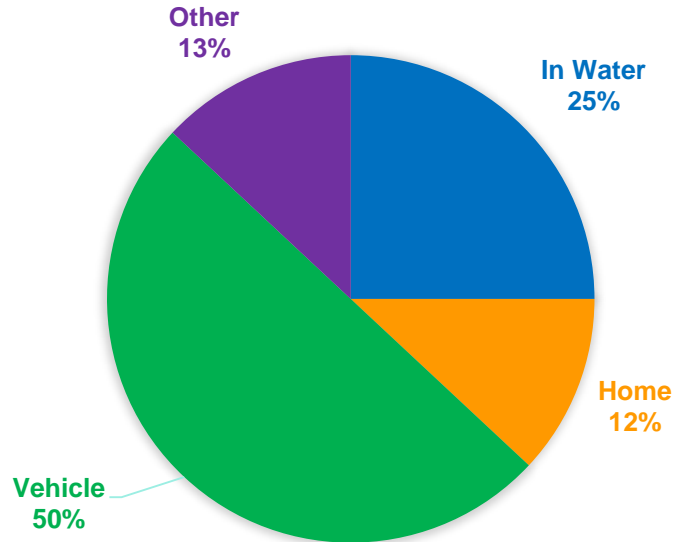
## Weather-Related Deaths in Texas



In the 4 year period from 2014 to 2017, **more** people have died in Texas from flooding than ***all other weather hazards combined.***

# Flood Fatalities

## TEXAS FLOOD FATALITIES BY SHELTER FROM 2014-2016



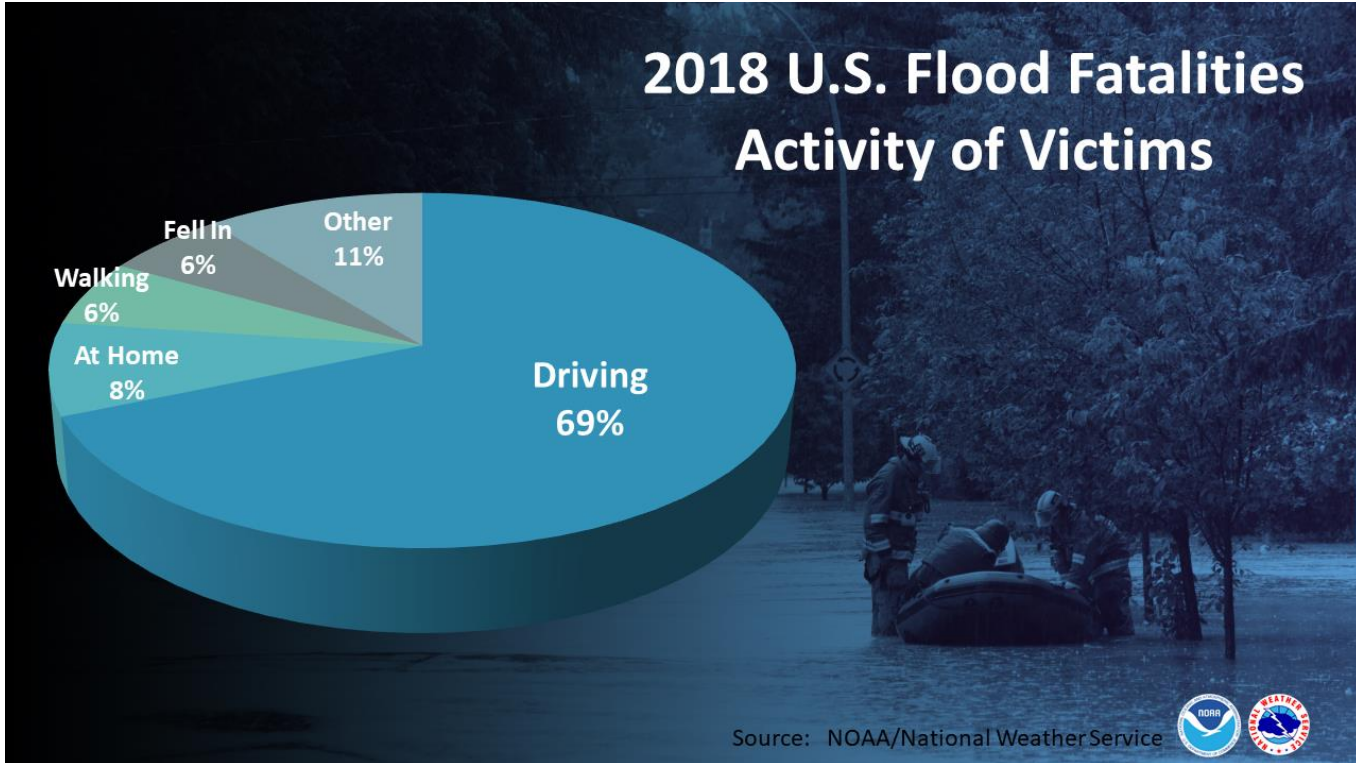
Half of the flood fatalities in Texas occurred while people were in their car.

2017 was skewed due to Hurricane Harvey. In 2017, there were 33 flood fatalities in the water and 19 in vehicles.

# Houston Floods: April 18, 2016



# Flood Fatalities





# Recent Big Floods...

Memorial Day 2015

Tax Day 2016

Brenham 2016

Harvey 2017



## And other historic floods...

Tropical Storm Allison

1994 Flood

Tropical Storm Claudette



# **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



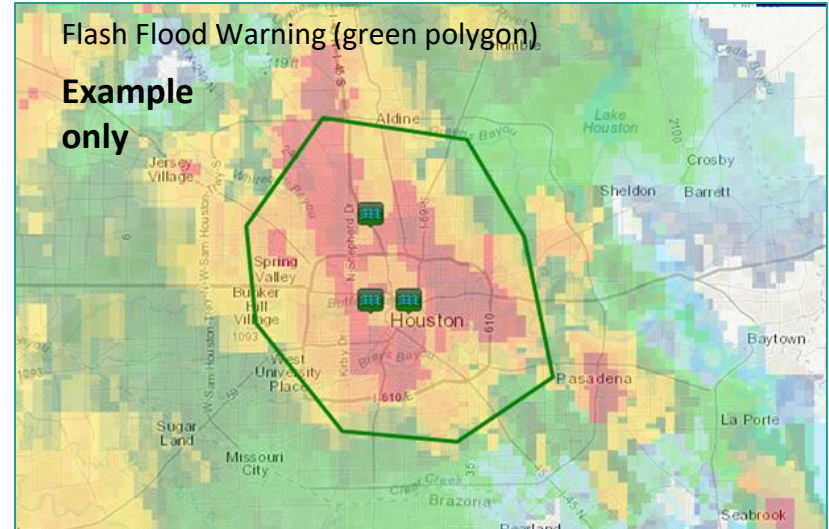
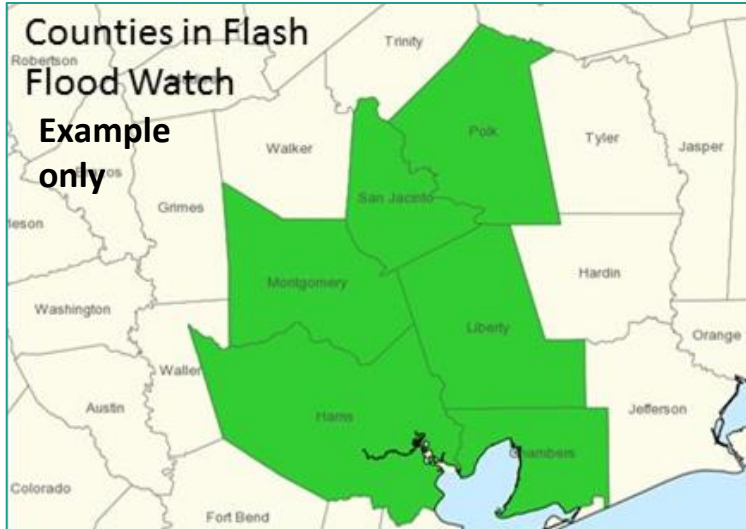


# Flood Products

# 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, poor drainage, or high tides/surge. 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 Advisory**

### **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

## **Flood Watch**

### **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

## **Flash Flood Watch**

### **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

## **Flood Warning**

### **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

## **Flash Flood Warning**

### **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

## **Flash Flood Emergency**

### **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



**You make the call...**



Urban /  
Small  
Stream  
Flood  
Advisory



This image depicts what conditions may look like during a flood advisory.

Flash  
Flood  
Warning



This image depicts what conditions may look like during a Flash Flood Warning.

Flash  
Flood  
Emergency

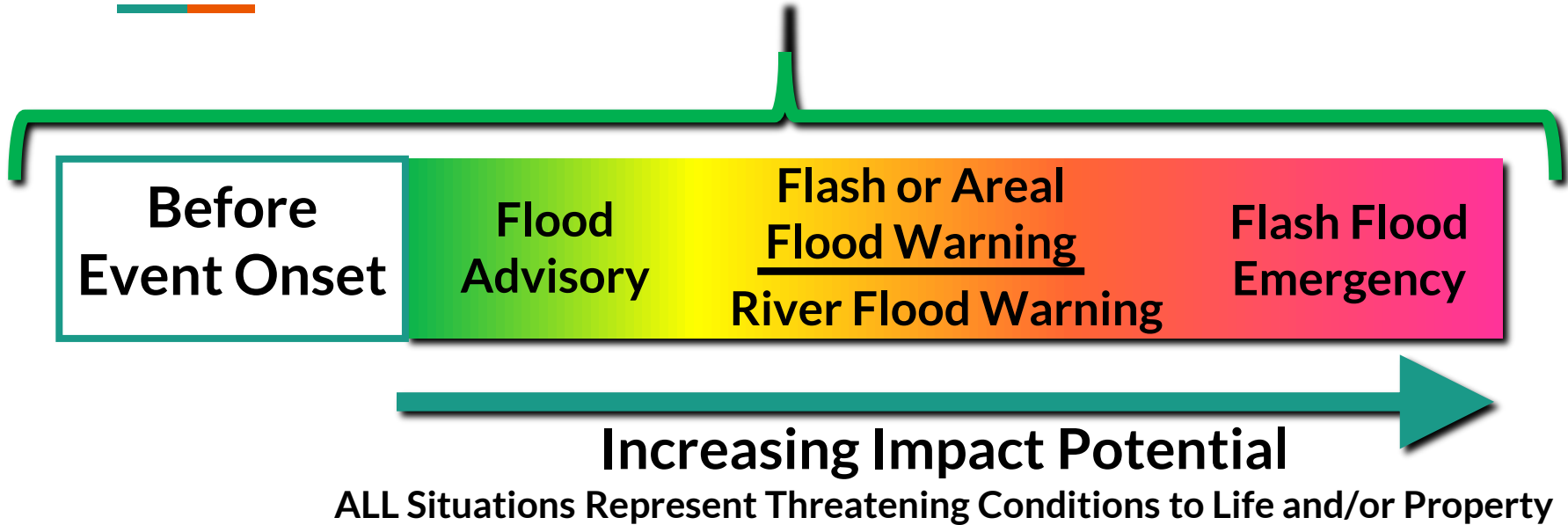


This image depicts what impacts may result from a Flash Flood Emergency. A rapidly moving flood wave resulted in this roadway being completely washed out.

  
**Flood  
Warning  
(Areal/  
River/  
Bayou)**



# Flood Timeline



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

Be sure to have multiple ways to receive warnings.

# Ways to Receive a Warning

## NOAA Weather Radio



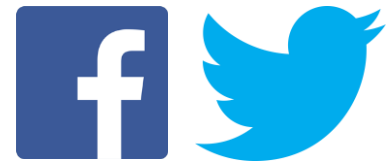
## Wireless Emergency Alerts and Weather Apps



## TV and Radio



## Social Media



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



# River Flooding

# 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.

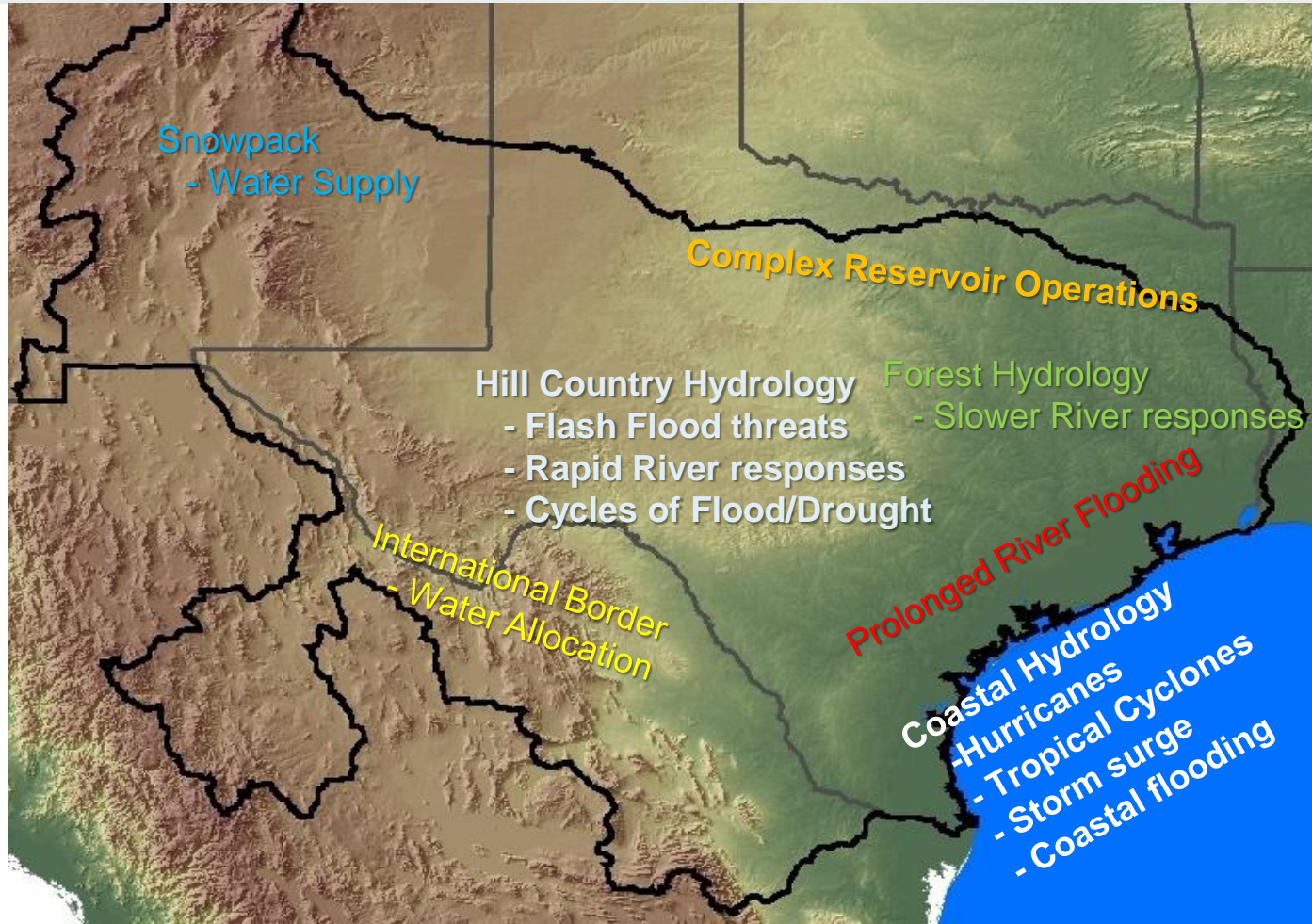


# Watershed

- A watershed, or basin, 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.
- **Brazos County deals with 2 primary watersheds: Brazos River and Navasota River.**

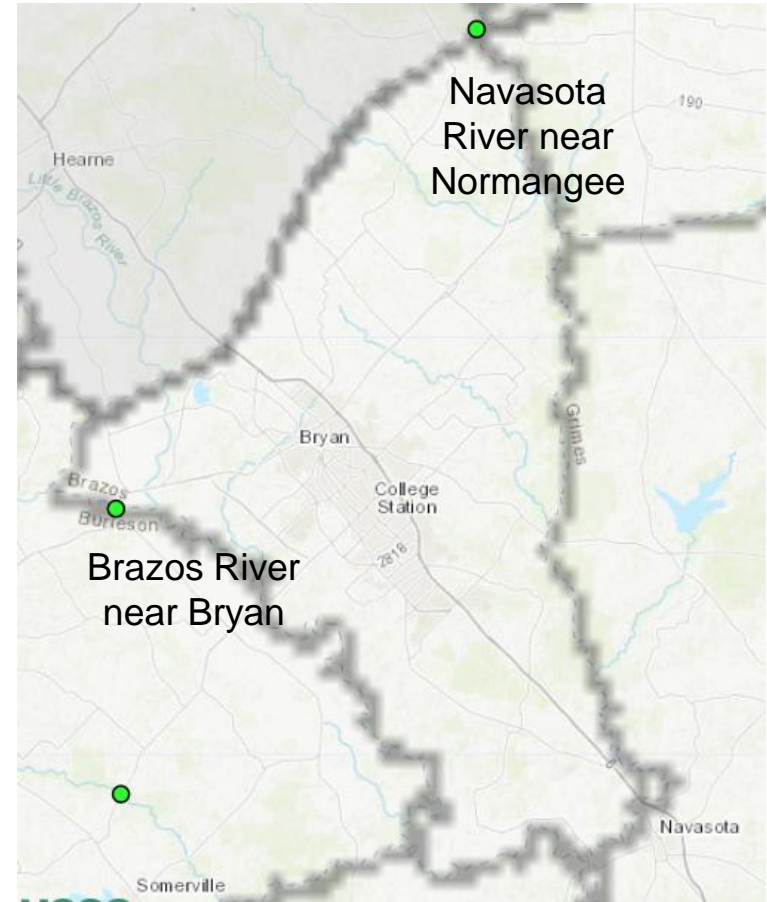


# Diverse Watershed Characteristics in Texas



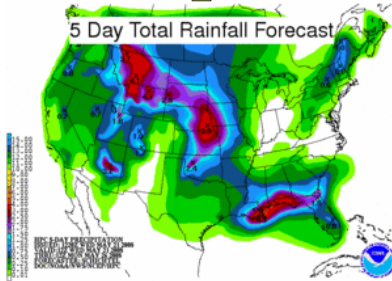
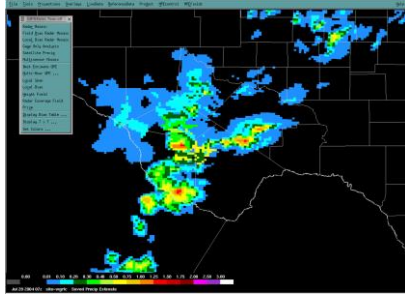
# Watershed

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- Watersheds vary in shape and size which ultimately lead to unique challenges.
- Topography plays a big role in how watershed boundaries are defined.
- **Brazos County deals with 2 primary watersheds: Brazos River and Navasota River.**
- **NWS issues river forecasts for 2 sites in Brazos County.**



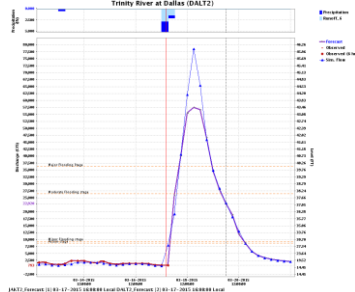
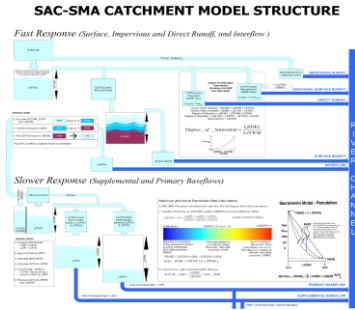
# River Forecast Process

## Rainfall Analysis



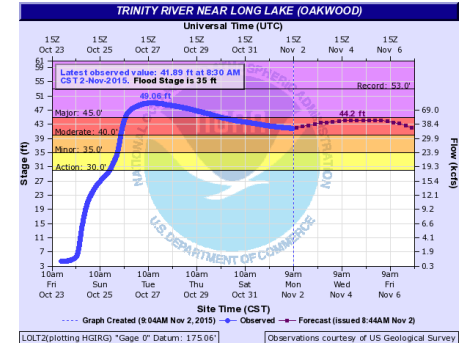
Rainfall estimates and forecasts merged into continuous dataset

## Hydrologic Modeling



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

## Forecast



## Warning

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.NEU.KHGX.FL.W.0149.160529T0730Z-000000T0000Z/  
 /R/MOT2.1.ER.160529T0730Z.160531T0600Z.000000T0000Z.NO/  
 126 PM CDT THU MAY 26 2016

The National Weather Service in Houston/Galveston has issued a

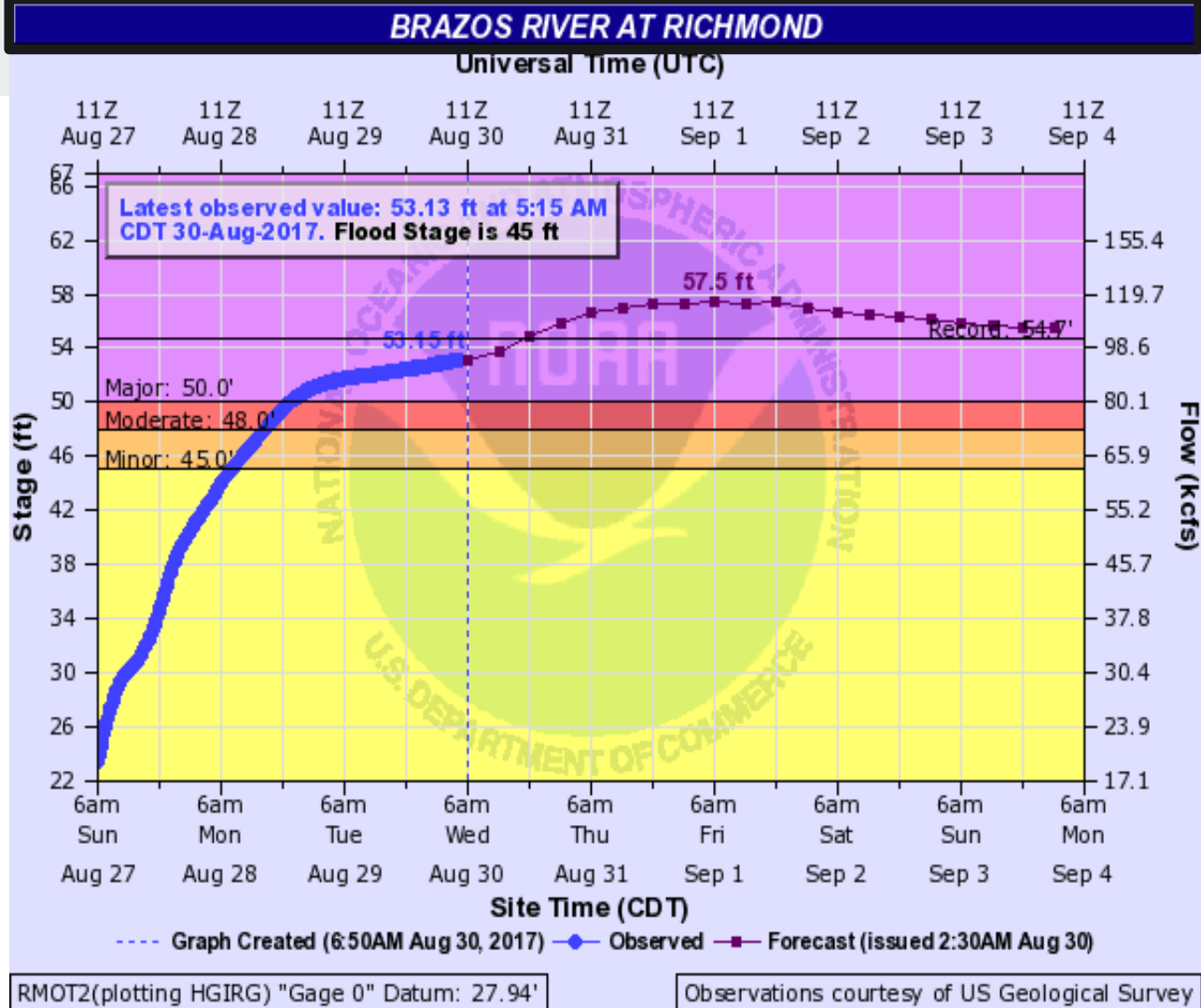
Flood Warning for  
 The Brazos River In Richmond.  
 from late Saturday night until further notice...or until the warning is canceled.

# 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

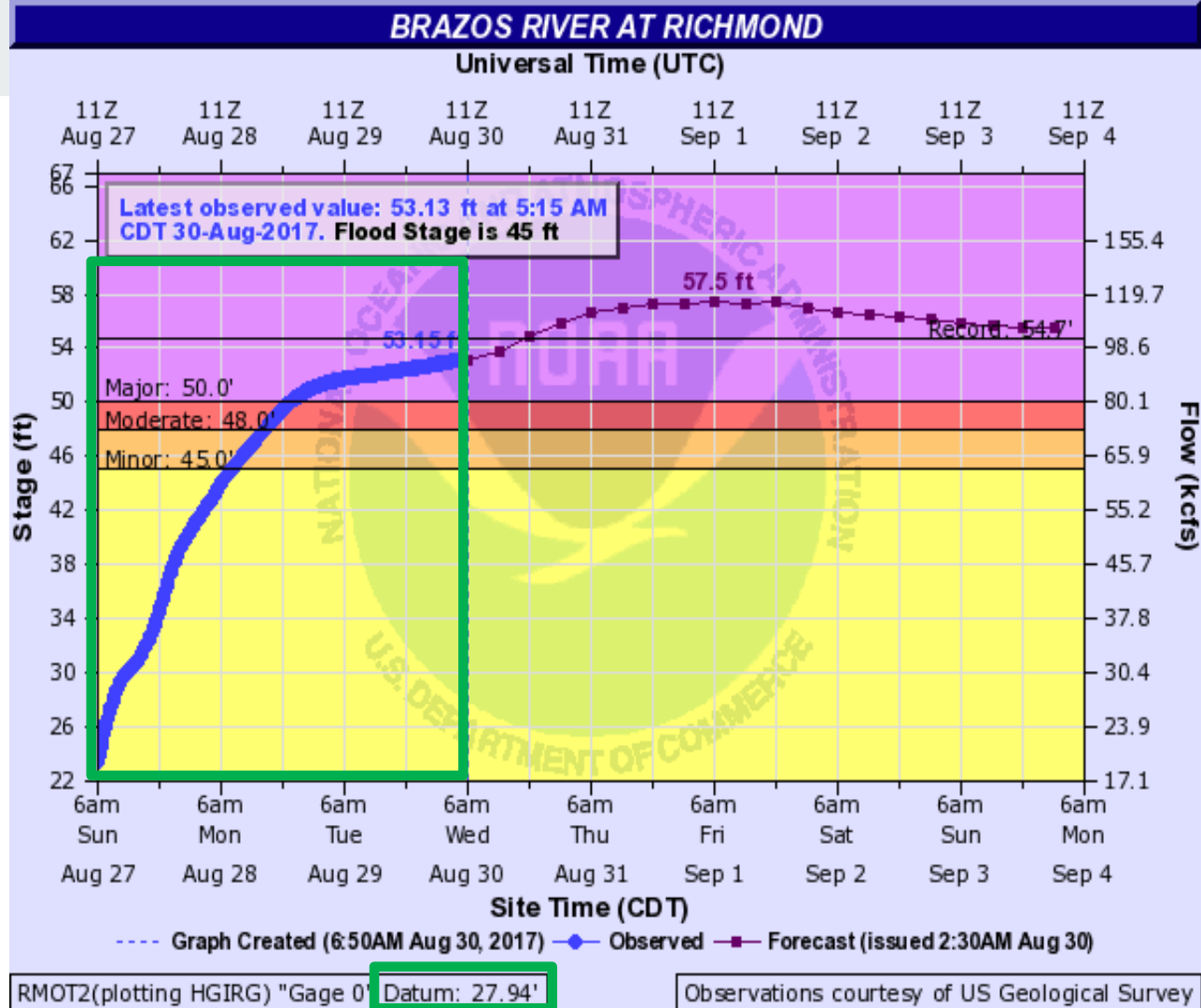


# Hydrograph Basics



**OBSERVATIONS:**  
Past river stages

**DATUM:**  
Adjustment to mean sea level

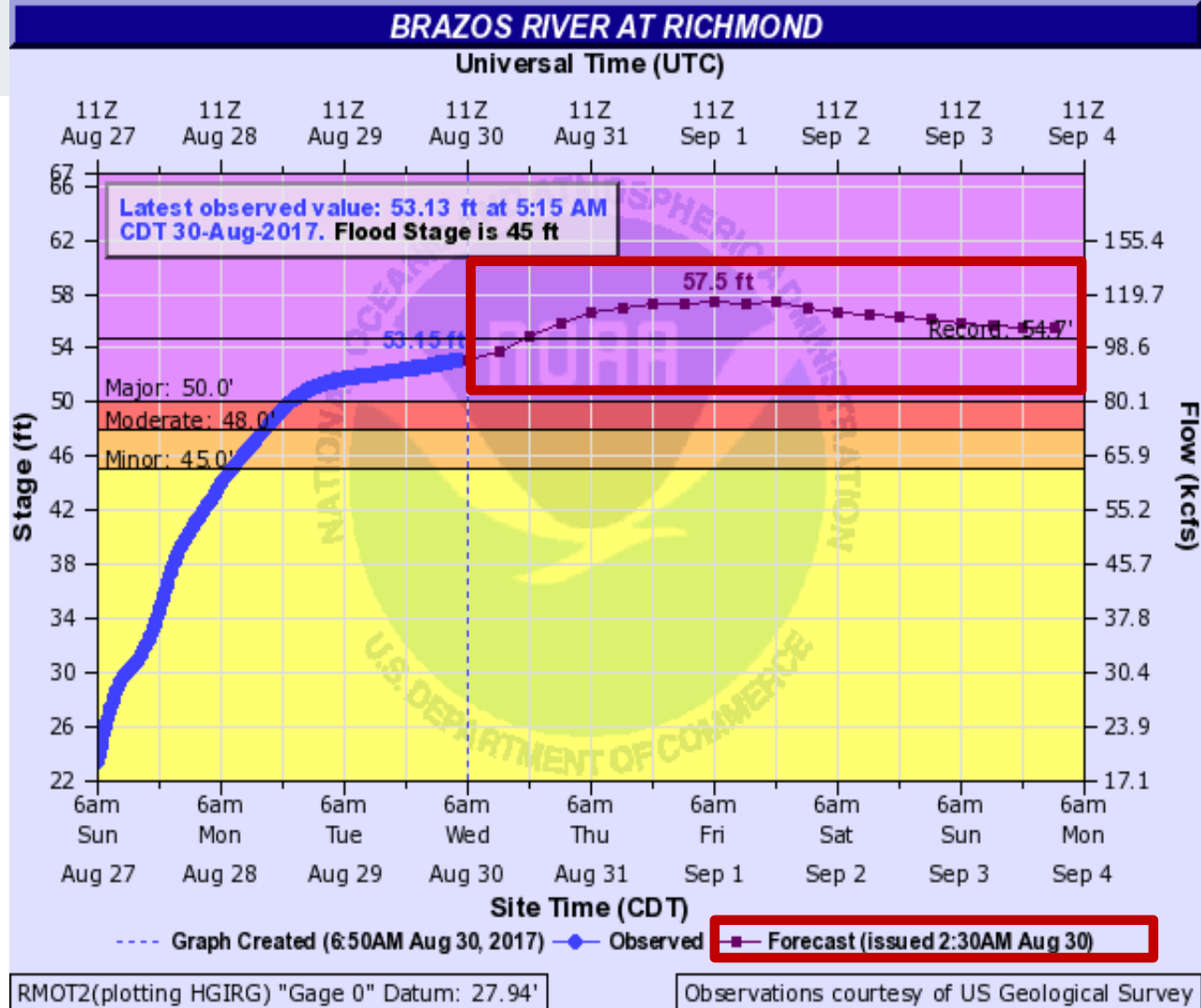


# Hydrograph Basics



**FORECAST:**  
Forecast River  
Stages

**CREST:**  
Peak Stage

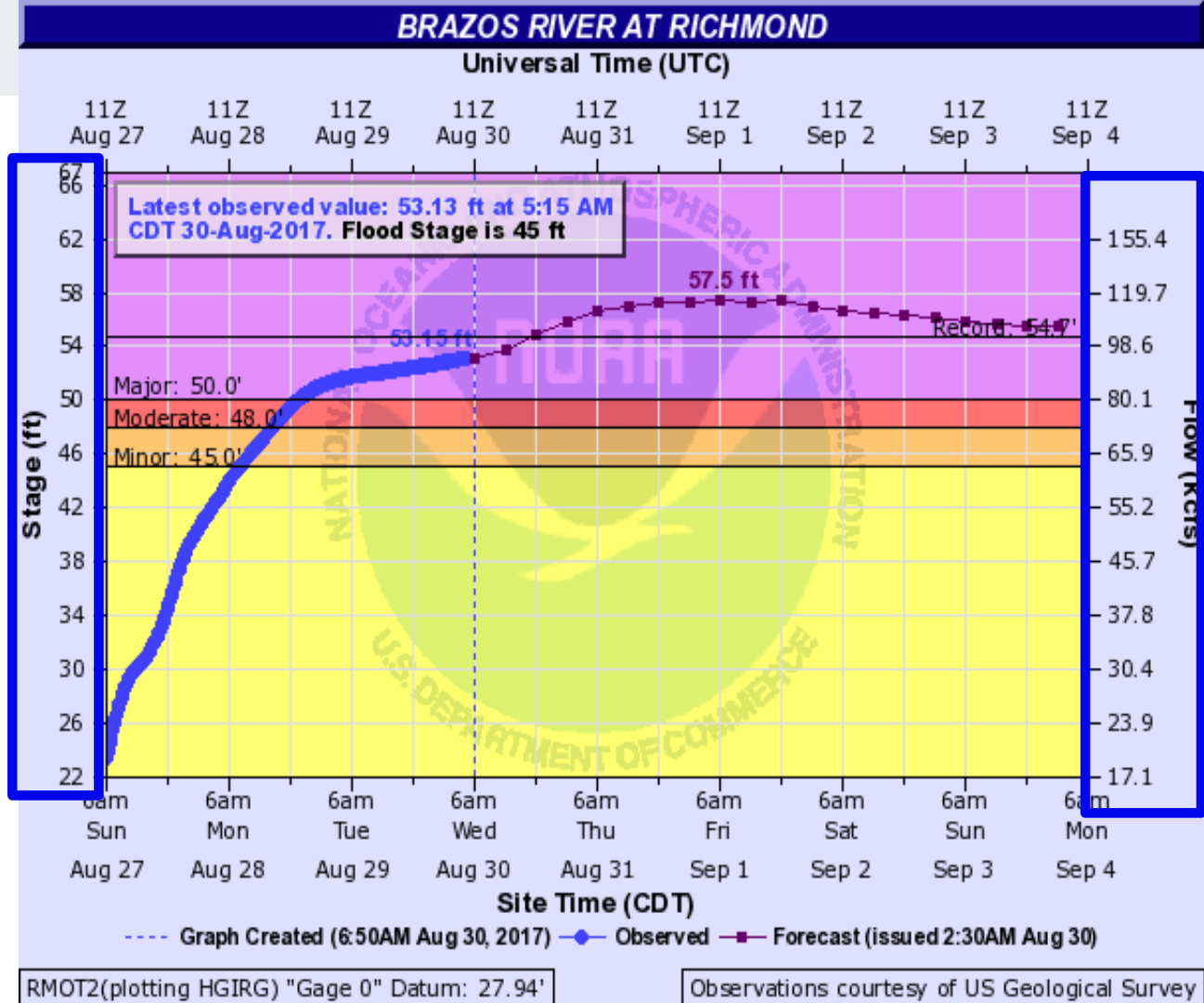


# Hydrograph Basics

## STAGE VS FLOW:

Hydrologists, models, reservoirs work in flow. Emergency managers, media, general public work in stage.

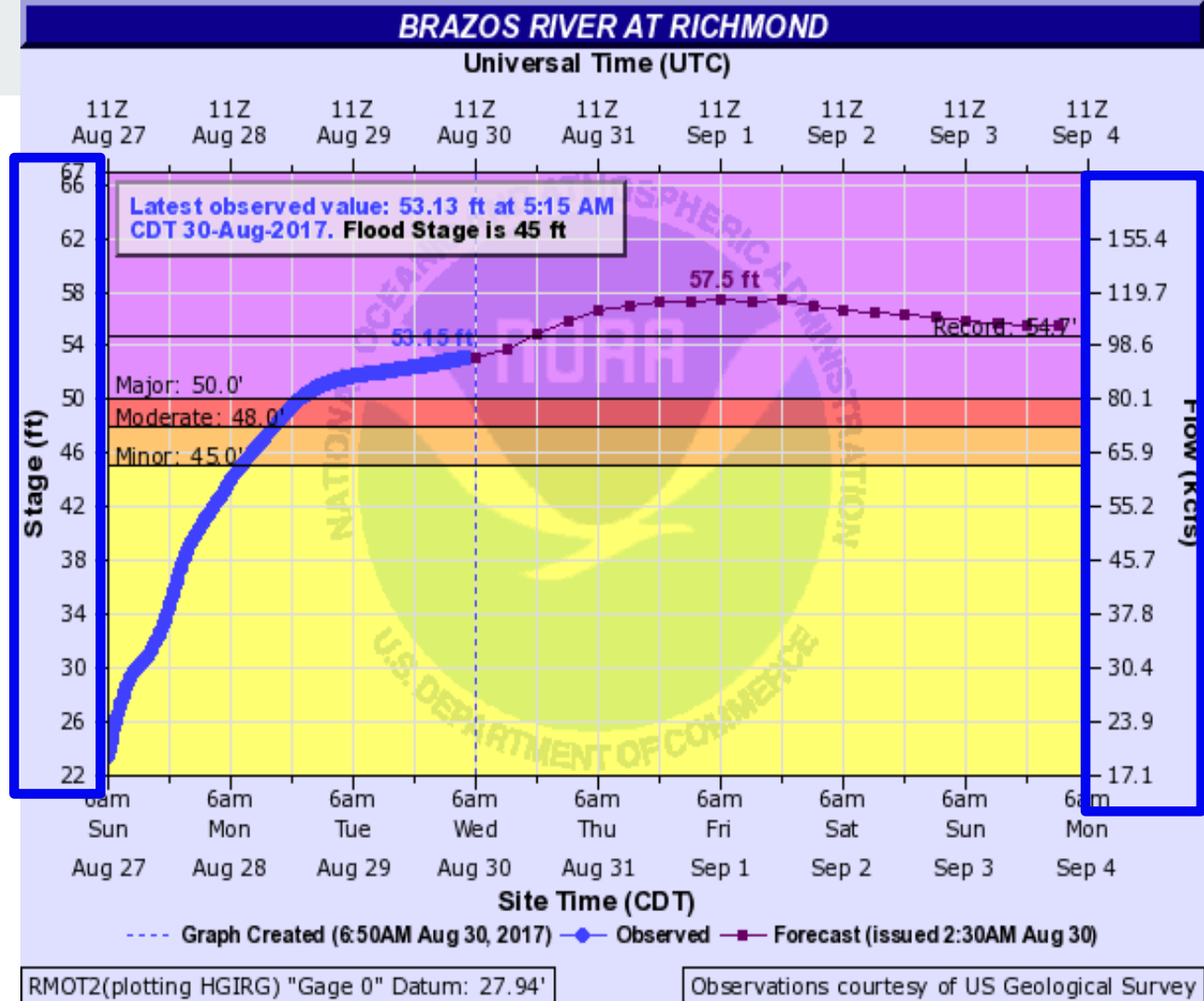
What is flow or a cubic foot per second?





# 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

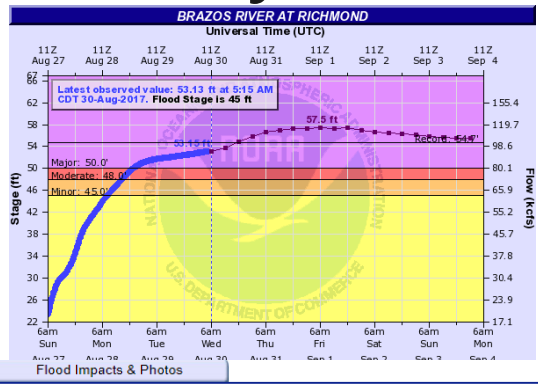
[Show More Historic Crests](#)

(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

[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/Cummings 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 occurs 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 Cummings/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.

River Observations | River Forecasts | Experimental Long-Range Flood Risk | Precipitation | Download

Auto Refresh: Off | Print this map | Permalink | BOOKMARK

132 total gauges | 3 gauges in flood

Forecast available  
Probability and forecasts available  
Observations only available

Major Flooding  
Moderate Flooding  
Minor Flooding  
Near Flood Stage  
No Flooding  
Observations Are Not Current  
Out of Service  
Flood Category Not Defined  
At or Below Low Water Threshold

Last map update: 03/07/2018 at 06:57:40 am CST 03/07/2018 at 12:57:40 UTC

What is UTC time? | Map Help | Disclaimer

USGS | esri | Esri, HERE, Garmin, FAO, USGS, EPA, NPS

<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

The image shows the USGS WaterAlert website interface. At the top, the USGS logo is displayed with the tagline "science for a changing world". Below the logo is a banner image of people kayaking on a river. The main header is "WaterAlert". The interface includes a "Sites" tab and a "Map" tab. A search panel on the left is highlighted with a red border, containing the following search options:

- Select Location
- News updated September 30, 2013
- Search by Street Address: Enter Street Address
- Search by Place Name: Enter Place Name
- Search by Site Number(s): Enter Site Number(s)
- Search by State/Territory: Select an Area
- Search by Watershed Region: Select a Region

Below the search panel are links for "Select Data Type", "About WaterAlert", "How To Use WaterAlert", and "Related Information". The main map area shows a map of Houston, Texas, with numerous black triangles representing gauge locations. The map includes labels for "The Woodlands", "Houston", "Pasadena", "Baytown", "Sugar Land", "Missouri City", "Pearland", "League City", "Rosenberg", "Angleton", and "Lake Jackson". A scale bar at the bottom indicates 0, 10, and 20 miles. The coordinates -95.597, 29.149 are shown at the bottom left of the map.

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"

**USGS**  
science for a changing world

## WaterAlert

Sites Map

Select Location

News updated September 30, 2013

Search by Street  
Enter Street Address

Search by Place Name  
Enter Place Name

Search by Site Number  
Enter Site Number

Search by State  
Select an Area

Search by Watershed  
Select a Region

Select Data Type

About WaterAlert

How To Use WaterAlert

Related Information

**Site Information**

**Site Number:** 08069500  
**Site Name:** W Fk San Jacinto Rv nr Humble, TX  
**Site Type:** Stream  
**Agency:** USGS  
[Access Data](#)

**Streamflow:** 7260 ft<sup>3</sup>/sec  
on 2018-04-02 at 22:15 CDT (TSID 229383)  
**Stage:** 42.78 ft  
on 2018-05-07 at 06:45 CDT (TSID 140334)

**Subscribe to WaterAlert**

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"
- 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):

Discharge, in ft <sup>3</sup> /s	<input checked="" type="radio"/>	Recent value: 7260 <a href="#">[peak chart]</a>
Gage height, in ft	<input type="radio"/>	42.78 <a href="#">[peak chart]</a>

### Alert Threshold Condition:

- [about this...](#)
- Greater than (>)  
 Less than (<)  
 Outside a range (< or >)  
 Inside a range (> and <)

Real-time value is greater than:  ft/s

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

[? Related Information](#)



USGS Water Alerts:

<https://maps.waterdata.usgs.gov/mapper/wateralert/>



# Partners

# Partners

## Roles of Primary River Forecast Partners



**US Army Corps  
of Engineers®**

- Operate Flood Control Reservoirs
- Manage Other WR Projects



**US Army Corps  
of Engineers®**

- Assist w/Gage Maintenance
- Assist w/Stream Measurements
- Assist w/Funding Data Networks



- U.S. Stream Gage Network
- Water Science Studies



- Gage Maintenance
- Stream Measurements
- Focus Stream Gage Network



- Issue Weather & Water  
Forecasts, Watches, Warnings &  
Data



- Cooperative Data Network
- NOAA/NWS Satellite Transmission
- Forecasts/Data for Operations





# ***Brazos River Authority Operations 2019 FloodAware Training***

***Presented by***

***Brad Brunett, Regional Manager – Central & Lower Basins***

***Aaron Abel, Water Services Manager***

***Chris Higgins, Senior Hydrologist***

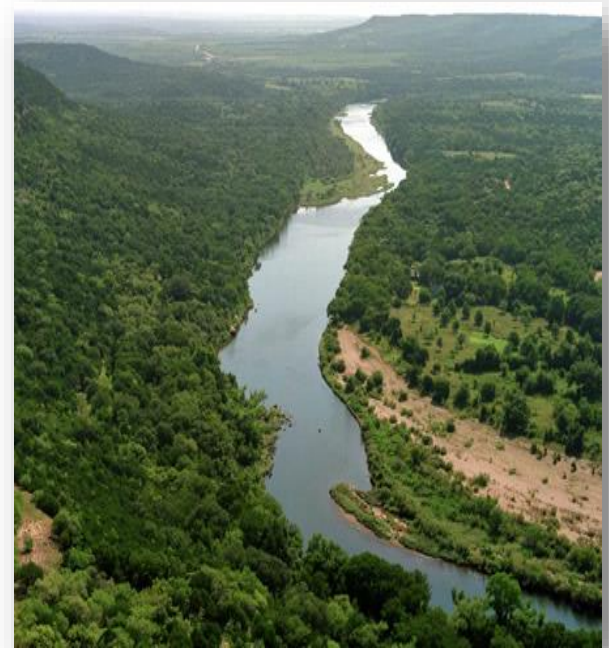


## *Brazos River Authority Overview*

# *Our Mission*

**To develop, manage, and protect  
the water resources of the Brazos River basin**

- **Oldest river authority in Texas**
- **Created by the Texas Legislature in 1929**
- **First entity of its kind in the nation**
- **Self-funded (not appropriated), do not levy taxes**
- **21 member Board appointed by Governor**
- **Territory:**
  - **Extends from the Texas-New Mexico state line west of Lubbock to the Gulf of Mexico near Freeport**
  - **More than 42,000 square miles**
  - **All or part of 76 counties**





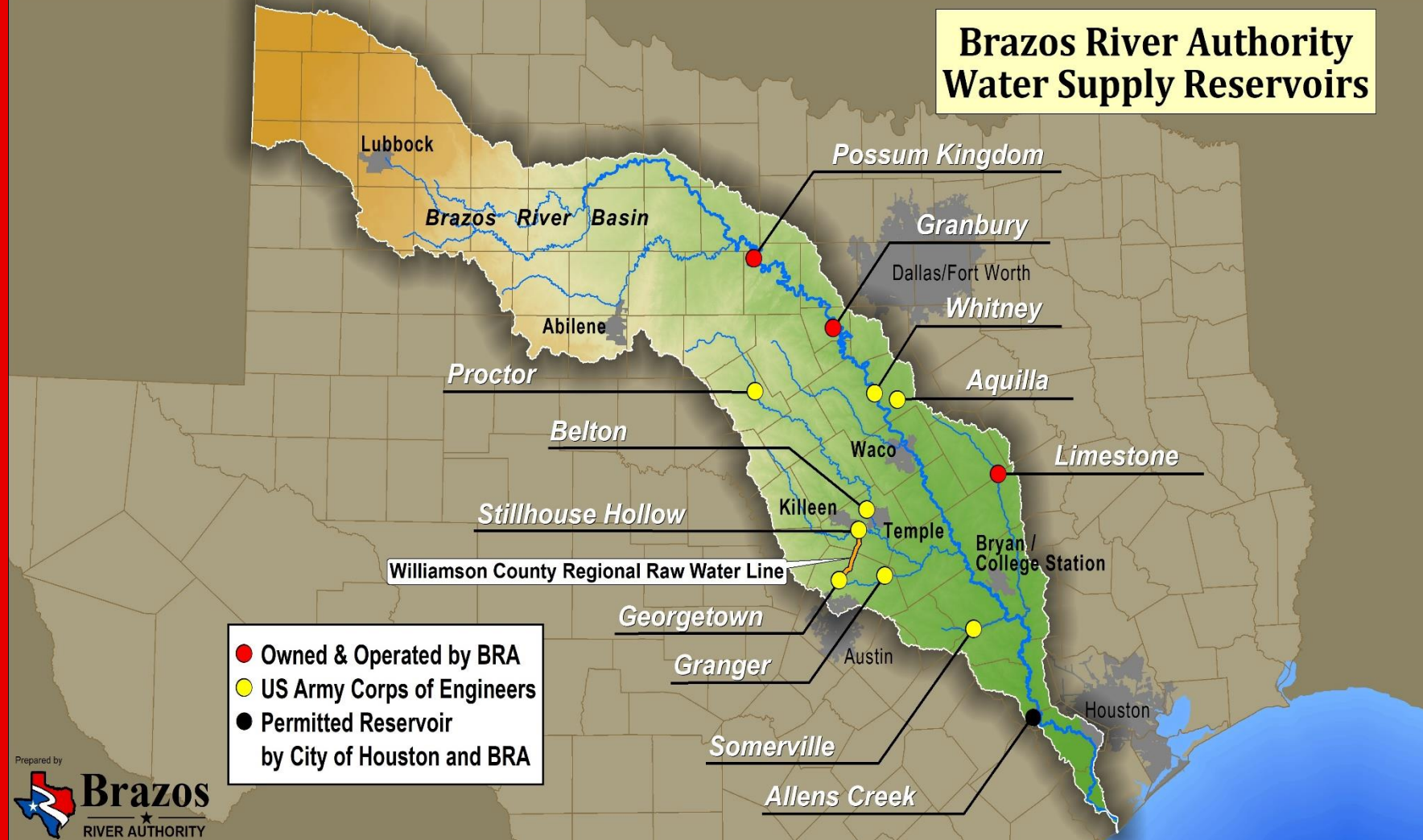
# Our Business

- Raw Water Supply
- Water & Wastewater Treatment
- Water Quality & Environmental Stewardship



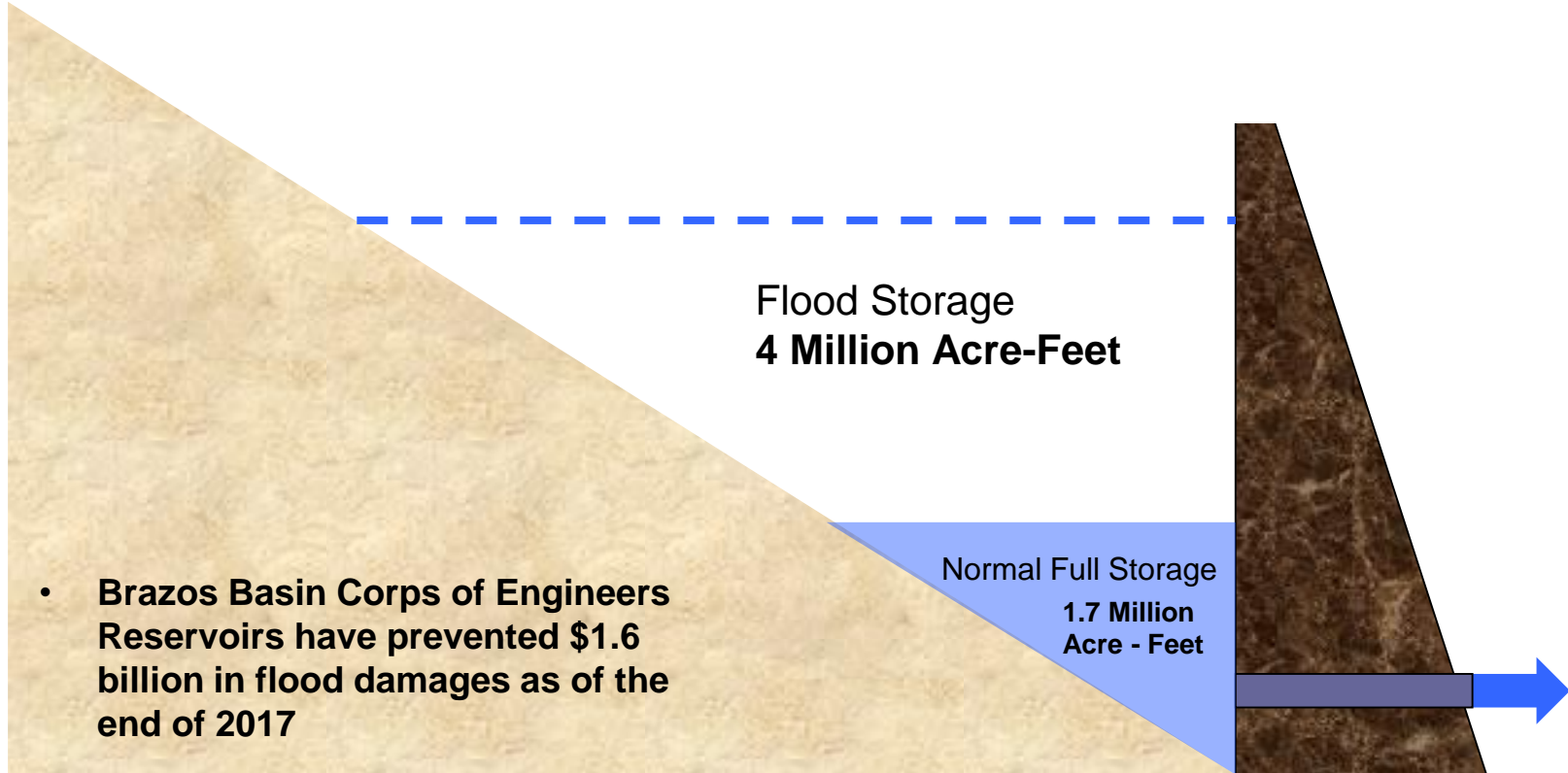


# Brazos River Authority Water Supply Reservoirs





# Storage in Brazos Basin Corps of Engineers Reservoirs





Brazos River Authority



*Lake Somerville Emergency Spillway,  
Late May, 2016*



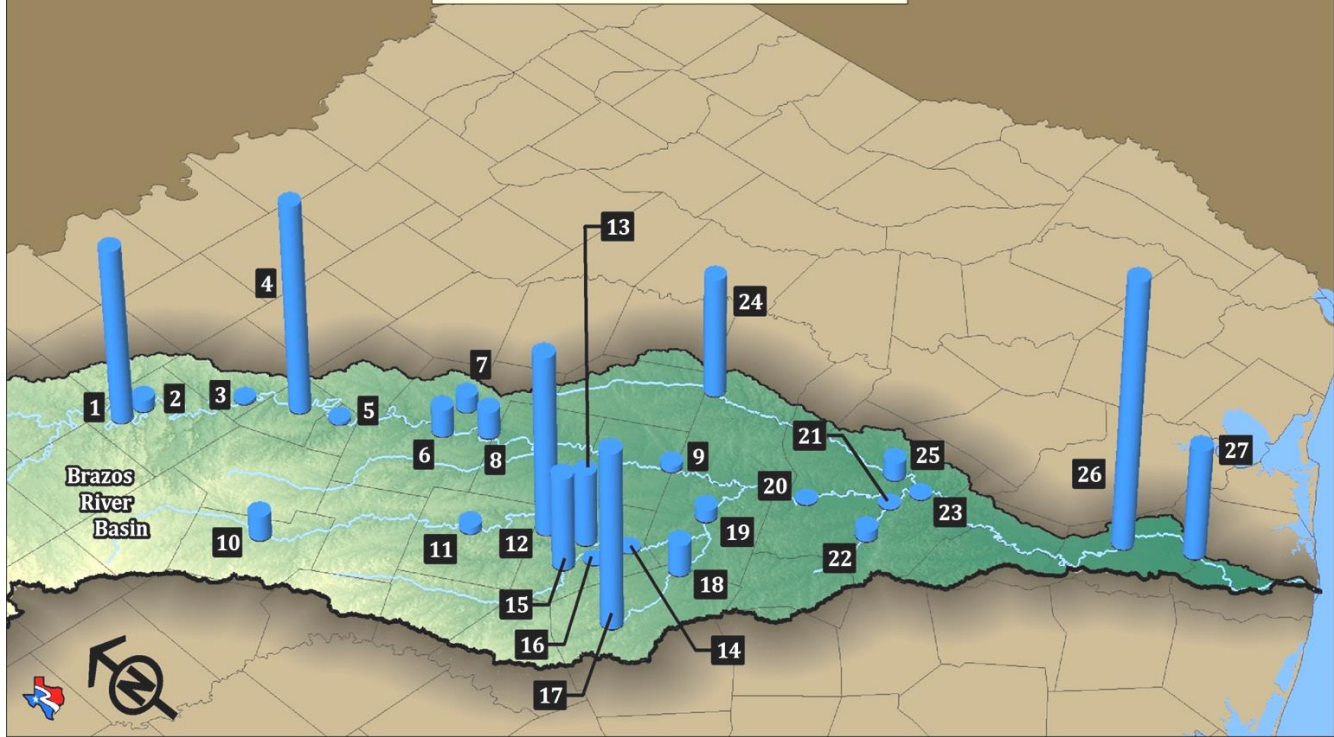
# *The Drought, 2011 – 2015...(RIP!)*



Brazos River at Seymour – August 3, 2011



# Long Term Water Contracts



## TOTAL DIVERSIONS AUTHORIZED UNDER EXISTING CONTRACTS

values are acre-feet per year  
aggregated by stream segment reaches

1. Possum Kingdom Lake	74,166	10. Lake Proctor	10,180	19. Little-San Gabriel conf. to Little Rv at Cameron	5,000
2. Possum Kingdom Lake dam to Palo Pinto gage	4,800	11. Lake Proctor dam to Leon Rv at Gatesville gage	2,909	20. Brazos-Little conf. to Bryan gage	200
3. Palo Pinto gage to Dennis gage	1,050	12. Leon Rv at Gatesville gage to Lake Belton dam	76,062	21. Bryan gage to Brazos-Yegua conf.	150
4. Dennis gage to Lake Granbury dam	89,244	13. Lake Belton dam to Leon Rv nr Belton gage	30,453	22. Lake Somerville	4,200
5. Lake Granbury dam to Glen Rose gage	1,200	14. Leon Rv nr Belton gage to Little Rv gage	200	23. Brazos-Yegua conf. to Brazos-Navasota conf.	540
6. Glen Rose gage to Lake Whitney dam	11,510	15. Stillhouse Hollow Lake	39,255	24. Lake Limestone	50,875
7. Lake Aquilla	6,500	16. Stillhouse Hollow Lake dam to Lampasas Rv nr Belton gage	8	25. Easterly gage to Brazos-Navasota conf.	7,600
8. Lake Whitney dam to Brazos nr Aquilla gage	11,403	17. Lake Georgetown	74,561	26. Hempstead gage to Richmond gage	113,070
9. Brazos-Aquilla conf. to Highbank gage	2,300	18. North San Gabriel gage to Lake Granger dam	13,015	27. Richmond gage to Gulf of Mexico	46,780





# *Reservoir Operations*

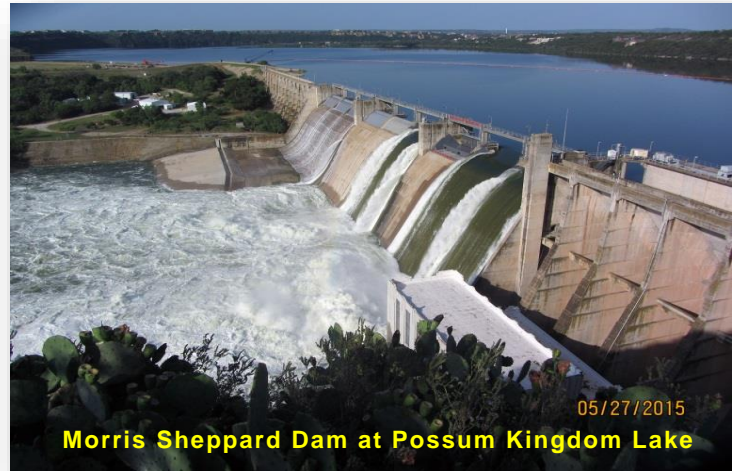


- BRA reservoirs contain no flood storage space
- What comes in must go out real-time



# ***Significant Operating Rules***

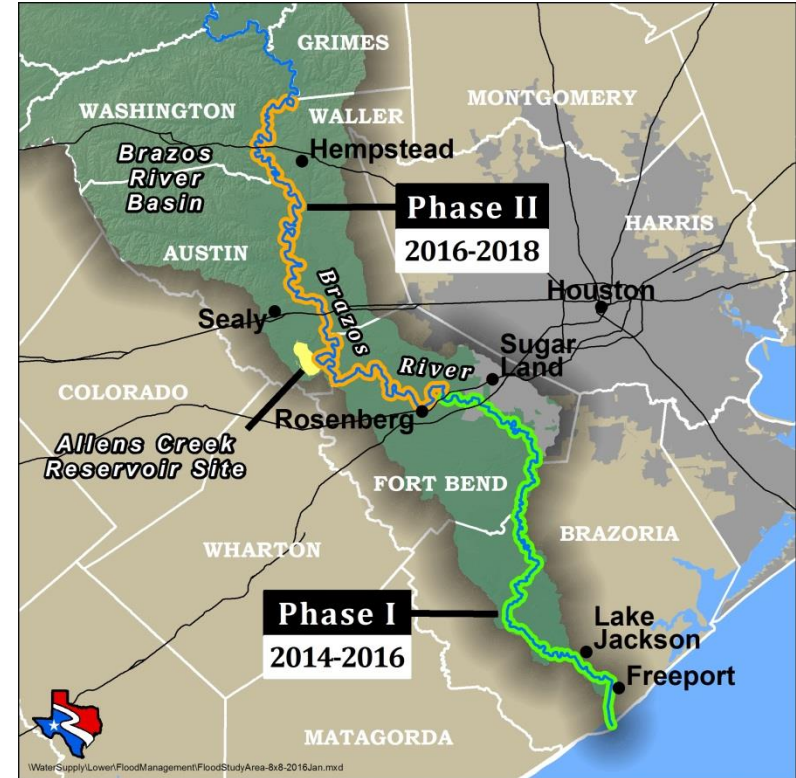
- **Don't release based on weather forecasts**
- **Don't make flooding worse downstream than it would have been without the reservoir being present**
- **Prevent water overtopping flood gates**
- **Attempt to minimize flood potential on upper end of lakes**
- **Ensure good communication**
  - **BRA Central Office and Lake Office staff**
  - **Downstream Call Lists**
  - **West Gulf River Forecast Center & Other Agencies**
  - **Emergency Management Officials**
  - **General Public**
  - **Social Media**





# Lower Brazos Flood Study

- **Why?**
  - High growth area with outdated and inconsistent Brazos River floodplain information
- **Who?**
  - Texas Water Development Board, lower basin entities, BRA, & Halff Associates, Inc.
- **What?**
  - New models
  - New estimates of how much water, how fast, and how high
  - New maps
  - Alternatives to reduce/mitigate future damages





# Brazos

RIVER AUTHORITY  
[www.brazos.org](http://www.brazos.org)



[information@brazos.org](mailto:information@brazos.org)

[www.BrazosBasinNow.org](http://www.BrazosBasinNow.org)



@BrazosWater



**Brazos**  
RIVER AUTHORITY

Home Map Sites Dashboards Bookmarks

Home

### Welcome to BrazosBasinNOW

Current Brazos River Basin Information

#### Streamflow

Streamflow

- Upper Basin Streamflow
- Central Basin Streamflow
- Lower Basin Streamflow

#### Reservoirs

- Reservoir Elevation
- Reservoir Drawdown
- Percent Capacity

#### Rainfall

- Limestone Mean Areal Precip
- Granbury Mean Areal Precip
- Possum Kingdom Mean Areal Precip



# Brazos River Authority



# Flood Safety

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

# Safety Before a Flood

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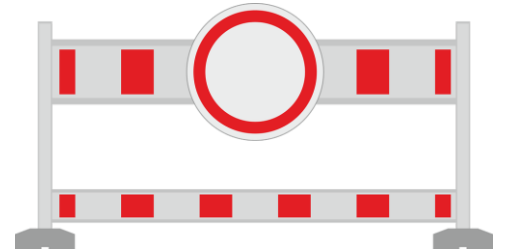
- Prepare a family disaster plan.
- Check if your insurance covers flood damages. If not, get flood insurance.
- Keep insurance and other important documents, such as copies of driver's licenses and credit cards, and other valuable items, in a safe place.
- Assemble a disaster supplies kit. Be sure to 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 Flood

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- Monitor warnings and be prepared to take action.
- Have multiple ways to receive weather information.
- Turn around, don't drown!
- Stay away or be swept away. Flood waters will be moving swiftly and river banks/culverts can become unstable.
- **Barricades are for your protection; do not drive around them!**
- Do not sightsee!
- If evacuations are ongoing, don't get in the way of first responders.
- Stay out of the flood waters!





# 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.
- Be especially cautious when traveling at night .
- 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 After a Flood

- Stay away from damaged areas unless your assistance has been specifically requested by police, fire, or a relief organization.
- Return home only when authorities indicate it is safe.
- Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations.
- Cut power to flooded areas of your home
- Only use generators in well-ventilated areas—never in a closed garage!

## Flooding Resources

Flood Safety

Turn Around Don't Drown

State Flood Information

Flood Hazards

NWS Flood Related Products

Forecasts and Observations

National Water Center

Education and Outreach Materials

Partner Agencies

**[weather.gov/flood](https://www.weather.gov/flood)**



# Reporting/Wrap Up

# What to Report

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## Flash Flooding

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

## Any River or Bayou Flooding

## Any Coastal 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

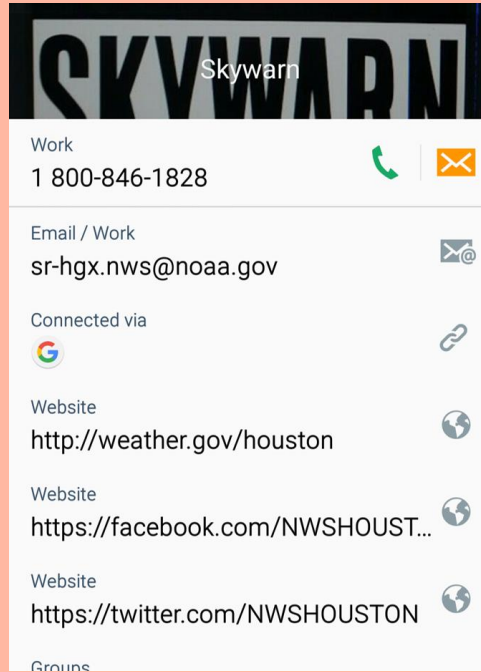
## Email

[sr-hgx.nws@noaa.gov](mailto:sr-hgx.nws@noaa.gov)

## Social Media

Twitter: @NWSHouston

Facebook: NWSHouston



## Spotter Tip

Set up SKYWARN as a contact  
in your smartphone



# Flood Risk



# 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**

# Insurance Misconception

## ▪ Misconception:

*“I’m already covered—my homeowners policy covers flooding.”*

## ▪ Fact:

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

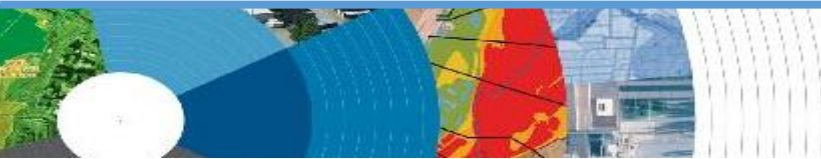
Renters and Business owners should also consider flood insurance for contents.

## ▪ 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.

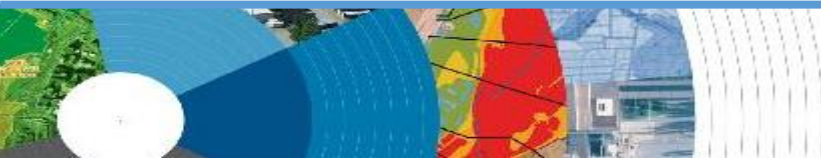


**FEMA**

# 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

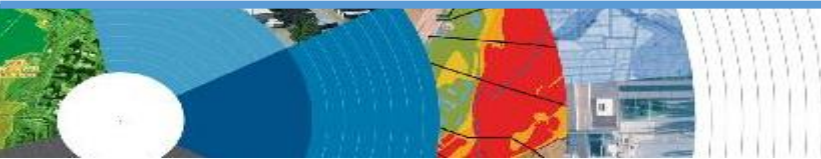


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# Flood Insurance/Group Flood Insurance

## Everyone is at risk for flooding

- **Brief definition of flooding is any forms of rising water in which 2 properties are affected-one being yours**
- **Structure Coverage**
  - 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
- **Wait Period**
  - Typically - 30-days from purchase until effective.
- **Average NFIP pay out for Harvey was \$112K (March 2018)**
- **Group Flood Insurance**
  - Available during a Presidential Declared event
  - If qualified for a IA grant a GFIP will be purchased in the amount of \$600
  - Policy is good for 3 years
  - Must maintain insurance on the property forever
  - Max amount on the policy is 33,500 this includes structure and dwelling
  - Average pay out for Harvey for IA was \$6000

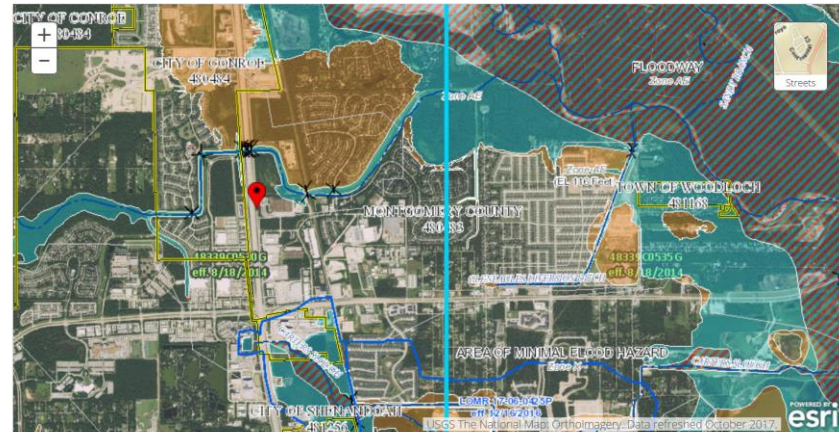


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# What is a FIRM?

## Flood Insurance Rate Map

- Identifies the flood zones
  - SFHA (high risk)
    - A, AE, AO, AH, VE, V etc. (Aqua)
      - 1% annual chance flood
  - 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.
- Used for rating flood insurance policies
- Are subdivided by panels to cover jurisdictional boundary.
- Shows what the BFE within the zones
- FIRM's only show Coastal and Riverine flood risk



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



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# Structure Elevation Impact Insurance Rates



High Risk =  
\$\$\$

Medium Risk =  
\$\$

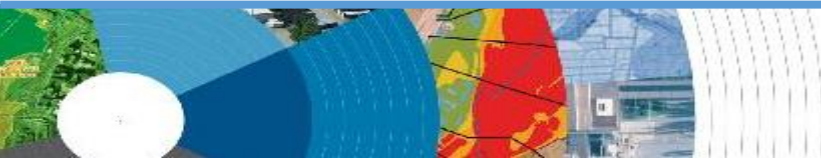
Lower Risk = \$

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.*

# 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.
- Flood insurance allows individual property owners to manage their risk.
  - **Buy policies that cover the structure AND contents.**



**FEMA**

# Contact Information

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Yho-Meka Conway, Insurance

Cell 470-572-0803 | [Yho-Meka.Conway@fema.dhs.gov](mailto:Yho-Meka.Conway@fema.dhs.gov)

NFIP Hotline

1-800-427-4661

[www.fema.gov/nfip](http://www.fema.gov/nfip)

Lauren Schmied, PE, Floodplain Management

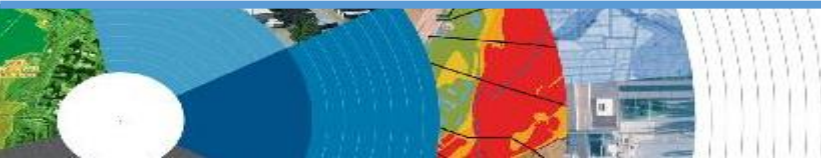
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# Questions

National Weather Service  
Brazos River Authority