

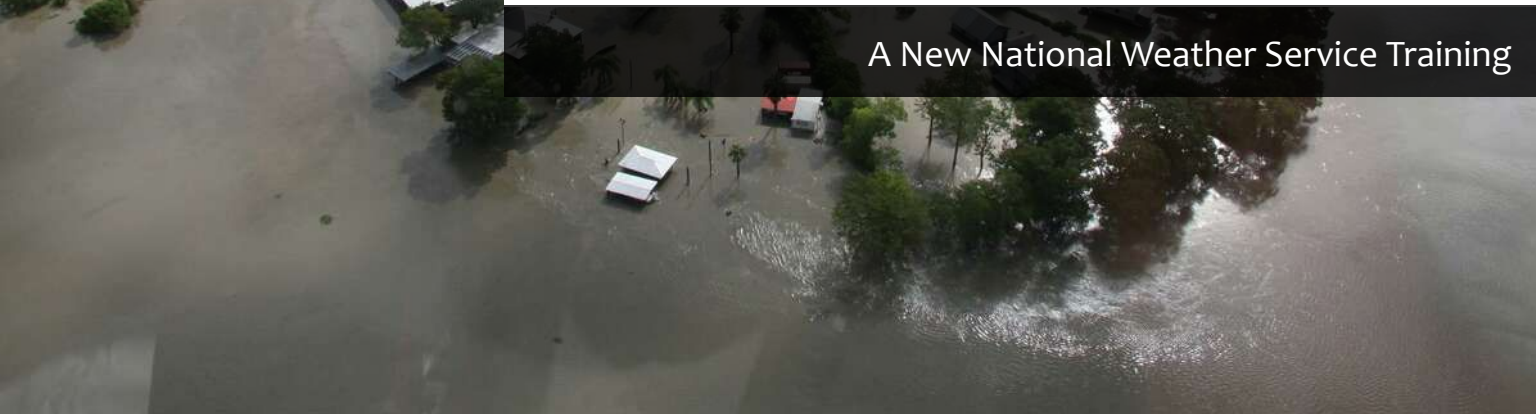


NWS FloodAware

A New National Weather Service Training

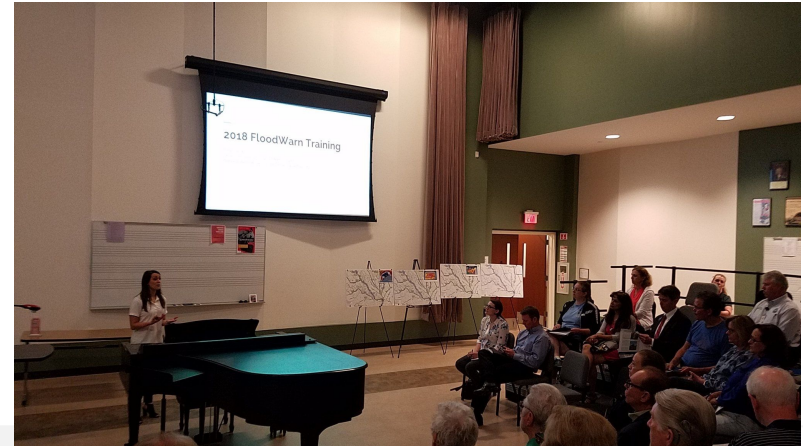


National Weather
Service



FloodAware Background

- Designed to raise flood awareness and educate the public on all things flooding.
- NWS Houston hosted first seminar on May 1st, 2018 in Kingwood/Humble.
- Invited Harris County Flood Control District, San Jacinto River Authority, and FEMA to participate.
- Based on feedback, revised content and rolled out official FloodWarn program in Fall 2018.
- Due to trademark issues, program was rebranded as FloodAware in 2019.
- Since 2018, NWS Houston and Austin/San Antonio has completed 30 seminars across SE TX with more planned this fall.



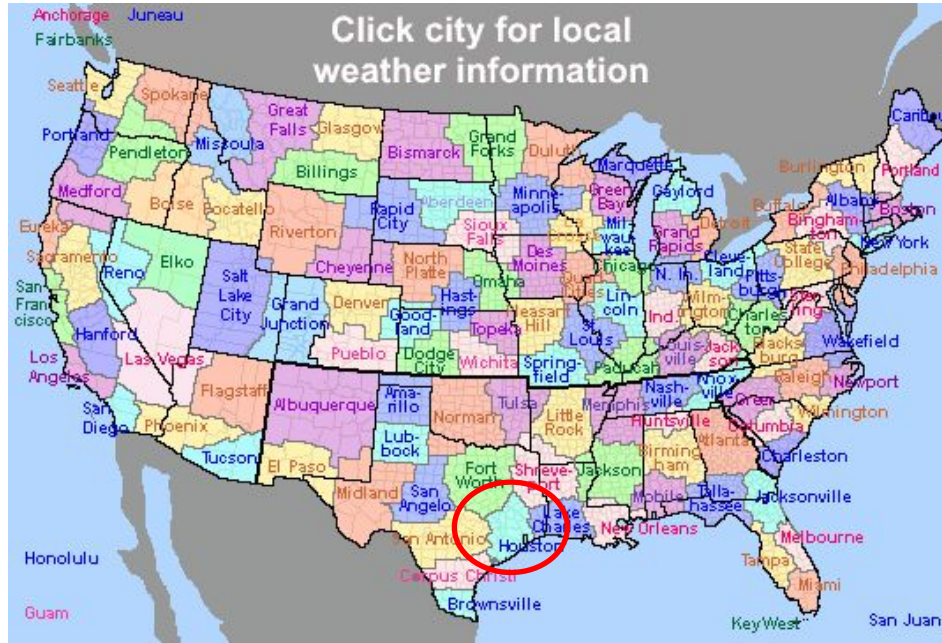


2023 FloodAware Training

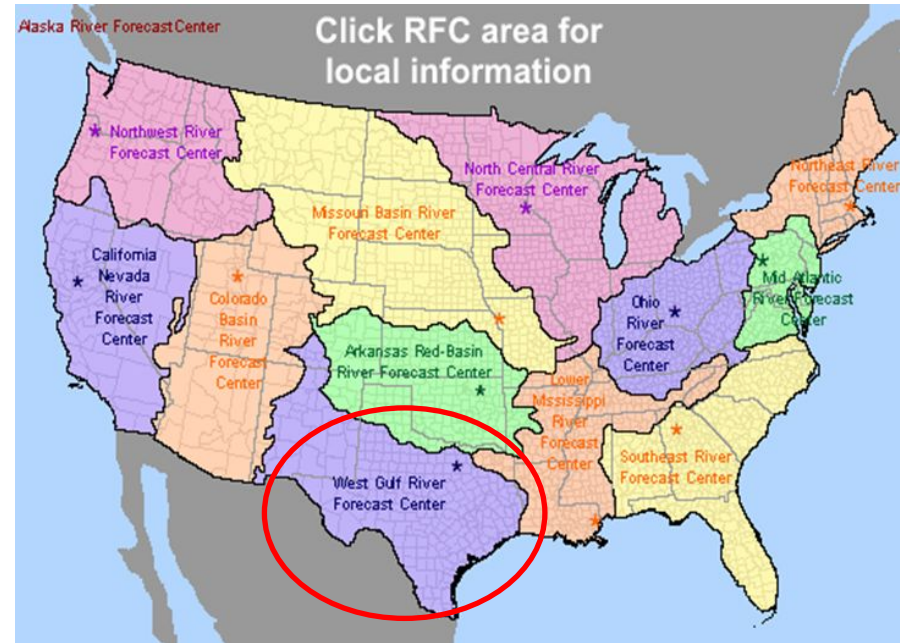
Katie Landry-Guyton
Senior Service Hydrologist/Meteorologist
National Weather Service- Houston/Galveston, TX

National Weather Service

Weather Forecast Offices



River Forecast Centers



National Weather Service

National Water Center



Outline

Importance of Flooding

Flooding Types and Causes

NWS Flood Products

River Flooding

Partners

Flood Safety

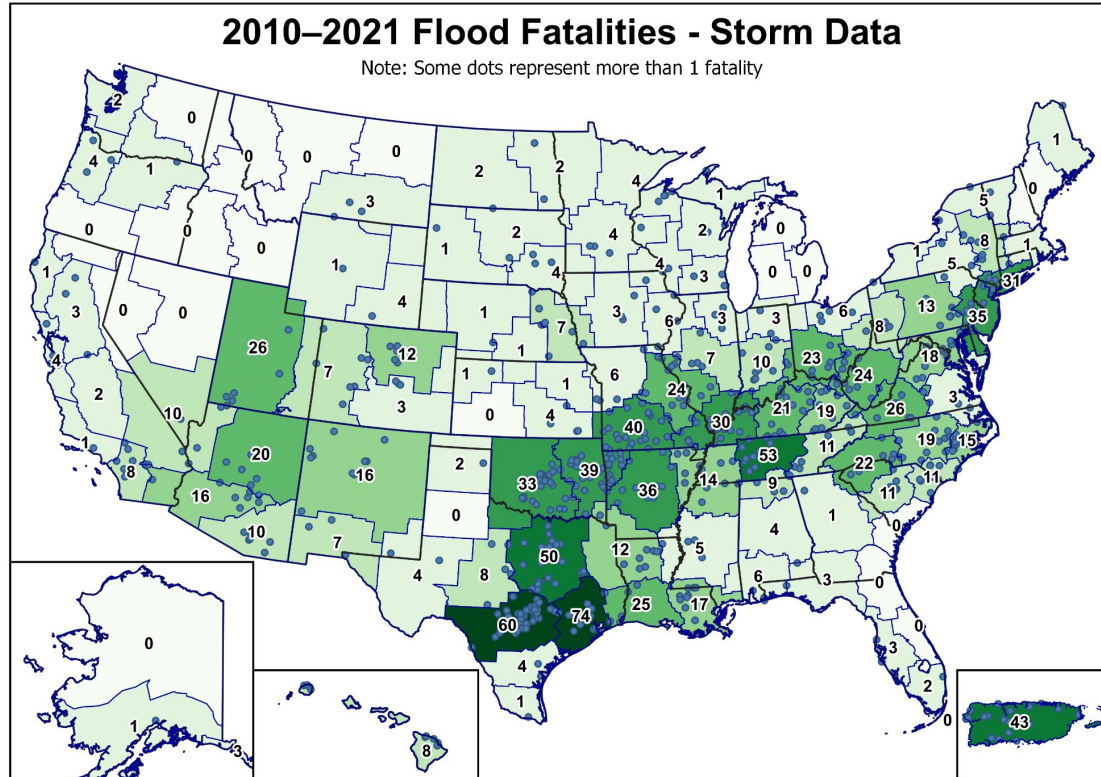
Reporting Flooding

Flood Risk





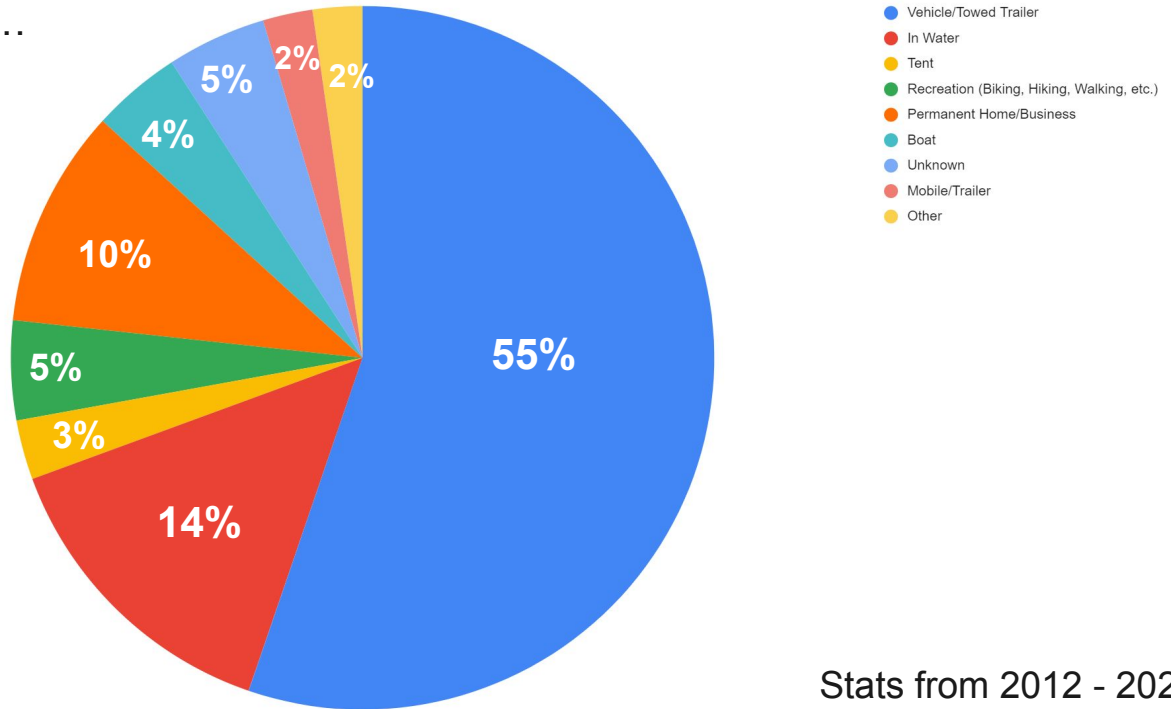
Importance of Flooding



Flood Fatalities

Where TX flood fatalities occur...

- 55% in Vehicles
- 14% in Water
- 10% in Homes



Stats from 2012 - 2023

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

Imelda 2019

Other historic floods...

Tropical Storm Allison

1994 Flood

Tropical Storm Claudette



Flooding Types and Causes

Flooding Basics...Why We Flood

- Easy...Too much water, too fast OR for too long!
- Every flood is different and there are a lot of variables



Characteristics of Flooding

Flash

River

Coastal

Urban

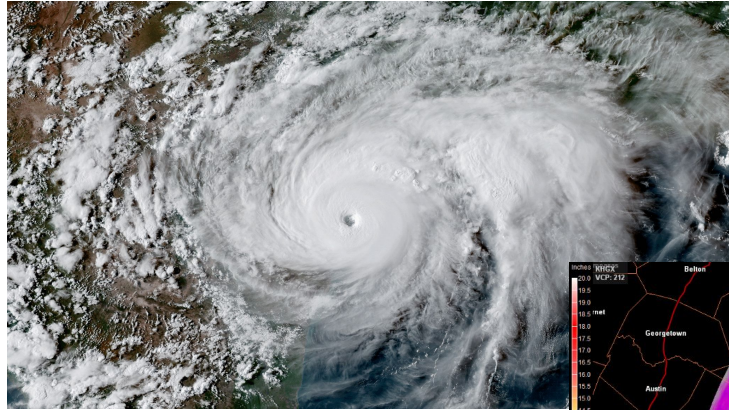
Slow

Swift

Rural

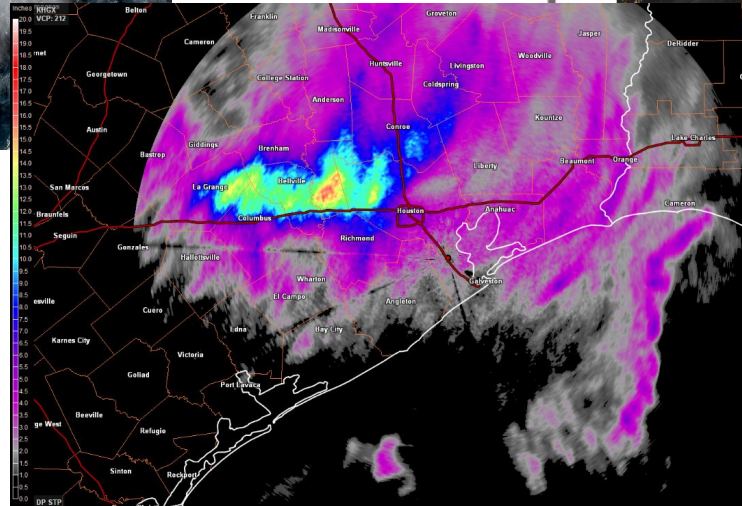
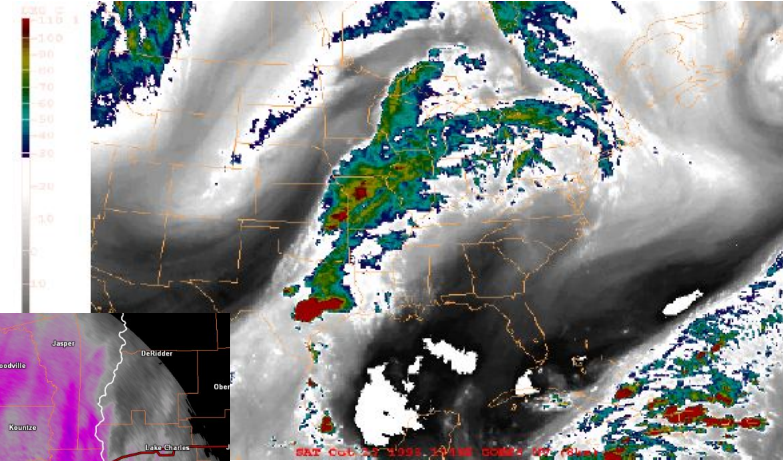


Common Setup for Southeast Texas Floods



Tropical Cyclone
(i.e. Harvey, Imelda,
Claudette, Allison, Ike)

**Frontal
System**



Mesoscale System
(i.e. Tax Day, Memorial
Day, Brenham Flood)

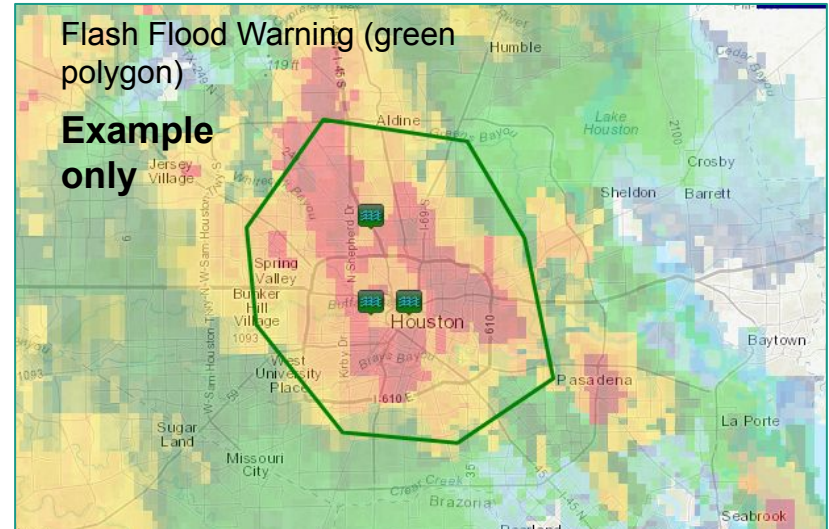
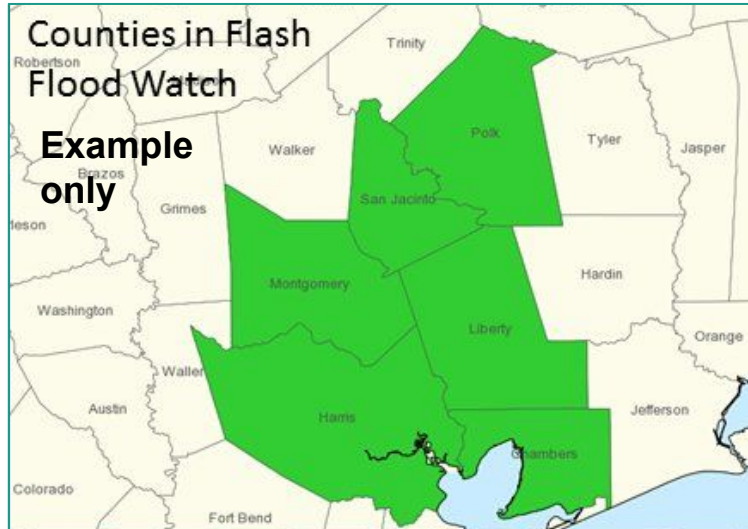


Flood Products

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

Damage Tags:
Base, Considerable, Catastrophic

Flood 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

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

Flood Advisory



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



Flash Flood Warning (Base)

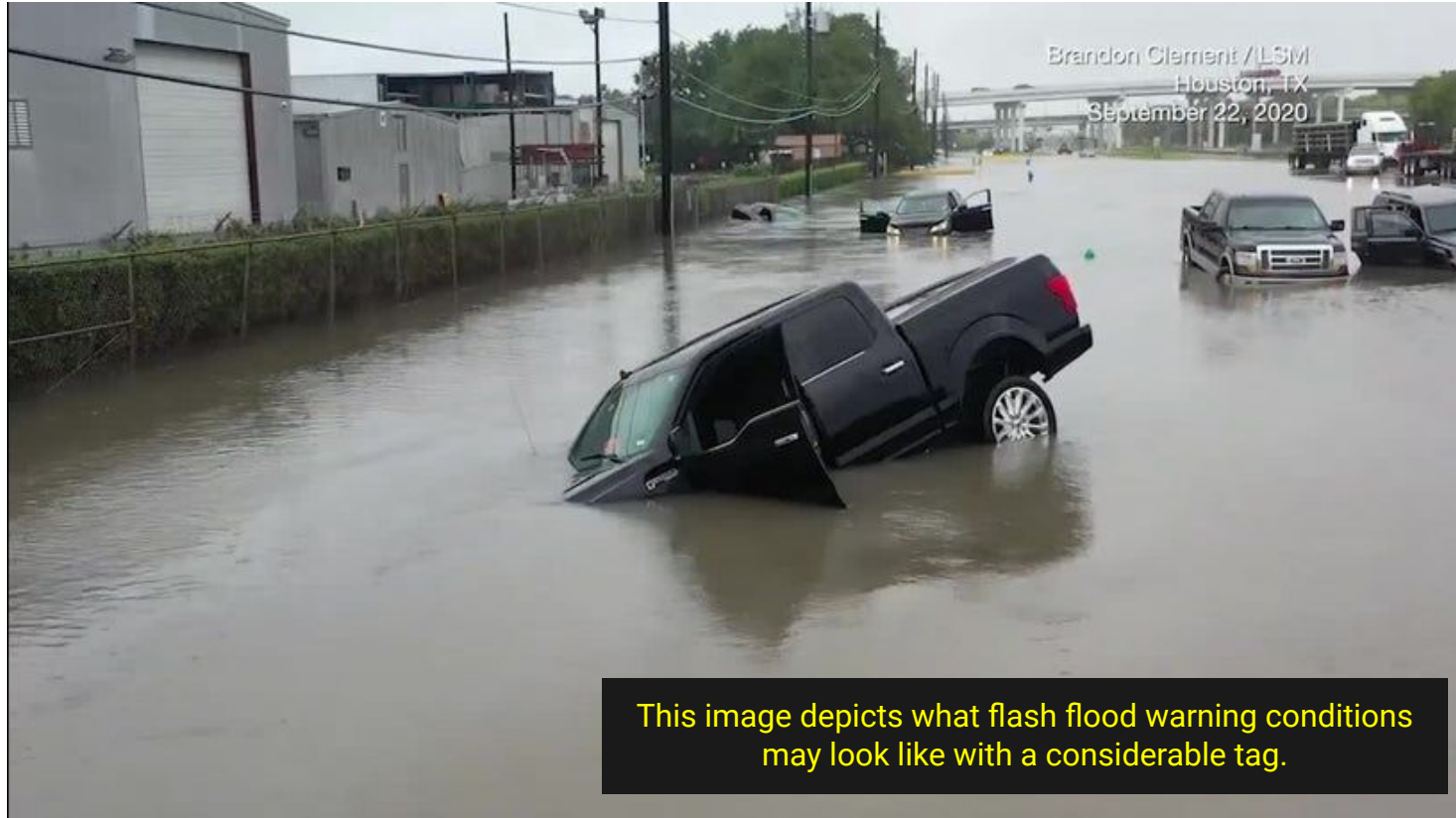


This image depicts what flash flood warning conditions may look like with a base tag.



Flash Flood Warning

(Considerable)






Flash Flood Emergency

(Catastrophic)



This image depicts what impacts may result from a Flash Flood Emergency (aka Flash Flood Warning with a catastrophic tag).

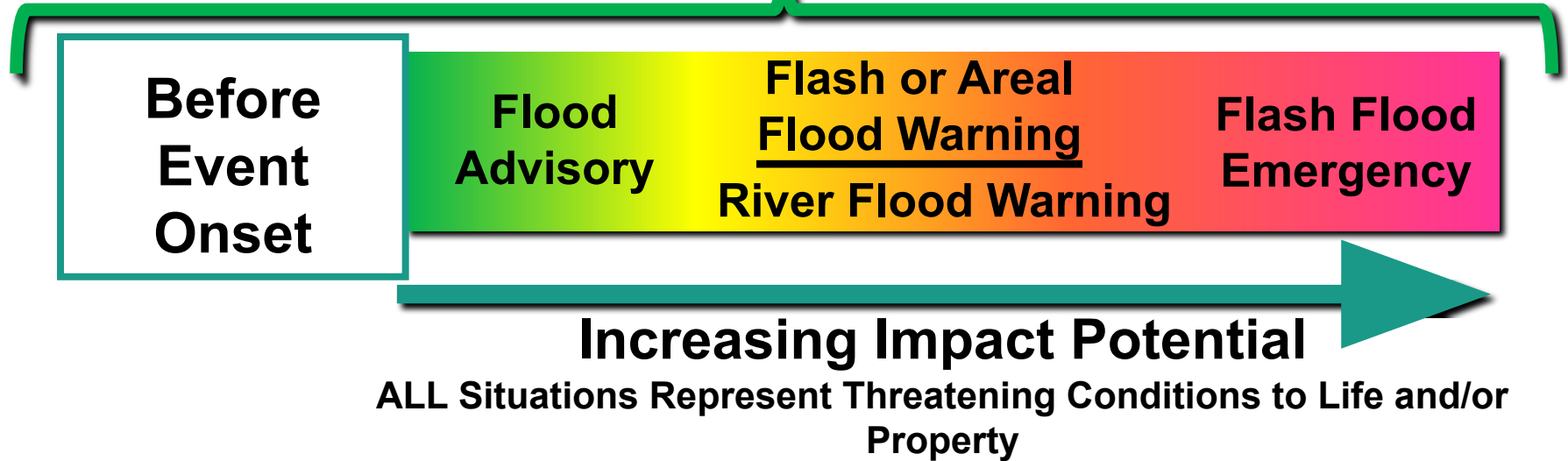


Flood Warning (Areal/ River/ Bayou)



This image depicts what conditions may look like with an Areal Flood Warning.

Flood Timeline



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

**Be sure to have multiple
ways to receive**

Ways to Receive a Warning

NOAA Weather Radio



Wireless Emergency Alerts and Weather Apps

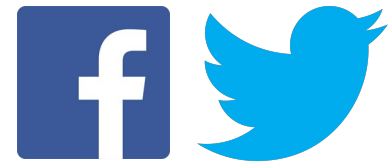


Considerable & Catastrophic ONLY

TV and Radio



Social Media



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



River Flooding

River Flooding



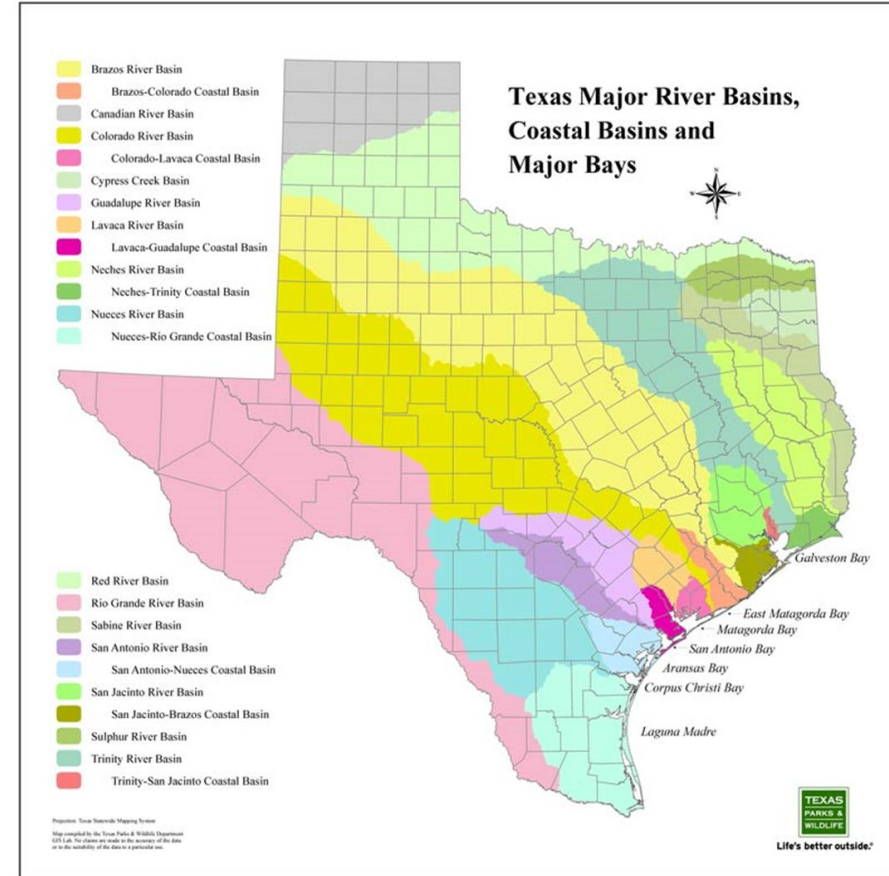
River flooding occurs when water escapes the river banks. There are different thresholds for river flooding: action, minor, moderate, major and record flooding. This image depicts what a river flooding looks like.

Llano River Flooding



Watershed

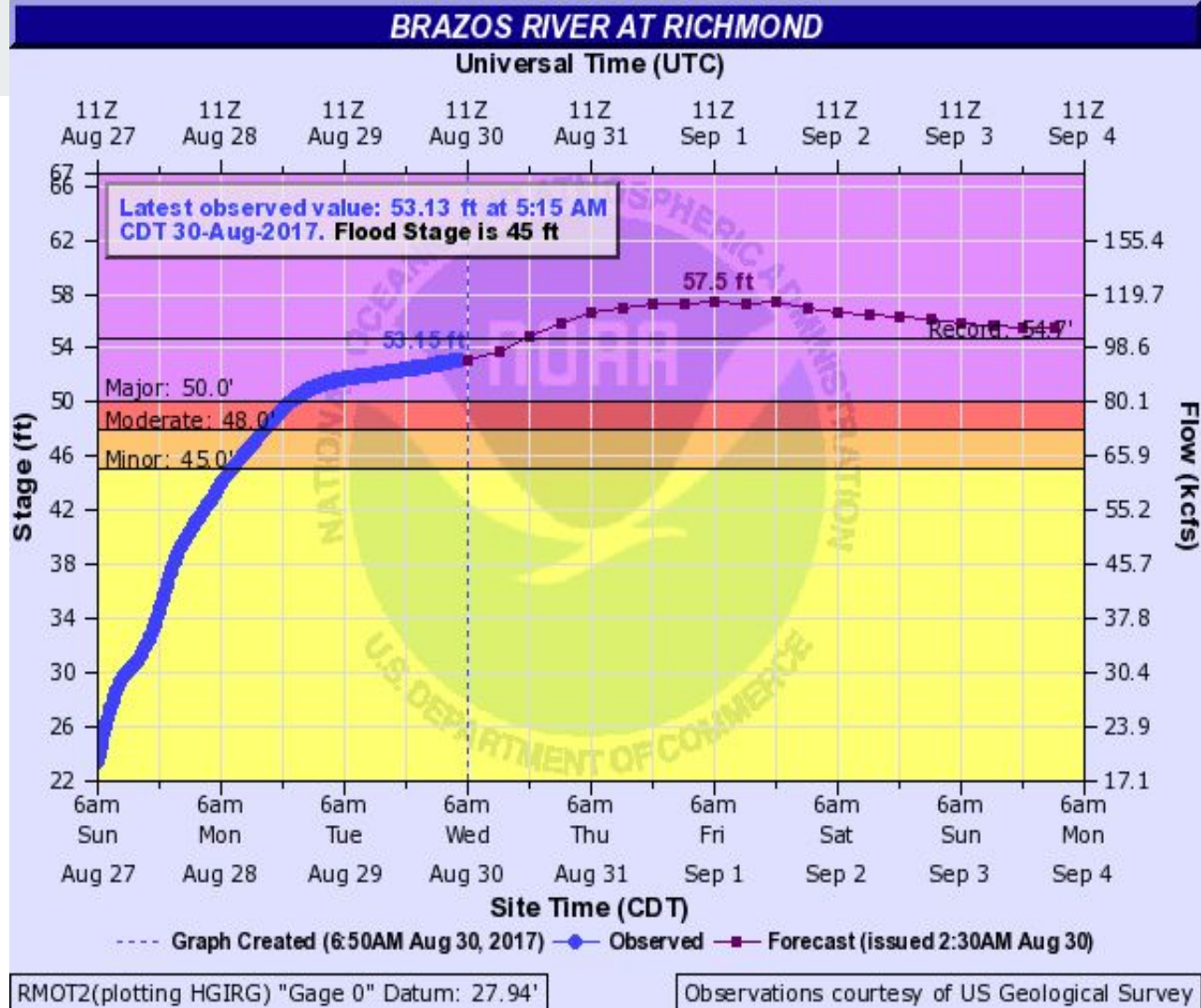
- A watershed, or basin, is an area of land that drains runoff from rainfall (stormwater) to a body of water, either a river, bayou, creek, or lake.
- Topography plays a big role in how watershed boundaries are defined.
- Watersheds vary in shape and size which ultimately lead to unique challenges.
-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



Diverse Watershed Characteristics in Texas

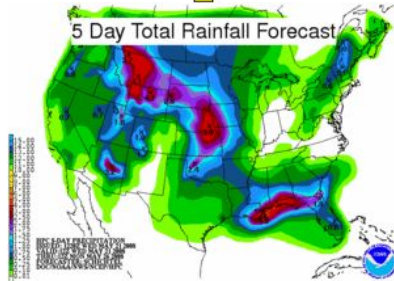
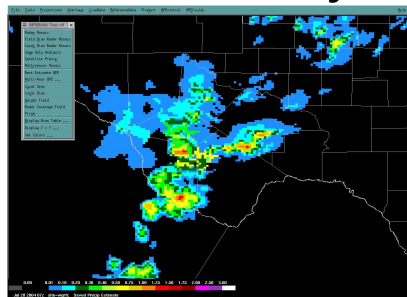


Hydrograph



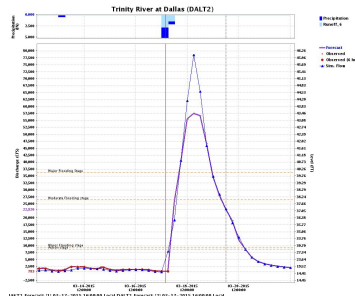
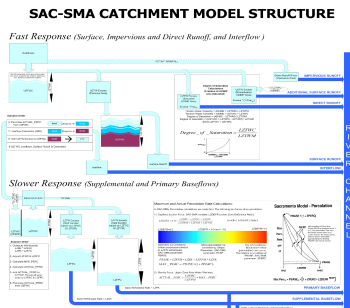
River Forecast Process

Rainfall Analysis



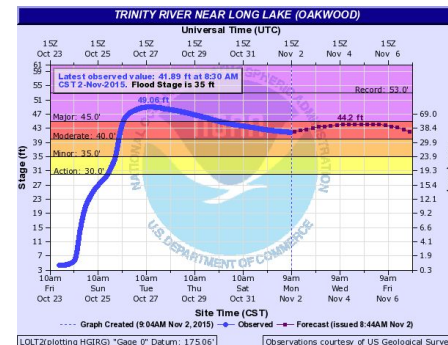
Rainfall estimates and forecasts merged into continuous dataset

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.NEM.KHGX.FL.W.0149.160529707302.00000070000Z/
'R/ROT2.1.ER.160529707302.160531706002.00000070000Z.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:

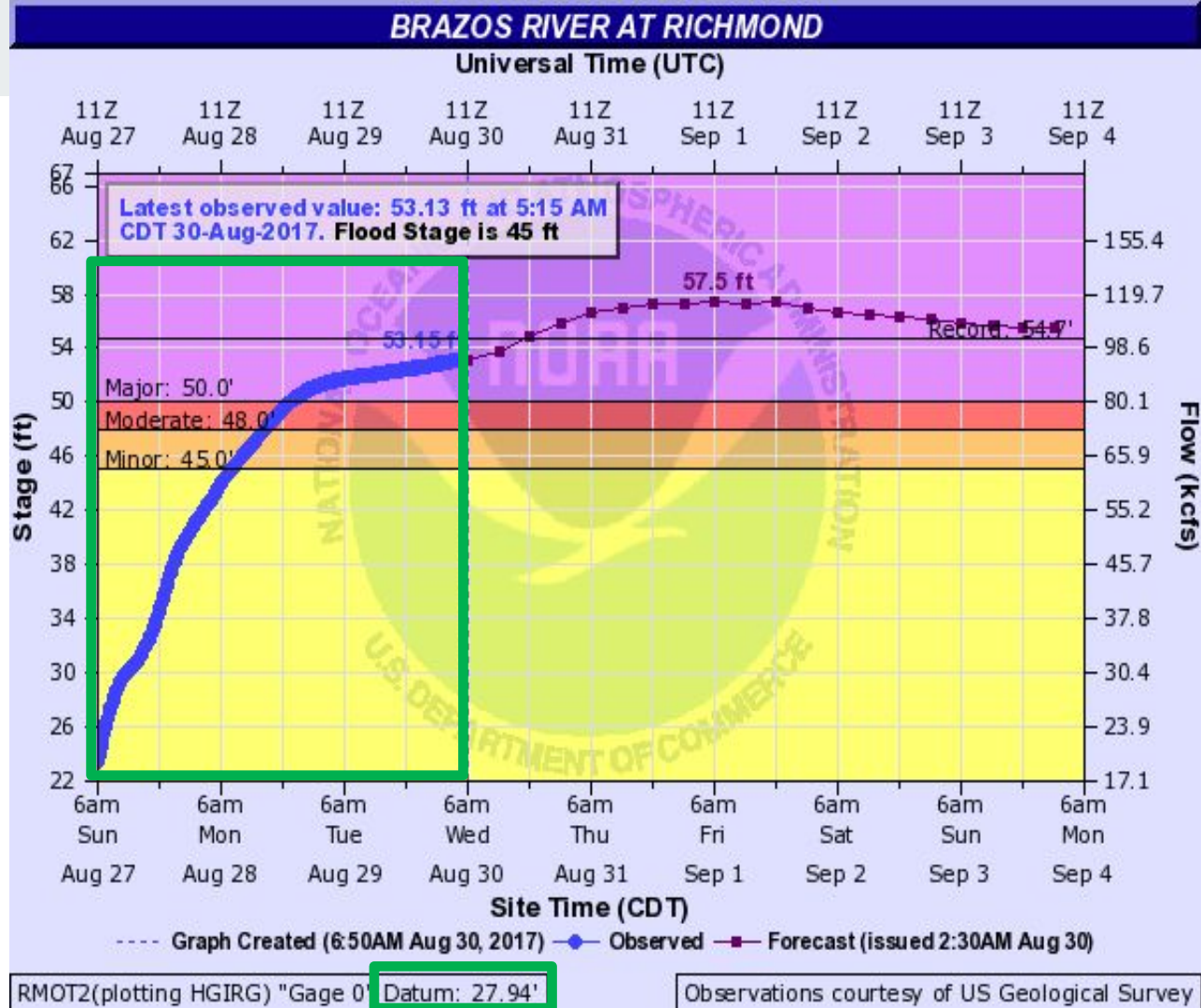
Of the gage the forecast is made, AT means the gage is in the limits of the town/city, NEAR or NR means that town/city has the closest post office



Hydrograph Basics

OBSERVATIONS:
Past river stages

DATUM:
Adjustment to
mean sea level

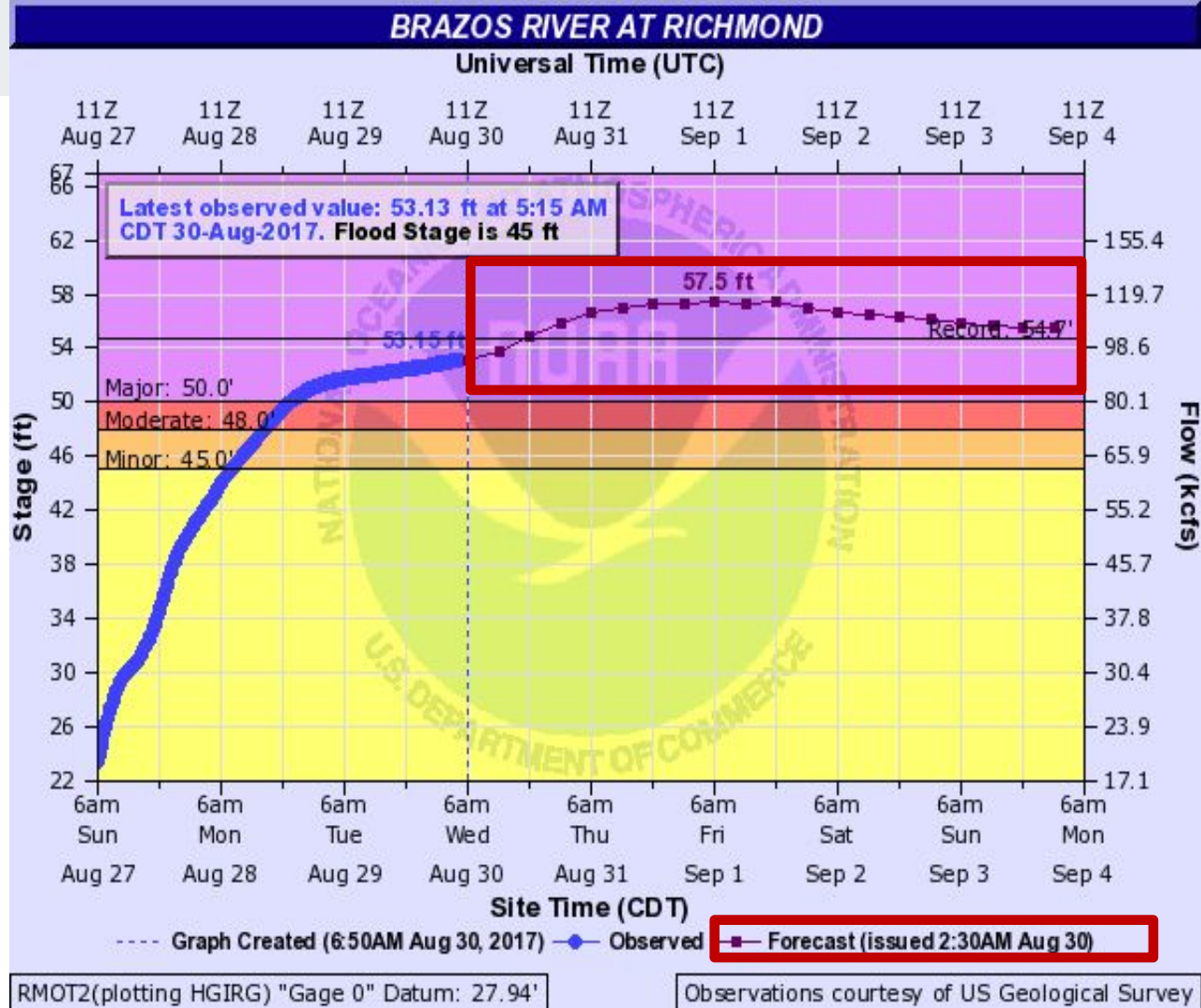


Hydrograph Basics



FORECAST:
Forecast River
Stages

CREST:
Peak Stage

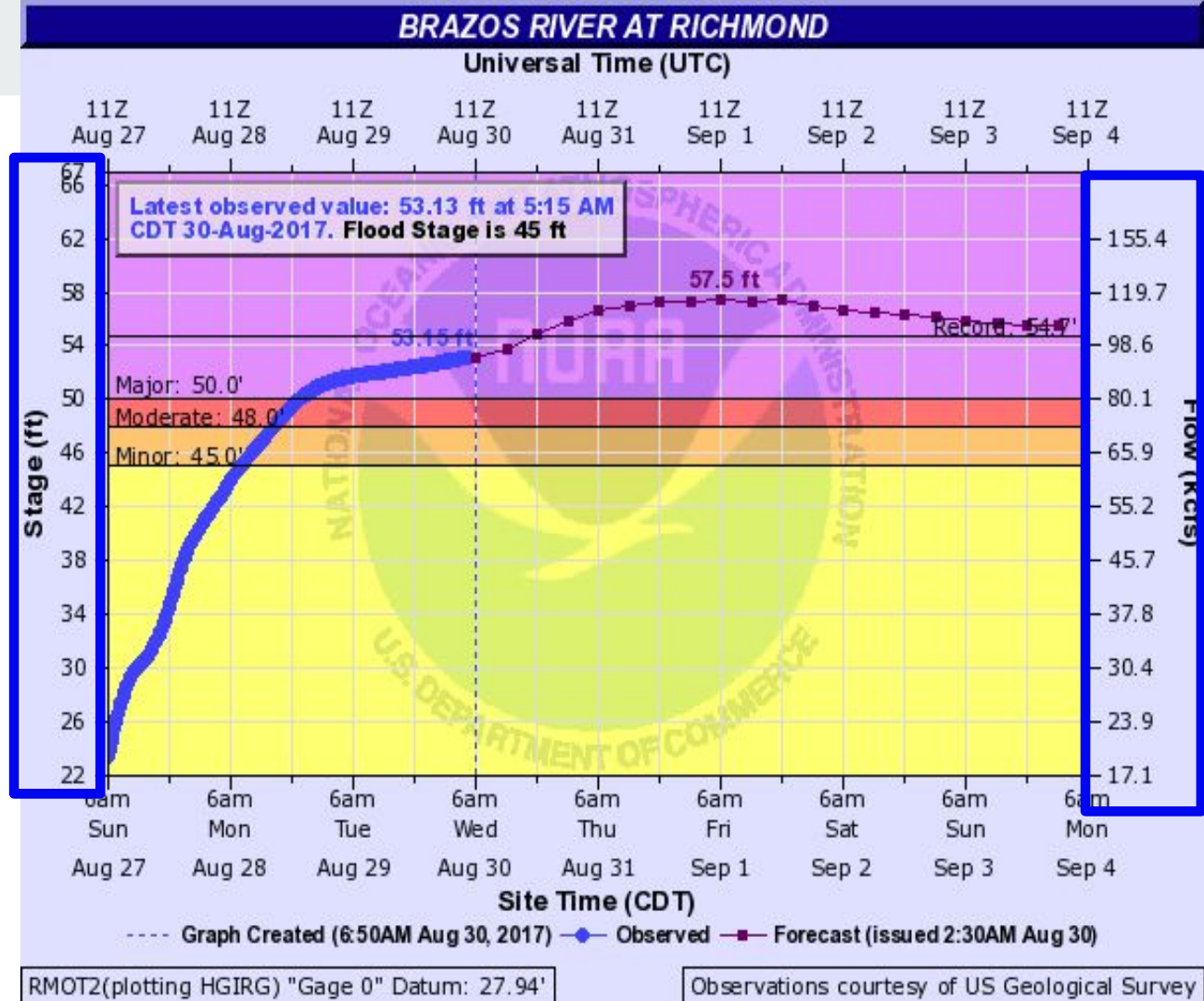


Hydrograph Basics

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

Good

ACTION

Watch

MINOR

Roads

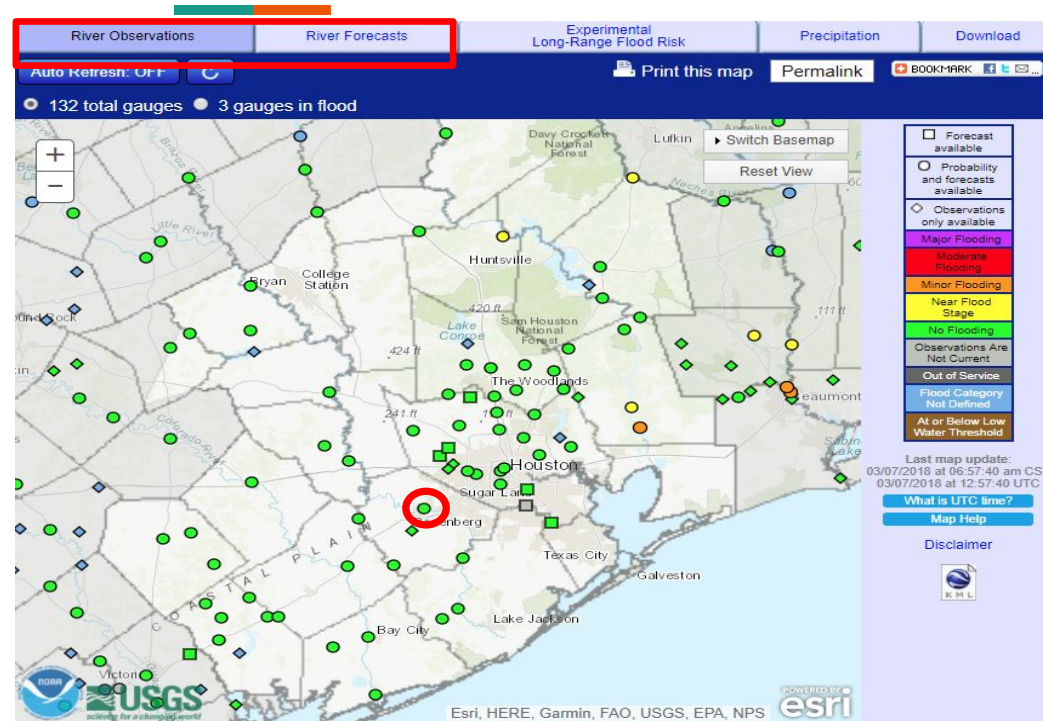
MODERATE

Structures

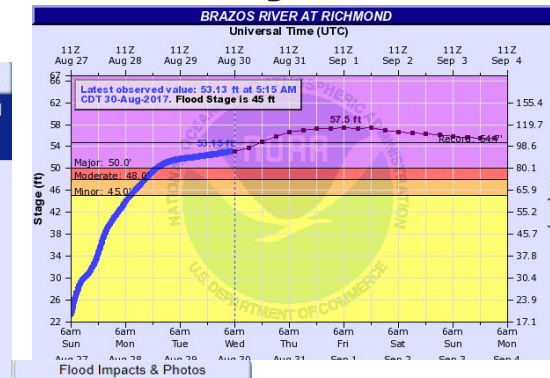
MAJOR

Widespread Structures/Major Roads

Advanced Hydrologic Prediction System



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



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

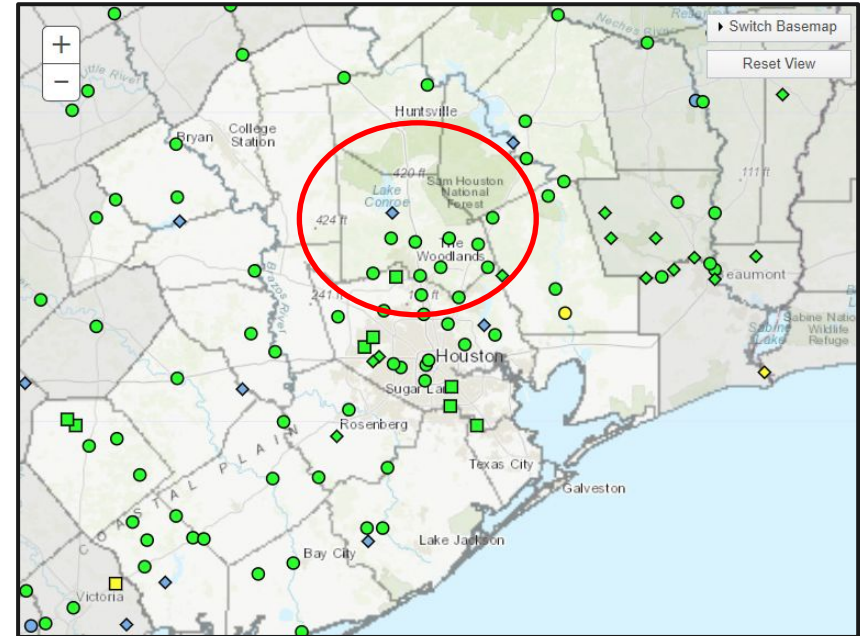
[Collapse](#)

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

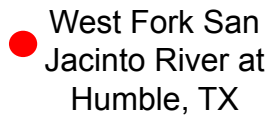
- Major flooding continues with significant home flooding in the following areas: Valley Lodge near Simonton, Bar Rd, Baker Rd/Cumings Rd/Rio Brazos area north of Rosenberg, Edgewood/Baudet Rd in Richmond, and FM 2759 near Thompsons. Low lying homes in Grand River, Rivers Edge, Pecan Estates in Thompson,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

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.
- Topography plays a big role in how watershed boundaries are defined.
- Watersheds vary in shape and size which ultimately lead to unique challenges.
- A watershed can flow into another watershed.
- **Montgomery County deals with 1 primary watershed: San Jacinto River.**
- **NWS issues river forecasts for 10 sites in and around Montgomery County.**



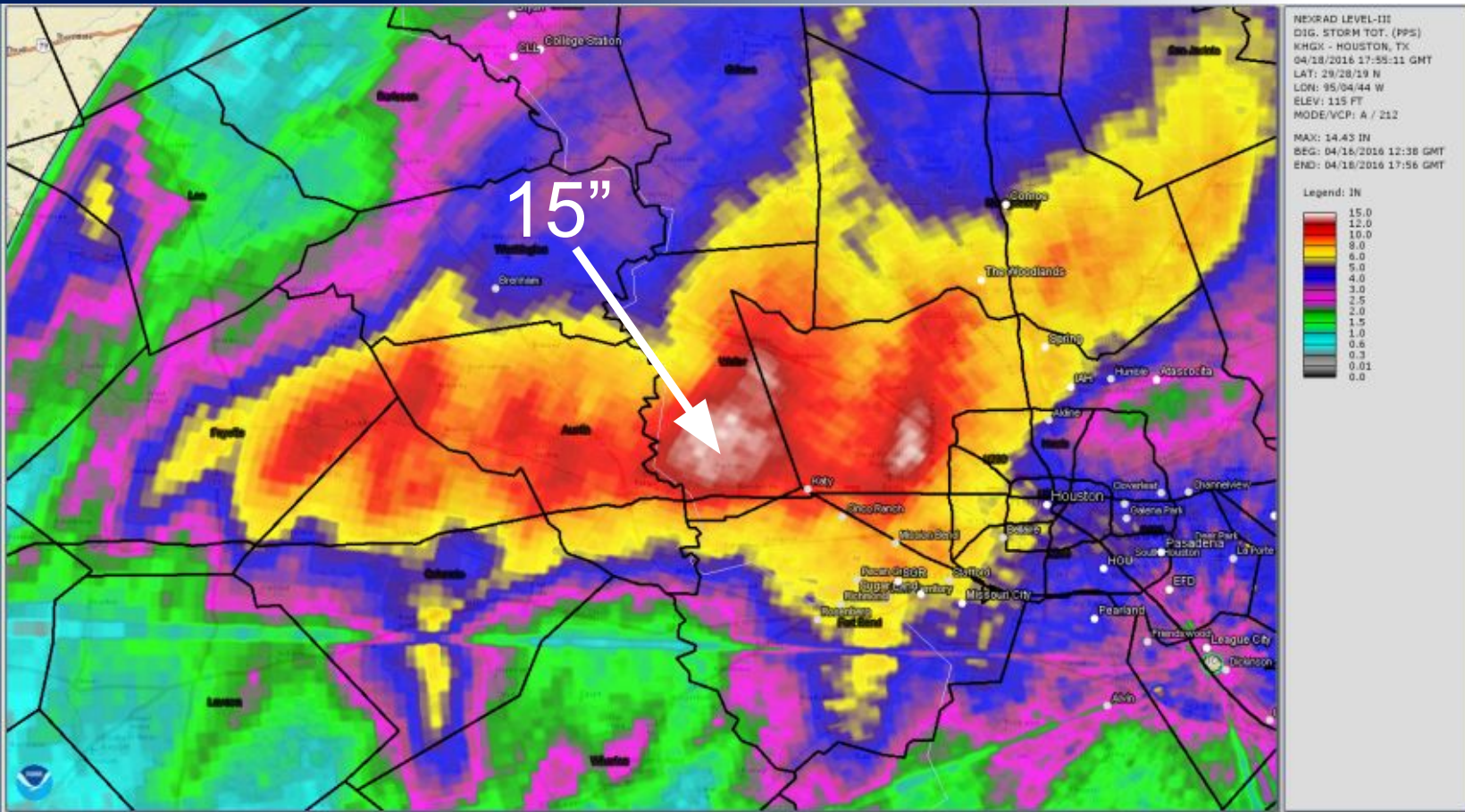
Upper San Jacinto River Watershed Map

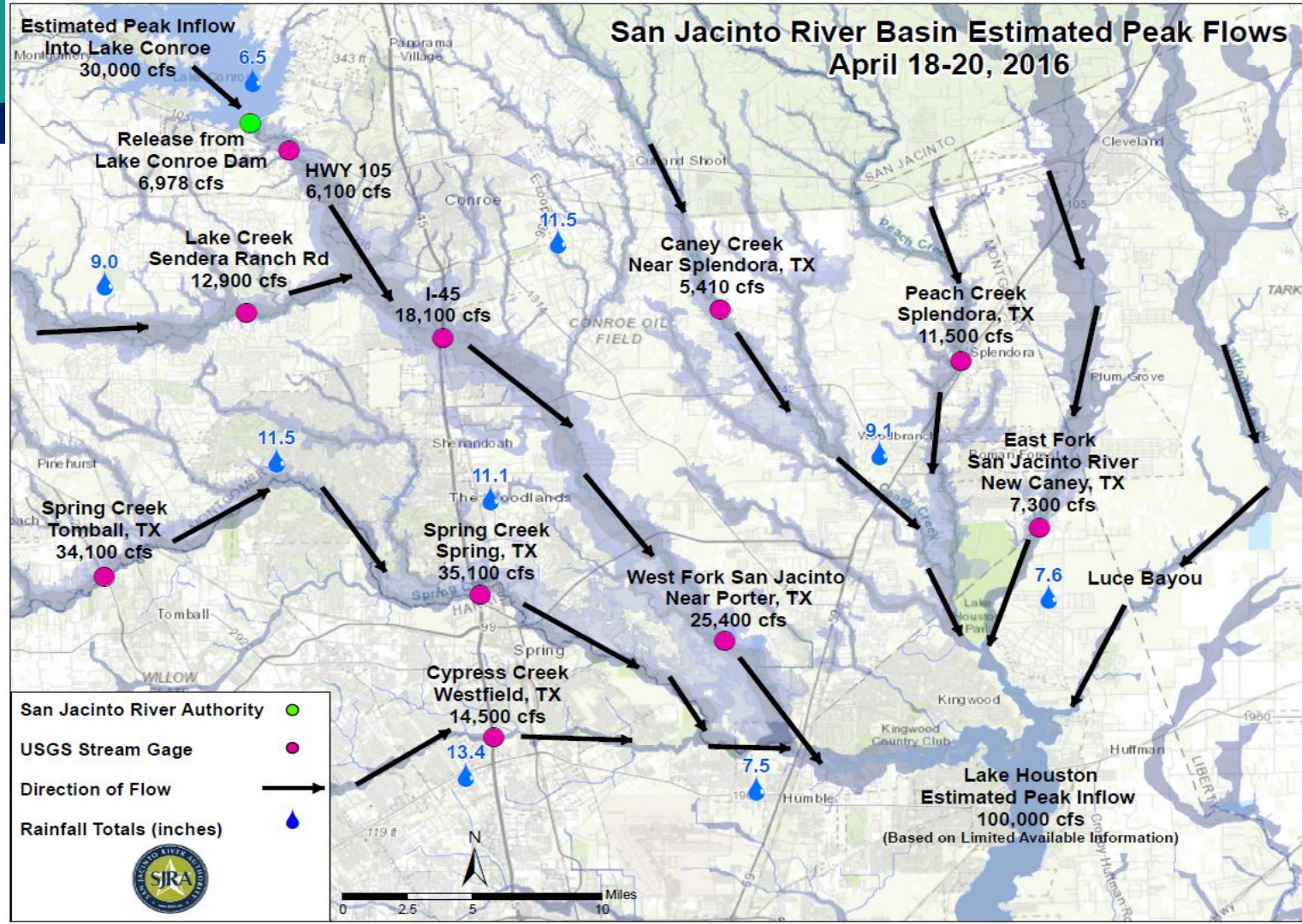




Tax Day 2016 Event

National Weather Service Houston/Galveston



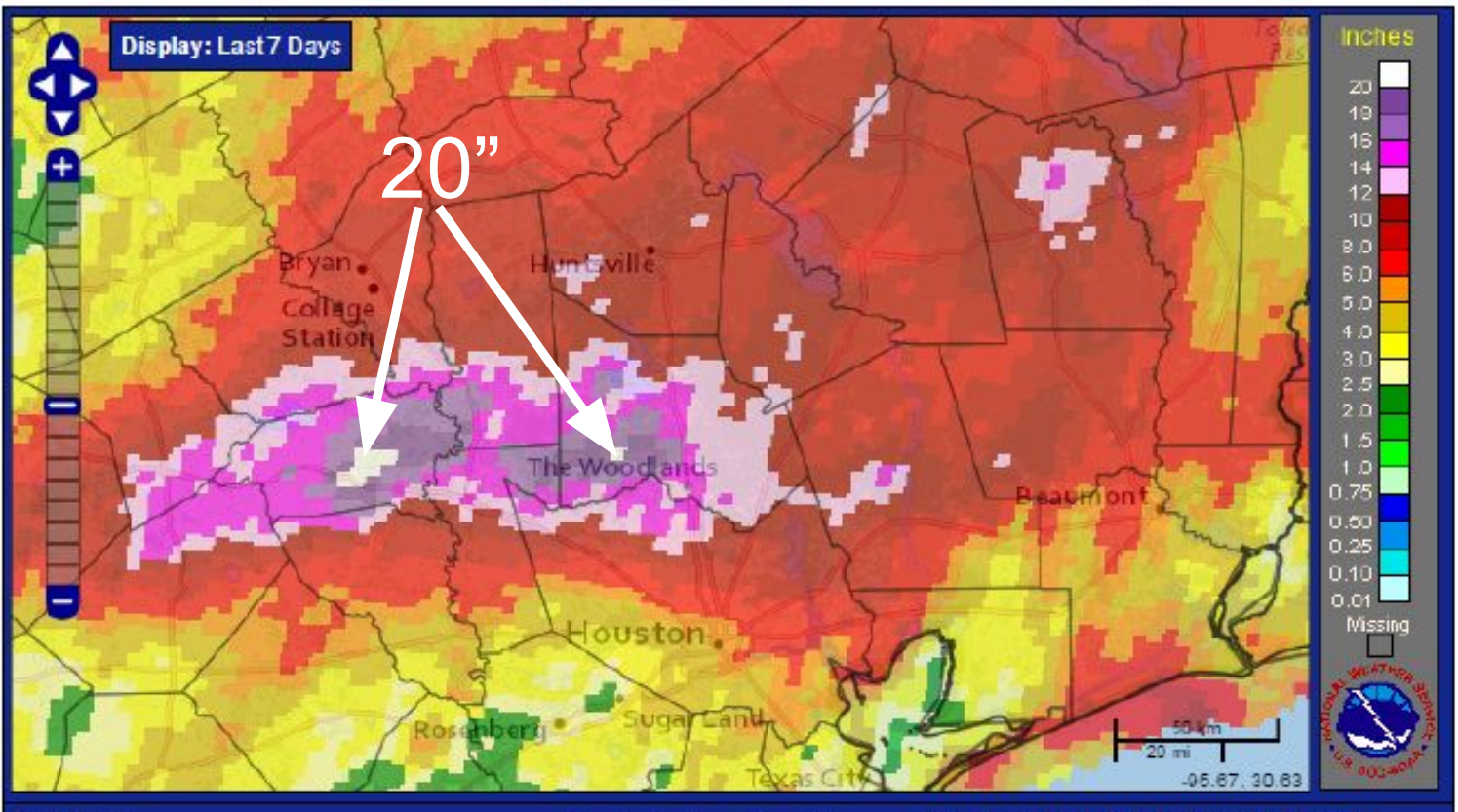




Memorial Day 2016 Event

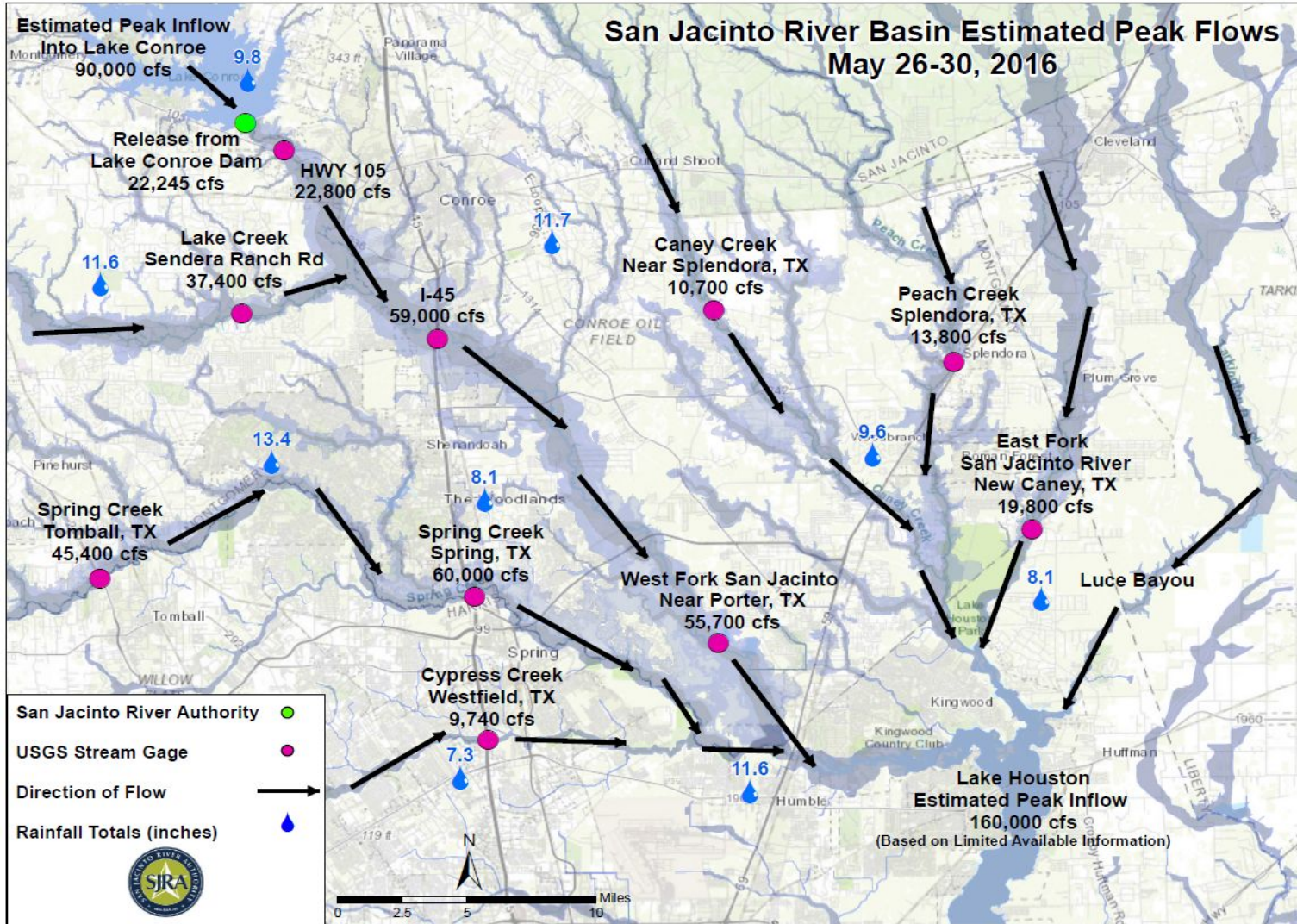
National Weather Service Houston/Galveston

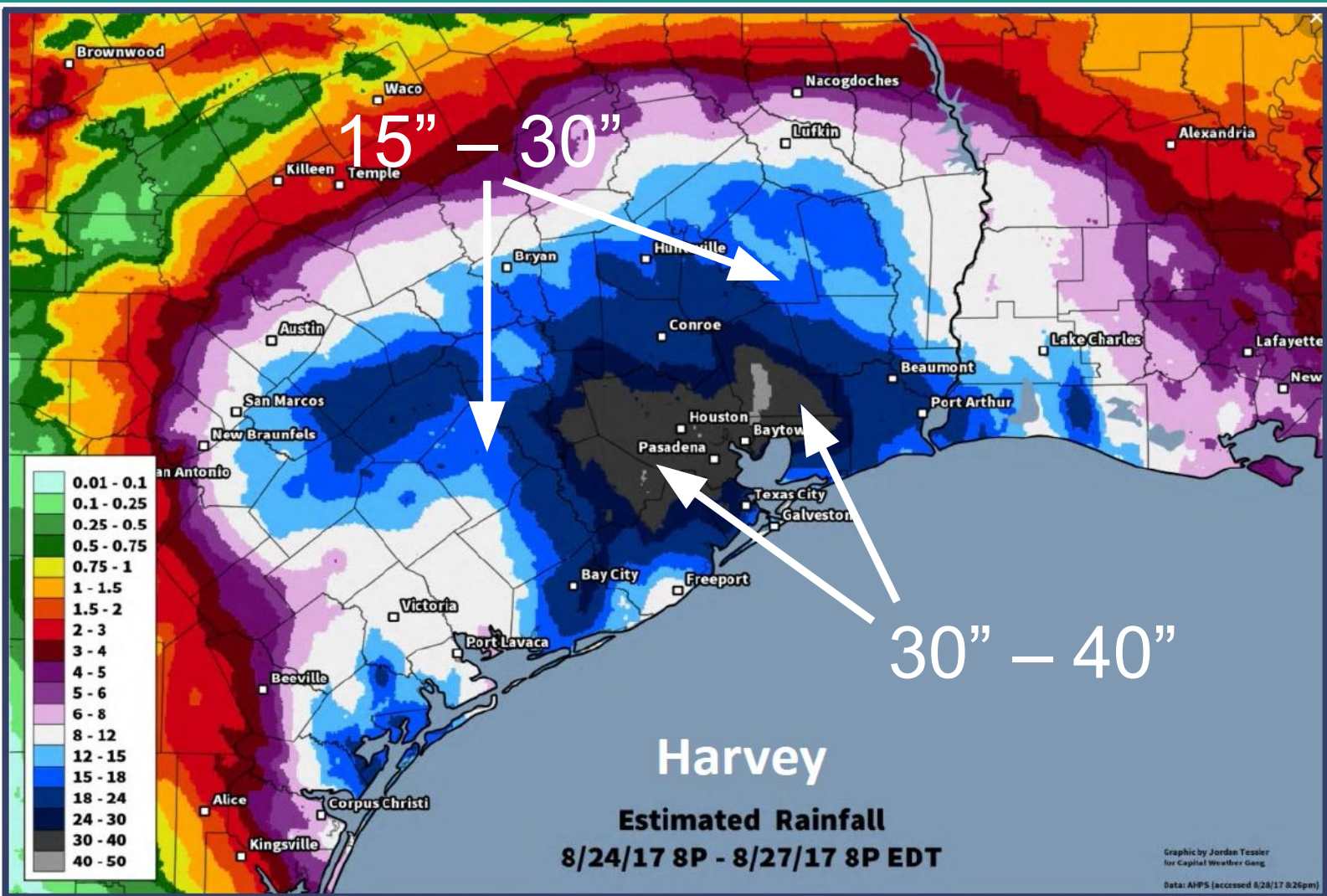
[Precipitation Map](#) [Download Shapefiles](#) [About this Page](#) [Other Useful Information](#) [Survey & Feedback](#)

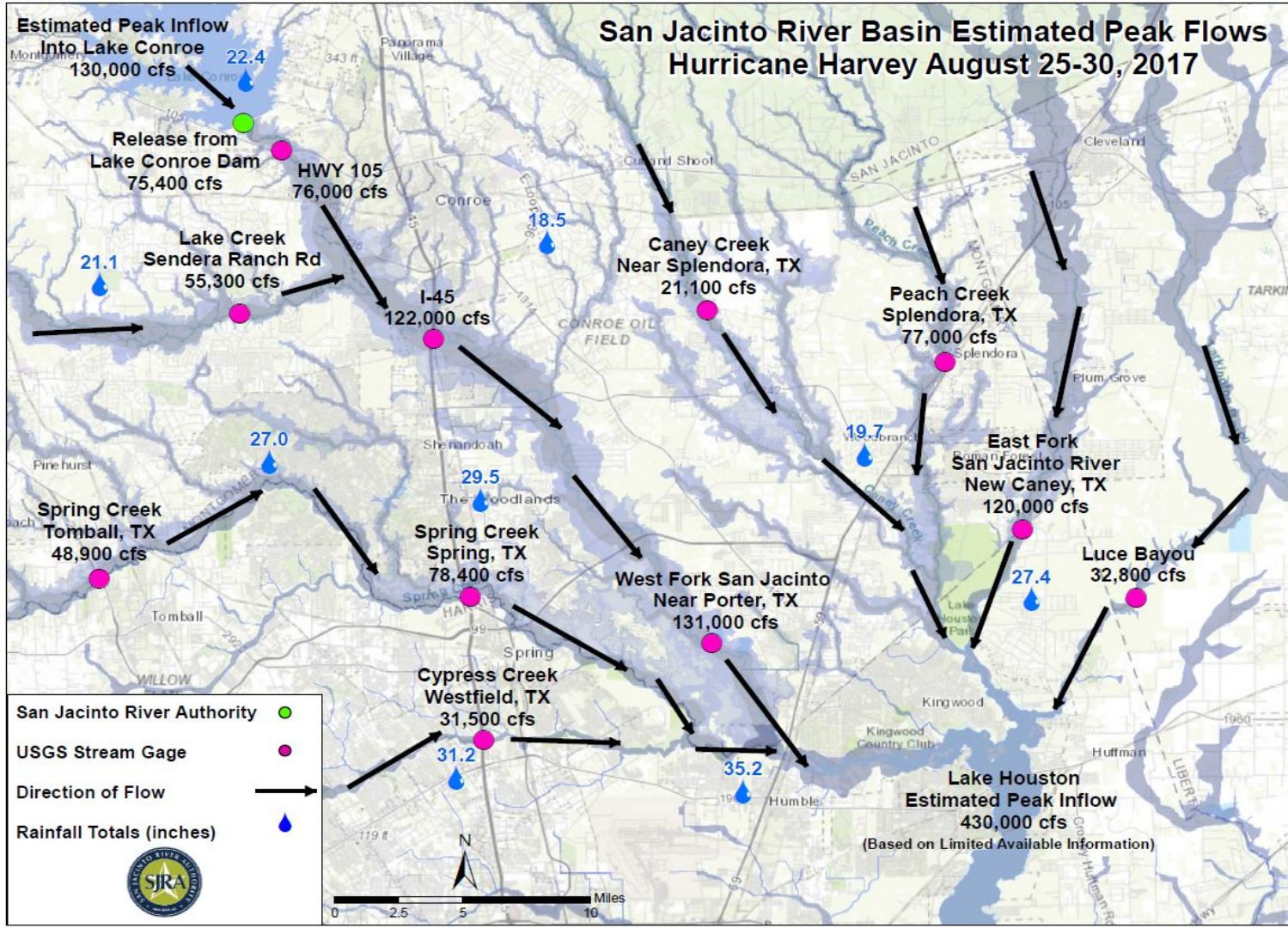




San Jacinto River Basin Estimated Peak Flows May 26-30, 2016









Partners

Partners



Roles of Primary River Forecast Partners



**US Army Corps
of Engineers®**

- Operate Flood Control Reservoirs
- Manage Other WR Projects



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



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



**US Army Corps
of Engineers®**

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



- Gage Maintenance
- Stream Measurements
- Focus Stream Gage Network



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

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 ft³/s ☒ Recent value: 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](#).

[Related Information](#)



USGS Water Alerts:

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

San Jacinto
River Authority



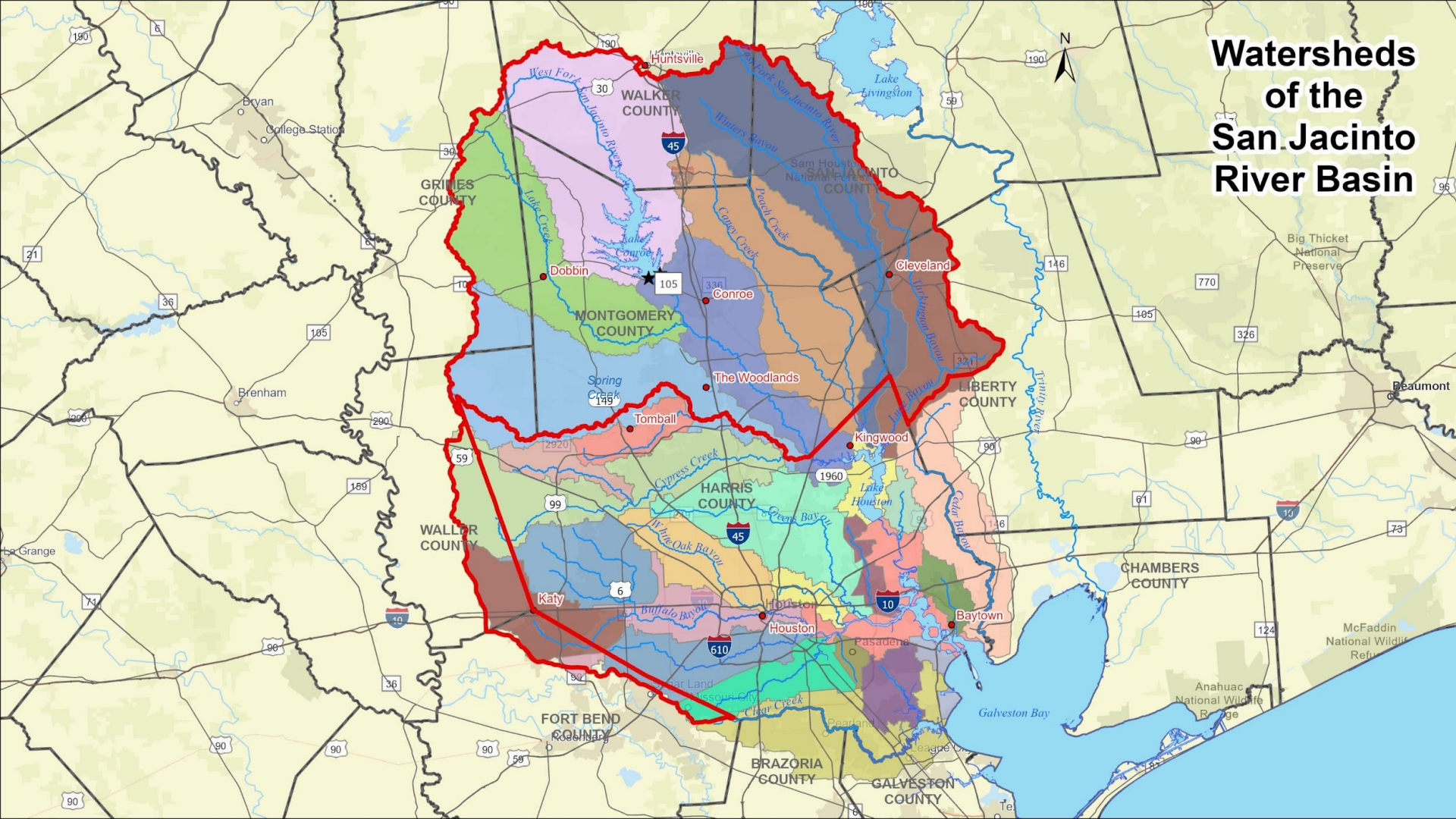
SJRA's Flood Management Division



Creation of SJRA

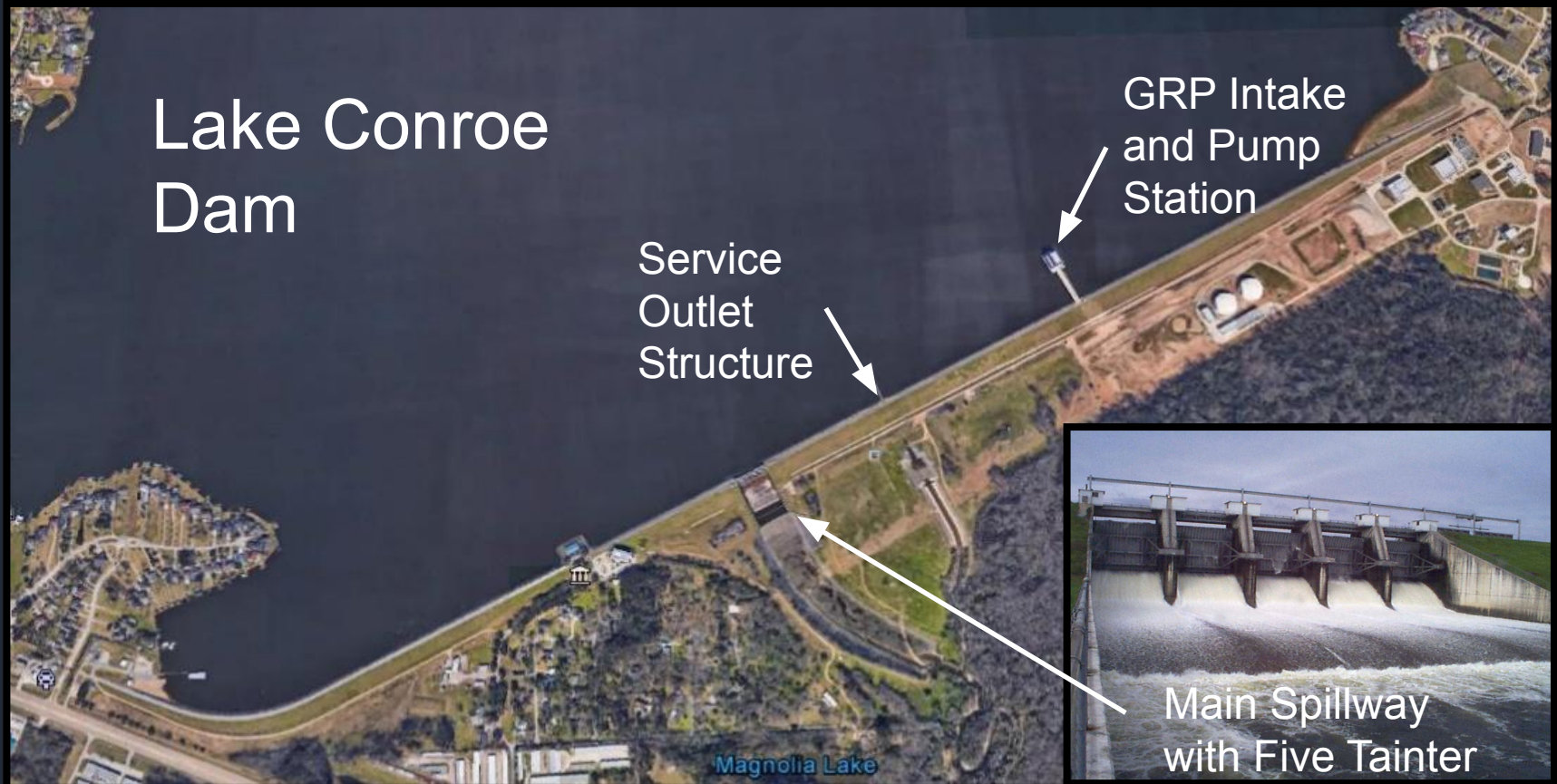
- 1937: SJRA was created by the Texas Legislature with a mission to develop, conserve, and protect the water resources of the San Jacinto River Basin.
- SJRA's jurisdiction includes the entire San Jacinto River Basin and covers seven counties, partly or entirely, but excludes Harris County.
- One of 12 major river authorities in Texas.
- Included four operating divisions (Woodlands, Highlands, Lake Conroe, GRP) until 2018, when the Flood Management Division was added.



[illegible]



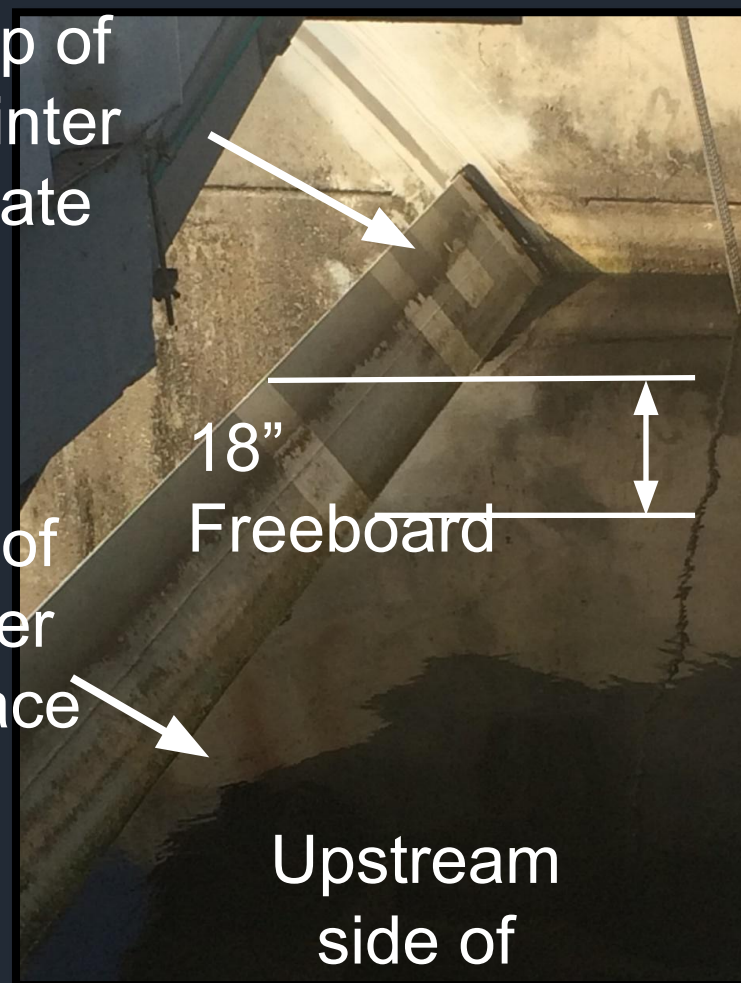
Key Points Regarding Lake Conroe Operations





Top of
Tainter
Gate

Top of
Water
Surface





Creation of the Flood Management Division

- **August 2017:** After Hurricane Harvey the call for flood control efforts in the San Jacinto River Basin resurfaced.
- **March 2018:** Governor Abbott calls on SJRA to become more involved with regional flood management.
- **April 2018:** SJRA Board and SJRA leadership create a new Flood Management Division.
- **May 2018:** SJRA staffs the Flood Management Division with Director of Flood Management and Project Coordinator.



Conroe, Hurricane Harvey



Flood Management Division





Reservoir Forecasting Tool

Flood Protection for the West Fork San Jacinto River Watershed Phase II:

- Develop an operational tool for the Lake Conroe watershed using the following:
 - Real-time data from the rain gages
 - Precipitation forecasts from NWS
 - Stream flow
 - Current lake level
 - Current gate position
- Provide more accurate data to estimate the peak lake level and peak discharge during rainfall events





Temporary Seasonal Lake Lowering

- Normal pool level is 201' msl
- All releases come from COH's 2/3 share of permitted water supply in Lake Conroe
- Seasonal lowering will occur:
 - **Spring**: *April 1- May 31 to 200'*
 - Gradual reduction starts *April 1st*
 - Recapturing starts on *June 1st*
 - **Fall**: *August 1-September 30 to 199.5'*
 - Gradual reduction starts *August 1st*
 - Recapturing starts on *October 1st*
 - If a named storm is predicted to impact our region, COH may initiate an additional release of six inches (to 199' msl) by notifying SJRA in writing of their call for release





Master Drainage Plan

San Jacinto Regional Watershed Master Drainage Plan

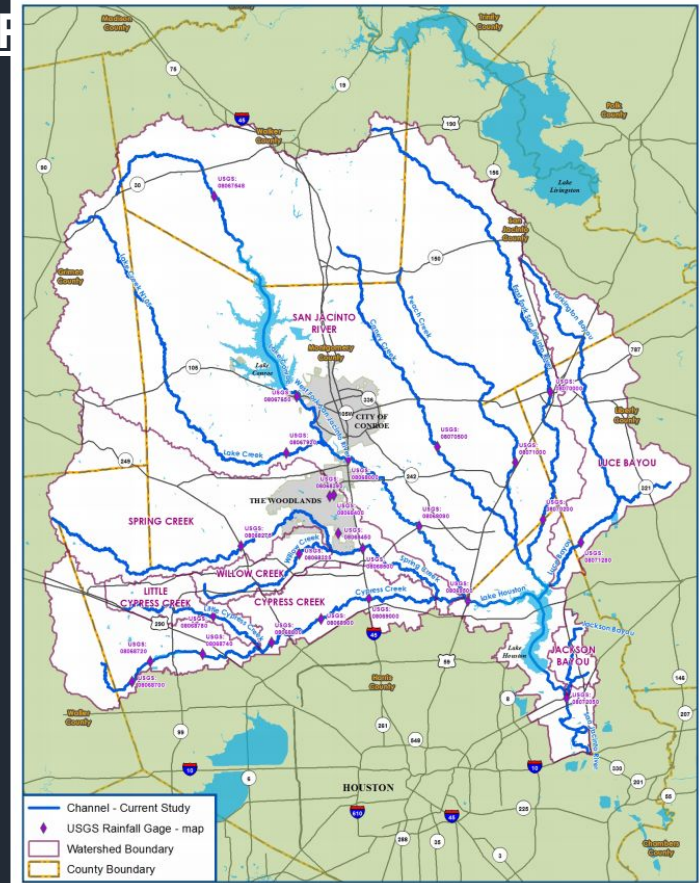
3,000 SQUARE MILES OF STUDY AREA

The watershed for the streams to be studied covers an expanse of nearly 3,000 square miles, located in seven different counties:

- Grimes County
- Harris County
- Liberty County
- Montgomery County
- San Jacinto County
- Walker County
- Waller County

The study includes approximately 535 miles of stream, including West Fork San Jacinto River, East Fork San Jacinto River, San Jacinto River, Lake Creek, Cypress Creek, Little Cypress Creek, Spring Creek, Willow Creek, Caney Creek, Peach Creek, Luce Bayou, Tarkington Bayou, and Jackson Bayou.

Stream Name	Stream Length (Miles)
West Fork San Jacinto River	61.4
East Fork San Jacinto River	73.2
San Jacinto River	16.3
Lake Creek	58.9
Cypress Creek	60.5
Little Cypress Creek	20.8
Spring Creek	69.6
Willow Creek	19.8
Caney Creek	49.3
Peach Creek	53.5
Luce Bayou	10.8
Tarkington Bayou	36.9
Jackson Bayou	4.6
Total	535.6





Master Drainage Plan

San Jacinto Regional Watershed Master Drainage Plan:

- Develop H&H models that will help predict flood risks in the study areas.
- Evaluate flood mitigation measures.
- Evaluate sediment management strategies.
- Analyze existing watershed conditions.
- Identify flood mitigation projects that will potentially reduce the flood risk in the study area.
- Study Goal: to identify vulnerabilities to flood hazards and develop a comprehensive flood mitigation plan.

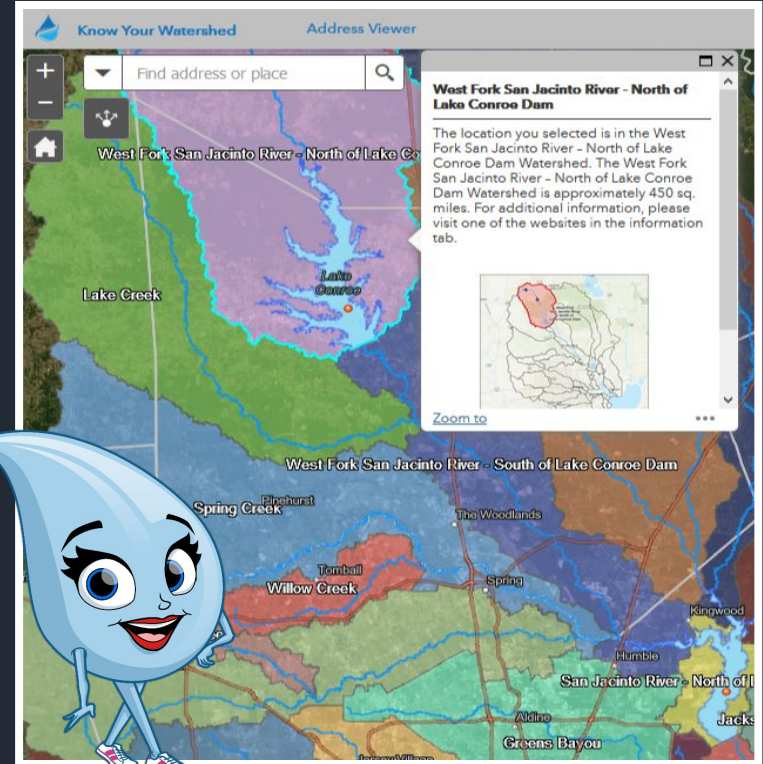




Know Your Watershed

Know Your Watershed Campaign:

- Provides the public with a better understanding of the watersheds in the San Jacinto River Basin, as well as how watersheds interact in the basin.
- The first phase of the campaign consists of two tools:
 - An address viewer to show residents the watershed they reside in.
 - An interactive story map that gives viewers an educational digital “tour” of the West Fork of the San Jacinto River.

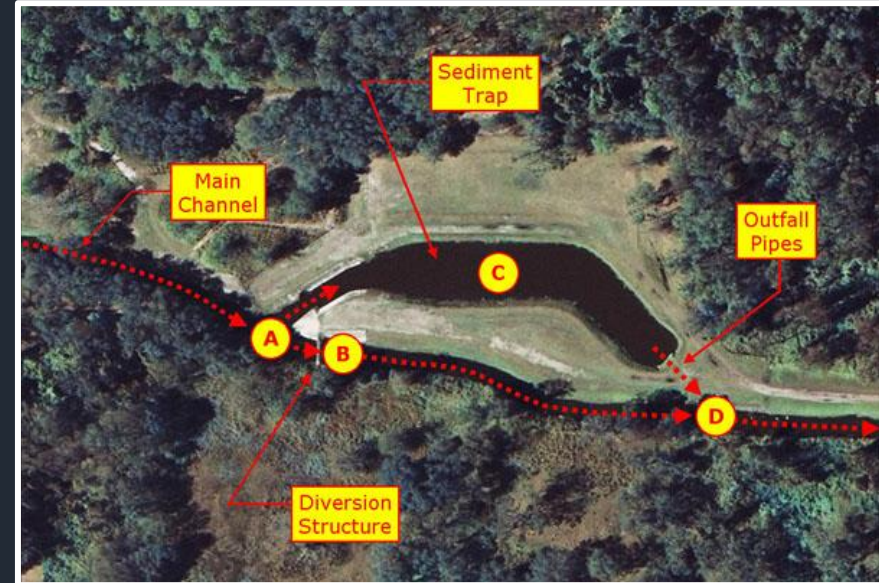




Sediment Management

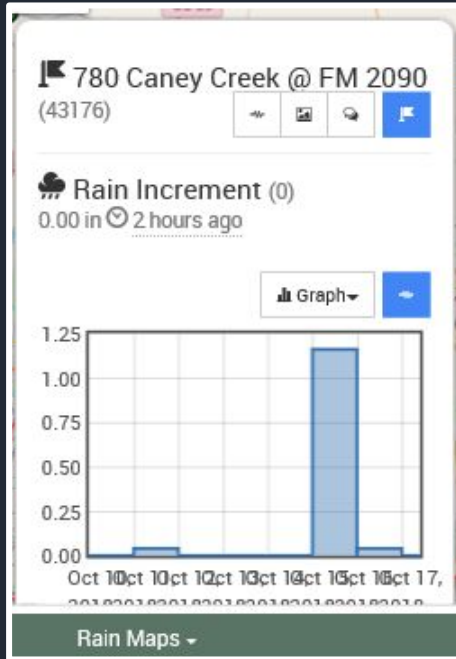
Sediment Management Program:

- SJRA has coordinated with aggregate companies operating along the West Fork to identify opportunities to minimize sediment migration and remove materials from the river that may be impeding water conveyance.
- HB 1824 passed the 86th Legislature and exempts SJRA and HCFCD from state permitting and royalty fees for sand and gravel removal in the San Jacinto River and its tributaries.
- Currently partnered with HCFCD and





SJRA Contrail System



Lake Conroe

Lake Level

Lake Conroe (43306)
Pressure Sensor (7)

201.34 Feet
3 minutes ago

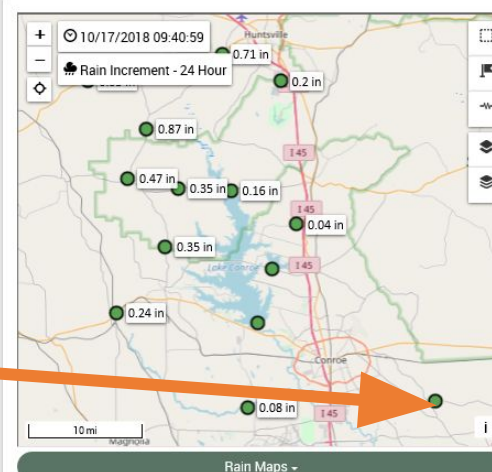
Lake Conroe (43306)
Lake Release (1581-A)

1,059 cfs
6 hours ago

Lake Conroe (43306)
Seasonal Lowering Flow (1531-B)

0.00 cfs
2 months ago

Lake Conroe (43306) Pressure Sensor (7)



Lake Level per USGS site
ID: 08067600 LK Conroe
nr Conroe, TX

201.01ft.
as of 9-22 11:15
(Normal Pool=201ft)

Lake Release

0 CFS

Air Temperature

77 DEG. F

Wind Direction

158 DEG.

Wind Speed

4.93 MPH

Barometric Pressure

25.1 in

Water Temperature

87.4 deg F

Lake & River Conditions



SJRA Information

- www.sjra.net
- CivicReady-Text
- Constant Contact-Email
- Facebook
- Twitter

SJRA Media Relations

+ [2019 Press Releases](#)

+ [2018 Press Releases](#)

+ [2017 Press Releases](#)



CivicPlus



Sign up to receive email updates

We will send updates to your email address.

* Email Address

* First Name

* Last Name

* Phone Number

* Address

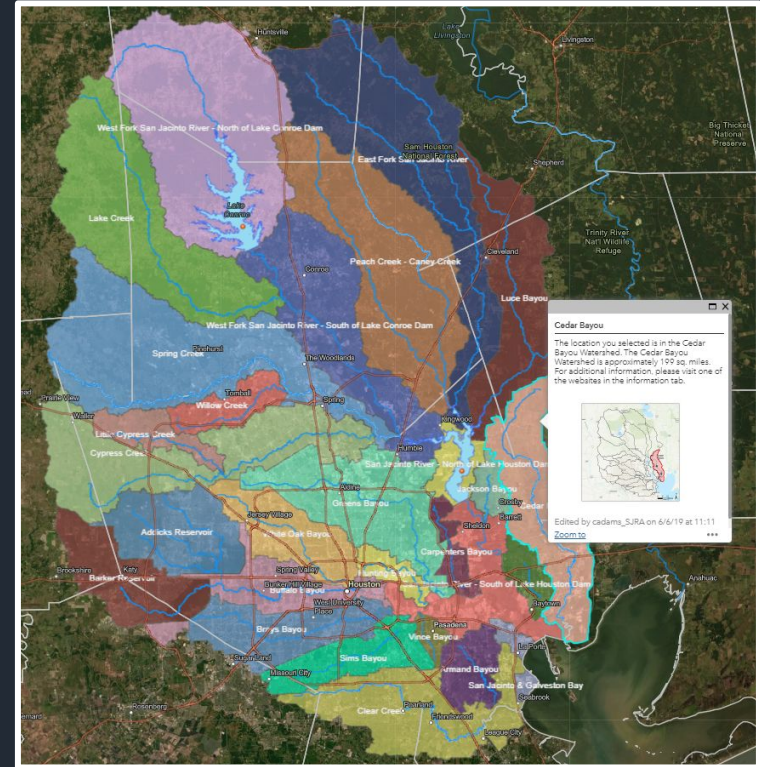
Zip Code

* Company



Other Resources

- SanJacStudy.org
- KnowYourWatershed.com
- gis.mctx.org/gallery.html
- HarrisCountyFWS.org



MONTGOMERY COUNTY

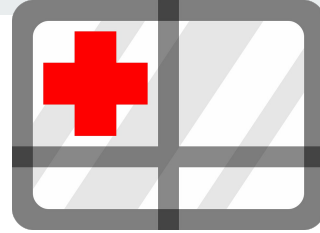
Office of Homeland Security and Emergency Management



Flood Safety

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

Safety Before a Flood

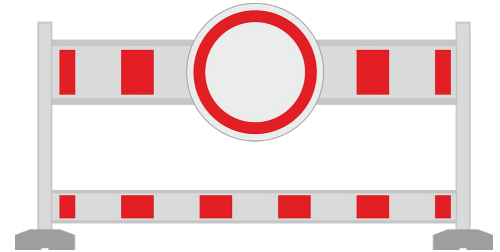


- Prepare a family disaster plan.
- Check if your insurance covers flood damages. If not, get flood insurance.
- Keep insurance and other important documents, such as copies of driver's licenses and credit cards, and other valuable items, in a safe place.
- Assemble a disaster supplies kit. Be sure to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

- 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



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

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

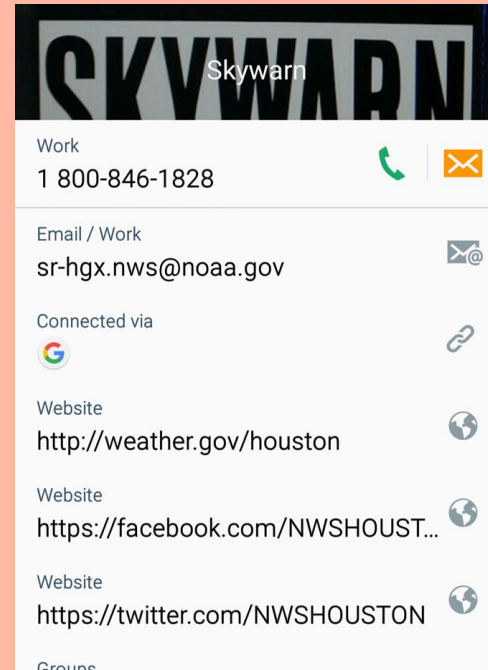
Email

sr-hgx.nws@noaa.gov

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.

Everyone is at a risk for flooding.



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.

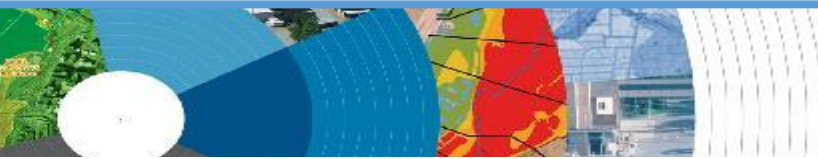
Renters and Business owners should also consider flood insurance for contents.

■ 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.

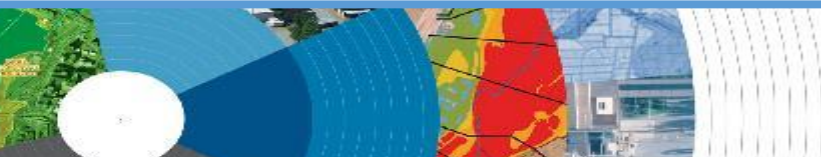


FEMA

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



FEMA

Flood Insurance Basics

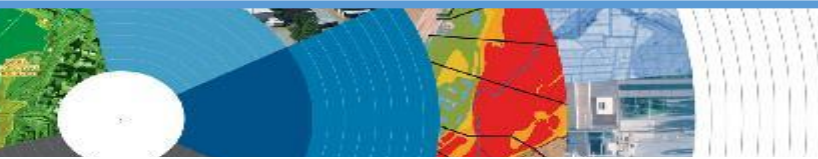
- **Brief definition of flooding – Any form of rising water in which 2 properties are affected.**
- **It doesn't have to be presidential declared event for a flood claim to be filed on a flood policy.**

Individual Flood Insurance

- **Structure Coverage**
 - Max coverage \$250,000
 - Higher limits for commercial risk
- **Contents coverage**
 - Contents is an optional addition (except for Preferred Risk Policy)
 - Max coverage \$100,000 coverage.
 - Renters can purchase flood insurance for contents.
- **Wait Period**
 - Typically - 30-days from purchase until effective.

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

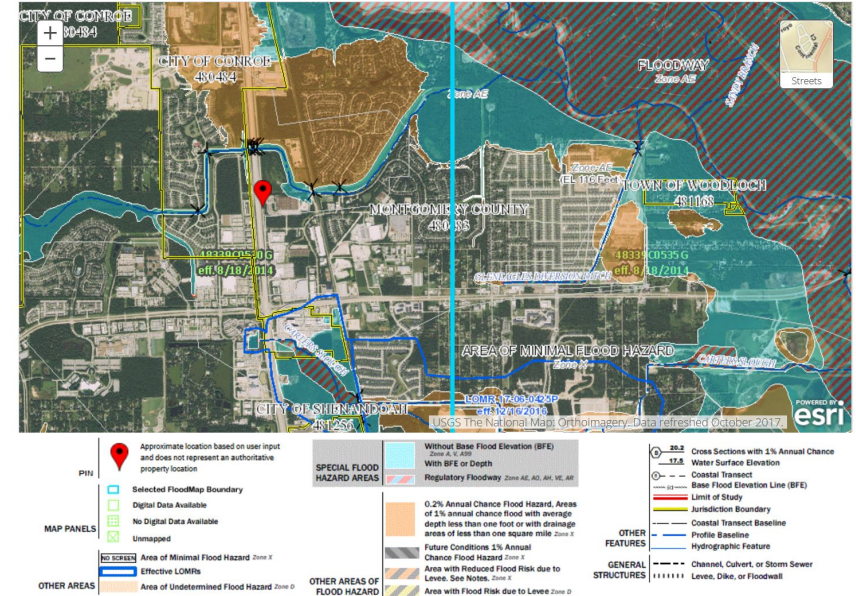


FEMA

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>



FEMA

Structure Elevation Impact Insurance Rates

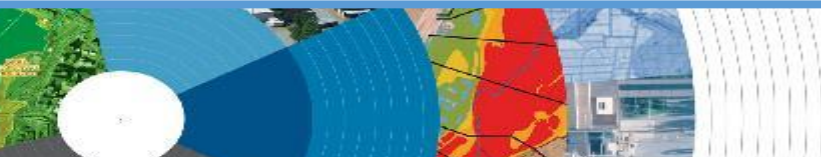


The elevation is just one factor, others include: when was the structure, has it flooded in the past, etc.

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

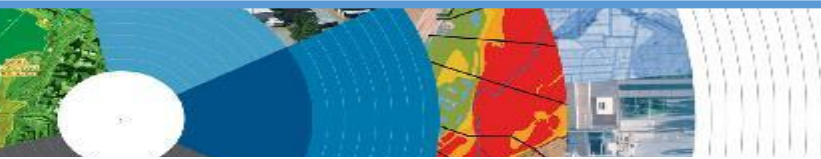
NFIP Hotline
1-800-427-4661
www.fema.gov/nfip

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

Gilbert Giron, ANFI, CFM, ACA
Senior Regional Insurance Specialist, FEMA Region 6
Phone: 940-898-5412 | Gilberty.giron@fema.dhs.gov



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Questions

National Weather Service
San Jacinto River Authority