

Volume

1



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**Texas Water**   
**Development Board**

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# Community Official Flood Resource Guide

Prepared for Texas Flood Officials

**Volume 1: February 2022**

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Throughout this guide, there are several icons that appear next to resources to indicate those that include videos, are available in Spanish, or are appropriate to share with kids. This key can be used to understand these distinctions:



The “video” icon indicates that the resource link contains a video.

The speech bubble “Spanish” icon indicates that the resource provides quick access to the information in the Spanish language.

The “for kids” icon indicates that the resource would be appropriate and/or valuable to share with kids.

When the “Spanish” and “video” icon appear together, this indicates that the resource contains a video that is easily available/accessible in Spanish.

# 1. Welcome to the Texas Water Development Board Resource Guide for Flood Officials

As flood officials, we know you wear many hats.



There are often many roles you play in helping Texans prepare for, respond to, and – stay safe during floods.

This guide provides resources to assist local flood officials with conducting effective flood education and communication with the public. The Texas Water Development Board and a research team at The University of Texas at Austin conducted research between August 2020 and August 2021 to understand: 1) the **needs, concerns, and priorities of stakeholders** who commonly access resources related to flooding, 2) **what flood officials need to educate and assist the public**, and 3) **what Texans need to better understand flooding in their communities**.

Findings suggest the **Texas public doesn't understand flood risk, mitigation, and flood insurance**. Insight gathered from interviews with Texas flood officials and a survey of over a thousand Texans informed the items in this guide. To learn more about the research behind this resource guide, see Section 8. We hope that as flood officials, this guide will help you better fill in the gaps to **provide necessary flood resources** in your community.

**In this guide, you will find online resources that can be shared with various stakeholders to better prepare them for flooding events in Texas. This guide is not meant to be used as a community's emergency response plan. The information and external links included in Volume 1 are current as of February 2022.**

A good starting point to learn more about flooding in Texas is [texasflood.org](https://texasflood.org):



## 2. Resources for Working with Different Texas Stakeholders

### 2.1. Communicating with the Texas Public

Texans' needs for flood education and communication materials **vary substantially between different communities**. Research findings show that flood materials should be designed to include educational materials:

- geared toward a **novice audience**
- **written at a 6<sup>th</sup> grade readability level**
- tailored for the **specific needs** of a local community

Findings reveal that the highest needs for Texans are understanding **safety during floods**, individual **flood risk**, and the **flow of water**.



*Flooding can happen anywhere in Texas and Texans need to be prepared to stay safe.*

#### 2.1.1. Helping Texans Understand How to be Safe During Floods

Texans' need to **understand** the importance of **remaining safe during** a flooding event and what they can do to **prepare for a flood** before and after a flood event occurs.

**Signing up for weather alerts** and creating an **emergency kit** are only a couple of ways to stay safe during a flood.

If you need to provide information to the public about safety before and during a flood, these are the **top three most helpful resources** to share:

- 1 Quick, digestible information on how to prepare for, and [stay safe](#) during a flood and how to respond safely to flood warnings and signs. Also included is information on how to obtain flood insurance. *Source: Ready.gov*
- 2 Directions on how to [build an emergency kit](#), including a comprehensive list of what items to include for flood preparedness. *Source: Ready.gov*
- 3 Be better [prepared for a flood](#) by understanding flood risk by location, flood insurance information, how to make a flood preparation plan, and signing up for weather alerts related to flooding, to minimize harm during flooding. *Source: Texas Water Development Board*

Additional resources to share on **understanding flood safety**:

- Direct the public to this [online guide](#) for a comprehensive list of resources related to flood information, education, and preparedness in Texas. *Source: Texas General Land Office*
- Provide educational resources written specifically for the public on flood awareness and preparedness by sharing [this resource](#) developed by the City of San Antonio about the danger of severe flooding. *Source: San Antonio Flood Emergency (SAFE)*
- Look here for simple and easy to understand [information](#) on flood and other natural disaster preparedness that can be shared with different community members and stakeholders. *Source: Federal Alliance for Safe Homes (FLASH)*
- Help the public better understand flood awareness campaigns such as the National Weather Service's Turn Around, Don't Drown program. You can share this short [video](#) and catchy tune that explains the importance of not driving into flood waters. *Source:*

*National Weather Service, NOAA*



Here are shareable/printable versions of FEMA's ready.gov emergency supply list and emergency supply kit: [https://www.ready.gov/sites/default/files/2021-02/ready\\_checklist.pdf](https://www.ready.gov/sites/default/files/2021-02/ready_checklist.pdf)

Figure 2.1. Ready.gov Emergency Supply List

**Additional Items to Consider Adding to an Emergency Supply Kit:**

- Prescription medications and glasses
- Infant formula and diapers
- Pet food, water and supplies for your pet
- Important family documents such as copies of insurance policies, identification and bank account records in a portable waterproof container
- Cash and change
- Emergency reference material such as a first aid book or information from [www.ready.gov](http://www.ready.gov)
- Sleeping bag or warm blanket for each person. Consider additional bedding if you live in a cold-weather climate.
- Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes. Consider additional clothing if you live in a cold-weather climate.
- Fire Extinguisher
- Matches in a waterproof container
- Feminine supplies, personal hygiene items and hand sanitizer
- Mess kits, Paper cups, plates and disposable utensils, paper towels
- Paper and pencil
- Books, games, puzzles or other activities for children

**Ready**  
Prepare. Plan. Stay Informed.®

**Emergency Supply List**

**FEMA**  
[www.ready.gov](http://www.ready.gov)

Figure 2.2. Ready.gov Recommended items to include in Basic Emergency Supply Kit.

**Recommended Items to Include in a Basic Emergency Supply Kit:**

- Water and non-perishable food for several days
- Extra cell phone battery or charger
- Battery-powered or hand crank radio that can receive NOAA Weather Radio tone alerts and extra batteries
- Flashlight and extra batteries
- First aid kit
- Whistle to signal for help
- Dust mask, to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place
- Moist towelettes, garbage bags and plastic ties for personal sanitation
- Non-sparking wrench or pliers to turn off utilities
- Can opener (if kit contains canned food)
- Local maps

FEMA's Ready Campaign educates and empowers Americans to take some simple steps to prepare for and respond to potential emergencies, including those from natural hazards and man-made disasters. Ready asks individuals to do three key things: get an emergency supply kit, make a family emergency plan, and be informed about the different types of emergencies that could occur and appropriate responses. Everyone should have some basic supplies on hand in order to survive several days if an emergency occurs. This list of emergency supply kit items is only a starting point. It is important that individuals review this list and consider the unique needs of their family, including pets, for items to include. Individuals should also consider having at least two emergency supply kits, one full kit at home and smaller portable kits in their workplace, vehicle or other places they spend time.

**Ready** **FEMA**

Federal Emergency Management Agency  
Washington, DC 20472

## 2.1.2. Helping Texans Understand the Dangers of Contact with Flood Water

Texans also need to understand the **flow of water**, the **damage it can cause** to homes or businesses, and why exposure to **floodwater is dangerous**.

**Flood waters or standing flood waters** can spread infectious diseases and have the potential to **cause injury** to community members. Here are some resources to share with your stakeholders and community members about the dangers associated with floodwater.

If you need to provide information to the public on the health dangers posed by flood waters, these are the **top three most helpful resources** to share:

- 1 This [informative webpage](#) created by the Centers for Disease Control (CDC) addresses the dangers of exposure to contaminated floodwaters in a format that is clear and easy to understand. *Source: CDC*
- 2 Community members with septic systems on their properties may find [this webpage](#) helpful. It was created by the United States Environmental Protection Agency (EPA), and contains information on what to do, and not do with septic systems during and after a flood. *Source: EPA*
- 3 This video addresses the [dangers that playing in flood waters](#) can pose to health and safety . The video contains short clips of residents in the Rio Grande Valley coming in contact with floodwaters, and warnings from the Cameron County Health Authorities about the health risks associated with exposure to contaminated flood water. *Source: Valleycentral.com* 

- Share a link to [power outage maps](#) so the public can view outages in their area during a flood. *Source: AEP Texas*
- The CDC provides information on [staying safe from electrical hazards](#) after a flood, hurricane, or other natural disaster. *Source: CDC*
- This [video](#) provides a simulation that shows how shallow, fast-moving water can float acar away during a flood. *Source: UNSW Water Research Laboratory* 
- AAA provides a few “Turn Around, Don’t Drown” [driving tips](#) to share with motorists dealing with the effects of heavy flooding or rainfall, including guidance on visibility and avoiding standing water. *Source: AAA*

## 2.1.3. Helping Texans Understand Personal and Household Flood Risk

To help Texans understand their **personal and their home’s flood risk**, share information on preparing for the risk of flood, the potential of floods occurring where they live, and how to **identify their risk**.

This risk might look different for homeowners, business owners, or renters.

If you need to provide information on personal and household flood exposure and risk, these are the **top three most helpful resources** to share:

1

[FEMA Flood Insurance Rate Maps](#) from FEMA’s Map Service Center can be used to search for individual flood risk by plugging in the address of a home or property. *Source: FEMA*



2

TWDB provides an “[Emergency Preparation](#)” page discussing risk and planning for floods, including determining flood risk, flood insurance information, and alert system information. *Source: Texas Water Development Board*

3

TWDB, in coordination with USGS and FEMA, is developing approximate flood risk data statewide at this “[Base Flood Elevation \(BFE\) Viewer](#)” [website](#). These data are considered approximate, nonregulatory, and do not supersede FEMA’s Flood Insurance Rate Maps (FIRMs), which are the regulatory flood maps. But, where a FIRM’s data may be lacking or out of date, these data may be considered “best available”. *Source: USGS.gov*

Additional resources to share on **understanding personal and household flood exposure and risk**:

- For additional information on flood mapping, direct the public to the [Flood Hazard Mapping Updates Overview Fact Sheet](#), which will provide details regarding mapping updates and changes to flood maps. *Source: FEMA*
- Where Flood Insurance Rate Maps or Base Level Engineering Data is not available, encourage the public to find their home or property’s individual flood risk by searching on [Flood Factor](#), a search tool that is based on research from flood modelers. The site allows users to search for their individual address and discover their flood risk. *Source: FloodFactor*

## 2.1.4. Helping Texans Understand the Flow of Water

Many things can **affect the flow of water**, such as urban development and impervious surfaces. Helping Texans understand **what surface runoff water is** or the **significance of living downstream** in a watershed as they relate to flood risk, can be challenging.

If you need to provide information about **how water flows** and explain how **watersheds work**, here are the **top three most helpful resources** to share:

- 1 Provide residents an introduction to the link between weather and flooding by sharing [flood basics](#), which includes information on what flooding is, where and when it occurs, which areas are at risk for floods and flash floods, and basic flood terminology. *Source: NOAA* 
- 2 Share an animated video to help [explain watersheds](#) to the general public. *Source: Community Collaborative: Rain, Hail, & Snow Network (Colorado State University)* 
- 3 Show this video to simply explain [how flooding happens](#) when water flows. *Source: CrashCourse* 

Additional resources to share on the **flow of water and watersheds**:

- To provide details on watersheds in Texas from a nature and ecosystem perspective, the [Texas Parks and Wildlife Department Texas Waters textbook](#) provides descriptions of floods and information on flooding. *Source: Texas Parks and Wildlife*
- Show [how water moves through the Highland Lakes](#) system, including the estimated times it takes water to move from upper basin regions, through the dam system, and to the Gulf. *Source: Lower Colorado River Authority*
- To explain what a watershed is and how water flows within one, the National Oceanic and Atmospheric Administration (NOAA) has a brief [summary of watersheds](#). *Source: NOAA*
- For a more [visual explanation of watersheds](#), you can share videos that explain how watersheds work, the terminology used to understand the flow of water, and watershed definitions. *Source: Greater Lansing Regional Committee* 

- To provide [location-based information on watersheds](#) in particular communities, the EPA has a helpful resource for exploring and understanding waterways from the local to national level. *Source: The U.S. Environmental Protection Agency*
- The Vermont Agency of Natural Resources has a 5-minute video that [explains the role of rivers in flooding](#). This video is clear, appropriate for many audiences, and most of the content applies to Texas rivers. *Source: Vermont Agency of Natural Resources* 
- If you want to see examples of how the State of Vermont developed a Flood Training program for the public, you can [review this website](#). *Source: State of Vermont Official Vermont Government Website*

## 2.1.5. Tips for Communicating with the Public about Flood Risk

Research says that many individuals do not understand their flood risk. It is essential for Texans to understand how their geographical location, such as living near the coast, or close to a river or a dam, influences their flood risk. Understanding the difference between coastal flooding and river flooding, or the difference between flood watches and flood warnings are important to remaining safe.

If you need to provide information to communities or individuals about the **risk of floods**, these are the **top three most helpful resources** to share:

- 1 Access and download [GIS data for the state of Texas](#). *Source: Texas Water Development Board*
- 2 Help the public understand the [risk of flooding](#) where they live and work, including understanding FEMA flood zones, flood maps, and their property's individual flood risk. *Source: FloodSmart.gov (FEMA, NFIP)*
- 3 Help residents search for their home or property to [identify the risk](#) of flooding where they live or work. This data is particularly useful when other FEMA flood risk map data are not available. *Source: FloodFactor.com*

Additional resources to share on communicating **flood risk**:

- Share this article from [Realtor.com](https://www.realtor.com) to help residents understand flood risk for their home. *Source: Realtor.com*
- Help Texans understand what a flood is, how to prepare for a flood, and what to do during a flood by visiting [texasflood.org](https://texasflood.org). *Source: Texas Water Development Board*
- NOAA offers an excellent website, including a 2.5 minute [video on flooding](#), that explains multiple types of flooding and how floods are dangerous. *Source: The National*

*Severe Storms Laboratory, NOAA* 

## 2.2. Communicating with Texas Home and Property Owners

During a flood, many Texans are concerned about their homes or properties. The following sections provide resources to share with home and property owners in Texas.

### 2.2.1. Resources about Protecting Home and Property

While personal flood safety is important, home and property owners also want to mitigate damage and risk to their homes. Some of these damages can be avoided by taking actions, such as elevating their home, if they live in a flood prone area.

Additionally, Texas has some new flood disclosure laws, including [HB 531 from 87R](#), which requires landlords to provide notice to tenants if the property has ever flooded (effective January 2022). You can find information on **flood disclosure and home and property ownership** [here](#), a flood **disclosure map** [here](#), and flood law and **property code information** [here](#).

If you need to provide information to help home and property owners **prepare their homes or properties** for floods, these.

Here are the **top three resources** to share:

- 1 Encourage home and property owners to digital [FEMA flood maps](#) to understand the risk of flooding in the areas where their properties are.  
*Source: FEMA* 
- 2 FEMA provides a straightforward guide on how to [protect homes](#) from a flood. *Source: FEMA*
- 3 Homeowners can check their property flood risk using [Flood Factor](#). (\*please note that this may not be the most accurate source for structure level risk information\*) *Source: FloodFactor*

Additional resources to share on **protecting homes or property**:

- If you need to share information about how to build stronger homes, you can share [these videos](#) provided by the Federal Alliance for Safe Homes. *Source: Federal Alliance for*

*Safe Homes (FLASH)* 

- This is a brief (under 1-minute) video FEMA prepared to educate potential homeowners on how they can [tell if a home has flooded before](#). *Source: FEMA*  
- [TWDB](#) provides a comprehensive explanation of proactive steps to protect communities and homes from potential damage from flooding. *Source: Texas Water Development Board*

## 2.2.2. Flood Insurance Information Resources

Texans need to understand that if it can rain, it can flood. Home insurance policies don't typically cover flood damage, so to protect property from floods, a separate **flood insurance policy is needed**. The following section provides helpful resources on **flood insurance programs** and how to **acquire a flood insurance policy**.

If you need to provide information about flood insurance programs and policies, these are the **top three most helpful resources**:

- 1 Learn about the [National Flood Insurance Program \(NFIP\)](#), including information on the cost of flooding, what is covered under the NFIP policy, flood maps, and reducing the cost of insurance. *Source: FloodSmart.gov (FEMA, NFIP)*
- 2 Provide a full summary of the [NFIP's coverage](#) and policies under the National Flood Insurance Program. You may also want to explain the new changes that will be coming to the way flood insurance policies are being rated with [FEMA's Risk Rating 2.0](#). *Source: FEMA* 
- 3 Use this FEMA created a 1-minute video to [address the myth](#) that renters do not need or cannot get flood insurance. Renters can purchase flood insurance to protect their belongings. *Source: FEMA*  

Additional resources on **flood insurance**:

- Provide more details about the [National Flood Insurance Program \(NFIP\)](#). *Source: FloodSmart.gov (FEMA, NFIP)* 
  - For information on what is covered under the NFIP, direct people to this helpful [guide on what flood insurance covers](#).

- Encourage Texans to better understand how much damage can be caused to their home and/or property by directing them to a financial [cost of flooding calculator](#).
- Help the public understand how to [reduce the cost of flood insurance](#).
- Here is a quick video (under 1 min.) explaining that everyone has some flood risk. English version [here](#). Spanish version [here](#). Source: FEMA  

- Share a [quick video and additional resources](#) that explain the importance of flood insurance in Texas, what it costs, what is covered, and other steps toward flood protection. Source: Texas Department of Insurance 
- Request residents to visit [FloodSmart.gov](#) or call 1-800-427-4661 to find an agent for insurance in their area and get more information. Source: FloodSmart.gov (FEMA, NFIP) 
- Use [FEMA's Historical Flood Risk and Cost data](#) to help evaluate the flood risk in an area. It is important to note that historical data does not always represent the current or future state of flooding in the area, price of flood insurance, or damage estimates. Source: FEMA 
- Refer residents to FEMA's [Flood Insurance Rate Maps \(FIRMs\)](#), which are used to determine flood insurance rates and assist communities in managing development on or near floodplains. Source: FEMA 
- Help residents understand the [factors that influence local flood insurance](#) rates by checking out this video from FEMA. (approx. 1 minute)  Source: FEMA, NFIP
- Help to highlight the fact FEMA's Individual Assistance grant will not pay for all flood costs, in fact, grants averaged **\$6000 in FEMA Region 6 from 2015-2020** for qualifying households by sharing this 1.5-minute video from FEMA discussing [flood insurance myths and facts](#). Source: FEMA  
- Show this approximately 1-minute FEMA video [[Second Home Coverage Myth – YouTube](#)] [which](#) addresses the myth that FEMA Individual Assistance will pay for repairs to second residences. Source: FEMA  

## 2.2.3. Preparedness and Recovery for Ranchers, Farmers, and the Agricultural Industry

According to Texasagriculture.org, 86 percent of the land in Texas is in some form of agricultural production. Therefore, it is important for those in the agricultural industry, including Texas' ranchers and farmers to understand flood risk, preparedness, safety, and recovery.

If you need to provide flood information to members of the agricultural industry, including ranchers and farmers, these are the **top three most helpful resources**:

- 1 If you need to share information on [preparing farm animals](#) or livestock for a disaster, FEMA's blog provides a list of steps to take in preparing for a disaster. *Source: FEMA*
- 2 Share this [report from Texas A&M prepared for farmers and ranchers](#) to understand how to get ready for floods and protect their agricultural operations before, during, and after a disaster. *Source: Texas A&M AgriLife Extension*
- 3 If farmers or ranchers are looking for information on [disaster assistance](#), the Texas Farm Bureau provides resources related to disaster recovery. *Source: Texas Farm Bureau*

Additional resources for **farmers, ranchers, and the agricultural industry**:

- Texas A&M's disaster education network has provided resources specific to [livestock preparedness and recovery during a flood](#), since flood is the most likely emergency scenario in Texas. *Source: Texas A&M*
- If you want to share useful tips to help farmers or ranchers prepare their farm or land for a flood, you can send them to agriculture.com flood and farming resources [here](#). *Source: agriculture.com*
- The National Centre for Farmer Health, based in Australia, provides information on [farm preparation](#) and clean up before, during, and after a flood. *Source: National Centre for FarmerHealth*
- If you want to share information on a fund to [help Texas farmers and ranchers recover from disasters](#), you can direct them to Texas Department of Agriculture's STAR fund. *Source: Texas Department of Agriculture*
- The TWDB provides a full list of [agricultural resources](#) for those in the agriculture industry in Texas. These resources include information on water throughout the state. *Source: TWDB*

## 2.3. Communicating with Texas Business Owners

Local businesses are an integral part of the community. It is important that business owners understand the potential risks due to flooding. During a flood, **business owners can be affected differently than homeowners** and therefore need information that is tailored to their specific needs.

If you need to provide business-owner specific information, these are the **top three resources** to share:

- 1 Help business owners [prepare for and respond to floods](#) by sharing business toolkits and management videos to better understand how to plan for floods and other disasters. *Source: Ready.gov* 
- 2 Share [recommendations to reduce the likelihood of flood damage to business owners](#) and their businesses, including understanding flood zones, learning the base flood elevation (BFE) of their business, and employing floodproofing techniques to their business. *Source: DisasterSafety.org*
- 3 Share information on helping business owners to [understand if their business is prepared](#) for a flood, including preparation, toolkits, and small business coverage. *Source: U.S. Small Business Administration*

Additional resources to share with **Texas business owners**:

- Share information on [water damage restoration and clean up](#) for businesses after a flood. *Source: Texas A&M AgriLife Extension* 
- Offer additional information to develop a **FEMA Ready Business Workshop**, that provides information about developing effective preparedness and mitigation programs. *Source: Ready.gov*
  - Technical assistance for conducting a workshop is available by contacting [FEMA-Private-Sector@fema.dhs.gov](mailto:FEMA-Private-Sector@fema.dhs.gov). 
- Share with business owners information such as this link to the [Inland Flooding Toolkit](#), which can help them **protect their employees and customers** and ensure the **continuity of their business after a flood**. *Source: Ready.gov*
- Provide videos about the Ready Business Program, which can be found [here](#). These resources will enable business owners to **identify their risk, develop a plan, and act to protect their business**. Business owners can also apply for recognition to become part of the Ready Business Community and promote their mitigation strategies with other community members. *Source: Federal Alliance for Safe Homes (FLASH)* 

## 2.4. Working with Flood Mitigation Grants and Funding

Grants that address flooding issues are complex. As a local flood official, you may need to inform people of 1) **grants for communities and projects**, or 2) **grants for individuals**.

Community-level grants are **NOT available directly to homeowners** or to the public. Several community-level grants are **competitive** and have specific application **deadlines**; not all communities that apply will be awarded a grant.

Click here for a [comprehensive 1-page checklist](#) that identifies what types of entities (e.g., cities, river authorities) are eligible to apply for grant programs administered by 1) TWDB, 2) Texas Government Land Office (GLO), 3) Texas Division of Emergency Management (TDEM), and Texas Commission on Environmental Quality (TCEQ). *Source: Texas Flood Information Clearinghouse*

If you need to provide information on flood grants and funding options to communities, these are the **top three resources** to share:

- 1 TWDB administers the Flood Mitigation Assistance (FMA) grant program on behalf of FEMA. FMA fundings assists with flood-related [planning and projects](#) activities. Communities must develop grant subapplications in FEMA GO, FEMA’s grant management system. TWDB provides technical assistance to communities in completing sub applications and reviews them prior to submission to FEMA. *Source: Texas Water Development Board*
- 2 [The Flood Infrastructure Fund \(FIF\) program](#) provides financial assistance in the form of loans and grants for flood control, flood mitigation, and drainage projects. *Source: Texas Water Development Board*
- 3 The Texas Flood Information Clearinghouse is a comprehensive resource for finding [flood mitigation funding opportunities](#) for Texas communities. Included are programs administered by TWDB, GLO, TDEM, and TCEQ. *Source: Texas Flood Information Clearinghouse*

Additional resources to share on **grants and funding for communities**:

- TWDB provides information on [available flood grants and low interest loan programs](#) (state and federal). *Source: Texas Water Development Board*
- The Hazard Mitigation Assistance (HMA) grants that are administered by TDEM and available to communities, are the [Hazard Mitigation Grant Program \(HMGP\)](#) and [Building Resiliency in Communities \(BRIC\)](#). *Source: TDEM*

- The [FEMA Flood Mitigation Assistance Grant Program](#) provides information on funding opportunities, deadlines for the grant cycle, eligibility requirements, and additional information on grants and outcomes. *Source: Texas Water Development Board*

There are also individual-level flood grants available to **homeowners** who have experienced flooding. If you need to provide information on flood grants and funding options to **individuals**, here are resources to share on **flood grants and funding for individuals**:

- DisasterAssistance.gov provides a list of resources available for [individualsexperiencing disasters](#). *Source: DisasterAssistance.gov*
- FEMA provides a list of resources through its [Individuals and HouseholdsProgram](#).  
*Source: FEMA* 
- The Partial Repair and Essential Power for Sheltering program, administered by GLO, provides resources designed for single-family owner-occupied residences. This program [provides temporary repairs](#) to allow homeowners to remain in their homes and communities while they complete permanent repairs to their home. *Source: West Street Recovery*
- The Direct Assistance for Limited Home Repair (DALHR) program, administered by the GLO provides [permanent repairs for homeowners](#). (Note: there are many restrictions on who qualifies.) *Source: West Street Recovery*
- The [U.S. Small Business Administration \(SBA\)](#) provides loans to small businesses as an additional option for individual property owners affected by a flood. *Source: U.S. SBA*
- The TWDB provides [information on available flood grants and low interest loan programs](#) (state and federal). *Source: Texas Water Development Board*

Additional resources from FEMA to share on **flood grants and funding**:

- If you want to provide a step-by-step list of how to get a grant from FEMA related to pre and post emergency or disaster related project, you can share [this resource on FEMA grants](#). *Source: FEMA*
- To share information on preparedness grants offered through FEMA that support work on improving capabilities to prepare for disasters or emergencies, share [this resource from FEMA on preparedness grants](#). *Source: FEMA*
- Information on [hazard mitigation assistance grants](#) through FEMA is available to those looking for grants that include long-term solutions to reduce the impact of future disasters. *Source: FEMA*

Additional resources from FEMA to share on grant writing guidance:

- A printable [fact sheet](#) that provides steps on how to write a successful grant proposal to request recovery assistance or other funding. *Source: FEMA*
- An [instructional video](#) that describes steps required to apply for FEMA preparedness or mitigation grants in the Non-Disaster Grants Management System and how to submit an application. 

## 3. Community Outreach and Education Programs

### 3.1. Tips for Community Outreach and Education

The Texas public needs more information about flood preparedness and education, and one way you can help is through outreach and education in communities. The following section provides materials that can be shared to initiate outreach and education in Texas communities around flood safety and preparedness.

#### 3.1.1. Texas Water Development Board Resources

The **Texas Water Development Board (TWDB)** provides information for Texans on the state's natural resources. Created in 1957, TWDB supports the development of regional water and flood plans, administers loans and grants related to water resources, conducts research and data collection on water in Texas, and maintains information on strategic mapping. It also provides **information to the public on water and flooding**.

If you need to provide flood educational and outreach information to the public, the **top three resources** provided by TWDB to share are:

- 1 Direct the public to [TexasFlood.org](https://www.texasflood.org) which provides a wealth of data on lake levels, stream and river flows, rainfall, and soil moisture levels, among other information. *Source: Texas Water Development Board*
- 2 For community information, including handouts and brochures for the public and helpful floodplain management links and resources, direct the public to [TWDB community resources](#) on flood risk, planning, and recovery. *Source: Texas Water Development Board*
- 3 Provide access to maps and other real-time information on the [status of nearby rivers](#), information on the potential for the [weather in the area](#) to cause flooding, and resources on [lakes and water](#) levels. *Source: Texas Water Development Board*

Additional information to share about resources available from the **Texas Water Development Board**:

- Share [flood mapping information](#) which explains flood insurance rate maps and provides information on flood maps and models used to identify flood risk in Texas. *Source: Texas Water Development Board*
- Encourage the public to visit TWDB's [flood information pages](#), should they have any questions about outreach, flood grants coordination, mapping, or modeling. *Source: Texas Water Development Board*
- View a [water data interactive map](#) to understand the flow of water throughout areas of Texas. *Source: Texas Water Development Board*

### **3.1.2. National Weather Services' Turn Around, Don't Drown Resources**

**Flood safety** is important for every Texan and knowing what to do before, during, and after a flood can increase preparedness, risk avoidance, and chances of survival. It is equally important for **drivers** to know what to do if they encounter a flooded road. The National Weather Service (NWS) has more detailed information on their website about flood safety and the [Turn Around Don't Drown® \(TADD\) Program](#).

The UT research survey of Texans conducted in 2021 found that 71% of Texans surveyed have heard of TADD. This also means that **29% have not heard of it**. [Given that a native Texan, Hector Guerrero, was instrumental in developing and launching the TADD program](#), a special connection to this education program exists for all Texans.



*Turn Around Don't Drown® helps Texans stay safe on the road during floods.*

If you need to provide information to the public on topics addressed by the **TADD** campaign and related educational programs, the **top three resources** to share are:

- 1 Learn how to [stay safe while on the road](#) during flooding and how easily flood water can wash away vehicles that drive into flooded roadways with this short video. *Source: NWS* 
- 2 Access [educational materials](#) that address the Turn Around, Don't Drown campaign, including safety quizzes for adults and kids, flood forecasting information, emergency alert information, brochures, and water safety information. *Source: NWS*
- 3 Share "Before a Flood" [flood safety](#) information that provides tips on creating an emergency flood kit, knowing your flood risk ahead of time, and preparing your family, pets, and home for floods. *Source: NOAA*

Additional information to share on the **Turn Around, Don't Drown** campaign:

- If you want to encourage the public to sign up for [weather and flood alerts](#), there are several free warning notification and app options to share.
- To learn more about the **Turn Around Don't Drown (TADD) Program** click [here](#). On this webpage you can find information about the difference between a yellow or a pink incident sign as well as policies about using TADD in road signs, social media, and external parties. *Source: NWS*
- For [an outreach and education video from Turn Around, Don't Drown](#) to educate on flood safety, click here. *Source: NOAA* 
- NOAA provides a [kids' version of how to prepare for a storm](#). *Source: NOAA* 

### 3.1.3. Texas Floodplain Management Association Resources

The Texas Floodplain Management Association (TFMA) was established in 1988. The organization is involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, flood preparedness, warning, and disaster recovery. One of its goals is to **increase community resilience and inspire their members to take a leadership role in floodplain management.**

As a local flood official, you may know this organization fairly well, but the 2021 UT research survey of Texans found that only 48% of those surveyed had heard of this organization.

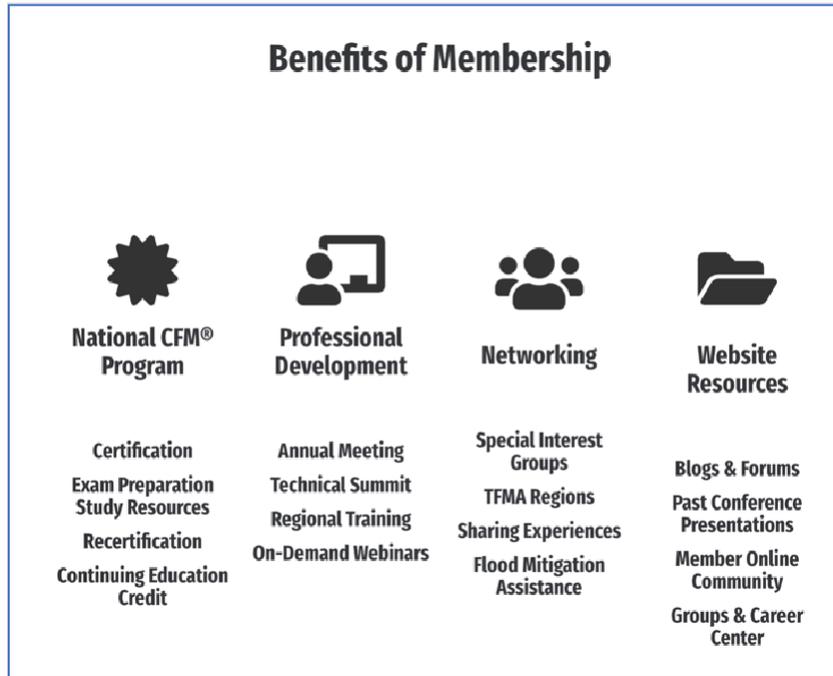
If you need to provide information to the public on the services and educational materials provided by the TFMA, the **top three resources** to share are:

- 1 [Become a member](#) of the TFMA after completing an application, paying dues, and enrolling in the list of active members of the organization. *Source: TFMA*
- 2 Access [professional development](#), training, and certification information, including registration information for floodplain management training opportunities. *Source: TFMA*
- 3 Share [education materials for children](#) from the TFMA, including information on Turn Around, Don't Drown and TexAnna TaDDpole. *Source: TFMA*

Additional information to share on **TFMA resources**:

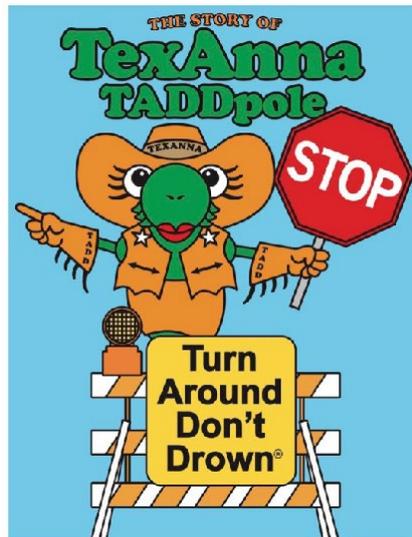
- If you need to share information about outreach such as Turn Around, Don't Drown and flood preparation videos, click [here](#). *Source: TFMA* 

**Figure 3.1.** The TFMA benefits of membership.



Source: TFMA

**Figure 3.2.** TexAnna TADDpole; a wise tadpole who instructs students on flooding in Texas and the Turn Around Don't Drown campaign.



Source: TFMA

## 3.2. Best Practices in Community Outreach and Public Education

There are some organizations and programs throughout Texas that provide community outreach and public flood education, and most of the materials are tailored for their specific communities. While tailoring materials to meet community needs are ideal approaches, only sometimes are their materials useful to other communities. The following section provides a compilation of best practices for flood outreach and education, and these examples were chosen because they provide broad utility.

### 3.2.1. San Antonio River Authority

The **San Antonio River Authority (SARA)**, established in 1937, was created to assist in developing and **maintaining water resources in Texas**. Its goal is to connect the needs of people and nature across rivers and land in Texas by maintaining creeks and rivers in the community, advancing science and engineering in water resource management, and enhancing community appreciation for water resources. SARA's website provides information on sustainability, **flood risk**, river health, parks and trails, and ecosystems, and many of their resources are relevant throughout Texas.

If you need to provide information on SARA's many flood-related resources, the **top three resources** to share are:

- 1 Learn [what the San Antonio River Authority does](#) to help mitigate flooding and protect the community. *Source: SARA* 
- 2 Access [interactive materials](#), videos, and written information on flood risk, protection, preparedness, and mitigation. *Source: SARA* 
- 3 Assess a [home's flood risk](#) by viewing floodplains and a risk map viewer to understand individual flood risk specific to their area. *Source: SARA*

Additional information to share from the **San Antonio River Authority that is relevant to many parts of Texas**:

- Learn about the [science of flood management](#), including watershed management, river basin information, and a local watershed map viewer. *Source: SARA*
- Encourage people to check their flood knowledge by [taking a pop quiz](#) on flood risk and information related to floodplains. *Source: SARA*

**Figure 3.3.** Sample quiz question from pop quiz on floods.

True or False?

The 100-year floodplain marks the area that is likely to only flood once every 100 years.

True  False

Source: SARA

### ***Specific Resources for San Antonio (that also provide ideas for other locations)***

- Share a video highlighting the source of the San Antonio River and the downtown [areas of the San Antonio River](#) that have been redeveloped to incorporate flood control features and tourist attractions to give viewers an idea of the complex relationship between the City and river (video approx. 7 minutes). Source: SARA 
- Watch a [simulation of Hurricane Harvey](#) and its potential impact on San Antonio. Source: SARA 
- Use the [GIS RiskMAP Web Mapping application](#) to identify the individual risk of homes or property in relation to floodplains in San Antonio. Source: SARA

## **3.2.2. Best Practice Example of Clear Website Design: Harris County Thrives**

The 2021 UT research survey found that Texans and Flood Officials in Texas find **website information** to be **confusing** (not knowing where necessary information is located), **text-heavy**, and **overwhelming**.

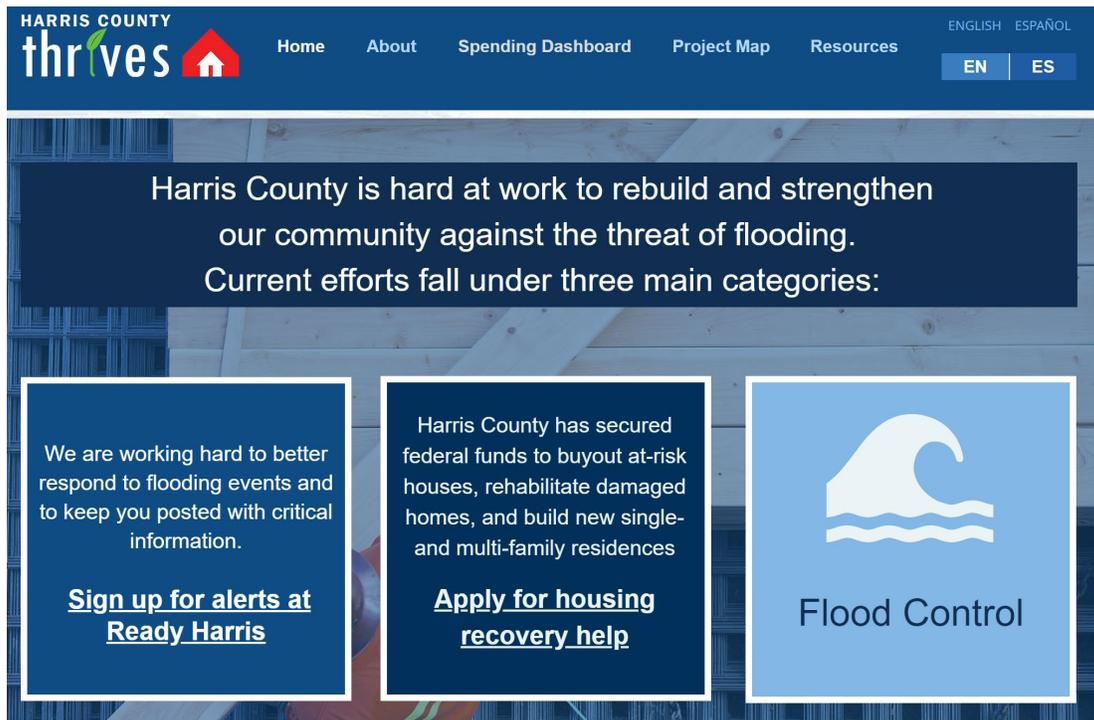
It is **difficult to create flood educational materials** that are both **simple enough to understand**, but also **engaging** for a broad and diverse group of stakeholders.

If you need examples to help you create a **website** with simple, clear, and engaging information, [Harris County Thrives](#) is a great exemplar.

Below are the **top three best practices** for creating simple, yet engaging content, as seen on the *Harris County Thrives* website:

- 1 Provide content that is easy for your stakeholders to navigate and avoid terms that are difficult for a layperson to understand. As shown in Fig. 3.4, Harris County Thrives uses a simple layout and a color scheme throughout the site that does not overwhelm people.
- 2 Tailor the content to your stakeholders and community members. Along with your content, include a short summary of the resources and their purpose. The [landing page](#) of Harris County Thrives provides specific information to Harris County community members, and though it does not apply beyond Harris County, it is a useful example of how to tailor content.
- 3 Include simple and clean graphics that engage stakeholders in addition to providing the needed information. The [homepage](#) and [spending dashboard](#) of Harris County Thrives provide examples of engaging graphics that communicate important information.

**Figure 3.4.** Harris County Thrives webpages' clean, uncluttered layout provides important flood information in an accessible and navigable way for users.

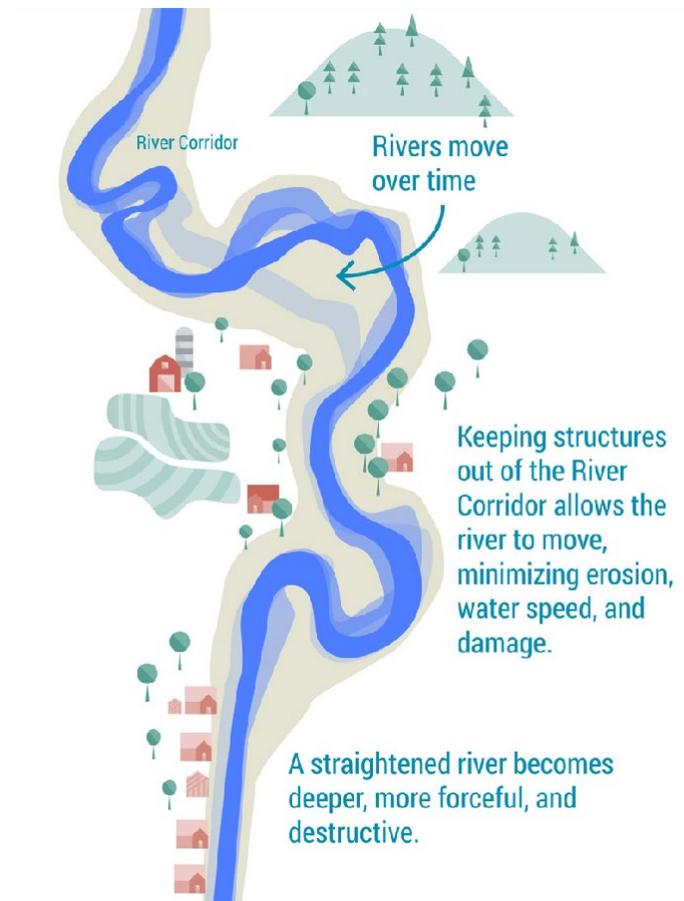


Source: [www.harristhrives.org](http://www.harristhrives.org)

### 3.2.3. Best practice Example of a Public Education Program about Flooding: State of Vermont

If you want to see a great example of a Flood Training program developed for the public, you can [review this website](#) developed by the State of Vermont.  Source: State of Vermont official Vermont Government Website

**Figure 3.5.** A simple graphic that illustrates how the course of rivers naturally changes over time.



Source: State of Vermont official Vermont Government Website

## 4. Resources for English as a Second Language (ESL) / Non-Native English Speakers

Being able to provide adequate flood education information before, during, and after a disaster is an important goal. Providing this information to as broad a range of community members as possible, including non-English speakers, is important. These are resources available that can help you reach as many people as possible.

### 4.1. Resources for ESL / Non-Native English Speakers

If you need to provide flood information in Spanish or other languages, the top three resources to use and share are:

1

Sharable disaster assistance information that is tailored to Spanish-speaking communities, including information on **disaster assistance programs, emergency preparedness, and flood insurance** is available from FEMA [here](#). Source: FEMA 

2

[FEMA in Your Language](#) offers “Help after a Disaster” information translated into 27 languages. Other multilingual resources on this webpage include information on **individual and household assistance, sheltering and housing assistance for survivors, and citizenship and immigration status requirements**. Source: FEMA 

3

If your community is seeking information in Spanish about how community **organization members** can become more involved in their community, click this [link](#). It contains a **video** about what it means to be a community-based organization, the importance of preparedness, and 10 necessary measures to prepare an organization for disaster incidents such as flooding. Source: Ready.gov  

Additional **Spanish and multi-language flood information** resources to share:

- If communities are seeking additional educational material written in Spanish for children, [here](#) are kid-friendly **activities** and **information** about **flooding and the flow of water**. *Source: University of Illinois* 
- FEMA provides a document containing [language access and protocol](#) during emergency management that can help in understanding language during flood preparedness and response. *Source: FEMA*

## 5. Resources for Differently Abled Residents

There are many people across Texas who are differently abled residents, including people who are seniors and older adults, deaf or blind. These are resources to share specific for each of these groups.

### 5.1. Resources for Seniors and Older Adults

- Red Cross provides a thorough report that guides seniors and older adults through steps to take in order to [prepare for a disaster or recover from one](#).
- Elder Affairs provides a [disaster resource guide](#) that focuses specifically on assisting seniors and older adults during extreme weather events, including hurricanes and floods.

### 5.2. Resources for the Deaf Community

- You can provide [weather safety information](#) for people who are deaf or hard of hearing, which includes safety, alerts, and awareness resources. 
- There are also several accessible resources that guide people who are deaf or hard of hearing through [preparedness information](#) related to floods, hurricanes, and general safety and preparedness. 
- If you want to provide tips and resources to people who are deaf or hard of hearing, this resource outlines ten things to consider to [be safe during disasters for individuals who are deaf or hard of hearing](#).

### 5.3. Resources for the Blind or Low Vision Community

- The Oklahoma Department of Health provides a resource guide on [emergency preparedness and response](#) for members of the community who are blind or have low vision.
- The Florida Division of Blind Services also has a [thorough guide that prepares members of the community who are blind or have low vision](#) with the tools they need to stay safe before, during, and after a disaster.

## 6. Resources for Children and Younger Family Members

Children are important members of the family who can be important participants in preparing for disasters such as flooding. Providing engaging educational content to the youngest community residents can also foster awareness of flood and climate-related topics among older family members.

Below are some of the **most helpful resources to share when engaging with children and their families.** 

- Ready.gov has a large selection of comprehensive online [flood education](#) content and printable materials for **all ages**. On their site you can find information on how to prepare for various disasters that is aimed towards [younger children](#), [teens](#), [families](#) and [educators](#). *Source: Ready.gov*

**Figure 6.1.** Ready.gov provides educational resources developed specifically for kids, teens, families, educators, and organizations.



*Source: Ready.gov*

- Sesame Street in Communities also provides great [bilingual resources](#) for young children and families that can help them build their skills to become more resilient to disasters.

Source: Sesame Street in Communities 

**Figure 6.2.** Sesame Street in Communities provides engaging, bilingual educational materials on being prepared for emergencies.

**Let's Get Ready**  
PLANNING TOGETHER FOR EMERGENCIES

*\*Example of bilingual educational materials.*



Family Emergency Kit  
[English](#) | [Spanish](#)



Let's Get Ready App  
[iTunes](#) | [Google Play](#) | [Amazon](#)

Source: Sesame Street in Communities

Additional **child and student-focused interactive flood resources** to share:

- PBS Kids' Design Squad has an [interactive game](#) and weather WizKids offers games, stories, safety information, and [science experiments](#) about natural disasters and flooding. Source: PBS Kids 

**Figure 6.3.** *Don't Flood the Fidgets!* is an interactive flood risk and safety game by PBS Kids Design Squad.



Source: PBS Kids

- This 3.5-minute video by Sci Show Kids, which is targeted toward younger children, describes how floods happen, what occurs during a flood, why one should avoid flood waters, and how to prepare for floods. It uses language that [people of any age can](#)

[understand](#). Source: SciShow Kids; YouTube  

- NOAA’s National Severe Storms Laboratory provides [learning resources for children](#) and young students. They have **coloring books, worksheets, and well-designed activities**.

Source: The National Severe Storms Laboratory (NSSL), NOAA 

- This [link](#) has free educational materials directed towards Texas school children and parents. These TFMA materials highlight a very special character known as TexAnna TADDpole. TFMA can provide you some of these materials. Source: TFMA 

## 6.1. Helping Adults, Teens, and Children Cope with Disasters

Floods can result in the loss of a home and belongings, displacement, changes in school, loss of support networks, and economic hardship for families. The aftermath may also involve coping with the injury and death of loved ones.

If you need to provide information for adults coping with the uncertainty caused by flooding and other disasters, the **top three resources** to share are:

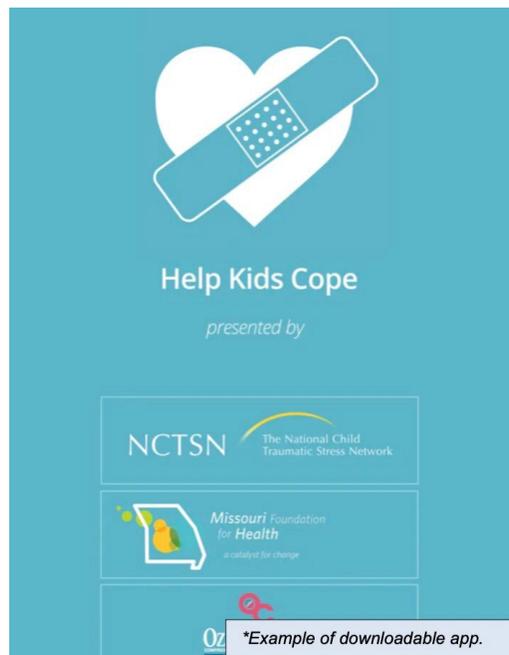
- 1 Help **adults** in your community learn about who is most at risk for [emotional distress](#) and where they can seek counseling and support if they are experiencing distress related to flooding. Source: SAMHSA
- 2 Access [information and resources](#) provided by the CDC about what you can do to help **teens** cope with disasters. Source: CDC 
- 3 Access [information and printable materials](#) provided by the CDC about what you can do to help **children** cope with disasters. Source: CDC 

For additional resources that help **children and their families cope with the uncertainties caused by flooding**:

- [Ready.gov](https://www.ready.gov) provides adults with information about how to recognize the signs of disaster-related stress, tips on easing stress, and guidance for helping teens and children cope. *Source: Ready.gov*
- The [National Child Traumatic Stress Network](#) provides families with suggestions, tips (downloadable phone app), and an online psychological first-aid e-course. Information specific to coping with hurricane disasters can be found [here](#). *Source: The National Child*

*Traumatic Stress Network (NCTSN)* 

**Figure 6.4.** National Child Traumatic Stress Network example of downloadable app for children.



*Source: The National Child Traumatic Stress Network (NCTSN)*

## 7. Resources for Pet Owners

Pet owners living in flood-prone areas face different challenges during a flood. Knowing how to build a pet safety kit for a flood event can help pet owners be better prepared when a disaster strikes. Additionally, it is important for them to be aware of shelters that accept pets. Being unsure about whether a pet can stay with its family during an evacuation event can lead to additional stress for family members.

Remember that the Red Cross does not allow pets in their shelters during evacuation events, unless they are service animals.

If you need to provide information on how to protect or care for pets before, during, and after a flood, the **top three resources** to share are:

1

The CDC provides [pet safety](#) information on what you can do to protect and care for pets **before, during, and after** an emergency. Also included are links to lists of pet-friendly hotels. *Source: CDC*



2

The Humane Society of the United States created a short and engaging [video](#) for pet owners on preparing a basic **disaster pet kit**. *Source: The Humane Society of the United States*



3

The American Society for the Prevention of Cruelty to Animals offers free [Pet Rescue Alert](#) stickers that can be placed on front doors or windows of a home. These stickers can help notify first responders to the presence of pets in a flooded home.

**Figure 7.1.** Basil, aka Disaster Kitten, provides guidance for humans on the important items to include in a pet emergency kit.



*Source: Humane Society of the United States; YouTube*

Additional **pet disaster safety information** resources to share:

- Ready.gov also provides great resources for pet owners such as a **guide** to making a [pet disaster evacuation plan](#). *Source: Ready.gov*
- Search engines allow users to search for hotels and other accommodations that allow pets, which may be useful when planning for a flood evacuation.

## 8. Background Information Used to Create this Guide

### Overview of Research Conducted

This resource guide was developed through a partnership between TWDB and The University of Texas at Austin, Moody College of Communication. [Dr. Keri K. Stephens](#), a Professor and Co-Director of the [Technology & Information Policy Institute](#), led the research effort along with her team of graduate students: Kendall Tich, Nancy Carlson, Anastazja Harris, and Brett Robertson. The UT research team first compiled a systematic literature review on flood risk perceptions and issues. Second, the team identified best practices from this literature. Third, the team conducted 20 interviews with flood officials and flood experts in Texas, analyzed the interview data, and created a model that explains the complexities of communicating with the public. The research team also identified best practices in communicating flood issues with the public and local flood officials' specific needs in that regard. Fourth, the team integrated their interview findings with portions of TWDB's findings from the TexasFlood.org survey from September 2020 to provide more nuanced explanations of the relationship between communication needs and available resources. Finally, the team designed and ran a state-wide survey of representative samples of Texas residents to help flood administrators better understand the education needs of their diverse stakeholders.

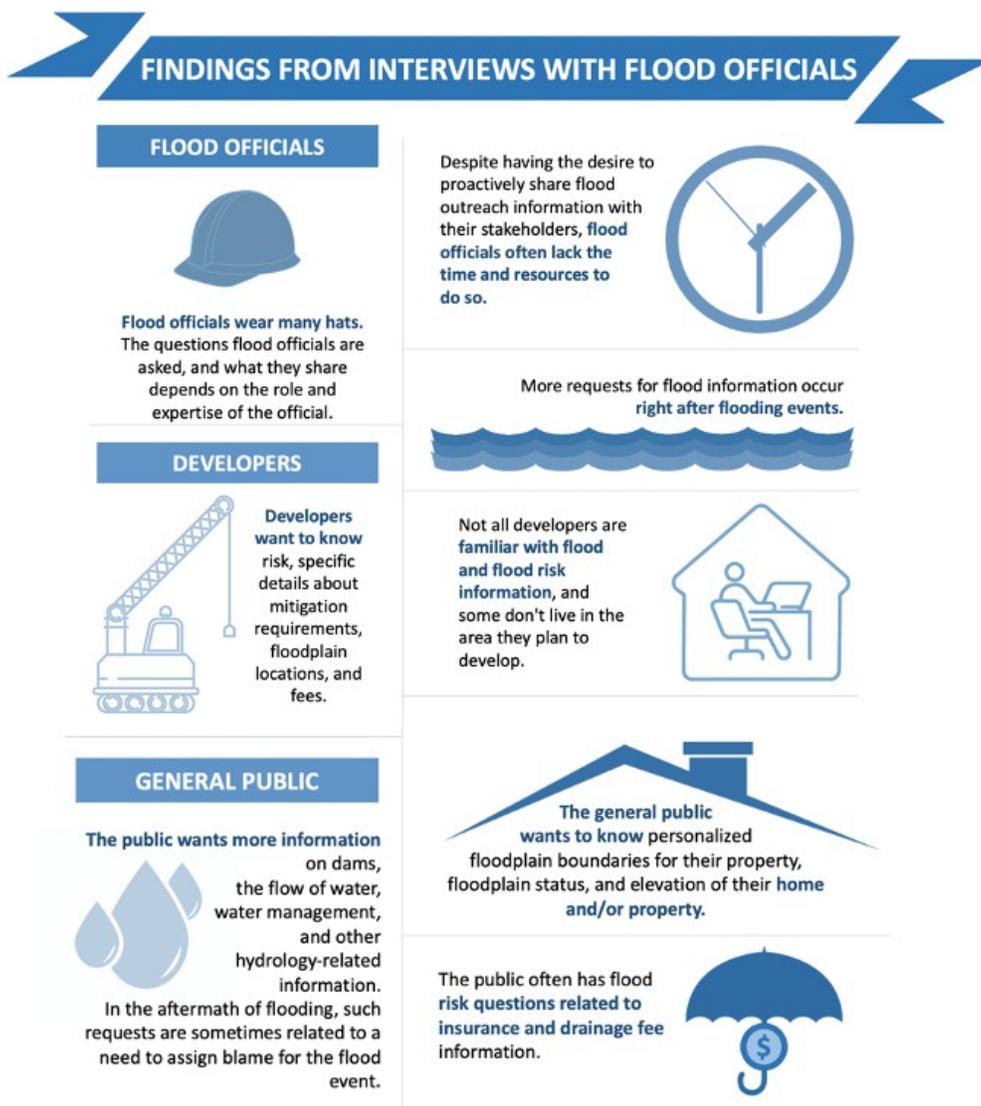
For the state-wide survey of the public survey participants, the UT research team worked with TWDB to design a meaningful sampling strategy that ensured the survey collected data that were 1) helpful to local flood administrators and TWDB, 2) representative of the demographic mix of Texas, and 3) two-thirds sampled from flood-prone zip codes. To determine flood-prone zip codes, TWDB staff used FEMA's Community Engagement Prioritization (CEP) tool (version 2.0) and applied two parameters: Individual Assistance Payments requested from FEMA, and the Population Percent in the Floodplain (using the FEMA National Flood Hazard Layer). The survey collected a total of 1,079 responses, which provided an adequate sample size for meaningful analyses. (For copies of the full data report, please contact TWDB). The full list of resources used in compiling this guide are found in the Appendix.

## 8.1. Understanding the Needs of Texas Flood Officials

Using the information gathered from TWDB’s survey of Texas flood officials was conducted in September 2020 (see section 10 of this manual for these survey results), the UT research team conducted interviews between December 2020 and March 2021 with Texas flood officials to better understand the survey findings.

Both the TWDB survey and UT interviews found that flood officials’ roles vary substantially, which affects the type of information people ask them to provide. Many flood officials wear several hats, including conducting outreach on floodplain management issues and handling requests from multiple stakeholders. Figure 8.1 elaborates some of those major findings

**Figure 8.1.** A summary of findings from interviews with flood officials.



### 8.1.1. Flood Officials' Concerns Related to Flooding and Flood Information and Resources

In addition to the questions and concerns identified in the TWDB survey, the interviews elaborated on notions of public distrust, pushback from developers and builders, and the public being unaware of floodplain boundaries, the flow of water, and how water infrastructure works (e.g., dams). Flood officials who were interviewed noted their **top concerns related to flood and flood information resources** as:

- Floodplains are constantly changing, so there is a **need for regularly updated flood map information**. Maps can often be out of date and the public doesn't understand why.
- **Flood risk and water data is not readily available or regularly updated**, and the public has difficulty understanding information related to floodplain boundaries.
- Property owners and developers are **unaware of their FEMA floodplain status** and where their properties are located in relation to regulatory floodplains.
- A **lack of understanding about flood risk** exists for many audiences.
- The **public distrusts** officials, which is often linked to lack of transparency about planning, development, and floodplain management issues in the community.
- **Preparedness for floods is severely lacking** among the public.
- They often receive **pushback from builders and developers** on the topic of flood risk information and disclosure.
- There is a **focus on other disasters instead of flooding**, such as drought.
- There can be **miscommunication** regarding water operations and procedures in the community.

### 8.1.2. Specific Flood Information and Resource Needs

In the interviews, flood officials also elaborated on their specific flood resources and information needs. The interview findings include a need for educational resources that are developed specifically for communities, elected officials, and floodplain managers. There were also calls to improve the accessibility of flood information resources to everyone (note that the 2021 reorganization of TWDB's TexasFlood.org is addressing this request).

Flood officials who were interviewed noted the specific **flood information and resources they need to serve their stakeholders** should consist of:

- **Up-to-date mapping data and accurate flood maps** Every flood official interviewed mentioned timely and accurate floodplain maps and data as a top need. Accurate and precise maps are essential to making informed decisions.
- **Streamlined tools and resources** Many organizations have produced easy-to-use flood information resources, which are often free, but the sources of the materials are scattered and decentralized, or the materials are inconsistent in their content and presentation of flood issues.
- **Cultural awareness and language comprehension** Consideration of the cultural sensitivity of the materials and ease of comprehension for residents who are immigrants, or for whom English is not a primary language.
- **Statewide educational support for schools** The need for flood education and flood literacy content to be included in curricula across the state would help students become familiar with flood related issues at an early age, because flood literate students grow up into flood literate adults.
- **Flood information related to home buying or property ownership** Information and resources that help potential property buyers in making informed purchasing decisions and inform current homeowners on how local flood issues may affect them.
- **Flood training for elected officials** Planning and development decisions are often made by officials who do not understand or are aware of floodplain management principles. Elected officials should be able to avail of floodplain management training.
- **Classes on flood issues for the community** Community-based adult flood education classes that teach about flood risk, exposure, and general flood awareness issues.
- **More virtual training opportunities for flood officials** Virtual trainings reduce the cost overhead of getting certified and maintaining continuing education credits. Lower cost and availability mean more local officials and community members can avail of the virtual training programs.
- **Improved accessibility of materials** Educational materials for non-English speakers or those who are not as technology-savvy, should be more easily available

### 8.1.3. Barriers to Flood Information and Resources

Both the TWDB survey and the UT research team’s follow-up interviews discussed barriers to flood information. The top barriers identified were similar across both the survey and interviews. TWDB’s TexasFlood.org and this resource guide are an attempt to address some of these barriers.

The top **barriers to flood information and resources** as identified during the interviews with flood officials include:

- **Content is difficult to find** Users often must search for flood related content on multiple websites.
- **Content is often outdated** FIRMs, for example, take at least five years to update and often do not represent current conditions by the time they are approved and released.
- **Flood officials stick with limited sets of familiar resources** Since accurate content is difficult to find and there are so many other resources, flood officials tend to find resources that work for them and stick with them.
- **GIS tools are difficult to understand** GIS data, maps, and other flood related content provided to the public are difficult to understand and use without prior familiarity with GIS.
- **Content is available only in English** Reaching as wide an audience as possible is challenging if flood information is available only in one language.
- **Availability of few non-technical interactive tools** When flood information is provided, it is usually in a technical format that the average person is unfamiliar with, which can lead to user confusion and frustration.
- **Audience needs not prioritized** Tools that officials use require more details than those for the public. One size does not fit all; overloading the public with technical details or using regulatory tools such as FIRMs to explain flood issues confuses the public even more.

## 8.2. Statewide Survey Findings on Perceptions of Flooding in Texas

A statewide survey of Texas residents living in both flood-prone and less flood-prone areas of the state was also conducted by the UT research team in partnership with TWDB. The survey sought to identify the flood education needs of Texas residents living in flood prone and less flood prone regions of the state. Findings highlight what the Texas public **does and does not understand about floods**, the level of public **awareness of flood education programs**, demographic differences in flood education needs and flood awareness, and offers some suggestions on how to address the flood-related needs and/or **concerns of the Texas public**.

### 8.2.1. Summary of Texans' Perception of Flooding in their State

In May 2021, The UT Austin research team conducted a survey of 1,079 Texans. The survey group was representative of the race, ethnicity, and gender demographics of Texas. In addition, two-thirds of the survey participants lived in flood-prone zip codes at the time the survey was conducted. It is especially noteworthy that approximately 40 percent of the participants had never experienced a flood event, while 34 percent had experienced one flood event, and almost 26% of participants had been flooded more than once.

Provided below is a summary of some of the **key findings** that may be helpful in engaging Texans on the topic of flooding.

1

There are almost **no differences in Texans' perception of their flood risk, or their awareness of flood programs based on whether they live in a flood-prone zip code or not**. This suggests that as a state, we do not provide effective or adequate flood education that is specific to the actual flood risk residents in different areas are exposed to. Though some communities in Texas have focused on community flood education, as a state, the differences in flood risk perception are minimal.

2

Texans who have experienced **flooding before are much more aware** of flood risk and perceive their flood risk as much higher than Texans who have not experienced flooding. They are also slightly more likely to have heard about the TWDB and TFMA. Many of the findings suggest that experiencing a flood in Texas is a **key motivator to seeking flood information and a more attuned perception of flood risk**. However, it

would be ideal to help people understand their risk **before** they experience a flood.

3

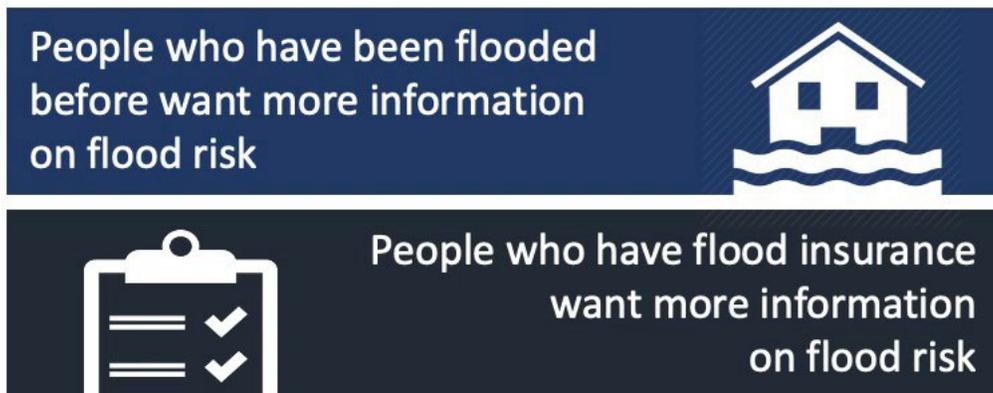
Texans **who have flood insurance are more aware of flood programs**, perceive their flood risk as much higher, are more likely to seek flood information, and have higher level of trust in official sources of flood information than Texans who do not have flood insurance. Official sources include local, state, and federal agencies and organizations.

4

In this sample of 1,079 Texans, 71 percent of respondents said they were aware of the **Turn Around, Don't Drown** program, approximately 41 percent have heard of TWDB, a little over 33 percent of respondents have heard of TFMA, and 10 percent have heard of TexAnna the Tadpole, (the student-focused, flood-education program by TFMA.)

There were additional findings related to flood risk perceptions and information. Figure 8.2. highlights these some key points from these findings.

**Figure 8.2.** Information based on flood risk and prior flood experience.



### 8.2.2. Types of Flood Information Texans Seek

Survey participants were asked about the type of flood-related information they seek. The participants were asked to select how often they seek certain types of flood information on a scale of 1 to 5, where 1 is never and 5 is always. Information on staying safe during a flood topped the list, but overall, it was not very different than the other flood information categories.

The **types of flood information that were frequently sought by Texans** includes information related to:

- How to stay safe during floods
- General flood education
- Understanding flood risk
- Learning if property is in a floodplain
- How to protect home and property
- How to evacuate for floods
- Educating children about floods
- Being prepared for floods
- Knowing about flood insurance

People who have been flooded before, and those who have flood insurance want more information on all these types of flood information than people who have not been flooded and those without flood insurance. This suggests that once people know they are at a risk for floods, they know this information is valuable.

### **8.2.3. Texans' Trust in Media Sources for Flood Information**

Texans have a **moderately high to moderate level of trust in various communication media**, with the highest level of trust being in traditional media. However, social media is not far behind. The trends were very similar across race/ethnicities including the Hispanic/Latinx sample (sample size of 442) and Black/African American sample (sample size of 132). Note that the race/ethnicity demographics in this study closely reflected the state of Texas demographics.

**Figure 8.3.** Communication media sources of information that Texans trust for flood information.



There were also several significant findings related to trust in information and past experiences with flooding and flood-related information. Figure 8.4. below displays these findings.

Figure 8.4. Findings related to information and significant flood variables

### Survey Findings: Significant Flood Variable Differences



### 8.2.4. Demographic Differences in Flood Risk Perceptions

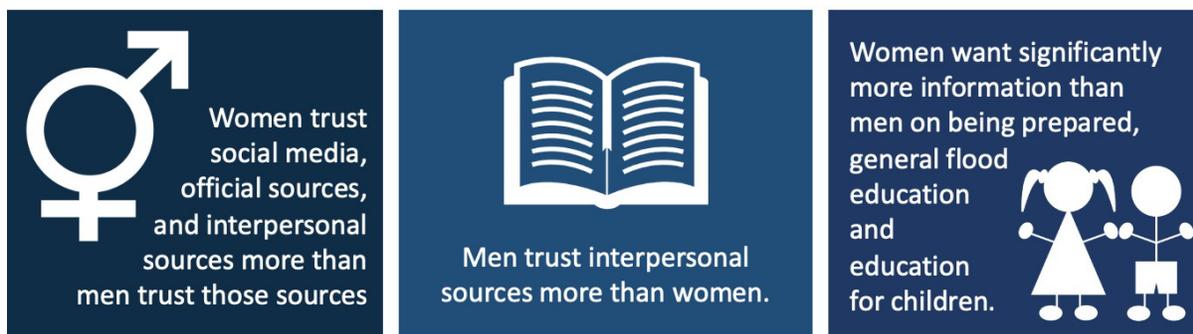
Based on the survey findings, **women perceive a higher risk of flooding**, tend to seek more flood information, and trust official sources more than men. **Men have heard of Turn Around, Don't Drown** and the Texas Water Development Board more often than women.

Note: Other research has found that **deaths** related to **driving into flood waters** are **higher in men** than women, indicating that some aspects of flood safety messaging are not working on all the intended audiences.

Figure 8.5. below displays additional important gender differences in the flood survey findings.

Figure 8.5. Survey findings on significant gender differences

### Survey Findings: Significant Gender Differences



Three statements on the survey, shown in Figure 8.6., are especially relevant for local flood officials. Here we compare the responses between the race/ethnicities in our sample that had meaningful differences. Note that in responses to all three questions, the **Hispanic/Latinx respondents expressed the lowest level of confidence in their flood preparedness.**

**Figure 8.6.** Flood preparedness by demographic sample.

Survey respondents were asked to rank how much they agree on a scale of from 1 to 5 with the listed statement, where 1 is “strongly disagree” and 5 is “strongly agree.” A higher score means the respondents agree with the statement.

Statement on Survey	Agreement Score for Hispanic Sample (Average)	Agreement Score for Black Sample (Average)	Agreement Score for White Sample (Average)
I would know what questions to ask flood experts.	<b>3.31</b>	3.67	3.64
When it comes to finding information about the potential risk posed by floods, I know what to do.	<b>3.69</b>	3.92	3.93
<b>Statement concerning technical nature of flood information</b>			
Much of the information on floods would be too technical for me to understand.	<b>2.88</b>	<b>2.76</b>	2.51

- Texans who identify as **African American or Black have higher risk perceptions** and would like access to more flood information than other race/ethnicities. These findings suggest this group **may be open to receiving more flood education materials.**
- Texans who identify as **Hispanic or Latinx have less knowledge about flood risks**, have higher risk perceptions, and feel they have less control over their ability to seek flood information. They also have **less knowledge of the Turn Around, Don't Drown program, TWDB, and TFMA.** However, this group does seek flood preparedness information more often, and they expressed a greater intention to seek flood information than other race/ethnicities in our study. This suggests there is a **key opportunity to provide flood education materials to Hispanic/Latinx communities** in Texas.

There were several additional significant differences based on race/ethnicity and age. Some key findings are highlighted in figure 8.7, below.

Figure 8.7. Significant survey findings based on race/ethnicity and age.

### Survey Findings: Significant Race / Ethnicity Differences



### Survey Findings: Significant Age Differences



## 9. Comprehensive List of Resources to Share with Texans (URLs)

The following section provides a comprehensive list of all the resources used throughout this guide. Links were retrieved during the listed year and will be updated as needed.

A

B

C

Centers for Disease Control and Prevention (2021). Flood Waters or Standing Waters.

<https://www.cdc.gov/healthywater/emergency/extreme-weather/floods-standingwater.html>

Centers for Disease Control and Prevention (2021). Pet Safety in Emergencies.

<https://www.cdc.gov/healthypets/emergencies/index.html>

D

Direct Energy (2021). How Can I Prepare My Home for a Flood?

<https://www.directenergy.com/learning-center/prepare-home-flood>

DisasterAssistance.gov (2021). Disaster Assistance and Local Resources.

<https://www.disasterassistance.gov/>

E

Edwards Aquifer (2021). Flood. <https://www.edwardsaquifer.net/pdf/flood.pdf>

F

Federal Alliance for Safe Homes (FLASH) (2021). Strengthening Homes and Safeguarding Families: Protect your home and learn how to be prepared. <https://www.flash.org/>

FEMA (2021). FEMA Flood Map Products. <https://www.fema.gov/flood-maps/products-tools/products>

FEMA (2021). FEMA Flood Map Service Center. <https://msc.fema.gov/portal/home>

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FloodSmart (2021). How can I pay less for flood insurance? <https://www.floodsmart.gov/costs/how-can-i-pay-less-for-my-flood-insurance>

FloodSmart (2021). The cost of flooding. <https://www.floodsmart.gov/flood-insurance-cost/calculator>

FloodSmart (2021). The Latest from the NFIP. <https://www.floodsmart.gov/>

FloodSmart (2021). What does my flood zone mean? <https://www.floodsmart.gov/flood-map-zone/find-yours>

FloodSmart (2021). What flood insurance covers. <https://www.floodsmart.gov/how/what-is-covered>

H

I

J

K

L

Lower Colorado River Authority (2021). How the Highland Lakes system works.  
<https://www.lcra.org/water/floods/how-lcra-system-of-dams-works/>

M

N

National Weather Service (2021). Before a Flood.  
<https://www.weather.gov/safety/flood-before>

National Weather Service (2021). Flood Related Hazards.  
<https://www.weather.gov/safety/flood-hazards>

National Weather Service (2021). Flood Safety Education and Outreach.  
<https://www.weather.gov/safety/flood-education>

National Weather Service (2021). Turn Around Don't Drown.  
<https://www.weather.gov/safety/flood-turn-around-dont-drown>

O

P

PBS Kids (2021). Flood Education Game for Children.  
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Q

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Ready.gov (2021). Build a kit. <https://www.ready.gov/kit>

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Sesame Street (2021). Sesame Street in Communities.  
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Storm Guard (2021). Preparing for a Flood – A comprehensive Guide for Homeowners.  
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<https://www.twdb.texas.gov/flood/grant/fma.asp>

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Z

## **10. Appendix**

### **10.1 Summary of TexasFlood.Org survey results**

# **TexasFlood.Org Survey Results**

**Conducted by the  
Texas Water Development Board**

**September 2020**

# METHOD AND POPULATION

Over 300 Texans participated in an online survey conducted by the Texas Water Development Board (TWDB) in September 2020. Participants were asked questions about their concerns regarding flooding and the resources they rely on to prepare for, mitigate, and respond to flood events. Most participants related to flood in a professional capacity, whether as local floodplain managers or as engineers working alongside mitigation and recovery efforts. Further, most participants identified as working with urban and suburban communities, though 30% of survey respondents came from rural areas.

Below are the results of the most note-worthy questions asked of the participants.

### 3. How would you categorize your community?

Urban	79
Suburban	120
Rural	88
Other	16

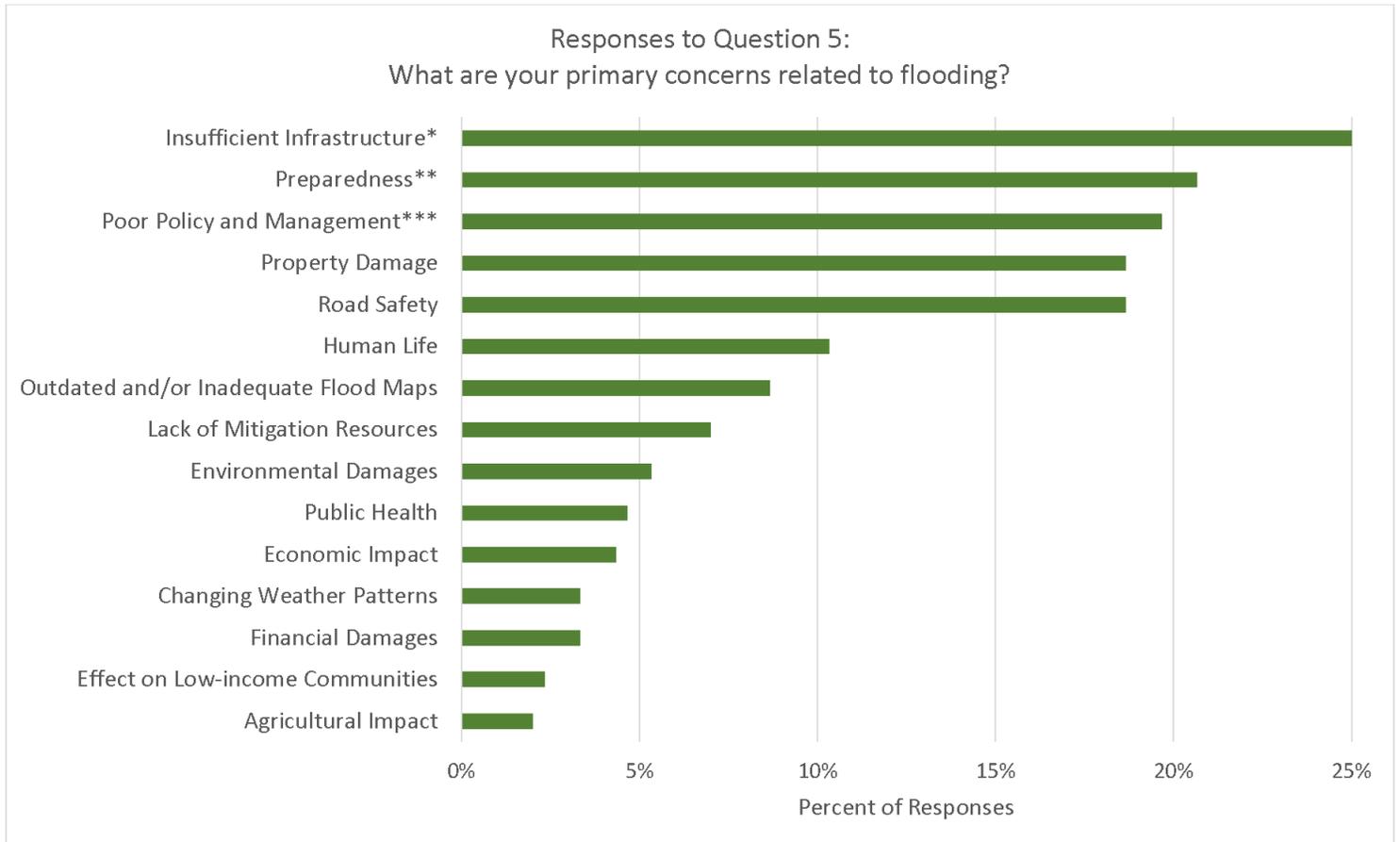


### 4. What is your housing type?

House	262
Apartment	21
Manufactured/mobile home	19



## RESULTS: Fears of Flooding



\*Includes inadequate drainage, lack of retention ponds, need for green infrastructure, too much impervious cover, etc.

\*\*Includes better realtime data for flood alert and warning systems

\*\*\*Includes allowing development in flood plains, lack of mitigation policy, lack of education, etc.

**Total number of Responses Analyzed:**

300

## RESULTS: Relations with Data

6. How often do you search for flood-related information?

● Rarely/Never (0-2 times/year ...	46
● Sometimes (3-12 times/year o...	109
● Frequently (at least 1 time/mo...	152



7. When do you search for flood-related information?

● Before a flood-event	95
● During a flood-event	51
● After a flood-event	34
● Other	127

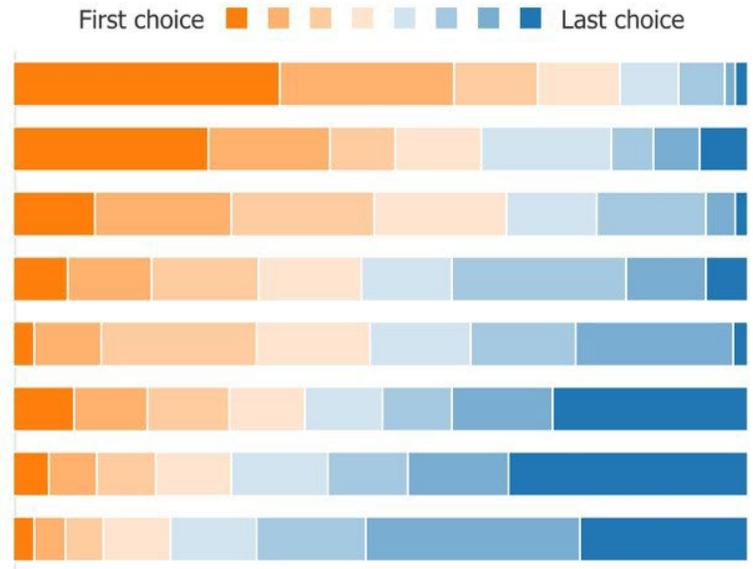


## RESULTS: Relations with Data

8. Please rank the internet resources that you use most frequently to access flood-related information, in order from most to least often.

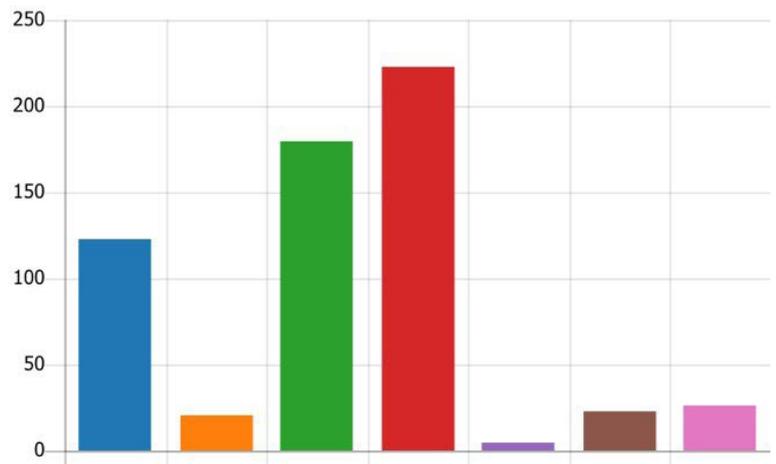
**Rank Options**

Rank	Options
1	Maps (ex: interactive maps, flo...
2	Search engine (ex: Google, Bin...
3	Local/regional governmental ...
4	News websites
5	State government websites
6	Federal government websites
7	Social media & multimedia (e...
8	Community forums or RSS ne...

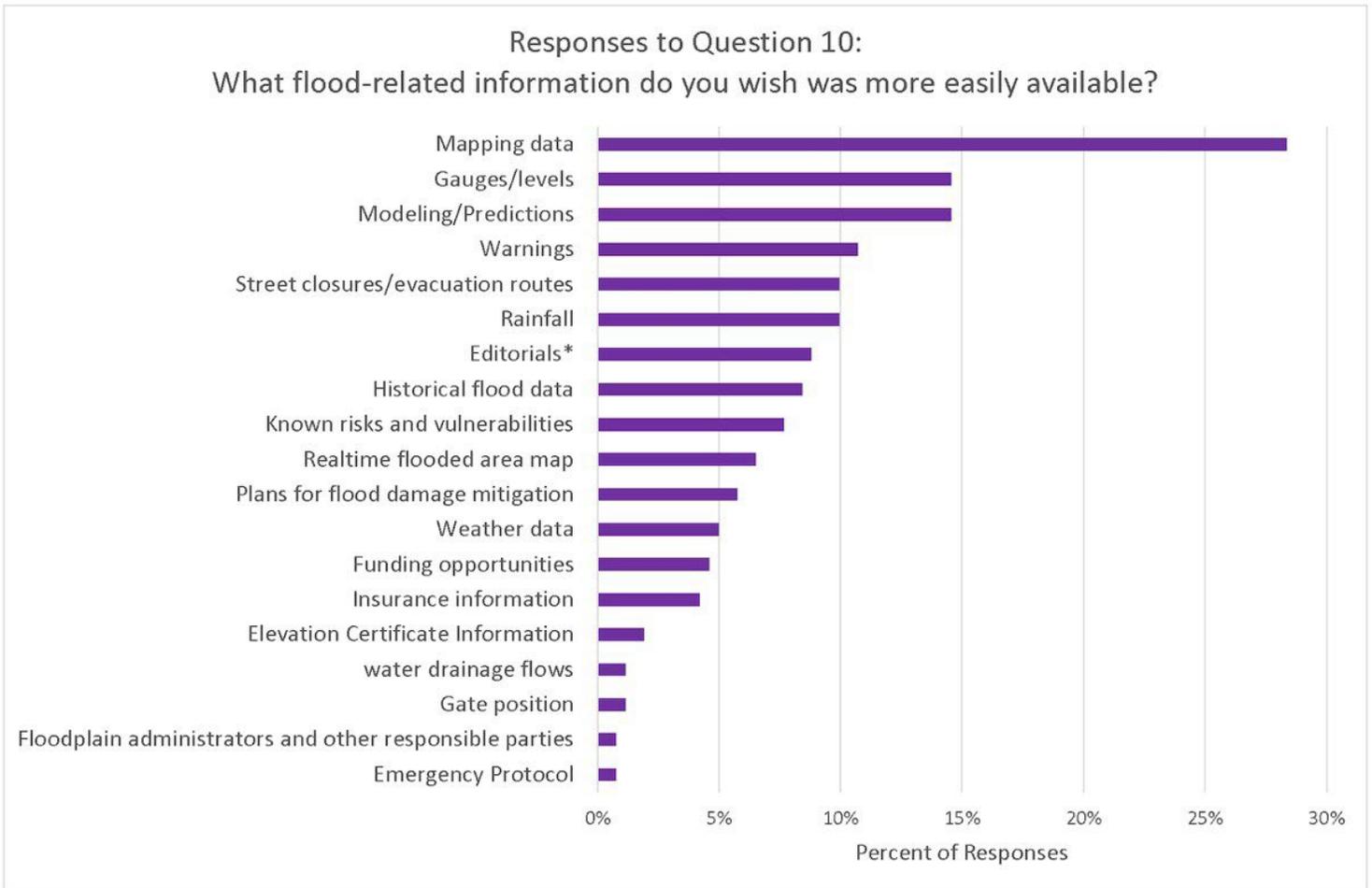


9. Choose the top 2 ways that you stay informed on flood-related topics.

TV	123
Radio	21
Stationary device (ex: desktop,...	180
Mobile device (ex: tablet, smar...	223
IoT (ex: smart speakers, AI-po...	4
Paper (ex: newspaper, magazi...	23
Word of mouth (ex: talk to nei...	26



# RESULTS: Frustrations and Wishes



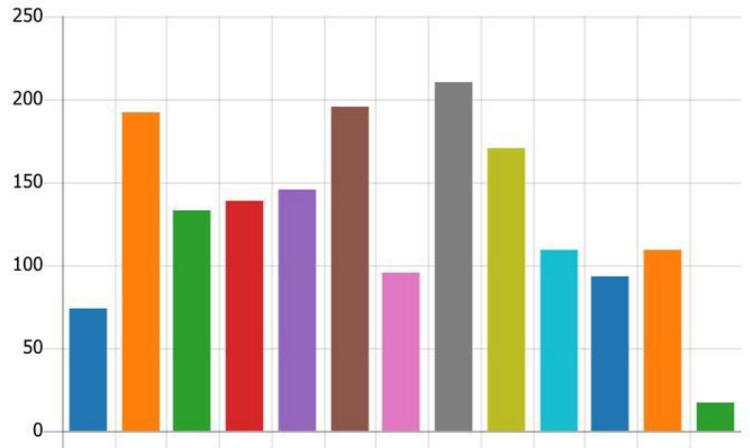
\*Includes reports on innovation and development or case studies on how communities solve problems

**Total Number of Responses Analyzed:**  
261

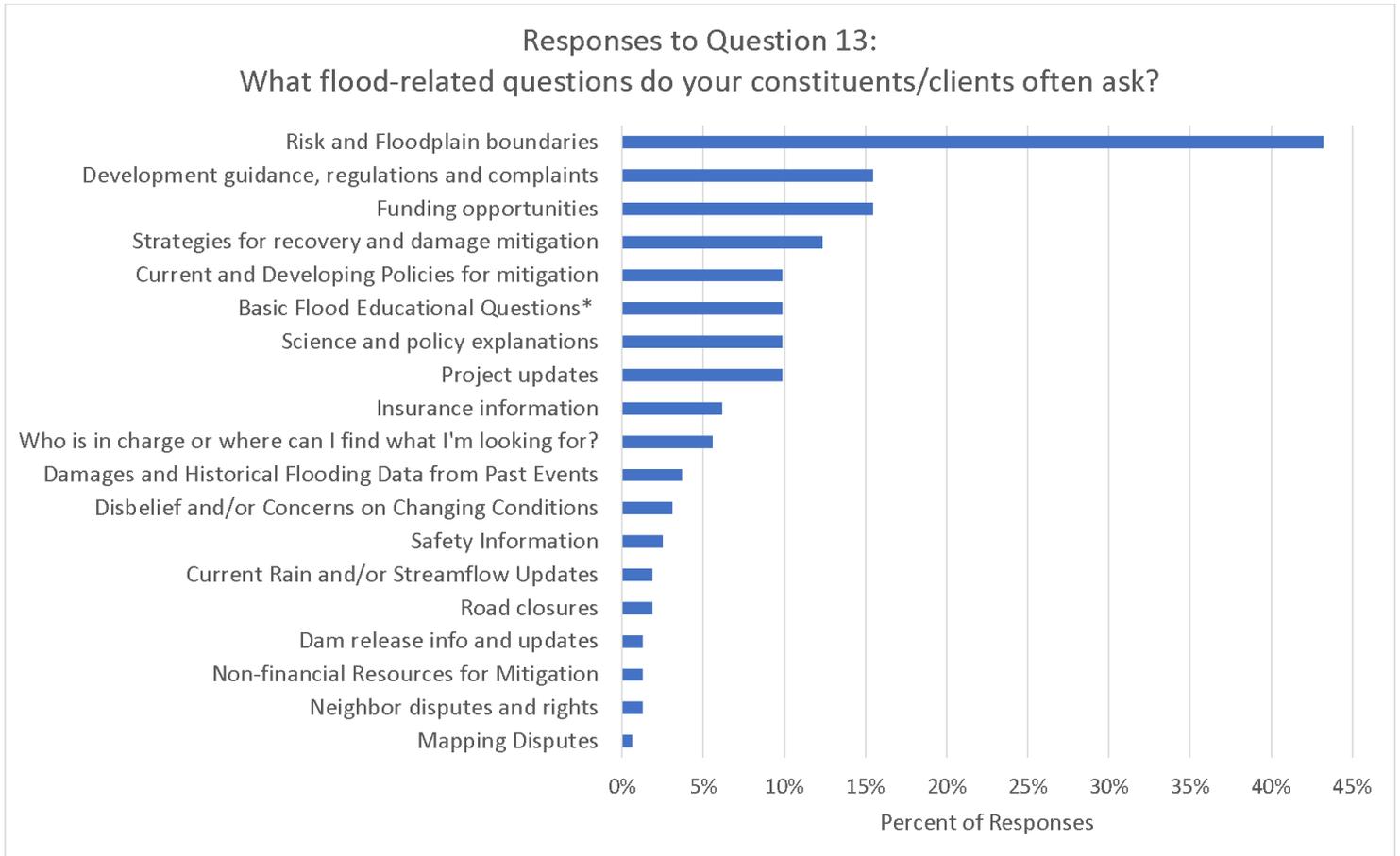
# RESULTS: Frustrations and Wishes

## 11. What kinds of flood-related information are you interested in?

● How to prepare for a flood	74
● Flood risk information specific...	192
● General flood risk information...	133
● Emergency response informati...	139
● Flood-related funding progra...	146
● Flood-related downloadable d...	195
● Flood recovery information	95
● Downloadable and interactive ...	210
● Historical flood information	170
● Current events	109
● How to get involved in the sta...	93
● National Flood Insurance Prog...	109
● Other	17

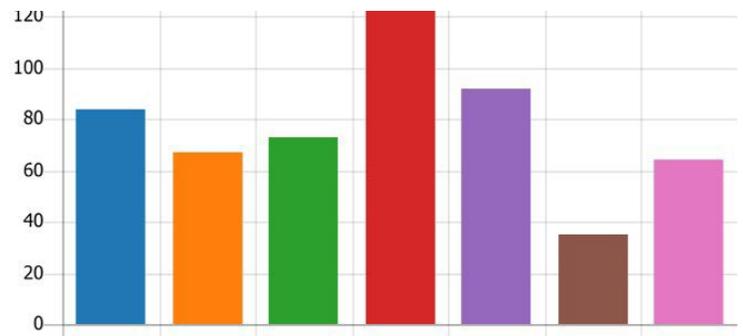
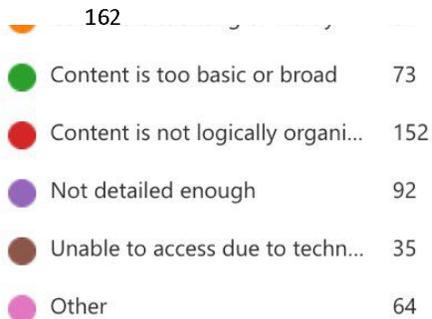


## RESULTS: Sharing with the Public

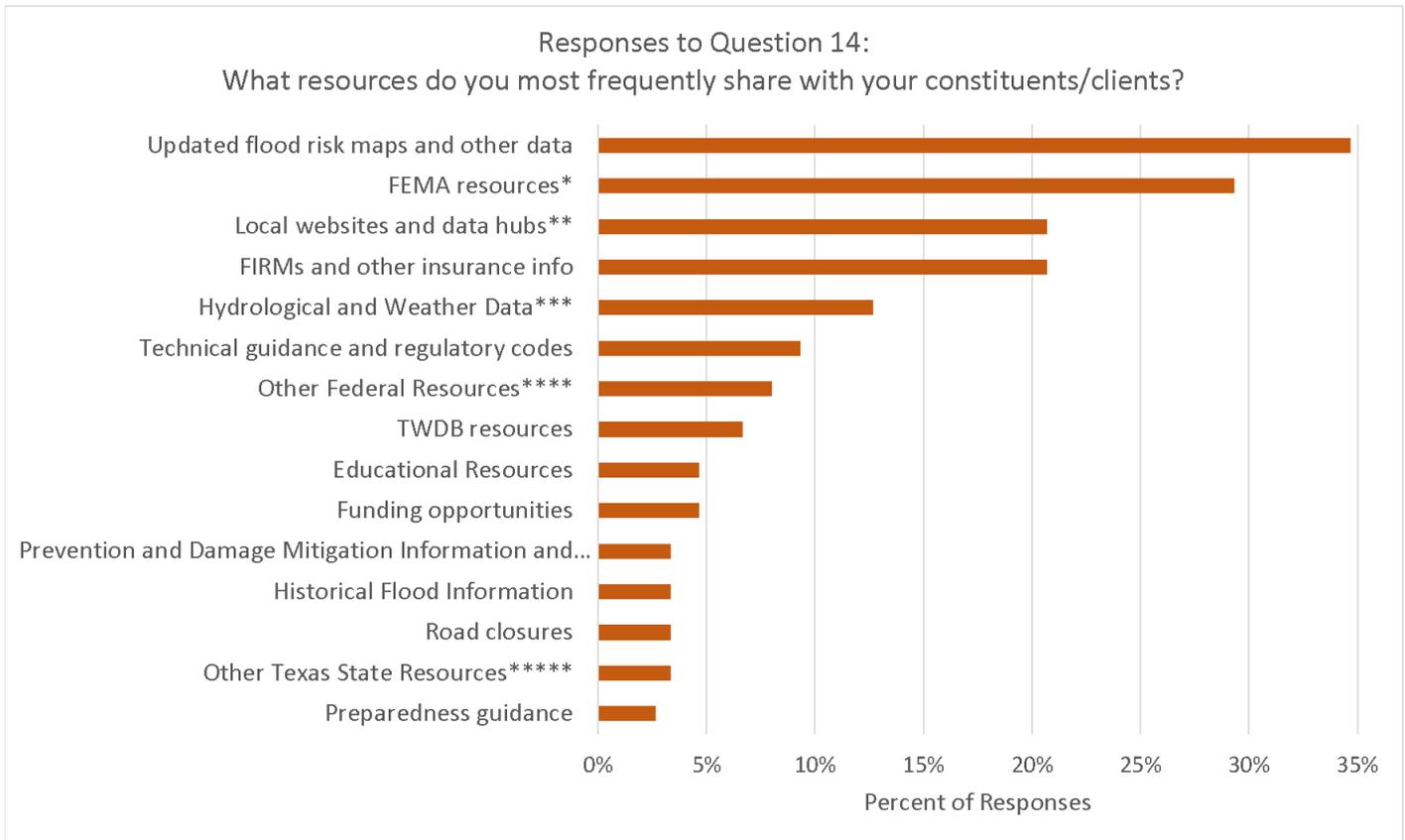


\*Includes "Why does my property flood?", "Why isn't there proper drainage?",  
Why do I need to elevate my structure?, "What does it mean to be in a 100-year floodplain?"

### Total Number of Responses Analyzed:



## RESULTS: Sharing with the Public



\*Includes maps and insurance information, FloodSmart.gov

\*\*Includes Harris County Flood Information Mapping Tool, San Antonio River Authority Risk Map, City of Austin FloodPro

\*\*\*Includes reservoir levels, streamgage and rainfall data

\*\*\*\*Includes NOAA, NRCS, NWS, US Army Corps of Engineers, USGS

\*\*\*\*\*Includes DriveTexas.org and TexasReady.gov

**Total Number of Responses Analyzed:**

150