

Chapter 7: Flood Response Information and Activities

This chapter summarizes the flood response preparations using demographic, historical, projected, and statistical data from the previous chapters, and by implementing data from the survey responses. The Texas Water Development Board (TWDB) specifically stated that RFPG “shall not perform analyses or other activities related to planning for disaster response or recovery activities.” The focus of this chapter is summarizing the information obtained and providing general recommendations regarding flood response activities. As discussed in **Chapters 1 and 2**, a variety of types of flood risks exist in the Guadalupe Flood Planning Region (FPR), including riverine, flash, urban, and coastal flooding. When such flood events occur, it is imperative that plans are in place to address flood response and recovery needs.

7.1 . The Nature and Types of Flood Activities

There are four phases to emergency management:

- **Flood Preparedness: Actions**, aside from mitigation, that are taken before flood events to prepare for flood response activities.
- **Flood Response: Actions** taken during and in the immediate aftermath of a flood event.
- **Flood Recovery: Actions** taken after a flood event involving repairs or other actions necessary to return to pre-event conditions.
- **Flood Mitigation: The** implementation of actions, including both structural and non-structural solutions, to reduce future flood risk to protect against the loss of life and property.

Examples of preparedness actions include creating disaster preparedness plans, performing drills and exercises, installing disaster warning systems, creating essential supply lists, and assessing potential vulnerabilities. During the response phase, disaster plans are implemented, search and rescues may occur, and low water crossing signs may be erected. In the recovery phase, evaluation of flood damage, rebuilding damaged structures, and removing debris occurs. The most important step of the four phases of emergency management is mitigation. The Federal Emergency Management Agency (FEMA) defines [hazard mitigation](#) as, “any sustainable action that reduces or eliminates long-term risk to people and property from future disasters.”

Flood mitigation is the primary focus of the regional flood planning process and plan development efforts regarding identifying and recommending FMEs, FMSs and FMPs by the RFPG. The plan may also include flood preparedness FMEs, FMSs and FMPs.

Examples of mitigation actions include structural and non-structural flood risk reduction projects such as property acquisition and relocation, drainage or channel improvements, dams,

or levees but also includes actions such as planning, zoning, floodplain regulation and protection, and public outreach projects.

7.2 Guadalupe Basin Flood Response – Stakeholder Input

7.2.1 Actions and Preparations

Hazard Mitigation Action Plans served as the primary data source for identifying flood mitigation (and preparation) actions. Mitigation actions from Hazard Mitigation Action Plans include:

- Buyout/Acquisition/Elevation Projects
- Drainage Control & Maintenance
- Education & Awareness for Citizens
- Equipment Procurement for Response
- Erosion Control Measures
- Flood Insurance Education
- Flood Study/Assessment
- Infrastructure Improvement
- Installation/Procurement of Generators
- Natural Planning Improvement
- Outreach and Community Engagement
- Technology Improvement
- Urban Planning and Maintenance

This initial list was refined and expanded upon through two different avenues of public input: a survey conducted through the Region 11 online Data Collection Tool that filtered questions based on whether the respondent indicated general public or practitioner, and direct questionnaires with sponsors of potential FMEs, FMSs, and FMPs. The survey indicated that several of the types of actions listed were in place or being implemented in the next 5 years including flood warning signs, reverse 911 systems, crews to set up barricades or close gates, social media, portable and/or temporary traffic message boards, stream or rain gauges with alerts, and flood gauges.

Figure 7-1, Figure 7-2, Figure 7-3, Figure 7-4, and Figure 7-5 present the results of survey and questionnaire relevant to Region 11 communities' current preparedness, response, recovery, and mitigation efforts.

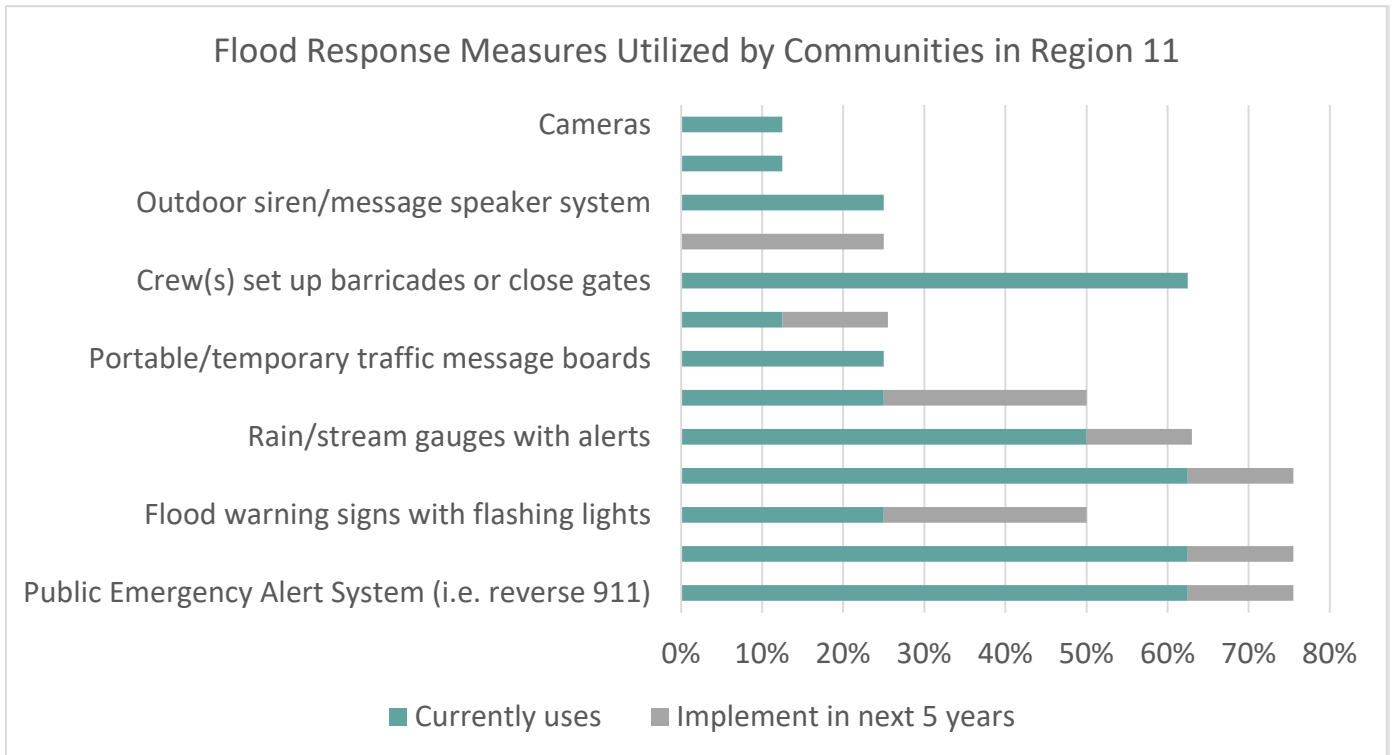


Figure 7-1: Flood Response Measures
 Source: Region 11 Data Collection Tool as of May 27, 2022

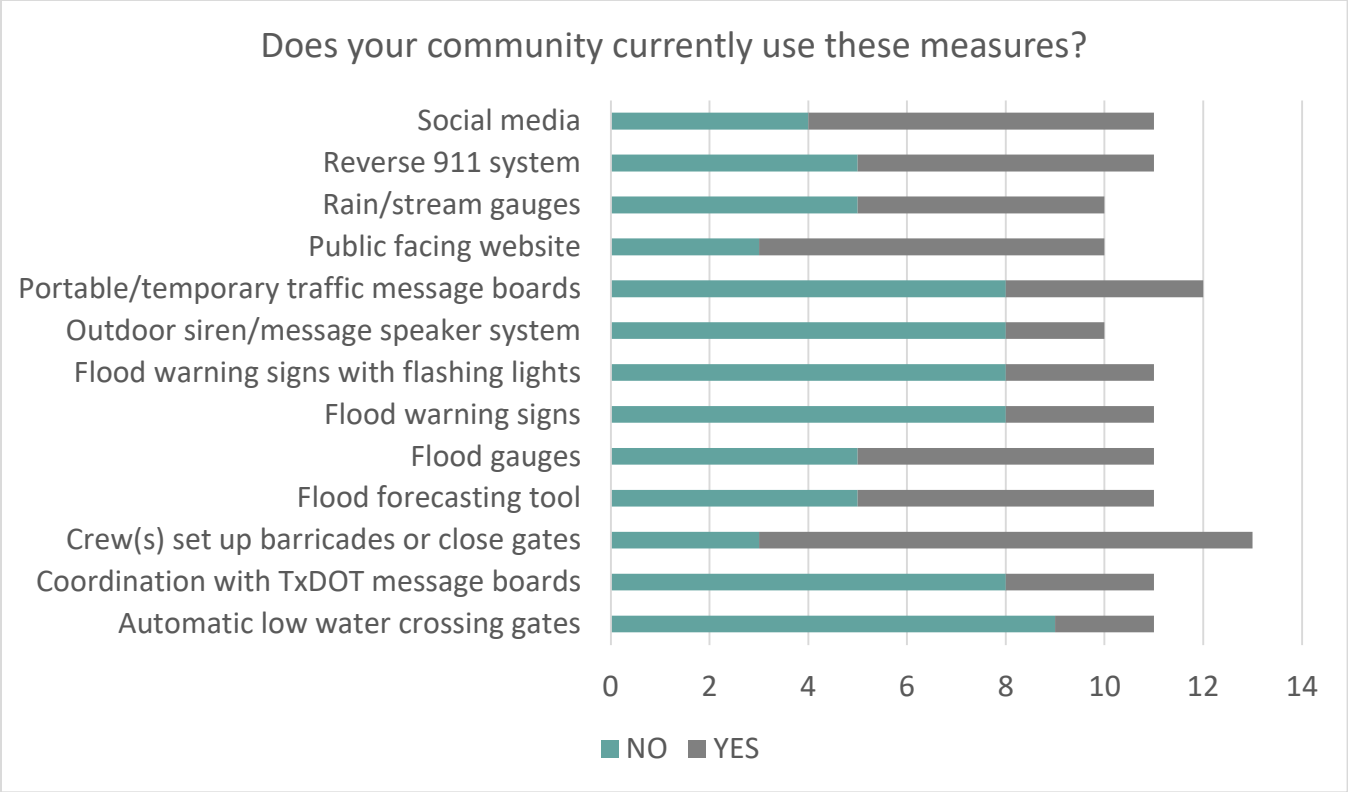


Figure 7-2: Flood Response Measures Communities are Currently Using
Source: Region 11 Sponsor Questionnaire

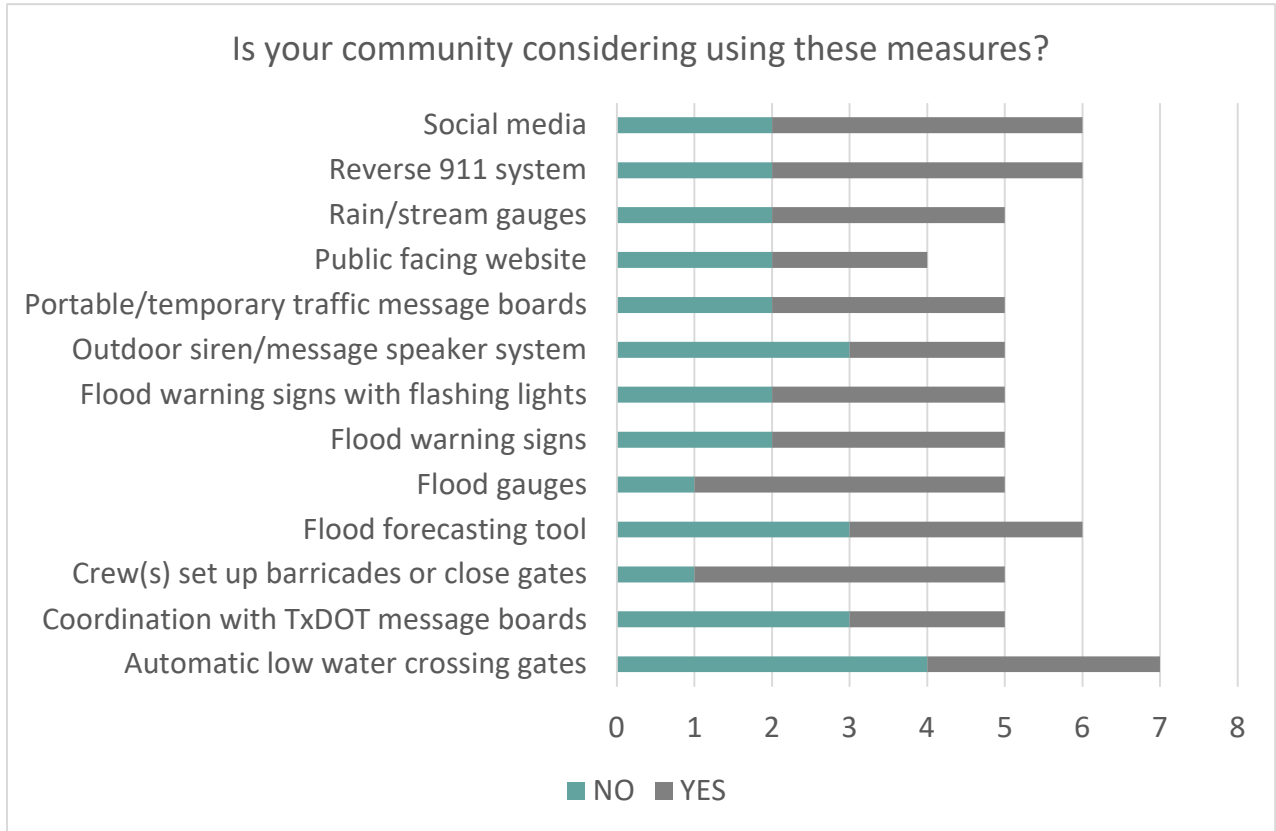


Figure 7-3: Flood Response Measures Communities are Considering
 Source: Region 11 Sponsor Questionnaire



Figure 7-4: Community Participation in Flood Management Activities

Source: Region 11 Data Collection Tool as of May 27, 2022

Survey respondents indicated that specific activities have already been in place to address flooding concerns in their jurisdiction, including performing existing drainage system maintenance and implementation and enforcement of drainage design criteria/floodplain management policies.

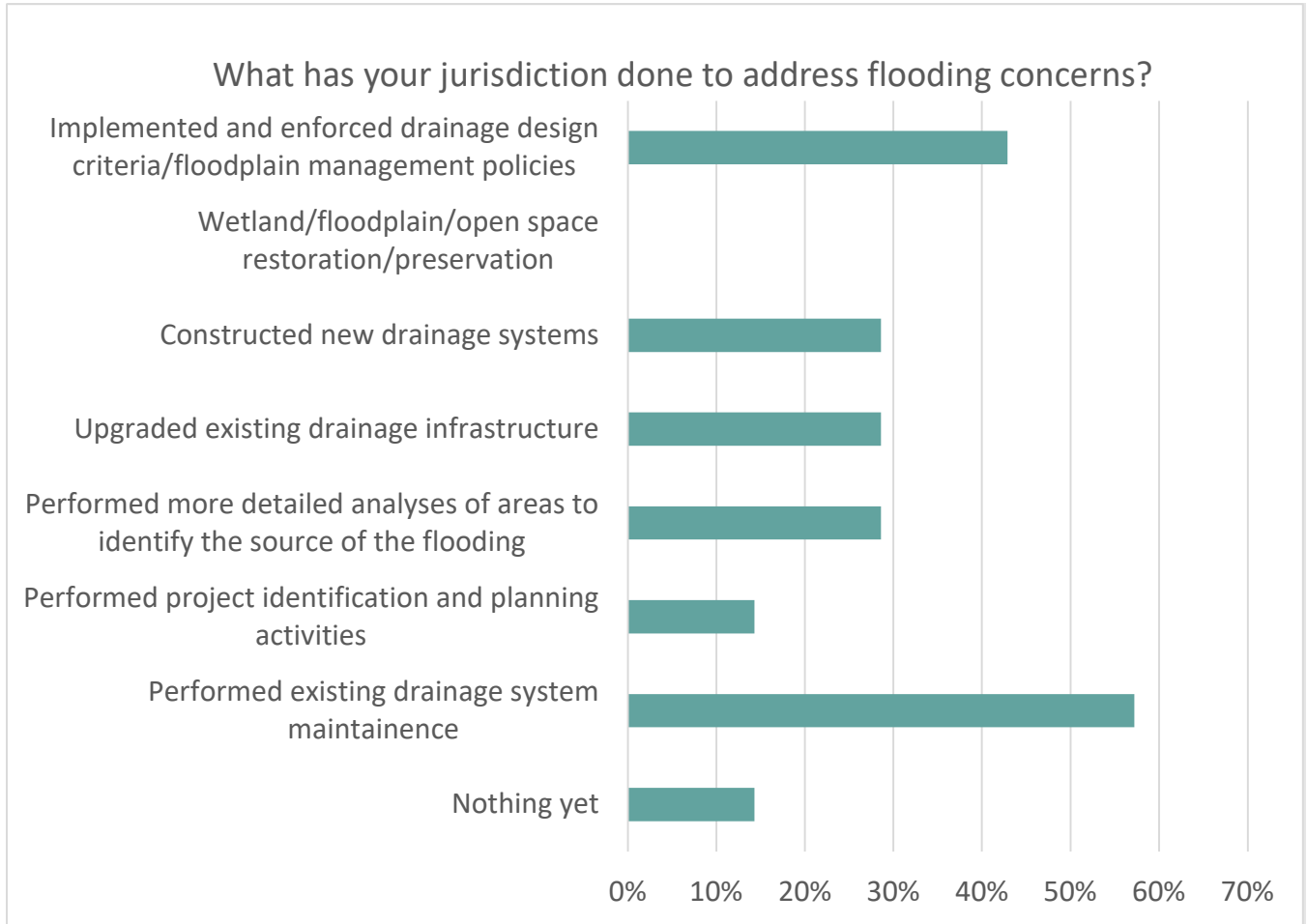


Figure 7-5: Flooding Concerns

Source: Region 11 Data Collection Tool as of May 27, 2022

Many of the mitigation and preparatory actions are done in conjunction with the relevant entities who put these actions into practice.

7.3 Relevant Entities in the Region

The purpose of flood risk management is to help prevent or reduce flood risk. Responsibility for flood risk management is shared between federal, state, and local government agencies; private-sector stakeholders; and the public. Listed below are the various contributing entities and partners who play significant roles in flood risk management.

The [Texas A&M AgriLife](#) Extension employs agricultural agents in each county throughout Texas, who serve as an expert or teacher on the topic of agriculture. Agents can provide valuable information on preparation and recovery from flood events specific to agricultural entities. The Guadalupe FPR has a significant agricultural footprint making working closely with agricultural extension agents crucial to prevent losses.

Municipalities and counties are generally responsible for local response, recovery, and preparedness for flood disasters within their jurisdictions. Emergency management operations will need the support of many of the departments within the jurisdictions including, but not limited to emergency responders, public works officials, road and maintenance crews, and city officials. Typical response activities for cities include the work of emergency responders to perform rescues during events. Public Works departments manage utilities including operating back-up generators for water and sewer plants. Road and maintenance crews monitor road conditions and close roadways to prevent vehicles from entering high water. City officials also update their citizens through social media posts and public alerts before, during and after events. During flood events, counties will provide the public with critical information, close flooded roadways, perform high water rescues, and coordinate emergency operations. [In the aftermath of a flood event, cities and counties coordinate to provide recovery services for residents including but not limited to debris clean up, providing vital resources such as fresh water, medical care, and shelter, issuing permits for the repair of flooded properties, and local infrastructure repair or improvements to mitigate future risk. Cities and counties can provide long-term resiliency through the successful implementation of mitigation projects to reduce the impact of future floods.](#)

[Council of Governments](#), regional councils or commissions are voluntary associations that represent member local governments codified pursuant to the Texas Local Government Code, Chapter 391. There are 24 regional councils in Texas that represent all 254 counties. The following COGs represent the Guadalupe FPG area: Alamo Area, Capital Area, Coastal Bend, Golden Crescent and the Middle Rio Grande. The COGs are focused on providing community services, cooperative planning, coordination, and technical assistance on a regional scale. COGs can serve as a resource for flood data, flood planning, and flood management. In addition, COGs are an eligible entity to apply as the designated grantee regarding federal and state funds. [When recovering from a flood event, COGs can serve as a valuable resource by providing information, services, and toolkits for residents. COGs facilitate recovery through public engagement and community outreach, the planning of and implementation of regional infrastructure projects, and the development of plans to aid in recovery and resilience.](#)

[TWDB](#) provides water and flood planning, data collection, flood mapping and dissemination, financial assistance, technical assistance services and training to the citizens and communities of Texas. TWDB financial assistance offers a variety of options to meet a community's needs. The financial assistance is in the form of grant programs, including administering FEMA's Flood Mitigation Assistance program, and cost-effective loan programs to aid in preparedness, response, recovery, and mitigation efforts.

[FEMA](#) has many functions in the support of planning and disaster recovery efforts at the Federal level. The agency works closely with States to provide state and local governments with resources, experts, funding and policies to help mitigate and rebuild before and after a disaster to reduce the loss of life and infrastructure. FEMA's Mitigation division has several grant

programs that are categorized by what type of project a community is applying for funds. These funds are used for:

- rebuilding after a disaster
- reducing risk prior to a disaster
- reducing risk of flood damage
- building resiliency after a wildfire

Additionally, FEMA manages the National Flood Insurance Program (NFIP) which enables homeowners, business owners and renters to purchase federally backed flood insurance in communities who participate in the NFIP.

The United States Department of Agriculture (USDA)'s [Natural Resources Conservation Service](#) (NRCS) program provides financial assistance, technical assistance and incentives for easements to farmers and ranchers, local and state governments, and other federal agencies to maintain and improve their land.

The NCRS administers the Watershed Protection and Flood Prevention Operations Program was established to assist federal, state, local and tribal governments to protect and restore watersheds up to 250,000 acres. This program provides financial and technical assistance for planning and implementing watershed projects.

Flood Control Districts were created by the Texas Legislature to reduce the effects of flooding and is governed by County Commissioners Court. This is done by developing and implementing flood reduction plans and maintaining the districts infrastructure. There are 14 Flood Control Districts in the region that provide flood control.

The [National Weather Service \(NWS\)](#) mission is to provide weather, water and climate data, forecasts, warnings, and impact-based decision support services for the protection of life and property and enhancement of the national economy. NWS provides flash flood indicators through watches, warnings, and emergency notices.

Daily river forecasts are issued by the [West Gulf River Forecast Center](#) through the National Weather Service using hydrologic models based on rainfall, soil characteristics, precipitation forecasts, and several other variables. Forecasts are used by a wide range of entities, including but not limited to those in agriculture, hydroelectric dam operation, and water supply resources. The forecasts can provide essential information on the river levels and conditions.

[Wireless Emergency Alerts \(WEAs\)](#) can be sent out by the National Weather Service via cell phone towers to provide short emergency messages to alert locals of emergency situations in their area.

The [National Oceanic and Atmospheric Administration \(NOAA\)](#) is a scientific and regulatory agency that is staffed with expertise to provide resources and information to local communities

including planners, emergency managers, and citizens. These resources include weather forecasts, severe storm warnings and climate monitoring. In addition, [NOAA's National Center for Environmental Information \(NCEI\)](#) is a major resource for communities in regard to historical weather data. This data is beneficial to communities in determining their future probability of flood events and is key in the planning and mitigation process. NOAA's Office of Coastal Management plays a key role in providing information, technology, and flood management strategies.

[The General Land Office \(GLO\)](#) administers Community Development Block Grant Disaster Recovery (CDBG-DR) and Mitigation (CDBG-MIT) funds from the U.S. Department of Housing and Urban Development (HUD) through its Community Development and Revitalization division. These funds are used in rebuilding or restoring critical infrastructure and mitigating future damages. These funds are key elements in recovery and mitigation in the Guadalupe FPR.

[River Authorities or Districts](#) are public agencies established by the state legislature to conserve and manage the distribution of water. Guadalupe has five River Authorities within its region that each have the power to protect, maintain, control, conserve, employ, and allocate the waters of a specific geographical area for the public.

[The Texas Division of Emergency Management \(TDEM\)](#), is responsible for the emergency management at the State level and to assist local jurisdictions in the recovery, rebuilding and future mitigation efforts to reduce the loss of life and property. This is done through training exercise, planning, and funding programs at both the recovery and mitigation stages of a disaster.

There are six TDEM regions throughout Texas to carry out the agency mission by providing technical assistance, planning, deployments of staff and resources. Additionally, TDEM manages the Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) FEMA grant programs. The Guadalupe FPR is completely within TDEM's Region 6.

The [Texas Department of Transportation's \(TxDOT\)](#) primary responsibility is the construction and maintenance of the state's highway system. TxDOT can provide real time road closure and low water crossing information during and after a flood event. Users can access this data through TxDOT's Drive Texas website: <https://drivetexas.org>.

[Texas Public Works Emergency Response Council](#) was established to promote and provide support for Public Works Agencies. The Council provides mutual aid assistance and trainings has created a statewide database of response.

The [U.S. Army Corps of Engineers \(USACE\)](#) offers many services through their programs. One is to reduce disaster risk by oversight of infrastructure programs such as construction and maintenance of dams, reservoirs and flood control projects. The Guadalupe FPR is within

several Districts of the USACE’s Southwestern Division: the Galveston District and the Fort Worth District.

The USACE Flood Risk Management Program (FRMP) works across the agency regarding policies, programs, and expertise concerning the reduction of flood risk. The program was established to set the national flood risk management vision and to communicate the vision to federal, state and local levels of government.

In the planning process it is important to consider flood planning in preparation, during, and following a flood event to access the entities that provide the respondents with the most assistance and support. Of the entities we received survey data from, the top entities in which coordination was indicated as key were the County and the City with all other entities accounting for much smaller responses.

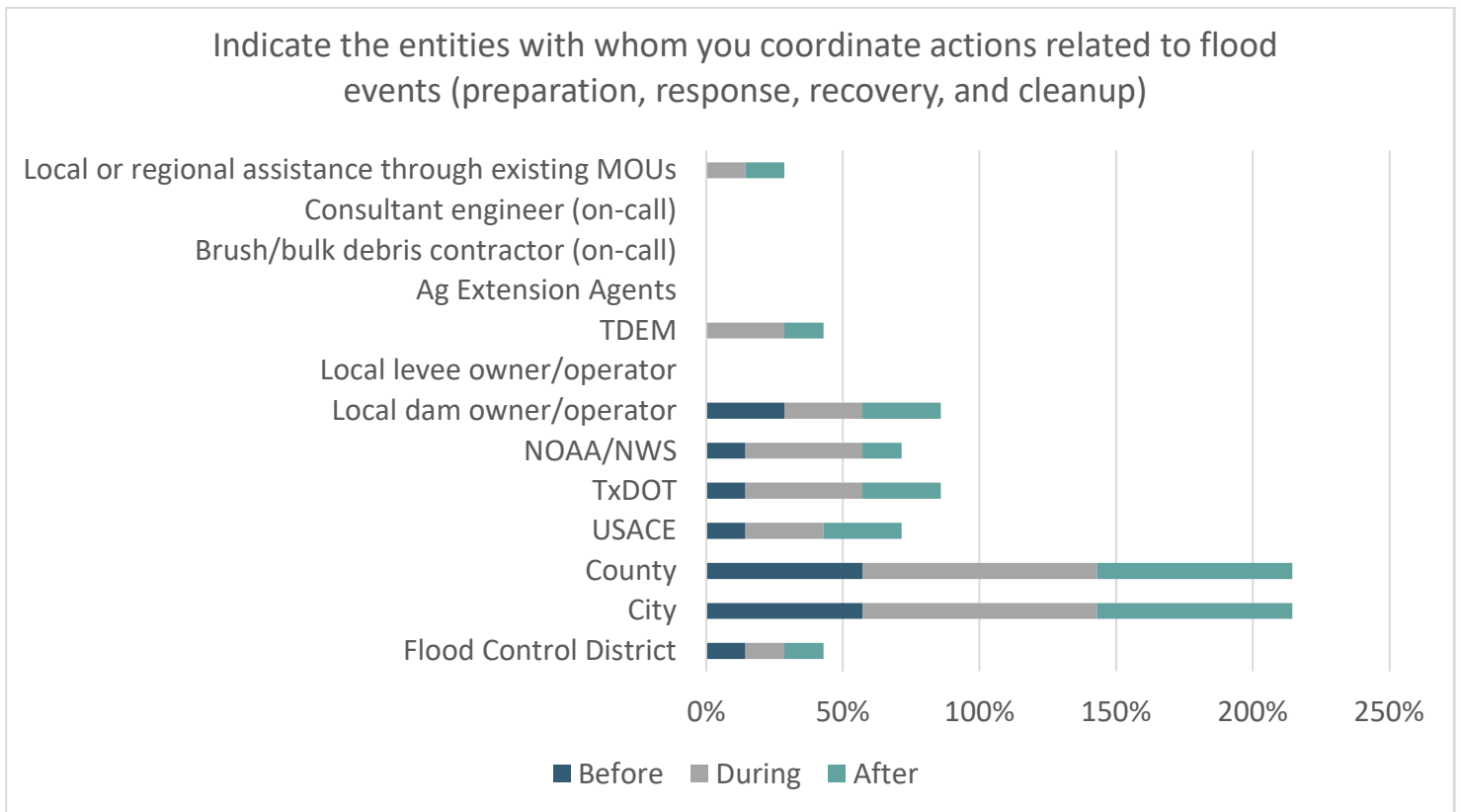


Figure 7-6: Coordination with Entities

Source: Region 11 Data Collection Tool as of May 27, 2022

7.4 Emergency Information

There are various means by which data can be collected and disseminated during a flooding event. These can range from physical collection devices (gauges), public announcements, and alert systems.

Two types of collection devices that are communally used are rain and stream gauges. A rain gauge is an instrument to measure rain fall depth over time, while a stream gauging station is used to measure the discharge, or the volume of water moving through a stream at a given period.

Stream gauging station data for the Guadalupe River basin can be accessed through the United States Geological survey website: www.waterdata.usgs/TX/nwis/current. This site has real-time stream flow data to use in determining possible flood conditions.

In addition to the National Weather Service, local news stations or radio stations are vital components in relaying real time information to local residents of inclement weather and flooding. They can also alert residents to low water crossing closings, dam or levee breaches, and other potential dangers. They can also issue flood watches, warnings, and emergency notifications.

An Emergency Alert System (EAS) is type of software that provides alert messages during an emergency, interrupting radio and television programming to broadcast emergency alert information by the President within 10 minutes.

A reverse 911 system allows an agency to pull up a map on a computer, define an area and send off a recorded phone message to each business or residence in that area. It can provide data to residents of flood dangers in their area.

School emergency alert systems are tools that allow schools to communicate quickly to staff, students, first responders and others so that they can take appropriate action in the event of an emergency. Various versions of this tool are used in schools throughout the region from daycares to K-12 grade, as well as universities. Messages may include important announcements about school events or emergency situations, such as inclement weather and local flooding.

7.5 Plans to be Considered

7.5.1 State and Regional Plans

The State Hazard Mitigation Plan is an effective instrument to reduce losses by reducing the impact of disasters upon people and property. Although mitigation efforts cannot completely eliminate impacts of disastrous events, the Plan endeavors to reduce the impacts of hazardous events to the greatest extent possible.

The plan evaluates, profiles and ranks natural and human-caused hazards affecting Texas as determined by frequency of event, economic impact, deaths and injuries. The plan:

- Assesses hazard risk.
- Reviews current state and local hazard mitigation

- Develops strategies and identifies state agency (and other entities) potential actions to address needs.

7.5.2 Local Plans

In the Guadalupe FPR’s data collection effort and survey tool in 2021, the region requested local emergency management and emergency response plans that were publicly available. Some emergency plans are protected by law and are not available for public consumption.

As indicated in **Chapter 1**, The Guadalupe FPR has several plans and regulations in place region wide that provide the framework that dictates a community’s capabilities in implementing mitigation and preparedness actions. The plans include Hazard Mitigation Plans, Emergency Action Plans, as well as Watershed Master Plans.

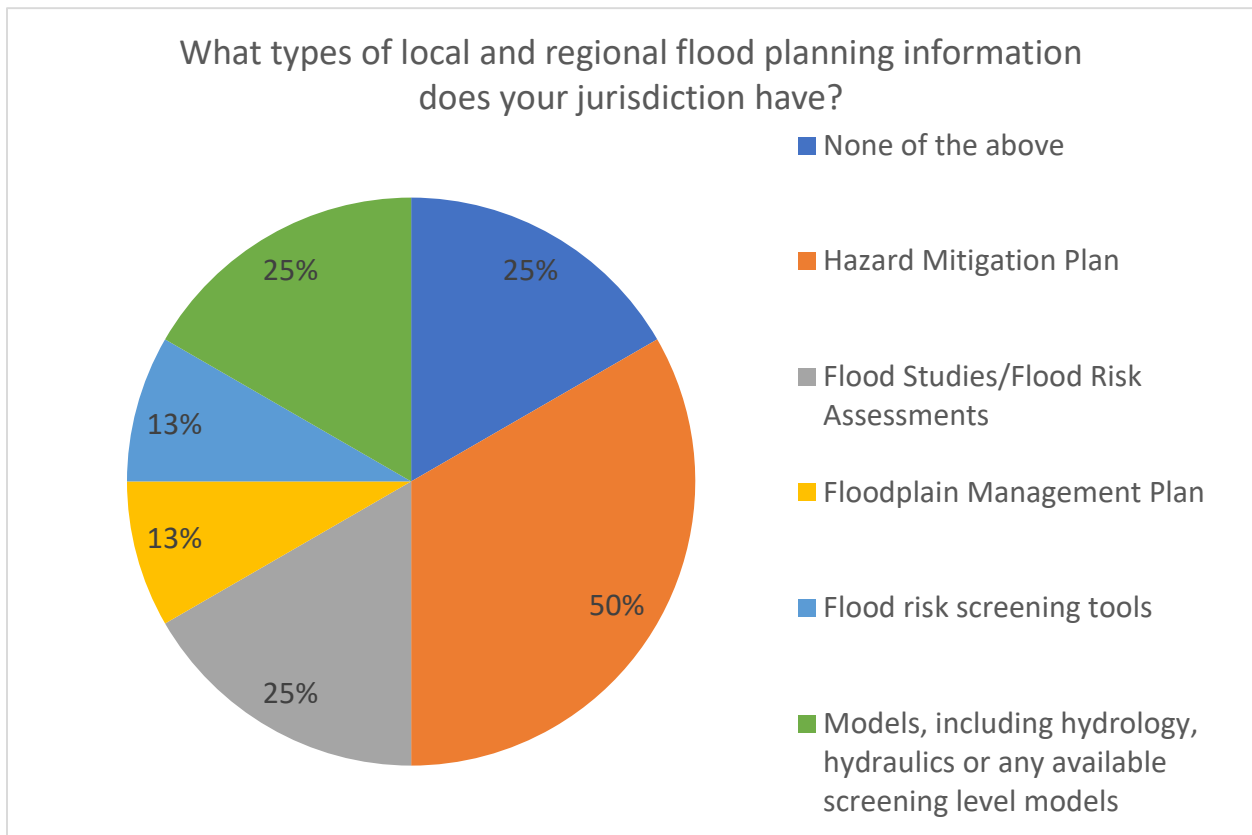


Figure 7-7: Flood Planning Resources

Source: Region 11 Data Collection Tool as of May 27, 2022

Table 7-1: Current Flood Plans and Regulations

Plan or Regulation	Total
Floodplain Ordinance	86
Drainage Ordinance	29
Stormwater Management Ordinance	43
Building Standards for Flood Proofing and Flood Protection	29
Future Conditions Land Use	57
Land Use Regulations	29

Source: Region 11 Data Collection Tool as of May 27, 2022

Hazard mitigation planning reduces loss of life and property by minimizing the impact of disasters. It begins with state, tribal, and local governments identifying natural disaster risks and vulnerabilities that are common in their area and developing long-term strategies to reduce those risks. Mitigation plans are key to breaking the cycle of disaster damage and reconstruction. Of the counties that have had a Hazard Mitigation Plan, only 14 out of 22 county plans are currently approved by FEMA, as they are to be updated on a five-year cycle. Three counties (Bastrop, Kendall, and Travis) are in the process of having their plans updated. Having an up to date HMP is key in assessing risk and in developing mitigation actions.

Emergency action plans (EAP) are developed to document processes and actions to be taken in response to potential events such as major floods to minimize damage to property or life as well as impacts to critical service. EAPs identify actions and responsible parties that can be taken in the lead up to an event (preparedness), emergency response during the event, and recovery actions after an event.

A watershed master plan is essentially a decision-making tool for communities. These plans typically evaluate the existing and expected (often based on future land use maps) flood, erosion, and water quality issues within a watershed and develop conceptual or preliminary mitigation actions to address those problems. The results of watershed plans are used to develop capital improvement to reduce existing flood risk. Watershed plans can also be used to educate and inform the public and community leaders regarding the impacts of land use changes and/or potential modifications to development regulations to reduce future flood risk.

The Guadalupe FPR's ability to prepare, respond, recover, and mitigate disaster events is determined by several factors. With a clear understanding of the plans that determine a community's capabilities, a recognition of the entities with whom coordination is key, and knowledge of the actions sustained to promote resiliency, the Guadalupe FPR can be better equipped to implement sound measures for flood mitigation and preparedness.