

Smith County, TX
Office of Emergency Management



Smith County 2018 Hazard Mitigation Plan



Smith County Fire Marshal's Office
11325 Spur 285
Tyler, TX 75707

October, 2018

Smith County
HAZARD MITIGATION PLAN UPDATE

OCTOBER 2018

Prepared for:

Smith County Fire Marshal's Office
Office of Emergency Management
11325 Spur 248
Tyler, Texas 75707

Smith County Hazard Mitigation Plan Update

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ACKNOWLEDGMENTS AND CONTACTS

Smith County

Fire Marshal

Connie Wasson

Smith County Fire Marshal's Office - Emergency Management Coordinator

Phone: (903) 590-2655

Email: cmccoy@smith-county.com

Staff

Eric Lowry - Deputy Fire Marshal - Assistant EM Coordinator

Chad Hogue - 1st Assistant Fire Marshal - Assistant EM Coordinator

Trey Glover - Deputy Fire Marshal - Assistant EM Coordinator

Caitlin Roberson - Deputy Fire Marshal - Assistant EM Coordinator

Carolyn Lewis - Administrative Assistant - Assistant EM Coordinator

Consultants

Laura D. Johnston, Tetra Tech, Inc., Project Manager

Kari Valentine, CFM, Tetra Tech, Inc., Lead Planner

Stephen Veith, MUP, Tetra Tech, Inc., GIS/HAZUS Analyst

EXECUTIVE SUMMARY

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The Disaster Mitigation Act of 2000 (DMA) is federal legislation that requires proactive, pre-disaster planning as a prerequisite for some funding available under the Robert T. Stafford Act. The DMA encourages state and local authorities to work together on pre-disaster planning. The planning network called for by the DMA helps local governments articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk reduction projects.

Hazard mitigation is the use of long- and short-term strategies to reduce or alleviate the loss of life, personal injury, and property damage that can result from a disaster. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of hazards. It is impossible to predict exactly when and where disasters will occur or the extent to which they will impact an area. However, with careful planning and collaboration among public agencies, stakeholders, and citizens, it is possible to minimize losses that disasters can cause. The responsibility for hazard mitigation lies with many, including private property owners; business and industry; and local, state, and federal government.

Smith County and the participating municipalities have developed and maintained a hazard mitigation plan to reduce risks from natural disasters and to comply with the DMA.

PLAN UPDATE

Federal regulations require monitoring, evaluation, and updating of hazard mitigation plans. An update provides an opportunity to reevaluate recommendations, monitor the impacts of implemented actions, and evaluate whether there is a need to change the focus of mitigation strategies. A jurisdiction covered by a hazard mitigation plan that has expired is no longer in compliance with the DMA.

The *Smith County Hazard Mitigation Action Plan* was formally approved by Federal Emergency Management Agency (FEMA) Region VI on November 3, 2011. Smith County and the planning partners adopted the previous hazard mitigation plan. There are no records of any further work, meetings, or correspondence related to the *Smith County Hazard Mitigation Action Plan, 2011-2016*. It is for that reason that the Smith County Office of Emergency Management elected to develop a completely new plan specifically for Smith County and its participating municipalities.

The development of this hazard mitigation plan update consisted of the following phases:

Phase 1: Organize and Review—A planning team was assembled to provide technical support for the plan update, consisting of county emergency management representatives, key county and city staff, and a technical consultant. The first step in developing the plan update was to re-establish a planning partnership with as the unincorporated Smith County, and the Cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Troup, Tyler, Whitehouse, and Winona. A Steering Committee was assembled to oversee the plan update, consisting of planning partner staff and community representatives from the planning area. Coordination with other county, state, and federal agencies involved in hazard mitigation occurred throughout the plan update process. This phase included a comprehensive review of the previous *Smith County Hazard Mitigation Action Plan, 2011-2016* and existing programs that may support or enhance hazard mitigation actions.

Phase 2: Update the Risk Assessment—Risk assessment is the process of measuring the potential loss of life, personal injury, economic impact, and property damage resulting from natural hazards. This process assesses the vulnerability of people, buildings, and infrastructure to natural hazards. All facets of the risk assessment of the plan were re-visited by the planning team and updated with the best available data and technology. The work included the following:

- Hazard identification and profiling
- Assessment of the impact of hazards on physical, social, and economic assets

- Vulnerability identification
- Estimation of the cost of potential damage

Phase 3: Engage the Public—A public involvement strategy agreed upon by the Steering Committee was implemented by the planning team and the Steering Committee meetings were open to the public. Participation in the hazard mitigation survey occurred across the county.

Phase 4: Assemble the Updated Plan—The planning team and Steering Committee assembled key information into a document to meet the DMA requirements for all planning partners.

Phase 5: Adopt/Implement the Plan—Once pre-adoption approval has been granted by the Texas Division of Emergency Management (TDEM) and FEMA Region VI, the final adoption phase begins. Each planning partner individually adopts the updated plan. The plan maintenance process includes a schedule for monitoring and evaluating the plan’s progress annually and producing a plan revision every 5 years. Throughout the life of this plan, a representative of the original Steering Committee will be available to provide consistent guidance and oversight.

MITIGATION GUIDING PRINCIPLE AND GOALS

The guiding principle for the Smith County Hazard Mitigation Plan Update is as follows:

To reduce or eliminate the long-term risks to loss of life and property damage in Smith County from natural disasters.

The following plan goals were determined by the Steering Committee:

- **Goal 1:** Minimize loss of life, and damage to property, the economy and natural resources from natural hazards.
- **Goal 2:** Increase public understanding, support and demand for hazard mitigation.
- **Goal 3:** Build and integrate local mitigation capabilities to encourage individual safety, reduce damage to public buildings and facilitate continuity of emergency services.
- **Goal 4:** Maintain the natural and man-made systems in the county to protect our communities from natural hazards.

IDENTIFIED HAZARDS OF CONCERN

For this plan, the Steering Committee considered the full range of natural hazards that could impact the planning area and then listed hazards that present the greatest concern to the county. The process incorporated review of state and local hazard planning documents, as well as information on the frequency, magnitude, and costs associated with hazards that have impacted or could impact the planning area. Anecdotal information regarding natural hazards and the perceived vulnerability of the planning area’s assets to hazards was also included. Based on the review, this plan addresses the following natural hazards of concern:

- Dam Failure
- Drought / Extreme Heat
- Earthquake
- Flood
- Hurricane / Tropical Storms
- Severe Storms (Hail, Lightning, and Wind)
- Tornado
- Wildfire
- Winter Storms (including Ice Storms)

MITIGATION ACTIONS

Mitigation actions presented in this plan update are activities designed to reduce or eliminate losses resulting from natural hazards. The update process resulted in the identification of 70 mitigation actions targeted for implementation by individual planning partners as listed in Table ES-1. The Steering Committee ranked the mitigation actions in order of priority, with 1 being the highest priority. The highest priority mitigation actions are shown in red on the table, medium priority actions are shown in yellow and low priority actions are shown in green.

Table ES-1. Recommended Mitigation Actions

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
SMITH COUNTY											
1	Purchase and install an electric back-up generator	Purchase and install electric back-up generators at all of the volunteer fire departments which will ensure emergency operations can continue in the event of a power outage from dam failure, earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	1	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Road and Bridge	\$60,000	HMGP	36-48	High
2 (Previous Drought4)	Distribute public awareness information on crop insurance.	We will have insurance information in our office and we will also put it out over social media annually.	3	Drought, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Fire Marshal's Office	\$2,000	County Budget	60	High
3	Take action to complete EAP for all high and significant hazard dams	There are 23 high and significant hazard dams in Smith County. We will work with dam owners in creating EAP for these dams and help reduce the risk associated with dam failure.	4	Dam Failure	●	◆ ◆	OEM	\$10,000	County Budget	36	Medium
4	Take action to evaluate earthquake risk due to the drilling and fracking in the area.	The county will collaborate with the cities, TX Oil and Gas Association, TCEQ, insurance rep and other experts to host public sessions on the topic.	7	Earthquake	●	◆ ◆	OEM	\$10,000	County Budget	18	Low

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
5	Upgrade Drainage Capacity	Evaluate existing culverts for current condition. The placement, removal, replacement, or repair of old culverts that are clogged with debris, unstable, or unusable due to damage or changing conditions have severely limited the capacity level and structural integrity of the current culverts within Smith County. The priority locations are along County Road 47 and County Road 1139.	2	Dam Failure, Flood, Hurricane/Tropical Storm	 		Road and Bridge	\$900,000	County Budget, HMGP	36	High
6	Purchase All-Hazard NOAA Weather Radios	Purchase NOAA All-Hazard radios for early warning. Place in area schools, business, and critical facilities.	5	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	EM	\$1,000	HMGP	36	Medium
7	Xeriscape around County Buildings	Purchase and plant drought and extreme heat resistant plants around county buildings to minimize water usage.	6	Drought, Extreme Heat			Road and Bridge	\$10,000	County Budget	36	Medium
CITY OF ARP											
1	Purchase and install permanent electric back-up generators	Purchase and install electric back-up generators at City Hall and water pumps located at 400 block of E. Longview, 100 block of Longview and 300 block of N. Main which will ensure operations can continue in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storm, lightning strike, tornado, wildfire, winter storm.	3	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Police Department	\$100,000	HMGP	48	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
2 (Previous Lightning2)	Install Surge Protectors at City Hall	Install surge protectors at City Hall to minimize loss of data and damage to electronics from lightning strike.	4	Lightning	●	◆ ◆	Police Department	\$10,000	City funds	36	Medium
3	Complete Drainage Study and Upgrade Drainage Capacity	Perform study of existing culverts and drainage capabilities in town. Then upgrade drainage capacity where needed.	1	Flood, Hurricane/Tropical Storm	●	◆ ◆	Police Department	\$1,900,000	City funds, HMGP	36	High
4	Purchase and Install Outdoor Warning Siren	An additional outdoor warning siren is needed near downtown area. Purchase and install one.	2	Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Police Department	\$60,000	City funds, HMGP	48	High
5	Xeriscape around City Memorial and Park	Purchase and plant drought and extreme heat resistant plants around City Memorial and Park to minimize water usage.	5	Drought, Extreme Heat	●	◆	Police Department	\$10,000	City funds	60	Medium
6	Construct a Multi-purpose Tornado Safe Room	Secure funding and construct a multi-purpose Tornado Safe Room that could also be a Community Activity Center. The proposed tornado safe room would be built to hold approximately 500 people. It will be hardened by the use of tornado, wind, fire, hail, ground movement, and impact resistant materials (windows, doors, roofing, construction, siding, roof bracings); dry-proofing buildings; upgrading to higher standard insulation; installing lightning rods and	6	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Police Department	\$3,000,000	HMGP, State grants, city funds	60	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		grounding systems; retrofitting for low-flow plumbing; replace landscaping with drought and fire resistant plants; implementing higher standards for foundations to mitigate impacts of earthquake and using R-value building materials to resist heat.									
7 (Previous Drought2)	Replace Water Fixtures with Low Flow Units	The city will replace water fixtures with low flow units at city-owned facilities.	7	Drought	●	◆	Police Department	\$10,000	City funds, State grants	60	Low
8	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	4	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Police Department	\$10,000	City Budget	60	Low
CITY OF BULLARD											
1 (Previous Flood2)	Perform maintenance of storm gutters and storm sewers.	The city will have a full-time employee for Street Department starting in January 2018. Identifying and performing clearing of storm gutters and storm sewers will be a task for the new employee.	1	Flood, Hurricane/Tropical Storm	●	◆	Street Department	\$10,000	City Budget	60	High
2	Upsize Culverts in City	The city will evaluate existing culverts for current condition. The placement, removal, replacement, or repair of old culverts that are clogged with debris, unstable, or unusable due to damage,	2	Flood, Hurricane/Tropical Storm	●	◆	Street Department	\$100,000	City Budget, HMGP	60	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		or changing conditions have severely limited the capacity level and structural integrity of the current culverts. The priority locations for upsizing is near downtown and 8 to 12 culverts are priority.									
3	Purchase and install back-up generator for Well #6	The city will purchase and install a back-up generator for well #6. The electricity can go out on well pump production for many reasons, thus a back-up generator is needed.	3	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	City Manager	\$10,000	City Budget, HMGP	60	Medium
4	Construct a multi-purpose Community Storm Shelter	The city will identify property site for structure. Purchase land if not owned. Design and build to FEMA Storm Shelter standards a structure that could hold emergency management operations, 500 residents approximately, and be used for multi-purposes. It will be hardened by the use of tornado, wind, fire, hail, ground movement, and impact resistant materials (windows, doors, roofing, construction, siding, roof bracings); dry-proofing buildings; upgrading to higher standard insulation; installing lighting rods and grounding systems; retrofitting for low-flow plumbing; replacing landscaping with drought	5	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	City Manager	\$3,000,000	City Budget, HMGP	60	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		and fire resistant plants; implementing higher standards for foundations to mitigate impacts of earthquake and using R-value building materials to resist heat.									
5	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	4	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	City Manager	\$10,000	City Budget	60	High
6	Implement water conservation measures	The city will implement water conservation measures for city-owned structures with low flow fixtures, using metering system to see usage and set alerts for high commercial and homeowner usage.	6	Drought, Extreme Heat	● ●	◆	City Manager	\$50,000	City Budget, grants	60	High
CITY OF HIDEAWAY											
1	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life will be provided by resident - Dr. J.D. Brown.	3	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Mayor and EM	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	60	High
2	Advertise October as Flood Awareness Month	In the month of October, the city will post FEMA flood maps in lobby of Member Services Bldg. available for all residents	2	Flood	●	◆	EM and Hide a Way Lake Club Inc. Management	\$10,000	Main. Budget	60	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		to come and learn about flood awareness.									
3	Maintain Dam Reliability	The city will remove trees from earthen dams on Hideaway Lakes #2 and #3 to mitigate erosion and assist with soil adhesion.	1	Dam Failure, Flood	●	◆ ◆	Hide a Way Lake Club Inc. Maintenance Dept.	\$10,000	Maint. Budget	24	High
4	Mandate Freeboard on Hideaway Lakes Dams	Mandate 2 feet of freeboard to be maintained on Hideaway Lakes Dams.	5	Dam Failure, Flood	●	◆ ◆ ◆	Hide a Way Lake Club Inc. Maintenance Dept.	\$10,000	Maint. Budget	24	High
5	Public Awareness of Evacuation Routes from rising water from dam failure.	Exercise with the residents the use of Code Red System to notify residents of impending flooding with the designated egress routes to higher ground.	4	Dam Failure, Flood	●	◆ ◆	EM and Hide a Way Lake Club Inc. Management	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	12	High
6	Develop and implement a program to clear tree limbs near power lines.	Pass ordinance authorizing Mayor's Office to hire contractors to assist Hideaway Club maintenance staff to clear tree limbs to mitigate against tornado, wind and ice storms.	6	Tornado, Wind, Winter Weather	●	◆	Mayor	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	60	Medium
7	Xeriscape around City Building	Purchase and plant drought and extreme heat-resistant plants around city building to minimize water usage.	9	Drought, Extreme Heat	●	◆	Mayor	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	36	Medium
8	Wildfire fuels reduction within city limits.	Parks department will control buildup of wildlands fire fuels by maintaining wildland interface within the city.	8	Wildfire	● ●	◆ ◆	Hide a Way Lake Club Inc. Maintenance and Security Departments	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	24	Medium
9	Storm Proof the Member Services Bldg.	Purchase and install surge protectors and lightning rods, wind and hail impact resistant windows and doors at the Member Services Building. This will	7	Hail, Lightning, Tornado, Wind	●	◆ ◆ ◆	Mayor and Hide a Way Lake Club Inc. Management	\$10,000	City budget	48	Medium

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		protect this critical facility and critical electronic equipment.									
CITY OF LINDALE											
1 (previous Hail2)	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	2	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Community Development	\$10,000	Department Budget	3	High
2 (previous Lightning2 and Hail2)	Adopt and enforce IBC 2015 version and IRC 2015 version and NFPA-70, 2014 version	The city will enforce the measures and guidelines to ensure the safety of natural hazards and incorporate these stricter building codes into other planning efforts such as the Comprehensive Plan. The stricter codes can mitigate the identified hazards, such as tornado, high wind, and impact resistant materials (windows, doors, roof bracings); dry-proofing public buildings for flooding; upgrading to higher standard insulation for extreme heat and winter storms; installing lighting rods and grounding systems on public buildings; retrofitting to low-flow plumbing and replacing landscaping with drought and fire resistant plants; stricter codes for hail and fire resistant roofing and siding; implementing higher standards for foundations.	1	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆ ◆	Community Development	\$10,000	Private and public	3	High
3 (previous Flood2)	Incorporate No Adverse Impact "Design	Incorporate "no adverse impact" design requirements in community development. Provide awareness to	4	Flood, Hurricane/Tropical Storm	●	◆ ◆	Community Development	\$10,000	City Budget	18	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
	Requirements" in Flood Ordinance	stakeholders and design engineers; building code adoption and plan approval process.				 					
4 (previous Flood2)	Incorporate "Natural Run-Off" Policies	Incorporate "natural run-off" policies. Calculate cumulative effect of development, increase capacity of storm water drainage systems, institute regular drain system maintenance.	3	Flood, Hurricane/Tropical Storm	 	   	Community Development	\$10,000	City Budget	18	High
CITY OF NEW CHAPEL HILL											
1	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	1	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather			Mayor/ City Council	\$10,000	Departmental Budget	30	High
2	Purchase and Install Outdoor Warning Siren	The city will purchase and install an outdoor warning siren.	4	Dam Failure, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather			Mayor/ City Council	\$50,000	City Budget	48	Medium
3	Purchase and Install permanent Back-up Generator for Old Fire Station	Purchase and install a permanent back-up generator for Old Fire Station as a safe haven for residents in the event of a power outage from dam failure, earthquake, extreme heat, flood, hail,	2	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropic			Mayor/ City Council	\$50,000	City Budget, HMGP	60	Medium

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.		al Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather							
4	Reduce Wildfire Fuels	The city will secure a grant to fund the removal of dead trees and brush that surround the city. This will reduce the possibility of a wildfire encroaching into the city.	3	Wildfire	●	◆ ◆	Mayor/ City Council	\$10,000	State and federal grants	60	Medium
5	Xeriscape around City Building	Purchase and plant drought and extreme heat-resistant plants around city building to minimize water usage.	5	Drought, Extreme Heat	●	◆	Mayor/ City Council	\$10,000	City Budget	36	Medium
CITY OF NOONDAY											
1 (previous Hail2)	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life will be available at city hall.	2	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Mayor	\$10,000	City Budget	60	High
2	Purchase and Install back-up generator for City Hall	Purchase and install an electric back-up generator at City Hall, which is an old school house. This will ensure service to city hall, food pantry, and library in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	1	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Public Works	\$100,000	HMGP	36	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
3	Purchase All-Hazard NOAA Weather Radios	Purchase NOAA All-Hazard radios for early warning. Place in City Hall and other critical facilities.	4	Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	 	 	Administration	\$10,000	FEMA grants	12	Medium
4	Xeriscape around City Buildings	Purchase and plant drought and extreme heat-resistant plants around city buildings to minimize water usage.	3	Drought, Extreme Heat			Public Works	\$10,000	City Budget	36	Medium
CITY OF TYLER											
1 (Previous H2, D1, WS2)	Conduct public outreach to educate homeowners on mitigation techniques for their homes.	Educate the public about ways to reduce the impact of disasters within our community.	2	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Fire Department	\$10,000	Fire Department Budget	12	High
2	Purchase and install permanent back-up generators at buildings designated as critical infrastructure.	Install permanent generators in buildings designated as critical infrastructure.	5	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Fire Department	\$100,000	City General Fund, HMGP	12	Medium

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
3	Establish ordinance that restricts or bans burning within city limits.	Establish ordinance that restricts or bans burning within city limits.	7	Wildfire	 	  	Fire Department	\$10,000	Fire department budget	12	High
4	Wildfire fuels reduction within city limits.	Parks department will control buildup of wildlands fire fuels by maintaining wildland interface within the city.	6	Wildfire	 	 	Park Department	\$10,000	City budget.	24	High
5	Enclose open channels that are identified as potential flood risk.	Enclose open channels that are contributing to flooding. Priority locations are: 1) Ashmore subdivision between Ashmore and Salisbury and 2) Fleishel Ave. between 6th and 8th Streets.	3	Flood, Hurricane/Tropical Storm	 	  	Engineering Department	\$500,000	City 1/2 sales tax fund, HMA grants.	36	High
6	Conduct hydrology studies and survey to identify flood prone areas.	Study areas that are reporting flood damage and general flooding.	4	Dam Failure, Flood, Hurricane/Tropical Storm		 	Engineering Department	\$10,000	City budget	36	High
7	Assist Vulnerable Population During Hazard Events	Complete application for STEAR program and identify at risk population. Promote STEAR on the Tyler Fire Department and city website. https://www.dps.texas.gov/dem/stear/public.htm or dial 211	1	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	 	  	Fire Department	\$10,000	City budget, CDBG, HMA	12	High
8 (Previous D3)	Plant drought and extreme heat resistant vegetation (xeriscaping) around City	The city will plant drought and extreme heat-resistant vegetation around city buildings and properties.	8	Drought, Extreme Heat		 	Engineering Department	\$10,000	City budget	48	Medium

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
	buildings and properties.										
CITY OF TROUP											
1 (previous Flood2)	Adopt and enforce a stricter Floodplain Ordinance	Adopt and enforce a stricter floodplain ordinance that no new structures are allowed in the 100-year floodway. Adopted by City Council action.	6	Flood, Hurricane/Tropical Storm	●	◆	Administration	\$10,000	City Budget	15	Medium
2	Take action to evaluate earthquake risk due to the drilling and fracking in the area.	The city will collaborate with Smith County, TX Oil and Gas Association, TCEQ, insurance rep and other experts to host public sessions on the topic.	7	Earthquake	●	◆	Administration	\$10,000	County Budget	18	Low
3	Detect water pipe leaks and notify customers.	The city will monitor water usage reports to quickly detect and notify customers and public works department of leaks. Public Works will quickly repair visible leaks as requested and private customers are encouraged to do the same. Preserving water supply especially during drought times and for water to be available for wildfire fighting is important.	3	Drought, Wildfire	●	◆	Administration	\$10,000	No additional funds needed	18	Medium
4	Purchase and Install back-up generator for elevated water storage tank critical facility	Purchase and install an electric back-up generator at the elevated tank which will ensure water can be pumped in the event of a power outage from dam failure, earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	1	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Administration	\$100,000	HMGP	12	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
5	Purchase All-Hazard NOAA Weather Radios	Purchase NOAA All-Hazard radios for early warning. Place in City Hall and other critical facilities.	2	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	● ●	◆ ◆	Administration	\$10,000	FEMA grants	12	Medium
6	Assist Vulnerable Population During Hazard Events	Organize outreach to vulnerable populations, including outreach to check on vulnerable population and establishing and promoting accessible heating or cooling centers in the community. Create a database to track those individuals at high risk of death, such as the elderly, homeless, and others.	4	Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Administration	\$10,000	City Budget	12	Medium
7	Xeriscape around City Buildings	Purchase and plant drought and extreme heat-resistant plants around city buildings to minimize water usage.	5	Drought, Extreme Heat	●	◆	Public Works	\$10,000	City Budget	36	Medium
CITY OF WHITEHOUSE											
1	Upgrade Stormwater Capacity	Increase stormwater drainage capacity by completing a hydraulic study, evaluating historical water drainage, then construct. Consider the placement, removal, replacement or repair of old culverts that are clogged with debris, unstable, or unusable due to damage, or changing new development have severely limited the capacity level and structural integrity of the current culverts within Whitehouse.	1	Flood, Hurricane/Tropical Storm	●	◆ ◆	Public Works	\$900,000	Stormwater Drainage assessment fee \$5.00 a month.	24	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
2	Implement Water Supply Management	The city will update the Drought and Extreme Heat Contingency Plan to include the new water rationing ordinance, complete research on additional water resources and feasibility, and implement water conservation PSAs during extreme heat and drought periods.	2	Drought, Extreme Heat	 	  	City Administration	\$100,000	Unknown	36	High
3	Purchase and Install Outdoor Warning Sirens	The city will purchase and install one additional outdoor warning siren and replace existing sirens.	4	Dam Failure, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Emergency Services	\$100,000	HMGP	36	High
4	Contract with Electrical Provider for Tree Trimming	The city will complete a contract with the electrical provider for tree trimming.	6	Hurricane/Tropical Storm, Tornado, Wildfire, Wind, Winter Weather		 	City Administration	\$100,000	City General funds	12	Low
5	GIS Map, Reassess Zoning, and Develop Ordinance	The city will identify and GIS map the potential hazard events from dam failure, earthquake, riverine and flash flooding, lightning strikes, maximum wind knots, historical tornado paths, urban wildfire interface, and winter storm ice events. Then the city will develop new zoning regulations and ordinances to prevent development in known hazard areas as the city is experiencing fast growth.	3	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		  	City Administration	\$10,000	City General funds	12	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
6	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; especially as new homes are being built, information will be available via city website and social media.	5	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Emergency Services	\$10,000	Departmental Budget	60	High
CITY OF WINONA											
1	Purchase and Install Back-up Generator for Water Tower Pump House	Purchase and install an electric back-up generator at the water tower pump house in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	2	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆ ◆	Mayor	\$100,000	HMGP	48	High
2	Purchase and Install Back-up Generator for Community Center	Purchase and install an electric back-up generator at the Winona Community Center in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather. It could be a back-up EOC location and house approximately 75 displaced people. It is equipped with a full kitchen and it is built of cinder block thus it can withstand a fire.	3	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆ ◆	Mayor	\$100,000	HMGP	48	High
3	Conduct public outreach to	Host public forums at community center on methods and materials landlords and	1	Drought, Earthquake,	●	◆ ◆	Mayor	\$10,000	City budget	60	High

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
	educate homeowners and residents on mitigation measures for their residents.	residents can use to minimize property damage and human life. The city will invite subject matter experts (i.e. county emergency manager, insurance representative, building trade expert, etc.) to speak at the public forums. The city will use the water bill to announce the forum dates.		Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather							
4	Purchase and Install Surge Protectors and Lightning Rods at Critical Facilities	Purchase and install surge protectors and lightning rods at water tower pump house and city hall. This will protect critical facilities and critical electronic equipment.	5	Lightning	●	◆ ◆ ◆	Mayor	\$10,000	City budget	48	Medium
5	Increase capacity of storm water system along Main Street area (Hwy 155)	The city will increase the capacity of storm water system along Main Street area (Hwy 155).	4	Flood, Hurricane/Tropical Storm	●	◆ ◆	Mayor	\$800,000	City budget, State and federal grants	48	High
6	Xeriscape around city Buildings	Purchase and plant drought and extreme heat-resistant plants around city buildings to minimize water usage.	6	Drought, Extreme Heat	●	◆	Mayor	\$10,000	City Budget	36	Medium

LEGEND

Action Type: ● EAP ● SIP ● LPR ● NSP

Applicable Goals: ◆ G1 ◆ G2 ◆ G3 ◆ G4

Note:

EAP	Emergency Action Plan	EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency	GIS	Geography Information System
HMGP	Hazard Mitigation Grant Program	IBC	International Building Code
IRC	International Residential Code	NFPA-70	National Fire Protection Association 70 (National Electrical Code)
NOAA	National Oceanic and Atmospheric Administration	OEM	Office of Emergency Management

STEAR

State of Texas Emergency Assistance Registry

TCEQ

Texas Commission on Environmental Quality

PART 1
PLAN ELEMENTS AND PARTICIPATING
COMMUNITIES

Chapter 1. INTRODUCTION

1.1 WHY PREPARE THIS PLAN?

1.1.1 The Big Picture

Hazard mitigation is defined as a way to reduce or alleviate the loss of life, personal injury, and property damage that can result from a disaster. It involves long- and short-term actions implemented before, during and after disasters. Hazard mitigation activities involve planning efforts, policy changes, programs, improvement projects, and other activities to reduce the impacts of hazards.

For many years, federal disaster funding focused on relief and recovery after disasters occurred, with limited funding for hazard mitigation planning in advance. The Disaster Mitigation Act (DMA; Public Law 106-390), passed in 2000, shifted the federal emphasis toward planning for disasters before they occur. The DMA requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. Regulations developed to fulfill the DMA's requirements are included in Title 44 of the Code of Federal Regulations (44 CFR).

The responsibility for hazard mitigation lies with many, including private property owners, commercial interests, and local, state and federal governments. The DMA encourages cooperation among state and local authorities in pre-disaster planning. The enhanced planning network called for by the DMA helps local governments articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk-reduction projects.

The DMA also promotes sustainability in hazard mitigation. To be sustainable, hazard mitigation needs to incorporate sound management of natural resources and address hazards and mitigation in the largest possible social and economic context. The planning network called for by the DMA helps local governments articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk reduction projects.

1.1.2 Purposes for Planning

Smith County prepared a hazard mitigation plan in compliance with the DMA that was adopted and approved in November 2011. That plan identifies resources, information, and strategies for reducing risk from natural hazards and to be revised on a 5-year cycle. This update fulfills that requirement.

The County prepared this update in partnership with local municipalities. Elements and strategies in the plan were selected because they meet a program requirement and because they best meet the needs of the planning partners and their citizens. One of the benefits of multi-jurisdictional planning is the ability to pool resources and eliminate redundant activities within a planning area that has uniform risk exposure and vulnerabilities. The Federal Emergency Management Agency (FEMA) encourages multi-jurisdictional planning under its guidance for the DMA. This plan will help guide and coordinate mitigation activities throughout the planning area.

This plan update was developed to meet the following objectives:

- Meet or exceed requirements of the DMA.
- Enable all planning partners to continue using federal grant funding to reduce risk through mitigation.
- Meet the needs of each planning partner as well as state and federal requirements.
- Create a risk assessment that focuses on Smith County hazards of concern.
- Create a single planning document that integrates all planning partners into a framework that supports partnerships within the county, and puts all partners on the same planning cycle for future updates.

- Coordinate existing plans and programs so that high-priority actions and projects to mitigate possible disaster impacts are funded and implemented.

1.2 WHO WILL BENEFIT FROM THIS PLAN?

All residents, businesses and visitors of and to Smith County are the ultimate beneficiaries of this hazard mitigation plan update. The plan reduces risk for those who live in, work in, and visit the county. It provides a viable planning framework for all foreseeable natural hazards that may impact the county. Participation in development of the plan by key stakeholders helped ensure that outcomes will be mutually beneficial. The resources and background information in the plan are applicable countywide. The plan's goals and recommendations lay groundwork for the development and implementation of local mitigation activities and partnerships.

Chapter 2. PLAN UPDATE—WHAT HAS CHANGED

2.1 THE PREVIOUS PLAN

Smith County Hazard Mitigation Action Plan, 2011-2016 included the following planning partners:

- Smith County
- City of Arp
- City of Bullard
- City of Hideaway
- City of Lindale
- City of New Chapel Hill
- City of Nooday
- City of Troup
- City of Tyler
- City of Whitehouse
- City of Winona

These are the same planning partners for *Smith County Hazard Mitigation Plan* update in 2017-2018.

The *Smith County Hazard Mitigation Action Plan, 2011-2016* ranked 12 hazards from high (H) to low (L) for Smith County and all the planning partners. Table 2-1 shows the hazards and their ranking. These hazards include three human-caused hazards: disease, hazardous materials (HAZMAT) storage facilities, and HAZMAT transportation related. Although the previous plan profiled human-caused hazards, only natural hazards will be evaluated in this plan update.

Table 2-1. Hazards Evaluated in Smith County Hazard Mitigation Action Plan, 2011-2016

	Tornado	Disease	HAZMAT – Storage Facilities	HAZMAT Transportation Related	Winter Storms / Ice Storms	Drought	Flooding	Thunderstorm/ Lightning/ Hail	Flash Flooding	Wildfire	Earthquake	Dam Failure
Smith County	H	H	H	H	MH	MH	MH	M	M	M	L	L
City of Arp	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Bullard	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Hideaway	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Lindale	H	H	H	H	MH	MH	M	M	M	M	L	L
City of New Chapel Hill	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Nooday	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Troup	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Tyler	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Whitehouse	H	H	H	H	MH	MH	M	M	M	M	L	L
City of Winona	H	H	H	H	MH	MH	M	M	M	M	L	L

Note:

H High
 MH Moderate High
 M Moderate
 L Low

2.2 WHY UPDATE?

Title 44 of the Code of Federal Regulations (44 CFR) stipulates that hazard mitigation plans must present a schedule for monitoring, evaluating, and updating the plan. As mentioned previously, Smith County participated in a mitigation planning process in 2008-2010. The plan was officially approved by FEMA Region VI on November 3, 2011, but has since expired. This update process provides an opportunity to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and evaluate whether there is a need to change the focus of mitigation strategies. A jurisdiction covered by a plan that has expired is not able to pursue elements of federal funding under the Robert T. Stafford Act for which a current hazard mitigation plan is a prerequisite.

2.3 THE PLAN—WHAT IS DIFFERENT?

This 2017-2018 plan update uses the best and most current data and technology available. The county and the planning partners were fully involved in the preparation of this plan update. The plan update includes a more robust hazard analysis. In addition, flooding and flash flooding were profiled separately and they will be profiled together in this plan update and hurricane/tropical storms hazard will be added.

Mitigation actions were reviewed and amended to include only those that would move the jurisdiction toward a higher degree of resiliency while being feasible, practical, and implementable given current finances. Federal and state funds for projects have become difficult to obtain. Actions from the previous plan were carried forward into the mitigation actions if they were identified as delayed or in progress and still applicable or beneficial. These actions are indicated on Table 17-1.

2.4 LOCAL MITIGATION PLAN REVIEW TOOL

The Local Mitigation Plan Review Tool demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the community.

The Regulation Checklist provides a summary of FEMA's evaluation of whether the plan has addressed all requirements.

The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.

The Multi-Jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of each element of the plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference the *Local Mitigation Plan Review Guide* when completing the Local Mitigation Plan Review Tool.

Chapter 3. PLAN METHODOLOGY

3.1 GRANT FUNDING

Smith County applied for a grant through FEMA’s Pre-Disaster Mitigation grant program to supplement the plan development process. The Smith County Fire Marshal’s Office was the applicant agent for the grant. Grant funding was appropriated in fiscal year 2015 (FY2015). Smith County hired Tetra Tech to assist with development and implementation of the plan. The Tetra Tech Project Manager assumed the role of the lead planner, reporting directly to a county-designated project manager, Assistant Emergency Management Coordinator Mr. Eric Lowry.

3.2 ESTABLISHMENT OF THE PLANNING PARTNERSHIP

Smith County opened this planning effort to all eligible local governments in the county. The planning partners’ responsible leaders (point of contacts) are shown in Table 3-1. These responsible leaders were asked to join the Steering Committee and its process.

Table 3-1. County and City Planning Partners

Jurisdiction	Point of Contact	Agency	Title
Smith County	Eric Lowry	Smith County Fire Marshall’s Office, Office of Emergency Management	Smith County Deputy Fire Marshal, Assistant Emergency Manager Coordinator/ Hazard Mitigation Officer
City of Arp	Johnny Vargas	City of Arp Police Department	Assistant Police Chief
City of Bullard	Pam Frederick	City of Bullard Office of the Mayor	Mayor
City of Hideaway	Pat Bonds	City of Hideaway Office of the Mayor	Mayor
City of Lindale	Carolyn Caldwell	City of Lindale, Administration Department	City Manager
City of New Chapel Hill	Dale Acker	City of New Chapel Hill Fire Department	Fire Chief
City of Noonday	Mike Turman	City of Noonday Office of the Mayor	Mayor ProTem
City of Troup	Gene Cottle	City of Troup Managers Office	City Manager
City of Tyler	Michael Frost	City of Tyler Fire Department	Assistant Fire Chief
	Marty Lawence		Administrative Captain
City of Whitehouse	Madison Johnson	City of Whitehouse Fire Department	Fire Chief / Emergency Manager Coordinator
City of Winona	Pat Schlau	City of Winona Office of the Mayor	Mayor

3.2.1 Steering Committee

A Steering Committee was established comprised of representatives from Smith County as well as each of the planning partners’ responsible leaders and stakeholders throughout the communities. Each planning partner and stakeholder wishing to join the Steering Committee was asked commit to the process and have a clear understanding of expectations. These include:

- Support and participate in the Steering Committee meetings overseeing the development of the plan update. Support includes making decisions regarding plan development and scope on behalf of the partnership.
- Each partner will provide support as needed for the public involvement strategy developed by the Steering Committee in the form of mailing lists, possible meeting space, and media outreach such as newsletters, newspapers, or direct-mailed brochures.

- Each partner will participate in plan update development activities such as:
 - Steering Committee meetings
 - Public meetings or open houses
 - Workshops and planning partner training sessions
 - Public review and comment periods prior to adoption

Attendance was tracked at these activities, and attendance records documenting participation for each planning partner are included in the plan. All participating communities were expected to attend and actively participate in all meetings and activities.

- Each partner within the Steering Committee is expected to review the risk assessment and identify hazards and vulnerabilities specific to its jurisdiction. Contract resources will provide jurisdiction-specific mapping and technical consultation to aid in this task, but the determination of risk and vulnerability ranking will be up to each partner.
- Each partner will be expected to review the mitigation recommendations chosen for the overall county and evaluate whether they will meet the needs of its jurisdiction. Projects within each jurisdiction consistent with the overall plan recommendations will need to be identified, prioritized, and reviewed to identify their benefits and costs.
- Each partner will be required to sponsor at least one public meeting to present the draft plan at least 2 weeks prior to adoption.
- Each partner will be required to formally adopt the plan.
- Each partner will agree to the plan implementation and maintenance protocol.

Failure to meet these criteria may result in a partner being dropped from the partnership by the Steering Committee, and thus losing eligibility under the scope of this plan.

3.3 DEFINING THE PLANNING AREA

The planning area was defined to consist of all of Smith County (Figure 3-1). It should be noted that the Cities of Bullard and Troup are split between Smith County and Cherokee County, and this planning area only includes the portion within Smith County. Relevant planning area characteristics are described in Chapter 4. All partners to this plan have jurisdictional authority within this planning area.

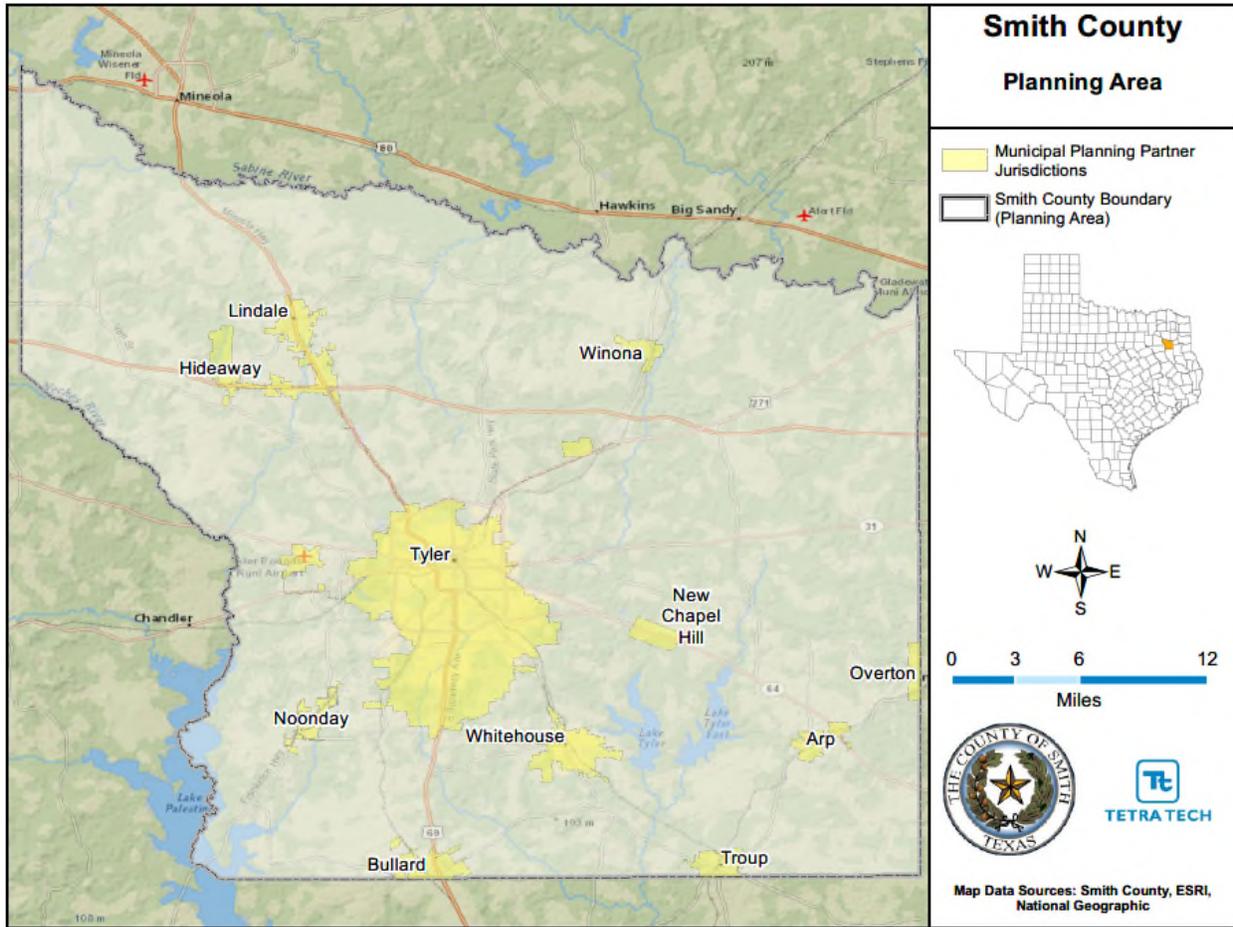


Figure 3-1. Smith County Planning Area

3.4 THE STEERING COMMITTEE

Hazard mitigation planning enhances collaboration and support among diverse parties whose interests can be affected by hazard losses. A Steering Committee was formed to oversee all phases of the plan update. The members of this committee included key planning partner staff, citizens, and other stakeholders from the planning area. Table 3-2 shows the representation of each participating jurisdiction at the planning meetings and update/development of mitigation actions. Sign-in sheets are include in Appendix D: Planning Process Documentation. All of the jurisdictions listed as official participants in this plan met all of these participation requirements.

Table 3-2. Steering Committee Members Participation in Planning Process

Jurisdiction	Kick-off Mtg.	Planning Mtg. #2	Planning Mtg. #3	Status of Previous Actions	Mitigation Actions Recvd.
Smith County	X	X	X	X	X
City of Arp	X	X		X	X
City of Bullard	X	X	X	X	X
City of Hideaway	X	X	X	X	X
City of Lindale	X	X	X	X	X
City of New Chapel Hill	X	X	X	X	X
City of Noonday	X	X		X	X
City of Troup	X	X	X	X	X
City of Tyler	X	X	X	X	X
City of Whitehouse	X	X	X	X	X
City of Winona	X	X		X	X
Eastman Chemical	X	X			
University of Texas, Tyler	X	X			

The Steering Committee agreed to meet a minimum of three times or as needed throughout the course of the plan's development. The consultant and the Smith County Emergency Manager facilitated each Steering Committee meeting, which addressed a set of objectives based on the work plan established for the plan update. The Steering Committee met three times from June 2017 through December 2017. Meeting agendas, notes, and attendance logs can be found in Appendix D of this document.

The planning team made a presentation at a Steering Committee meeting on June 26, 2017, to introduce the mitigation planning process. The Steering Committee, planning partners, and the public were encouraged to participate in the plan update process. Key meeting objectives at the June meeting were as follows:

- Steering Committee purposes and responsibilities
- Plan partners and signators responsibilities
- Purpose and goals of the update process
- Review and amend mitigation goals
- Review previous mitigation actions from 2011 plan
- Critical facilities discussion

The Steering Committee met on September 14, 2017, to review the hazard risk assessment for Smith County and the results of the community survey. Based on the risk assessment and survey results, the Steering Committee then ranked the natural hazards. The hazards were ranked based on their probability of

occurrence and their potential impact on people, property, and the economy. The results of the hazard ranking is discussed in Chapter 16.

The third Steering Committee meeting was held on December 18, 2017. The main objective of the meeting was to present and rank mitigation actions, which were developed to address all hazards of concern. The mitigation actions are discussed in Chapter 17. The meeting provided for an exchange of information on how the plan would be maintained and the consultant presented a fact sheet on Hazard Mitigation Assistance (HMA) grants.

3.5 COORDINATION WITH OTHER AGENCIES

Opportunities for involvement in the planning process must be provided to neighboring communities, local and regional agencies involved in hazard mitigation, agencies with authority to regulate development, businesses, academia, and other private and non-profit interests (44 CFR, Section 201.6(b)(2)). This task was accomplished by the planning team as follows:

- **Steering Committee Involvement**—Agency representatives were invited to participate on the Steering Committee.
- **Agency Notification**—The Texas Division of Emergency Management (TDEM) was invited to participate in the plan development process from the beginning and was kept apprised of plan development milestones.
- **Pre-Adoption Review**—Agency representatives listed above were provided an opportunity to review and comment on this plan, primarily through the county’s website and during the Steering Committee meetings. Each agency was sent an e-mail message informing them that draft portions of the plan were available for review. In addition, the complete draft plan was sent to TDEM for a pre-adoption review to ensure program compliance.

3.6 REVIEW OF EXISTING PROGRAMS

Hazard mitigation planning must include review and incorporation, if appropriate, of existing plans, studies, reports and technical information (44 CFR, Section 201.6(b)(3)). Chapter 4 of this plan provides a review of laws and ordinances in effect within the planning area that can affect hazard mitigation actions. In addition, the following programs can affect mitigation within the planning area:

- Smith County
 - Subdivision Regulations
 - Flood Damage Prevention Order
 - Floodplain Map
 - Basic Emergency Operations Plan

An assessment of all planning partners’ regulatory, technical, and financial capabilities to implement hazard mitigation actions is presented in Chapter 4 and Chapter 5. Many relevant plans, studies, and regulations are cited in the capability assessment.

3.7 PUBLIC INVOLVEMENT

Broad public participation in the planning process helps ensure that diverse points of view about the planning area’s needs are considered and addressed. The public must have opportunities to comment on disaster mitigation plans during the drafting stages and prior to plan approval (44 CFR, Section 201.6(b)(1)). The strategy for involving the public in this plan emphasized the following elements:

- Include members of the public on the Steering Committee

- Use a community survey/questionnaire to evaluate whether the public's perception of risk and support of hazard mitigation has changed since the initial planning process
- Attempt to reach as many planning area citizens as possible using multiple media
- Identify and involve planning area stakeholders
- Solicit public feedback at each stage of plan implementation, monitoring, and evaluation.

3.7.1 Stakeholders and the Steering Committee

Stakeholders are the individuals, agencies, and jurisdictions that have a vested interest in the recommendations of the hazard mitigation plan and may be affected by a mitigation action or policy. Examples of Stakeholders encouraged to participate in the plan update process include business owners, chamber of commerce, neighborhood associations, Red Cross, hospital districts, and private organizations. The effort to include stakeholders in this process included stakeholder participation on the Steering Committee and encouraged to attend and participate in all jurisdictional committee meetings. Stakeholders were notified by various methods including email, Community News webpages, social media, and face-to-face invites.

Additionally, representatives from the Steering Committee were encourage to give plan progress updates at their various organizations public and private committee meetings. Plan and Steering Committee updates were also included on community and/or department websites encouraging interested stakeholders to either reach out to Steering Committee leaders one on one to provide comments or ask questions.

3.7.2 Survey/Questionnaire

A hazard mitigation plan questionnaire (see Figure 3-2) was developed to gauge household preparedness for natural hazards; the level of knowledge of tools and techniques that assist in reducing risk and loss from natural hazards; and the perceived impact of natural hazards on Smith County residents and businesses. This on-line questionnaire was designed to help identify areas vulnerable to one or more natural hazards. The answers to these 35 questions helped guide the Steering Committee in prioritizing hazards of impact and in selecting goals, objectives, and mitigation strategies. A total of 249 questionnaires were completed during the course of this planning process.

Smith County TX HMP Update Survey

1. Survey Introduction

A partnership of local governments and other stakeholders in Smith County are working together to create a Smith County Hazard Mitigation Plan addressing natural hazards. The original Natural Hazards Mitigation Plan was prepared in 2008 - 2010. This updated plan will focus only on natural hazards identified within Smith County. The plan is developed in response to Federal programs that enable the partnership to use pre- and post-disaster financial assistance to reduce the exposure of County residents to risks associated with hazards.

In order to identify and plan for future natural disasters, we need your assistance. This questionnaire is designed to help us gauge the level of knowledge local citizens already have about disaster issues and to identify areas vulnerable to various types of disasters. The information you provide will help us coordinate activities to reduce the risk of injury or property damage in the future.

The survey consists of 36 questions plus an opportunity for any additional comments at the end. The survey should take less than 10 minutes to complete and is anonymous. When you have finished the survey, please click "Done" on the final page.

The Smith County Hazard Mitigation Steering Committee thanks you for taking the time to participate in this information-gathering process.

* 1. Where in Smith County do you live?

<input type="radio"/> City of Arp	<input type="radio"/> City of New Chapel Hill	<input type="radio"/> City of Whitehouse
<input type="radio"/> City of Bullard	<input type="radio"/> City of Nooday	<input type="radio"/> City of Winona
<input type="radio"/> City of Hideaway	<input type="radio"/> City of Tyler	<input type="radio"/> Other communities not identified
<input type="radio"/> City of Lindale	<input type="radio"/> City of Troup	<input type="radio"/> Smith County
<input type="radio"/> Other (please specify)		

2. Do you work in Smith County?

Yes No

Figure 3-2. Sample Page from Questionnaire Distributed to the Public

3.7.3 Meetings

Three Steering Committee meetings, as well as one meeting before the Smith County Commissioners' Court were held during the planning process. Meetings were held in the City of Tyler on June 26, 2017, September 14, 2017 and December 18, 2017 (see Figure 3-3). The meeting format allowed attendees to access handouts, maps, and other resources and ask questions during the meetings. Additionally, project staff and county personnel remained after the meeting to have direct conversations with interested attendees.

Details regarding the planning and information generated for the risk assessment were shared with attendees via a PowerPoint presentation.

Smith County and the planning partners held public meetings to present the draft plan, discuss the benefits of the plan, and solicit public comments. Unless otherwise noted below, the public meetings were held as part of a regularly scheduled public meeting and the plan was discussed as an item on the meeting agenda. Notice of the public meeting was provided in compliance with the communities' individual requirements. A member of the planning team was available during all meetings to answer questions from the public on the development of the hazard mitigation plan.

The 1st public comment period was from March 13 - 23, 2018. Smith County issued a Press Release (see Figure 3-5) to solicit public comments on the draft plan. The draft plan was available for review in hard copy at the Fire Marshall / Office of Emergency Management starting March 13, 2018 for review by interested parties and posted on the Smith County website (see Figure 3-7). The participating jurisdictions also solicited public comments on the draft. The City of Tyler had hard copies available at the libraries and Fire Department Administration office. A sample of participant's jurisdictions websites of the draft plan availability can be viewed at Figure 3-8, Figure 3-9, and Figure 3-10 for the cities of Bullard, Troup, and Tyler. No comments that resulted in changes to the plan were received from the public electronically or in person at the Office of Emergency Management.

Once the draft plan became approved pending adoption by FEMA, a second Public Outreach occurred. The plan was available to the public and was presented and reviewed in a public meeting before the Smith County Commissioners Court on July 17, 2018.

Each city held a public meeting between July and October of 2018 to present the draft plan and solicit public comments. The draft plan was made available for review in hard copy in the City Halls, library and on the county website for review by interested parties. No comments that resulted in changes to the plan were received from the public electronically or in person at the city hall or during the public meeting.



Figure 3-3. Steering Committee Meeting September 14, 2017

3.7.4 Press Releases/News Articles

Press releases were distributed over the course of the plan's development as key milestones were achieved and prior to each public meeting. Figure 3-4 is a sample press release issued by the City of Tyler Fire Department to participate in the HMP update.

Smith County issued a Press Release to solicit public comments on the draft plan (see Figure 3-5).



CITY OF TYLER FIRE DEPARTMENT

Paul Findley, Fire Marshal/Public Information Officer
Office (903) 535-0005 or cell (903) 360-0553, pfindley@tylertexas.com

Press Release
For Immediate Release
Jul. 11, 2017

Tyler Fire Department urges public to participate in Smith County Hazard Mitigation Plan Update

A partnership of local governments and other stakeholders in Smith County are working together to create an update of the Smith County Hazard Mitigation Plan addressing natural hazards. The original Natural Hazards Mitigation Plan was prepared in 2008 - 2010. This updated plan will focus only on natural hazards identified within Smith County. The plan is developed in response to Federal programs that enable the partnership to use pre- and post-disaster financial assistance to reduce the exposure of County residents to risks associated with hazards. Community input and involvement is instrumental in the development of a mitigation plan that truly reflects the perceptions and needs of Smith County residents.

In order to identify and plan for future natural disasters, we need your assistance. We have developed a community survey and would like as much input from Smith County residents, businesses, and interested citizens as possible. This questionnaire is designed to help us gauge the level of knowledge local citizens already have about disaster issues and to identify areas vulnerable to various types of disasters. The information you provide will help us coordinate activities to reduce the risk of injury or property damage in the future. Please take a few minutes to fill out this survey so that your ideas may become a part of the plan to make Smith County a safer and more resilient community. A link to the survey can be found on the Tyler Fire Department's webpage (www.tylerfiredept.com) or by clicking the link below.

The survey consists of 36 questions plus an opportunity for any additional comments at the end. The survey should take less than 10 minutes to complete and is anonymous. When you have finished the survey, please click "Done" on the final page.

The Smith County Hazard Mitigation Steering Committee thanks you for taking the time to participate in this information-gathering process.

Community Survey Link:

<https://www.surveymonkey.com/r/SmithHMPCCommunitySurvey>

Figure 3-4. Press Release Issued July 11, 2017



PUBLIC NOTICE –

UPDATE OF THE SMITH COUNTY HAZARD MITIGATION PLAN

Smith County, TX, the incorporated municipalities of Smith County including Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Nooday, Troup, Tyler, Whitehouse, and Winona have updated the 2011-2016 Hazard Mitigation Action Plan. The new 2018 plan focuses on reducing the risk of loss of life, injury, and property damage due to hazards such as severe storms, tornados, drought and floods. This plan also identifies specific actions that can be undertaken to minimize or eliminate these vulnerabilities. These projects can be implemented as funding becomes available. This plan is a requirement for eligibility for federal mitigation grant programs, including the Hazard Mitigation Grant Program (HMGP).

Each year, millions of federal hazard mitigation grant dollars are made available to eligible applicants via programs such as the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation Program (PDM). With an approved hazard mitigation plan, the participating jurisdictions are eligible to apply for these competitive grant funds.

As part of the development process, and in compliance with 44 CFR, part 201, we are requesting that the public review this plan, and submit any comments or suggestions on the document. The plan may be viewed at the following location:

Smith County Fire Marshal's Office
Office of Emergency Management
11325 Spur 248
Tyler, Texas 75707
Office Hours: 8:00 a.m. - 5:00 p.m. M - F

Please download a draft of the document using this link:

https://www.smith-county.com/NewCountyIntranet/Fire%20Marshal/MASTER_Smith_HMPUpdate_DraftClient%2003.05.18.pdf

Should you wish to comment on the draft, please send it in writing to one of the above address or by email to cmccoy@smith-county.com, noting the section and page number relevant to your comment. All comments must be received no later than March 23, 2018.

Figure 3-5. Smith County Press Release of Draft Plan, March 13, 2018

3.7.5 Internet

At the beginning of the plan development process, Smith County posted information regarding the update process, a link to the community survey, and a link to the mitigation plan on its website and on Facebook (see Figure 3-6). The website keeps the public informed on plan development milestones and to solicit relevant input. Information on the plan development process, the Steering Committee, the questionnaire, and phased drafts of the plan were available to the public on the site throughout the process. After the plan's completion, the Smith County website will keep the public informed about successful mitigation projects and future plan updates.

Sample internet posting from the Smith County Fire Marshal's website on March 13, 2018 (see Figure 3-7), City of Bullard's website (see Figure 3-8), City of Troup's website (see Figure 3-9), and City of Tyler's website (see Figure 3-10) as described in Chapter 3.7.3.



Smith County

July 3 at 10:07am ·

Like Page

Contact Us

Smith County officials are working with cities and communities within its boundaries to update the Smith County Hazard Mitigation Plan. Community input and involvement is instrumental in the development of this plan, which will reflect the needs and perceptions of Smith County residents. Please take a few minutes to fill out this survey so that your ideas may become a part of the plan to make Smith County a safer and more resilient community!

<https://www.surveymonkey.com/r/SmithHMPCCommunitySurvey>

Smith County Fire Marshal's Office
 Smith County ESD2
 City of Tyler, Texas Government
 City of Troup
 Whitehouse, Texas
 Nooday, Texas
 City of Bullard
 City of Lindale
 Hideaway, Texas
 Winona, Texas
 New Chapel Hill, Texas



Smith County Hazard Mitigation Plan Update

Public Involvement/Participation

A partnership of the county government and cities and communities in Smith County are working together to create the Update of the Smith County Hazard Mitigation Plan. Community input and involvement is instrumental in the development of a mitigation plan that truly reflects the perceptions and needs of Smith County residents.

We have developed a community survey and would like as much input from Smith County residents, businesses, and interested citizens as possible. Please take a few minutes to fill out this survey so that your ideas may become a part of the plan to make Smith County a safer and more resilient county!

Community Survey Link:

<https://www.surveymonkey.com/r/SmithHMPCCommunitySurvey>

Figure 3-6. Smith County Facebook Post, July 3, 2017



Figure 3-7. Smith County Draft Plan Availability, March 13, 2018

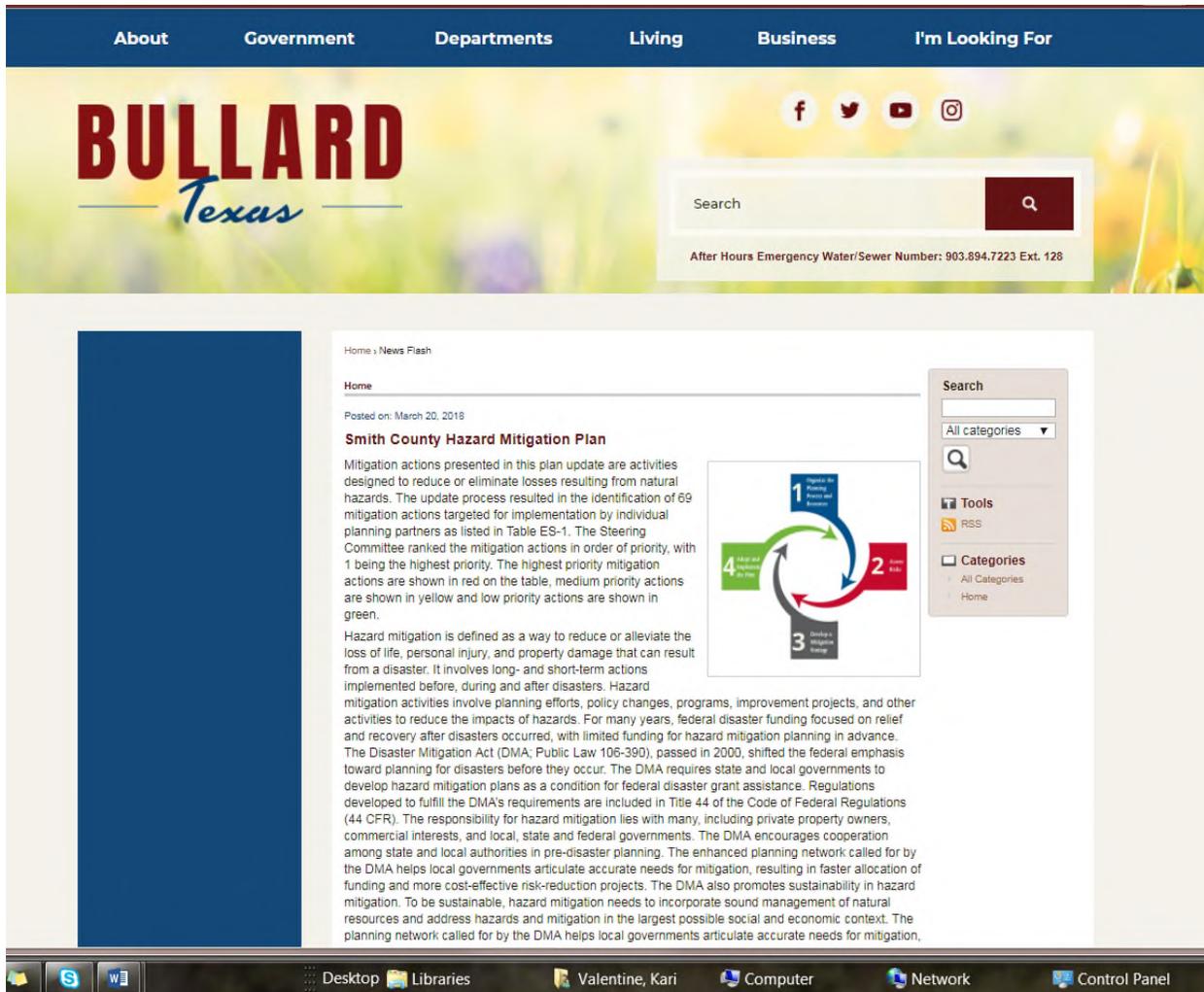


Figure 3-8. City of Bullard - Soliciting Public Comments on Draft Plan

The screenshot shows the City of Troup website. At the top, there is a navigation menu with links like 'Home', 'About Troup', 'City Services', and 'Contact Us'. Below the menu is a banner for 'THE GOOD NEIGHBOR TOWN'. The main content area features a section titled 'Troup' with a paragraph describing the city's history and a 'Public Notice' section for a 'DRAFT OF THE SMITH COUNTY HAZARD MITIGATION PLAN'. The public notice includes the text: 'The Final Draft of the Smith County Hazard Mitigation Plan is available for Public Comment.' There are also links for 'Community Organizations', 'City of Troup', and 'Public Notice'.

Figure 3-9. City of Troup - Soliciting Public Comments on Draft Plan

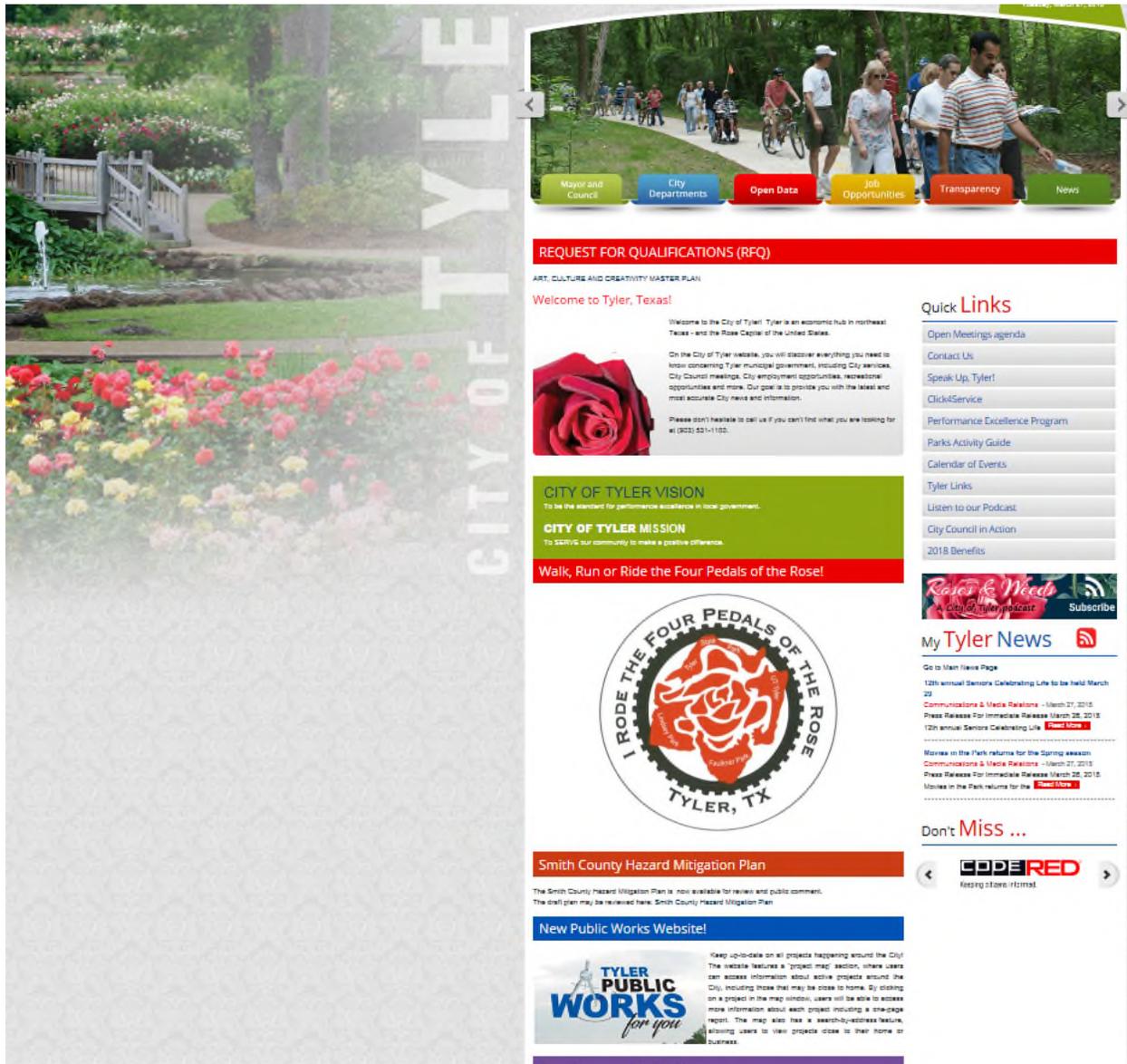


Figure 3-10. City of Tyler – Soliciting Public Comments on Draft Plan

3.8 PLAN DEVELOPMENT, CHRONOLOGY, MILESTONES

Table 3-3 summarizes important milestones in the development of the plan update.

Table 3-3. Plan Development Chronology/Milestones			
Date	Event	Description	Attendance
2017			
	Organize Resources	County OEM holds kickoff meeting for potential planning partners to inform them of the next steps in the plan update process, solicit commitment to participate, explain expectations, and organize resources for the update.	N/A
5/11	Contract signed	Notice to proceed given to Tetra Tech	N/A
6/26	Steering Committee Meeting #1	<ul style="list-style-type: none"> • Introduction to Hazard Mitigation Planning Process • Steering Committee purpose and responsibilities • Plan Goals update • Review of Past Mitigation Actions • Critical Facilities • Capabilities Assessment • Discuss options for public outreach strategy and survey 	23
7/3	Ongoing Public Outreach	<ul style="list-style-type: none"> • Website and social media postings 	N/A
7/11	Press Release	<ul style="list-style-type: none"> • City of Tyler issued a press release for public participation in HMP Update and survey. 	N/A
9/14	Steering Committee Meeting #2	<ul style="list-style-type: none"> • Reminder Hazard Mitigation Planning Process • Review Completed Items – Goals, Capabilities Assessment • Hazards of Concern Presentation • Survey Results to date • Hazard Ranking exercise • Mitigation Action Worksheet 	22
12/18	Steering Committee Meeting #3	<ul style="list-style-type: none"> • Mitigation actions prioritization • HMA project development 	16
2018			
3/12 – 3/23	1 st Public Comment Period	Public comment period of draft plan opens for Smith County and the planning partners. Press release of draft plan availability to public issued. Draft plan available on Smith County Fire Marshal’s website, planning partners websites, and in hard copy at Fire Marshal’s Office, in City of Tyler at libraries and Fire Department Administration office.	
3/27	Plan Review	Final draft plan submitted to Texas Division of Emergency Management for review	N/A
	5/14/2018	Plan approval pending adoption by FEMA	N/A
7/17/18	2 nd Public Outreach	Final public meeting on draft plan	N/A
7-10/18	Adoption	Adoption window of final plan opens	N/A
		Final plan approved by FEMA	N/A

Notes:
 FEMA Federal Emergency Management Agency
 HMA Hazard Mitigation Assistance
 N/A Not Applicable
 OEM Office of Emergency Management

Chapter 4. SMITH COUNTY PROFILE

4.1 GEOGRAPHIC OVERVIEW

Smith County covers 950 square miles of which all is land except for 28 square miles of water. It is located in the East Texas Timberlands region of Texas, 58 miles from the eastern state boundary and approximately 100 miles east of Dallas (Figure 4-1). It is bordered by Henderson and Van Zandt Counties on the west, Cherokee County on the south, Rusk and Upshur Counties on the east, and Upshur and Wood Counties on the north. Smith County is drained by the Sabine River to the north, Neches River to the west, and Angelina River to the south.

Tyler, the largest town and county seat, is at the intersection of U.S. Highway 69/271 with State highways 155, 110, 31, and 64, near the center of the county. Interstate Highway 20 runs east and west through the northern part of the county. The County's 2000 population was 174,706, an increase of 15.5% since 1990. As of the 2016 U.S. Census, Smith County had a population estimate of 225,290 (Census, 2016).



Figure 4-1. Location of the Smith County Planning Area within the State of Texas

The major livestock is cattle. The main crops are floricultural rose industry; as well as coastal Bermuda grass, behia grass, and common Bermuda grass; truck crop vegetables; and fruit, tree nuts, and berries. The City of Tyler has the nickname “Rose Capital of America.” Soil is an important natural resource in the county as many people depend on the soil to produce forage for livestock, timber, and cultivated crops.

Natural resources from water, fish, and wildlife play an important role at locations such as Lake Palestine, Lake Tyler, Lake Tyler East, Tyler State Park Lake, and many smaller private lakes and ponds. These natural resources provide recreational activities and for domestic, industrial, and agricultural resources.

Oil and gas are also valuable natural resources in the county. Numerous oil and gas wells are a source of income for many landowners. Sand and gravel are mined in the county and used in construction.

The following municipalities lie within Smith County:

- City of Arp
- City of Bullard
- City of Hideaway
- City of Lindale
- City of New Chapel Hill
- City of Nooday
- City of Troup
- City of Tyler
- City of Whitehouse
- City of Winona

4.2 HISTORICAL OVERVIEW

Smith County was created in 1846 and the majority of this section was summarized from the *Handbook of Texas Online* (McCroskey, 2017). The county was named for the General James Smith, a hero of the Texas Revolution and a military figure in the Republic of Texas. First, the Caddo Indians occupied the area for centuries before Europeans arrived. Late in the eighteenth century, disease and threats from other Indians forced the Caddos to move. By 1820, however, the Cherokees, settled at the Neches Saline. While these and other Indians occupied the area, the Mexican government issued grants for parcels of land now in Smith County and some people moved to the area. Still, unrest prevented the development of any sizable Anglo-American settlement. In 1836, there were 40 people, three trading posts, and a salt works on the Neches Saline, but after the fall of the Alamo the settlers retreated to Lacy's Fort, located nearby in what is now Cherokee County. Deteriorating relations with the Cherokees retarded settlement of the area until the Cherokee War of 1839 led to the removal of the tribe.

With the area open to permanent settlement, pioneers began to homestead. Tyler was designated as the county seat. By 1850 the county reached a population of 4,292. Most trade was carried on in New Orleans; goods were shipped from there to Shreveport and then transported by ox-drawn wagons to Tyler by way of the Dallas-Shreveport Road.

In 1860, Smith County farmers produced corn, sweet potatoes, peas, and beans for both families and livestock. Development began and was not limited to agriculture. Tyler had become a stop on the routes of five stagecoach lines that transported both passengers and mail and had emerged as an important legal center for the region.

During the Civil War, Smith County became a part of the Confederacy. Camp Ford was established 4 miles northeast of City of Tyler as a training post and prisoners of war were housed there. The facility held 6,000 federal troops during the war. The postwar years brought political chaos, but they also brought growth and, eventually, prosperity. In 1865, Professor J. T. Hand opened Charnwood Institute, a boarding school that became well known in the state. By 1870, the county population had increased to 16,532. Railroad expansion meant new jobs for unskilled labor and fresh markets for farm produce. In 1874, a branch of the International and Great Northern (later the Missouri Pacific) was completed through Tyler to Mineola, and in 1877, 21 miles of the Tyler Tap Railroad had been constructed. New towns, including Troup, Bullard, and Lindale, appeared along these new transportation lines. By 1880, Smith County contained 104 miles of track. The production of cotton, now easily shipped to market by railroad, had boomed from 9,763 bales in 1860 to 45,703 in 1880. Farmers grew more than a million bushels of corn as well as large amounts of oats. Livestock continued to be an important source of income; the number of sheep and horses had increased significantly.

With the turn of the century, Smith County took a new agricultural direction. Orchard produce had been the livelihood for farmers in smaller communities such as Pine Springs (then called Fruit) and Lindale since

early in the 1880s, when the railroad made fruit shipment feasible. Then, a serious blight hit the local orchards and spread quickly. Farmers could no longer depend on fruit as a staple crop and changed to pecans, tomatoes, cotton, and roses. The roses proved to be ideally suited to the Tyler area and soon became a lucrative business. Farms within 40 miles of Tyler, where the acidic soil was perfect for rose production, were especially successful. The first Tyler Rose Festival was held in 1933.

The greatest boost to the county economy came in 1931, when the first oil well was drilled in Smith County. This well was part of the original East Texas oilfield; soon other fields, including Chapel Hill, South Tyler, Mount Sylvan, and Sand Flat, were developed. Many oil companies and oil field developers established offices in Tyler. Suddenly, land was a valuable commodity.

World War II brought still more prosperity. In 1943, Camp Fannin, an infantry-training center, was constructed near the site of present-day Owentown. There were new markets for local produce, and the extensive system of railroads made Smith County important in transportation. The oil industry had developed with the war, and by 1947, 98,367,890 barrels had been produced. In 1949, the Whitehouse Dam impounded Lake Tyler. Fishing and boating opportunities led to more businesses. As commercial dealings became more important in the county, farming became secondary. Most landowners grew subsistence crops, roses, or fruit—if they were involved in crop production at all. The number of livestock, however, had risen considerably.

As people moved into the area in the 1960s, Tyler, Lindale, and Bullard became particularly prosperous. In 1966, the Mud Creek Dam project produced Lake Tyler East and is connected to Lake Tyler by a small canal; both lakes provide recreation opportunities. Tyler began to emerge as a medical center for the region. Roses remained enormously lucrative as a money crop and a tourist attraction, and over 12 million plants were produced in 1975.

Between 1980 and 1990, Smith County grew from 128,366 inhabitants to 151,309. In 1982, Tyler, with a population of 98,987, remained the county's largest city. Other incorporated communities were Whitehouse, Lindale, Troup (partly in Cherokee County), Bullard (partly in Cherokee County), Arp, Noonday, Winona, New Chapel Hill, and Overton (mostly in Rusk County). Hay, roses, and fruit were among the main agricultural products in the county, and oil and gas extraction firms, educational and medical facilities, and retail shops employed the most workers.

4.3 MAJOR PAST HAZARD EVENTS

Federal disaster declarations are typically issued for hazard events that cause more damage than state and local governments can handle without assistance from the federal government. However, no specific dollar loss threshold has been established for these declarations. A federal disaster declaration puts federal recovery programs into motion to help disaster victims, businesses, and public entities. Some of the programs are matched by state programs. The planning area has experienced 26 events since the first was issued in 1965 for Smith County. These events are listed in Table 4-1.

Review of these events helps identify targets for risk reduction and ways to increase a community's capability to avoid large-scale events in the future. Still, many natural hazard events do not trigger federal disaster declaration protocol but have significant impacts on their communities. These events are also important to consider in establishing recurrence intervals for hazards of concern. More detailed event tables can be found in the individual hazard profile sections.

Table 4-1. Presidential Disaster Declarations

Type of Event	FEMA Disaster # ^a	Declaration Date
Severe Storms and Flooding	DR-4269	4/25/2016
Severe Storms, Tornadoes, Straight-Line Winds, and Flooding	DR-4245	11/25/2015

Type of Event	FEMA Disaster # ^a	Declaration Date
Severe Storms, Tornadoes, Straight-Line Winds and Flooding	DR-4223	5/29/2015
Wildfires	DR-4029	9/9/2011
Hurricane Ike	DR-1791	9/13/2008
Hurricane Ike	EM-3294	9/10/2008
Hurricane Gustav	EM-3290	8/29/2008
Wildfires	EM-3284	3/14/2008
Hurricane Dean	EM-3277	8/18/2007
Severe Storms, Tornadoes, and Flooding	DR-1709	6/29/2007
Extreme Wildfire Threat	DR-1624	1/11/2006
Hurricane Rita	DR-1606	9/24/2005
Hurricane Rita	EM-3261	9/21/2005
Hurricane Katrina Evacuation	EM-3216	9/2/2005
Tropical Storm Allison	DR-1379	6/9/2001
Severe Winter Ice Storm	DR-1356	1/8/2001
Pine Cove Fire	FM-2340	9/18/2000
Extreme Fire Hazards	EM-3142	9/1/1999
Tropical Storm Charley	DR-1239	8/26/1998
Extreme Fire Hazard	EM-3117	2/23/1996
Severe Thunderstorms	DR-930	12/26/1991
Severe Storms, Tornadoes and Flooding	DR-828	5/19/1989
Severe Storms and Flooding	DR-823	4/23/1989
Severe Storms and Tornadoes	DR-802	11/20/1987
Severe Storms and Tornadoes	DR-793	5/26/1987
Tornadoes and Flooding	DR-199	6/19/1965

a. EM = Emergency Declaration; DR = Disaster Declaration; FM = Fire Management
Source: FEMA, 2017

4.4 CLIMATE

In Smith County, the summers are hot and oppressive, the winters are cool and wet, and it is partly cloudy year round. Average temperatures range from 82.5 degrees Fahrenheit (°F) in the summer to 49.5°F in the winter. The Western Regional Climate Center (WRCC) reports data from the City of Tyler weather station in Smith County. Table 4-2 contains temperature summaries for the station.

Table 4-2. Temperature Summaries for Planning Area	
	Tyler Weather Station
Period of record	1984 to 2016
Winter ^a Average Minimum Temperature	39.1°F
Winter ^a Average Maximum Temperature	59.9°F
Winter ^a Mean Temperature	49.5°F
Spring ^a Average Minimum Temperature	55.6°F
Spring ^a Average Maximum Temperature	77.8°F
Spring ^a Mean Temperature	66.7°F

	Tyler Weather Station
Summer ^a Average Minimum Temperature	72.1°F
Summer ^a Average Maximum Temperature	92.9°F
Summer ^a Mean Temperature	82.5°F
Fall ^a Average Minimum Temperature	56.5°F
Fall ^a Average Maximum Temperature	78.1°F
Fall ^a Mean Temperature	67.3°F
Maximum Temperature	108°F on August 19, 2011
Minimum Temperature	0°F on December 23, 1989
Average Annual # Days >90°F	94.9°F
Average Annual # Days <32°F	29.8°F

a. Winter: December, January, and February; Spring: March, April, and May; Summer: June, July, and August; Fall: September, October, and November.

b. Temperatures are in degrees Fahrenheit

Source: WRCC, 2016

Rainfall is uniformly distributed throughout the year, reaching a slight peak in winter. Snowfalls are infrequent. Precipitation is highest in May. The average annual precipitation is 46.59 inches. Severe thunderstorms occur mostly in the spring. Based on information measured by the National Lightning Detection Network, Smith County received 12 to 20 cloud-to-ground lightning flashes per square mile from 2007 to 2016 (National Lightning Detection Network, 2017).

Table 4-3. Precipitation Summaries for Planning Area

Period of record	1984 to 2012
Winter ^a Mean Precipitation	12.43 inches
Spring ^a Mean Precipitation	11.79 inches
Summer ^a Mean Precipitation	10.15 inches
Fall ^a Mean Precipitation	12.22 inches
One Date Maximum Precipitation	8.02 inches, October 19, 1985
Annual Precipitation	46.59 inches

a. Winter: December, January, and February; Spring: March, April, and May; Summer: June, July, and August; Fall: September, October, and November.

Source: WRCC, 2012

4.5 GEOLOGY AND SOILS

Texas is broadly divided into four regions by physical geography features such as landforms, and vegetation. Smith County is in east Texas and it lies in within the Coastal Region Natural Resource area. The majority of the county is within the Piney Woods subarea while a small portion is within the Post Oak Belt. Two-thirds of this environment is covered in post oak, blackjack oak, and tall grasses, and one-third is heavily forested with pine and hardwoods.

The soil varies from sandy prairie loams in the northwest and east to loam-covered clay through the remainder of the county. The elevation ranges from 300 to 600 feet above mean sea level. Mineral resources include petroleum, gas, iron ore, clay, limestone, lignite, and salt.

4.6 CRITICAL FACILITIES AND INFRASTRUCTURE

Critical facilities and infrastructure are assets, systems and networks, whether physical or virtual, whose incapacity or destruction would have a debilitating impact on security, economic security, public health or safety, or any combination. Risk assessment of hazards considers the potential impact of a hazard on the function of critical facilities and infrastructure. All critical facilities and infrastructure were analyzed in FEMA’s Hazus model to help rank risk and identify mitigation actions. The risk assessment for each hazard discusses critical facilities with regard to that hazard.

Typical critical facilities include hospitals, fire stations, police stations, storage of critical records, and similar facilities. These facilities should be given special consideration when formulating regulatory alternatives and emergency management plans. A critical facility should not be located in high hazard areas if at all possible. If a critical facility must be located in a high hazard area, it should be provided a higher level of protection so that it can continue to function and provide services after the hazard event. Communities should develop emergency plans to continue to provide these services during the hazard event.

The Hazus model used for risk assessment in this plan defines specific types of critical facilities and infrastructure as well as broader categories that include multiple types. For example, fire stations and police stations are specific types of facilities, both of which fall under the broader category of “protective function” facilities. Table 4-4 summarizes the critical facilities and infrastructure within each broad category for each municipality and unincorporated county area. This information was obtained from Hazus and county emergency management personnel.

Jurisdiction	Medical and Health Services	Emergency Services	Educational Facilities	Other Critical Facilities	Utilities and Communication	Transportation Infrastructure	Total
Arp	0	2	3	0	1	2	8
Bullard	0	2	2	0	0	0	4
Hideaway	0	1	0	2	0	0	3
Lindale	1	2	4	0	1	2	10
New Chapel Hill	0	0	0	0	0	0	0
Noonday	0	1	0	0	0	0	1
Overton	0	0	0	0	0	0	0
Troup	0	4	3	0	0	0	7
Tyler	8	15	27	1	11	21	83
Whitehouse	2	2	8	0	1	2	15
Winona	0	1	4	0	0	0	5
Unincorporated County	1	13	7	0	21	120	162
Total	12	43	58	3	35	147	298

Figure 4-2 and Figure 4-3 show the location of critical facilities and infrastructure in the county with symbols showing each specific type of facility. The figure legend identifies the broader category that encompasses each type. All the planning partner’s critical facilities and infrastructure maps are located in Appendix C. Because of the sensitivity of this information, a detailed list of facilities is not provided. The list is on file with each planning partner. Critical facilities and infrastructure were analyzed in Hazus to help rank risk and identify mitigation actions. The risk assessment for each hazard discusses critical facilities and infrastructure with regard to that hazard.

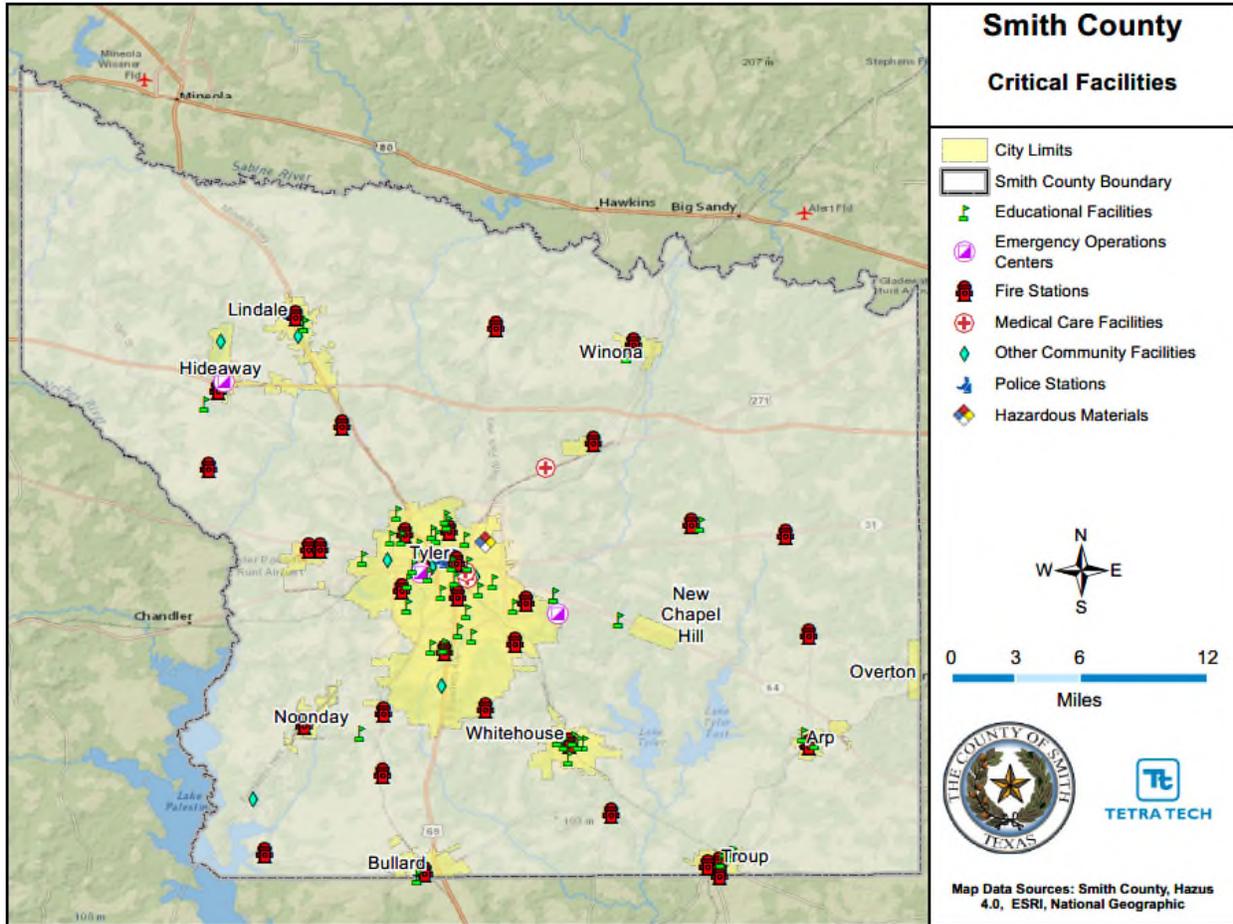


Figure 4-2. Critical Facilities in Smith County

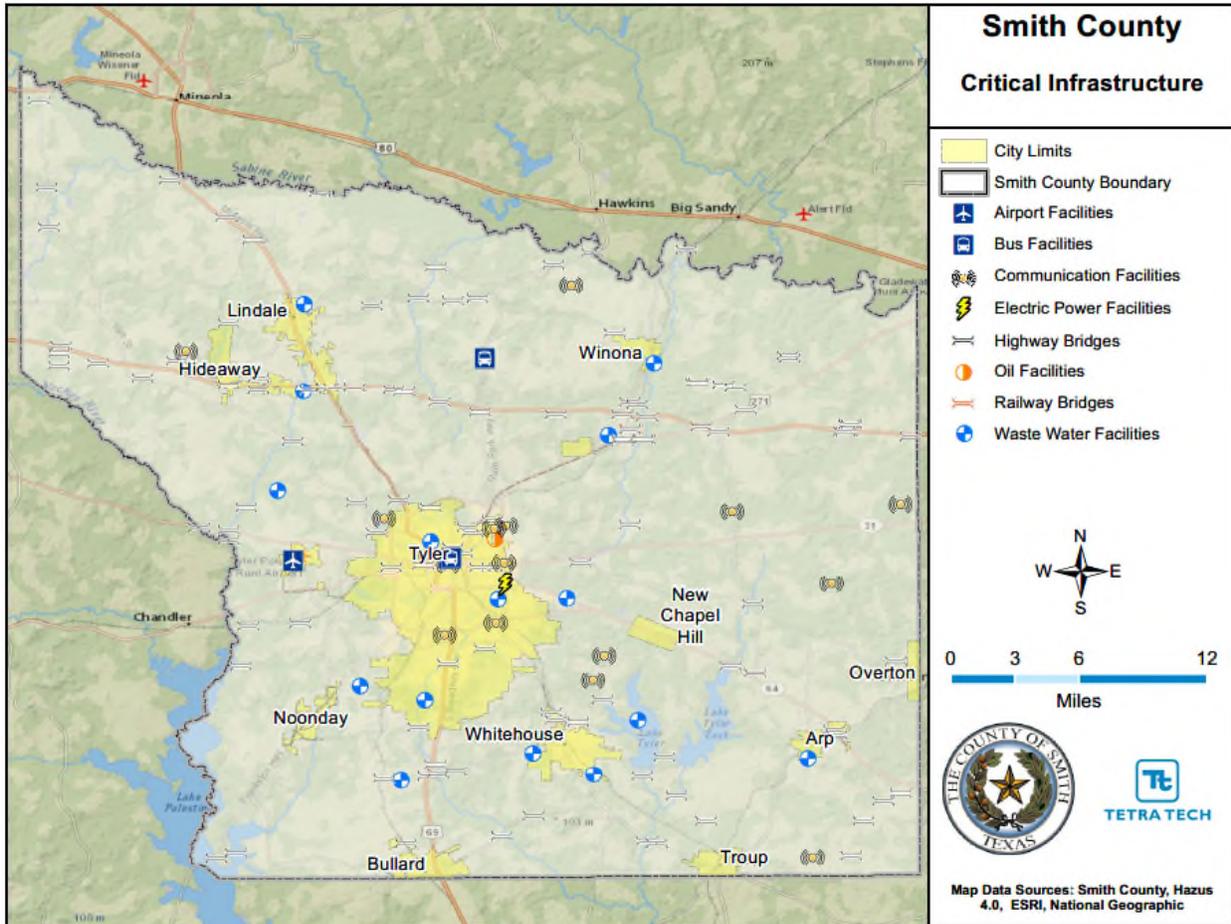


Figure 4-3. Critical Infrastructure in Smith County

4.7 DEMOGRAPHICS

Some populations are at greater risk from hazard events because of decreased resources or physical abilities. Elderly people, for example, may be more likely to require additional assistance. Research has shown that people living near or below the poverty line, the elderly, women, children, ethnic minorities, renters, individuals with disabilities, and others with access and functional needs, all experience more severe effects from disasters than the general population. These vulnerable populations may vary from the general population in risk perception, living conditions, access to information before, during and after a hazard event, capabilities during an event, and access to resources for post-disaster recovery. Indicators of vulnerability—such as disability, age, poverty, and minority race and ethnicity—often overlap spatially and often in the geographically most vulnerable locations. Detailed spatial analysis to locate areas where there are higher concentrations of vulnerable community members would help to extend focused public outreach and education to these most vulnerable citizens. Select U.S. Census demographic and social characteristics for Smith County are shown in Table 4-5.

Table 4-5. Smith County Demographic and Social Characteristics

Smith County	
Gender/Age (% of Total Population)	
Male	48.3%
Female	51.7%
Under 5 Years	7.0%
65 years and over	15.1%
Race/Ethnicity (% of Total Population)	
White	76.7%
American Indian/Alaska Native	0.4%
Asian	1.5%
Black or African American	17.9%
Other Race	2.0%
Two or more races	1.5%
Hispanic or Latino ^a	18.4%
Education	
High School Graduate or Higher	84.4%

a. U.S. Census Bureau considers the Hispanic/Latino designation an ethnicity, not a race.

Source: U.S. Census, 2011-2015 American Community Survey

4.7.1 Population

The Texas Association of Counties estimates a population of 225,290 for Smith County as of July 1, 2016. Table 4-6 shows planning area population data from 1990 through 2016. The Smith County population has increased 38.60% from 1990 to 2000, and increased another 7.42% from 2010 to 2016. The City of Tyler is the county's principal population center. The population in all the jurisdictions has grown since 1990.

Table 4-6. Population Data

	Population			
	1990	2000	2010	2016
Arp	812	970	969	1,002
Bullard ^a	890	2,416	2,443	2,994
Hideaway	N/A	3,083	2,945	3,127
Lindale	2,428	4,818	4,826	5,853
New Chapel Hill	439	594	599	620
Noonday	466	677	684	709
Troup ^a	1,659	1,810	1,827	1,920
Tyler	75,450	97,234	98,159	104,798
Whitehouse	4,032	7,713	7,812	8,269
Winona	457	578	583	602
Balance of County ^b	66,378	89,821	89,618	95,396
Total	151,309	209,714	210,465	225,290

a. Includes only the partial population located in Smith County

b. Includes unincorporated county and non-participating communities

Source: Texas Association of Counties

Figure 4-4 shows 10-year population changes in Smith County and the State of Texas from 1990 to 2010, and the 6-year change from 2010 to 2016. Between 1990 and 2016, the State of Texas' population grew by 64% (about 2.4% per year) while Smith County's population increased by 48.90% (1.8% per year).

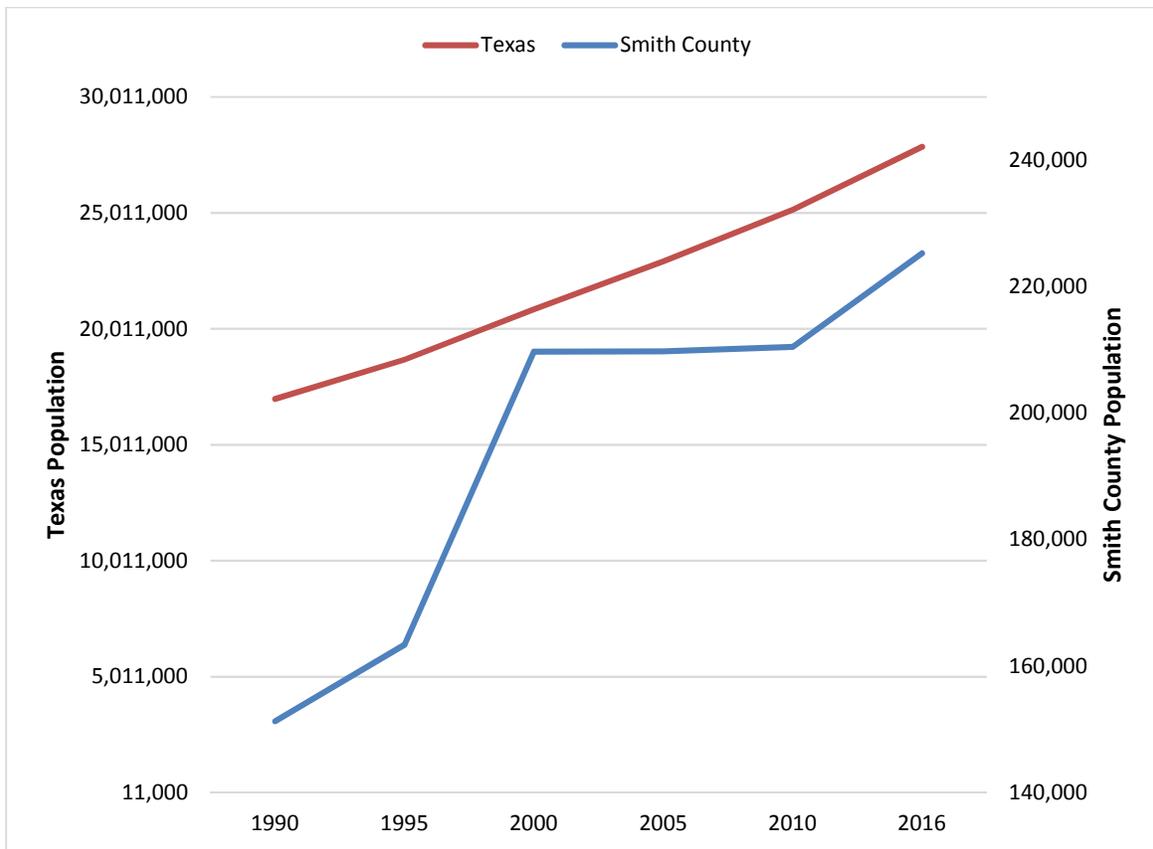


Figure 4-4. State of Texas and Smith County Population Growth

4.7.2 Age Distribution

As a group, the elderly are more apt to lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences making recovery slower. They are more likely to be vision, hearing, or mobility impaired, and more likely to experience mental impairment or dementia. Additionally, the elderly are more likely to live in assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. These facilities are typically identified as “critical facilities” by emergency managers because they require extra notice to implement evacuation. Elderly residents living in their own homes may have more difficulty evacuating their homes and could be stranded in dangerous situations. This population group is more likely to need special medical attention, which may not be readily available during natural disasters because of isolation caused by the event. Specific planning attention for the elderly is an important consideration given the current aging of the national population.

Children under 14 are particularly vulnerable to disaster events because of their young age and dependence on others for basic necessities. Very young children may additionally be vulnerable to injury or sickness; this vulnerability can be worsened during a natural disaster because they may not understand the measures that need to be taken to protect themselves from hazards.

The overall age distribution for the planning area is illustrated in Figure 4-5. Based on U.S. Census, 2011-2015 American Community Survey 5-year estimates, 15.1% of the planning area’s population is 65 or older. American Community Survey data do not provide information regarding disabilities in the planning area’s over-65 population. The 2011-2015 American Community Survey 5-year estimates indicate that 19.8% of Smith County families have children under 18 and are below the poverty line.

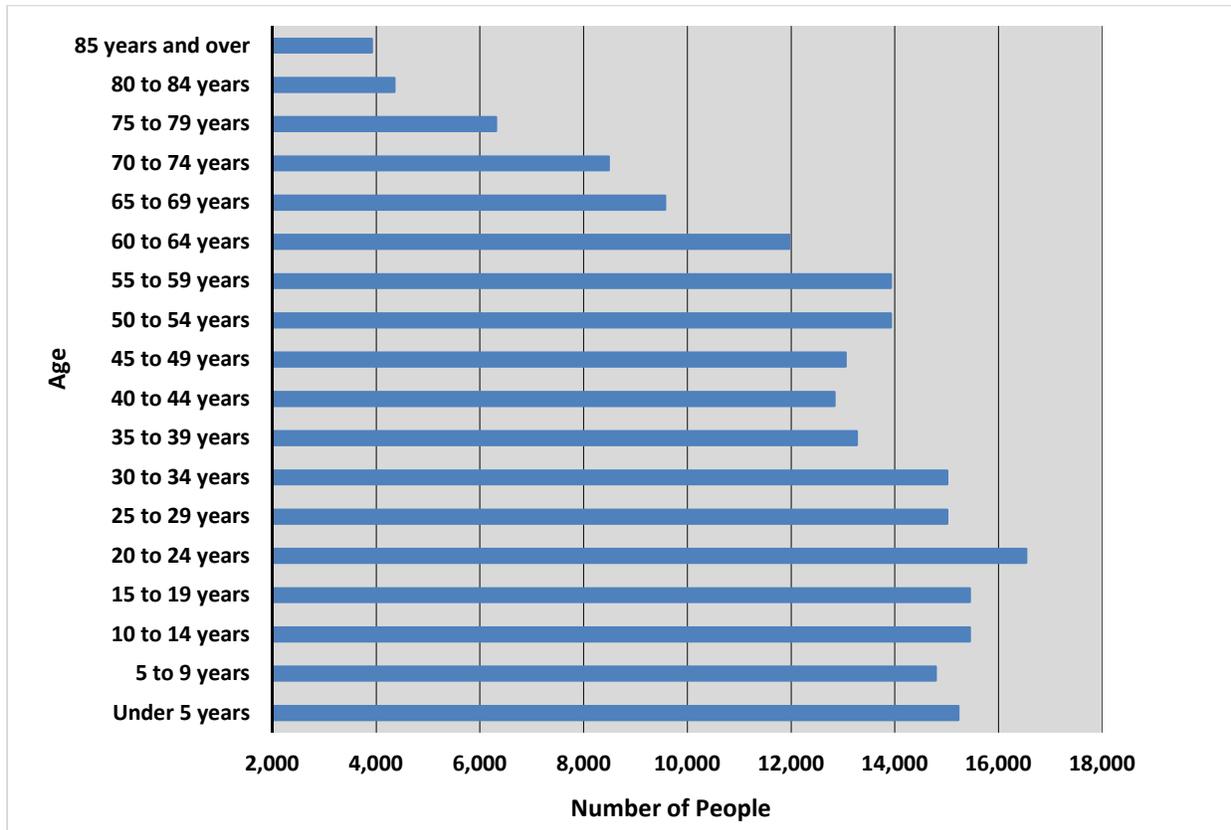


Figure 4-5. Smith County Age Distribution

4.7.3 Disabled Populations

The 2010 U.S. Census estimated that 57 million non-institutionalized Americans with disabilities live in the U.S. This equates to about one-in-five persons. People with disabilities are more likely to have difficulty responding to a hazard event than the general population. Local government is the first level of response to assist these individuals, and coordination of efforts to meet their access and functional needs is paramount to life safety efforts. It is important for emergency managers to distinguish between functional and medical needs to plan for incidents that require evacuation and sheltering. Knowing the percentage of population with a disability will allow emergency management personnel and first responders to have personnel available who can provide services needed by those with access and functional needs. According to the U.S. Census, 2011-2015 American Community Survey 5-year estimates, 13.1% of the population in the planning area lives with some form of disability.

4.7.4 Ethnic Populations

Research shows that minorities are less likely to be involved in pre-disaster planning and experience higher mortality rates during a disaster event. Post-disaster recovery can be less effective for ethnic populations and is often characterized by cultural insensitivity. Since higher proportions of ethnic minorities live below the poverty line than the majority white population, poverty can compound vulnerability. According to 2011-2015 American Community Survey 5-year estimates, the ethnic composition of Smith County is predominantly white, at about 76.7%. The largest minority population is Hispanic or Latino at 18.4%. Figure 4-6 shows the population distribution by race and ethnicity in Smith County. The values shown on Figure 4-6 exceed 100% because according to the U.S. Census, Hispanic or Latino is listed as an ethnicity, not a race. Therefore, the Hispanic or Latino designation encompasses several races.

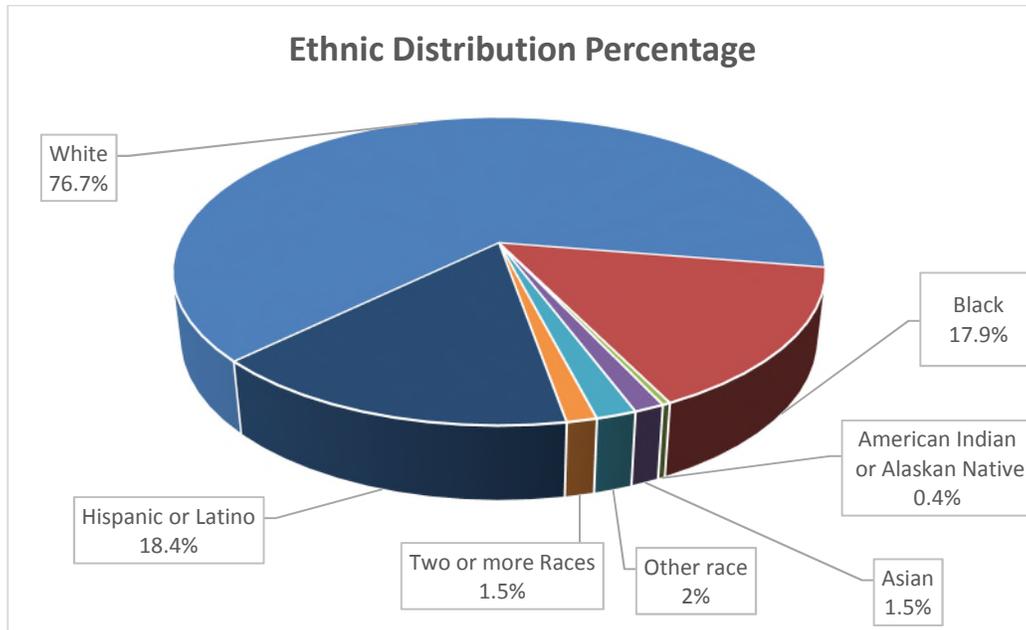


Figure 4-6. Smith County Ethnic Distribution

Smith County has an 8.2% foreign-born population. Other than English, the most commonly spoken language in Smith County is Spanish. The American Community Survey estimates 7.2% of the residents speak English “less than very well.”

4.8 ECONOMY

The U.S. Census, 2011-2015 American Community Survey 5-year economic characteristics estimates are shown in Table 4-7.

Table 4-7. Economic Characteristics

	Families Below Poverty Level	Individuals Below Poverty Level	Median Home Value	Median Household Income	Per Capita Income	Population >16 Years Old in Labor Force	Population Employed
Arp	6.6%	15.2%	\$67,900	\$53,594	\$24,432	57.9%	54.3%
Bullard	4.3%	4.65%	\$146,800	\$63,177	\$27,168	66.9%	64.3%
Hideaway	0.0%	3.9%	\$178,000	\$69,110	\$40,342	41.8%	37.8%
Lindale	15.2%	19.0%	\$122,100	\$62,434	\$24,723	59.7%	56.1%
New Chapel Hill	12.5%	15.1%	\$156,300	\$49,375	\$23,920	59.5%	54.1%
Noonday	4.5%	75.8%	\$167,800	\$69,628	\$27,987	53.9%	51.7%
Troup	23.2%	31.0%	\$83,100	\$29,474	\$15,804	55.3%	49.0%
Tyler	14.3%	20.9%	\$134,500	\$42,840	\$25,803	62.2%	57.8%
Whitehouse	8.9%	10.1%	\$69,957	\$152,100	\$25,368	73.8%	73.2%
Winona	N/A	14.3%	\$89,573	\$41,454	\$21,103	N/A	N/A
Smith County	12.1%	17.4%	\$130,600	\$77,480	\$24,964	61.2%	56.7%

Note: N/A Not Available

Source: U.S. Census, 2011-2015 American Community Survey; City-Data.com (used for City of Winona)

4.8.1 Income

In the United States, individual households are expected to use private resources to some extent to prepare for, respond to, and recover from disasters. This means that households living in poverty are automatically disadvantaged when confronting hazards. Additionally, the poor typically occupy more poorly built and inadequately maintained housing. Mobile or modular homes, for example, are more susceptible to damage in earthquakes and floods than other types of housing. In urban areas, the poor often live in older houses and apartment complexes, which are more likely to be made of un-reinforced masonry, a building type that is particularly susceptible to damage during earthquakes. Furthermore, residents below the poverty level are less likely to have insurance to compensate for losses incurred from natural disasters. This means that residents below the poverty level have a great deal to lose during an event and are the least prepared to deal with potential losses. The events following Hurricane Katrina in 2005 illustrated that personal household economics significantly impact people's decisions on evacuation. Individuals who cannot afford gas for their cars will likely decide not to evacuate.

Based on the U.S. Census, 2011-2015 American Community Survey 5-year estimates, per capita income in the planning area was \$24,964 and the median household income was \$77,480. It is estimated that 11.2% of households receive an income between \$100,000 and \$149,999 per year and 7.1% are above \$150,000 annually. Families with incomes below the poverty level made up 12.1% of all families and 17.4% of the total population in Smith County.

4.8.2 Employment Trends

According to the Federal Reserve Economic Data, Smith County's unemployment rate as of June 2017, was 4.3%, compared to a statewide rate of 4.6%. Figure 4-7 shows Smith County's unemployment trends from 1990 through June 2017. Smith County's unemployment rate was lowest in 2000 at 3.6% and peaked in 2009 at 8.9%.

Source: FRED, 2017

Note: Shaded areas indicate U.S. recessions

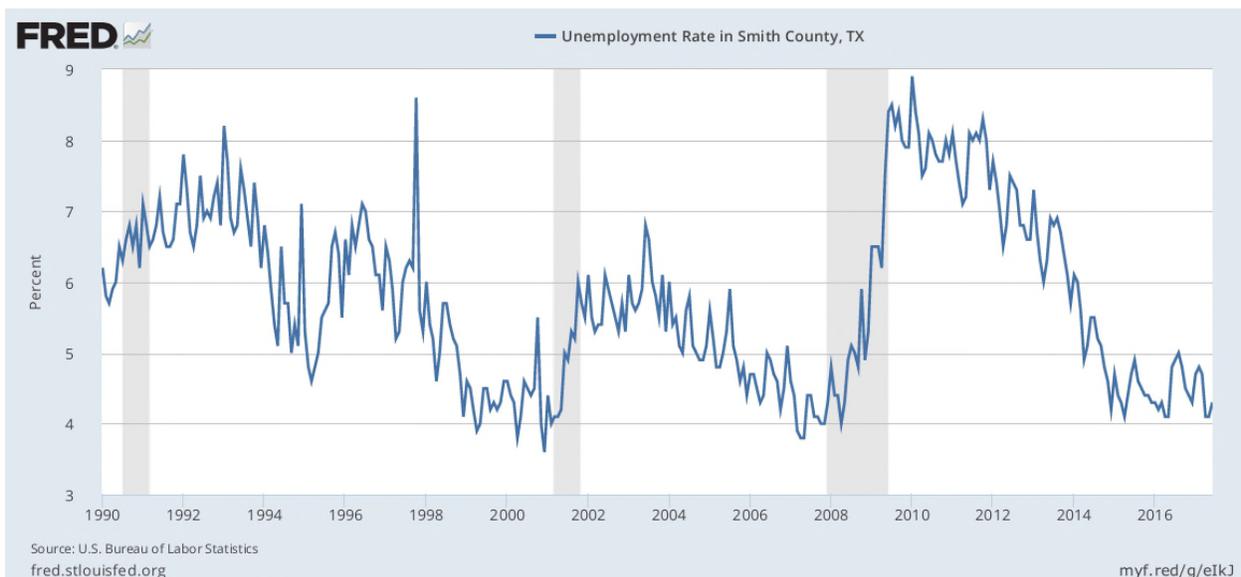


Figure 4-7. Smith County Unemployment Rate

According to 2011-2015 American Community Survey 5-year estimates, 61.2% of Smith County's population 16 years and older is in the labor force, including 51.7% of women and 48.3% of men.

4.8.3 Occupations and Industries

According to 2011-2015 American Community Survey 5-year estimates, the planning area's economy is strongly based in the education, health care and social assistance industries (26.6% of total employment), followed by retail trade (14.0%), and manufacturing (9.4%). Figure 4-8 shows the distribution of industry types in Smith County, based on share of total employment.

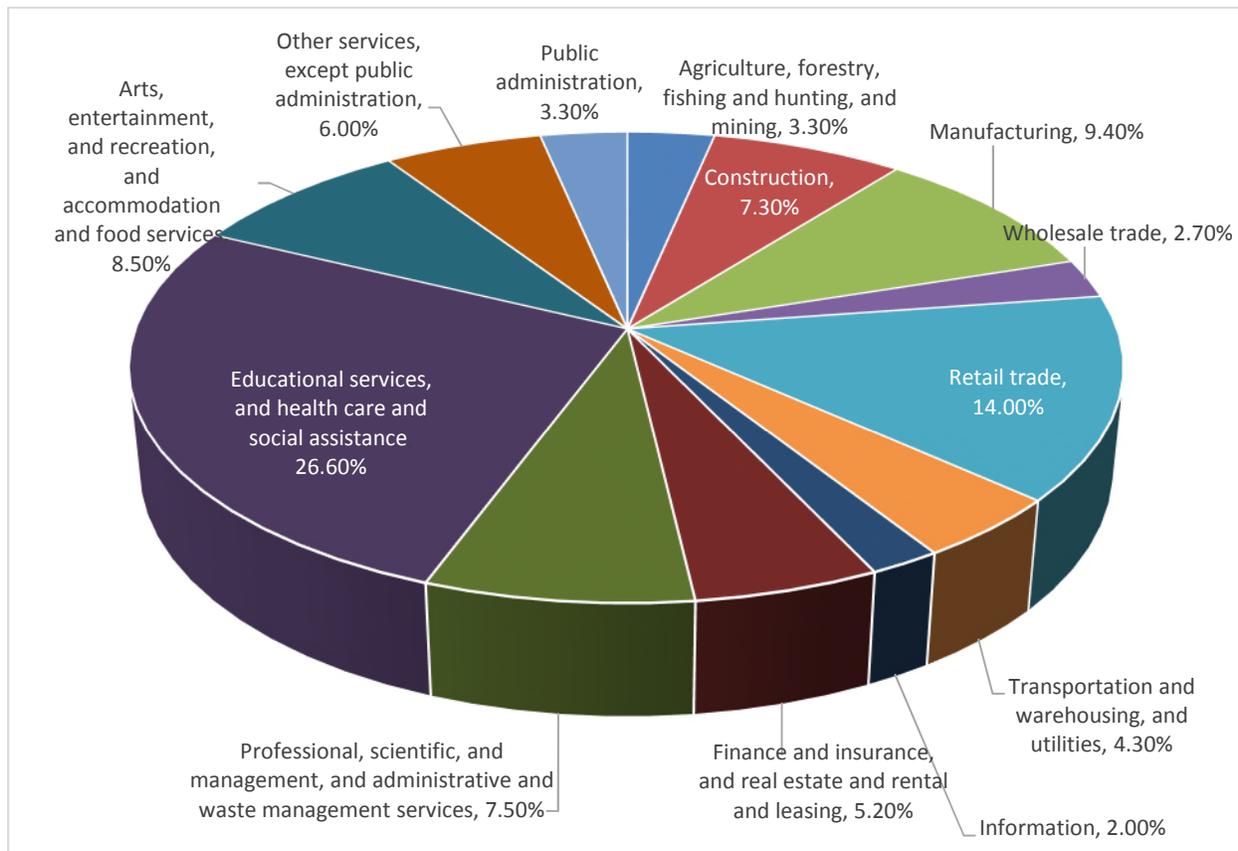


Figure 4-8. Percent of Total Employment by Industry in Smith County

4.9 LAND USE AND DEVELOPMENT TRENDS

The municipal planning partners have adopted plans that govern land use decision and policy making in their jurisdictions. Decisions on land use will be governed by these programs. This plan will work together with these programs to support wise land use in the future by providing vital information on the risk associated with natural hazards in the planning area.

It is the goal that all municipal planning partners will incorporate this hazard mitigation plan update in their comprehensive plans (if applicable) by reference. This will help ensure that future development trends can be established with the benefits of the information on risk and vulnerability to natural hazards identified in this plan. Table 4-8 lists the present land use in Smith County. Smith County consists primarily of forest land, agricultural land and water. The county and the city partners have not formally tracked the impacts of changes in development over the last 5 years and how these changes in development were influenced by the risk associated with natural hazards in the county or the city partners. As part of this hazard mitigation plan update, Smith County and the cities are now equipped with the knowledge and the tools to track and implement changes to the plan during their annual reviews and 5-year updates to reflect development changes. However, it should be noted that the mitigation actions developed and prioritized through the mitigation action ranking process reflect the current development conditions and applicable policies.

4.9.1 Smith County

Smith County consists primarily of forest land. Developed land accounts for 14.7% of the county, thus there is space for developed growth. Table 4-8 lists the present land use in Smith County.

Present Use Classification	Area (acres)	% of total
Agriculture	162,206	26.7
Developed, Open Space	24,810	4.1
Developed, High Intensity	5,019	0.8
Developed, Medium Intensity	12,766	2.1
Developed, Low Intensity	46,545	7.7
Forest Land	193,742	31.9
Grassland/Prairie	68,135	11.2
Water/Wetland	94,799	15.5
Total	608,022	100.0%

Source: NLCD, 2011

As described in Chapter 4.7.1, the population of Smith County increased 38.6% from 1990 to 2000, and another increase of 7.42% from 2000 to 2016. The population in 2016 was 225,290. Table 4-9 shows three projection scenarios, created by the Texas Demographic Center, based on migration to and from the county. Zero Scenario assumes that in-migration and out-migration are equal resulting in growth only through natural increases; the 0.5 Scenario assumes rates of net migration one-half of those of the 2000-2010 decade; and the 1.0 Scenario assumes that the trends in 2000-2010 decade will continue and occur in the future. 1.0 Scenario is a high-growth alternative and it is unlikely to be sustained over time.

As shown in Table 4-9, mitigation of people is occurring because the Zero Scenario for 2020 population projection has already been surpassed in 2016 population.

Migration Scenario	2020 Population Projection	2030 Population Projection	2040 Population Projection	2050 Population Projection
Zero Scenario	220,574	227,673	231,380	233,182
0.5 Scenario	231,653	254,486	276,544	299,745
1.0 Scenario	243,064	283,362	329,198	382,835

Source: Texas Demographic Center, 2018

Housing units in Smith County are mainly single-family detached homes. Figure 4-9 shows the number of building permits recorded in Smith County between 2007 and 2014. The highest number of permits was in 2014 with 377 building permits issued and the average home cost was \$292,700 (city.data.com, 2017). The large number of new home permits coincides with the population increases experienced during this timeframe and the trend is expected to continue. With this new homes surge and population increase, the vulnerability of hazard prone areas has increased since the plan was last approved.

Source: City-Date.com, 2017

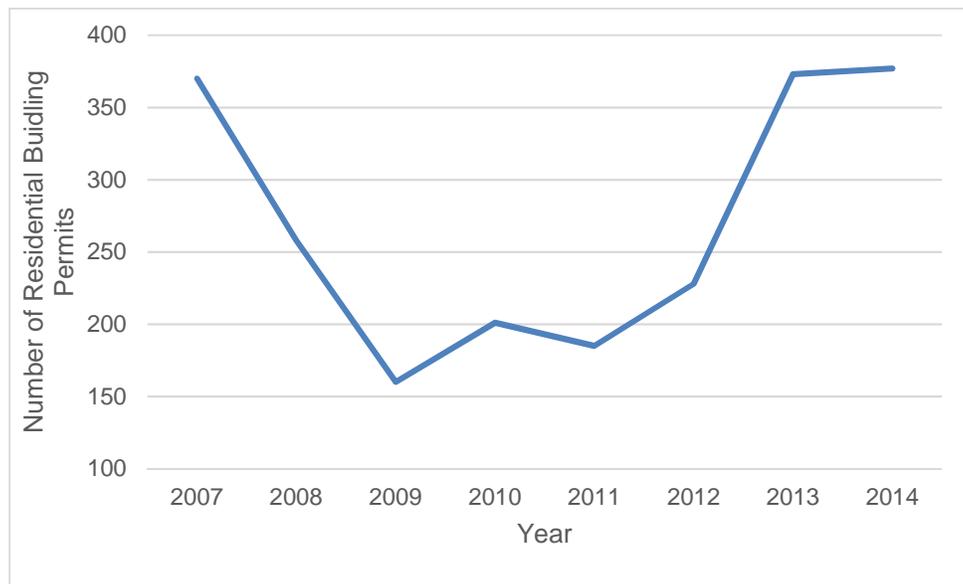


Figure 4-9. Residential Building Permits in Smith County

4.9.2 City of Arp

The City of Arp experienced about a 3% population increase between 2000 and 2016 and only small, if any, population increases are expected in the future. The city has been averaging one residential building permit per year for new construction between 2000 and 2009 with an average building cost of \$165,000. The vulnerability of hazard prone areas in the City of Arp has stayed the same since the plan was last approved based on minimal new housing development and only a small population increase.

4.9.3 City of Bullard

According to the City of Bullard 2030 Comprehensive Plan, Bullard's population has become more diverse and it is projected to double and exceed 5,000 residents by 2020. Figure 4-10 is a future land use map that recommends three general areas for future mixed-use neighborhood centers: FM 344 generally west of Lilly Lane; FM 2493 generally east of the Brook Hill School campus; and School House Road generally in proximity to the intersection with a future thoroughfare corridor.

With the new mixed-use neighborhood centers planned and population increases, the vulnerability of hazard prone areas has increased since the plan was last approved.

Source: Bullard 2030 Comprehensive Plan

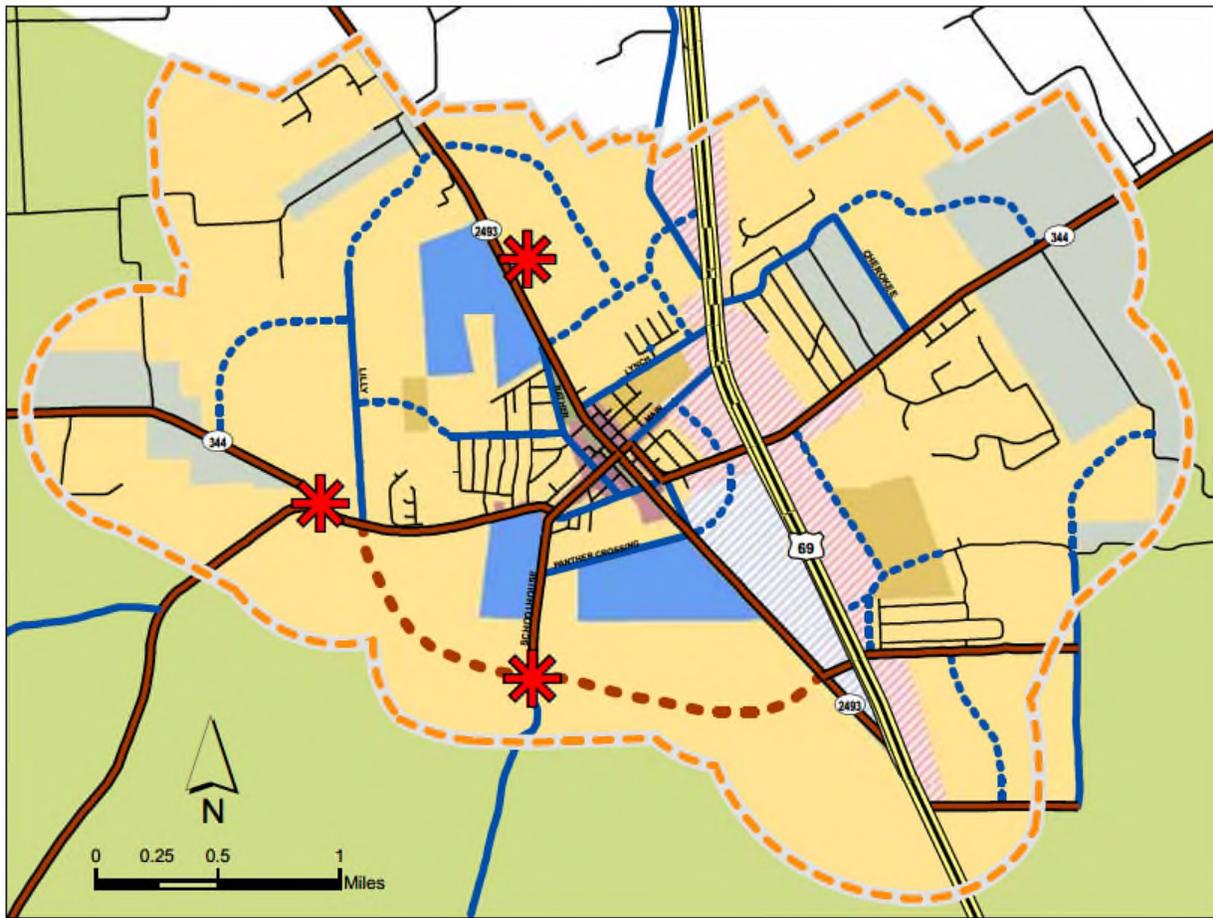


Figure 4-10. City of Bullard Future Land Use



4.9.4 City of Hideaway

The City of Hideaway experienced about a 6% population increase between 2000 and 2016 and small population increases are expected in the future for this gated residential community.

Building permits indicate what types of buildings are being constructed and their relative uses. Table 4-10 lists the number of residential building permits for the city that have been granted between 2010 and 2014. The data include all sizes of family homes for reported permits, as well as the average construction costs, to show the potential increase in vulnerability of structures to the various hazards reviewed in the risk assessment. The increase in vulnerability can be attributed to the construction costs that would be factored into repairing or replacing a structure using current market values.

The vulnerability of hazard prone areas has increased since the plan was last approved based on their population increases and new building permits issued.

Table 4-10. City of Hideaway Residential Building Permits

Year	Building Permits Issued	Average Cost
2014	10	\$273,000
2013	0	\$0
2012	9	\$278,200
2011	4	\$500,000
2010	4	\$485,000

Source: City-data.com, 2017

4.9.5 City of Lindale

According to City of Lindale's Second Century Comprehensive Plan, 2005, the city's population is expected to be between 5,550 and 6,200 by the year 2025. Since the population in 2016 was 5,853, it is evident that the city is growing and it is on its way to reach 6,200 population by the year 2025.

Building permits indicate what types of buildings are being constructed and their relative uses. Table 4-11 lists the number of residential building permits for the city that have been granted between 2010 and 2014. The data include all sizes of family homes for reported permits, as well as the average construction costs, to show the potential increase in vulnerability of structures to the various hazards reviewed in the risk assessment. The increase in vulnerability can be attributed to the construction costs that would be factored into repairing or replacing a structure using current market values.

The vulnerability of hazard prone areas has increased since the plan was last approved based on their population increases and new building permits issued.

Table 4-11. City of Lindale Residential Building Permits

Year	Building Permits Issued	Average Cost
2014	60	\$90,400
2013	61	\$90,400
2012	54	\$90,400
2011	44	\$90,400
2010	56	\$144,400

Source: City-data.com, 2017

4.9.6 City of New Chapel Hill

The city is a bedroom community to the City of Tyler and as such it does not generate any revenue and does not provide any services to the citizens. The city is only a mile and a half long and 1 mile wide and it is not growing in population nor buildings. The vulnerability of hazard prone areas in the City of New Chapel Hill has stayed the same since the plan was last approved based on no new development and minimal population changes.

4.9.7 City of Noonday

The City of Noonday is located about 11 miles southwest of Tyler with a population under 1,000. It is best known for its very productive farmland, especially for growing sweet onions. The city is experiencing small growth and that trend is expected to continue. The vulnerability of hazard prone areas in the city has stayed the same since the plan was last approved based on minimal development and a small population increase.

4.9.8 City of Troup

The City of Troup experienced about a 5% population increase between 2000 and 2016 and small population increases are future trends. The city did have 12 new house building permits issued in 2013-2014 and an average construction cost of \$81,700 to show that the city is experiencing some growth. The vulnerability of hazard prone areas has increased since the plan was last approved based on their population increases and new building permits issued.

4.9.9 City of Tyler

According to the Texas state demographer, Tyler is changing, with the population increasing as younger families move in for economic opportunities (Tyler Morning Telegraph, 2017). Smith County grew by about 2,000 in 2016 and about half of the growth was from domestic migration.

The Tyler 1st Comprehensive Plan, updated 2014, has outlined plans for future land use and Figure 4-11 shows the different land use mixes. Future city land use includes the multi-categories of land use to allow for additional growth.

Building permits indicate what types of buildings are being constructed and their relative uses. Table 4-12 lists the number of residential building permits for the City of Tyler that have been granted between 2010 and 2017. The data include all sizes of family homes for reported permits, as well as the average construction costs, to show the potential increase in vulnerability of structures to the various hazards reviewed in the risk assessment. The increase in vulnerability can be attributed to the construction costs that would be factored into repairing or replacing a structure using current market values.

The vulnerability of hazard prone areas has increased since the plan was last approved based on their population increases and new building permits issued.

Table 4-12. City of Tyler Residential Building Permits

Year	Building Permits Issued	Average Cost
2017	353	\$315,171
2016	344	N/A
2015	307	\$328,358
2014	268	\$354,900
2013	271	\$310,800
2012	134	\$176,500
2011	110	\$176,500

2010

114

\$176,500

Source: City-data.com, 2017 and City of Tyler, 2017.

Source: Tyler 1st Comprehensive Plan, 2014

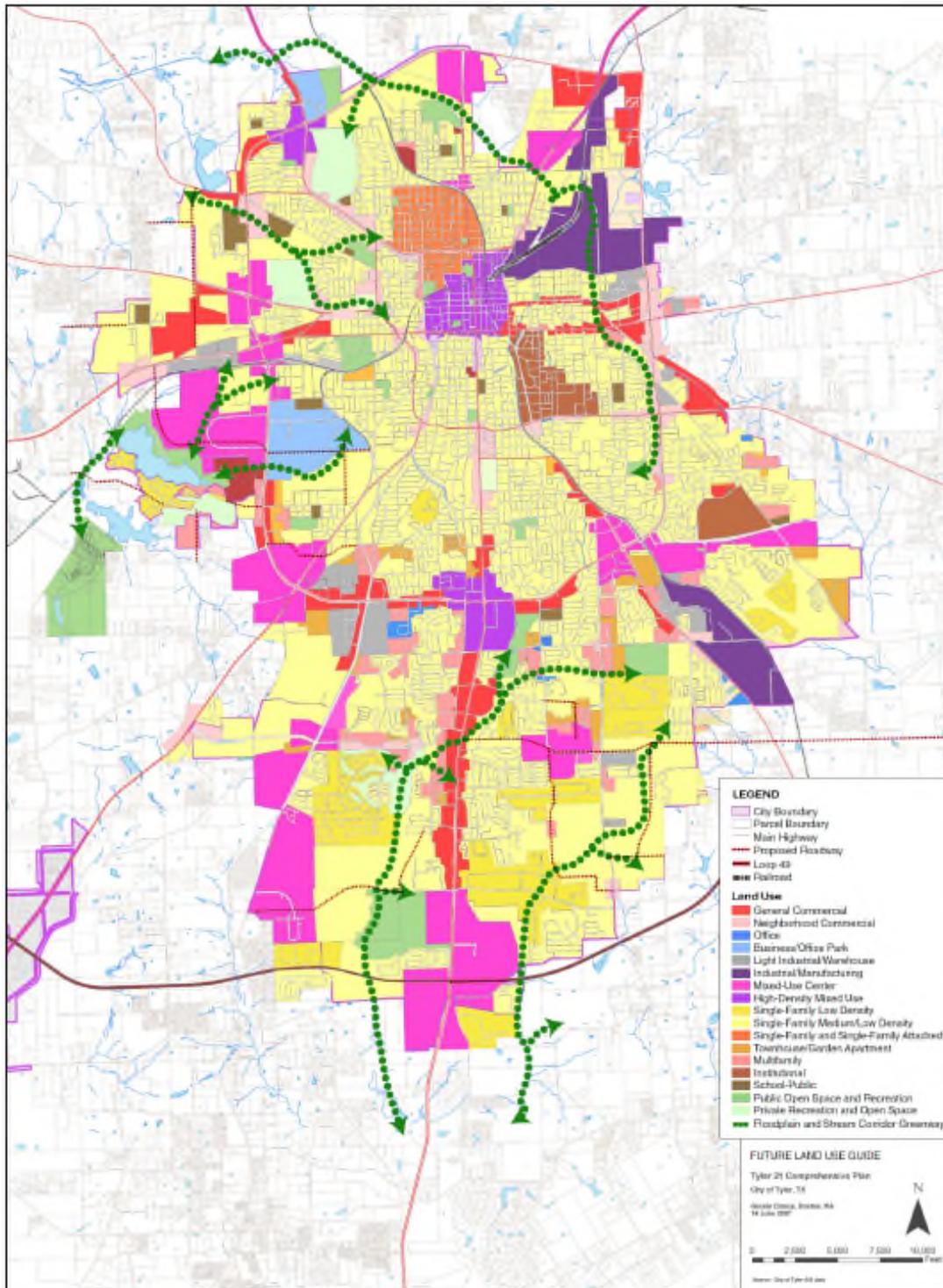


Figure 4-11. City of Tyler Future Land Use Within Current City Limits

4.9.10 City of Whitehouse

The City of Whitehouse experienced about a 6% population increase between 2000 and 2016 and small population increases are future trends.

Building permits indicate what types of buildings are being constructed and their relative uses. Table 4-13 lists the number of residential building permits for the city that have been granted between 2010 and 2014. The data include all sizes of family homes for reported permits, as well as the average construction costs, to show the potential increase in vulnerability of structures to the various hazards reviewed in the risk assessment. The increase in vulnerability can be attributed to the construction costs that would be factored into repairing or replacing a structure using current market values.

The vulnerability of hazard prone areas has increased since the plan was last approved based on their population increases and new building permits issued.

Table 4-13. City of Hideaway Residential Building Permits

Year	Building Permits Issued	Average Cost
2014	18	\$190,000
2013	19	\$145,200
2012	12	\$139,600
2011	12	\$166,300
2010	12	\$150,500

Source: City-data.com, 2017

4.9.11 City of Winona

The City of Winona has a population under 1,000. It is experiencing small growth and that trend is expected to continue. The city has many home rental properties and the population fluctuates based on the rental occupancy. The vulnerability of hazard prone areas has stayed the same since the plan was last approved based on their small population increases.

4.10 LAWS AND ORDINANCES

Existing laws, ordinances, and plans at the federal, state, and local level can support or impact hazard mitigation actions identified in this plan. Hazard mitigation plans are required to include review and incorporation, if appropriate, of existing plans, studies, reports, and technical information as part of the planning process (44 CFR, Section 201.6(b)(3)). Pertinent federal, state, and local laws are described below. These laws, programs, documents, and departments were reviewed to identify the plans, regulations, personnel, and funding mechanisms available to the county and planning partners to impact and mitigate the effects of natural hazards. The county and municipals partners have the capacity to expand their hazard mitigation capabilities through the training of existing staff, cross-training staff across program areas, and hiring of additional staff, as well as acquiring additional funding through the attainment of grant funds, raising of taxes, and levying of new taxes.

4.10.1 Federal

Disaster Mitigation Act

The DMA is the current federal legislation addressing hazard mitigation planning. It emphasizes planning for disasters before they occur. It specifically addresses planning at the local level, requiring plans to be in place before Hazard Mitigation Assistance grant funds are available to communities. This plan is designed to meet the requirements of DMA, improving the planning partners' eligibility for future hazard mitigation funds.

Community Development Block Grant Disaster Resilience Program

In response to disasters, Congress may appropriate additional funding for the U.S. Department of Housing and Urban Development Community Development Block Grant programs to be distributed as Disaster Recovery grants (CDBG-DR). These grants can be used to rebuild affected areas and provide seed money to start the recovery process. CDBG-DR assistance may fund a broad range of recovery activities, helping communities and neighborhoods that otherwise might not recover due to limited resources. CDBG-DR grants often supplement disaster programs of the Federal Emergency Management Agency, the Small Business Administration, and the U.S. Army Corps of Engineers. Housing and Urban Development generally awards noncompetitive, nonrecurring CDBG-DR grants by a formula that considers disaster recovery needs unmet by other federal disaster assistance programs. To be eligible for CDBG-DR funds, projects must meet the following criteria:

- Address a disaster-related impact (direct or indirect) in a presidentially declared county for the covered disaster
- Be a CDBG-eligible activity (according to regulations and waivers)
- Meet a national objective.

Incorporating preparedness and mitigation into these actions is encouraged, as the goal is to rebuild in ways that are safer and stronger.

Clean Water Act

The federal Clean Water Act (CWA) employs regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation’s surface waters so that they can support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.”

Evolution of CWA programs over the last decade has included a shift from a program-by-program, source-by-source, and pollutant-by-pollutant approach to more holistic watershed-based strategies. Under the watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired ones. A full array of issues are addressed, not just those subject to CWA regulatory authority. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining water quality and other environmental goals is a hallmark of this approach.

National Dam Safety Act

The potential for catastrophic flooding due to dam failures led to passage of the National Dam Safety Act (Public Law 92-367). The National Dam Safety Program requires a periodic engineering analysis of every major dam in the country. The goal of this FEMA-monitored effort is to identify and mitigate the risk of dam failure so as to protect the lives and property of the public.

To help the State Dam Safety Program achieve its goal, the state’s dam safety regulations now include the requirement for emergency action plans on all non-exempt Significant-Hazard and High-Hazard Potential dams (Title 30, Texas Administrative Code, Ch. 299, 299.61b).

National Flood Insurance Program

The National Flood Insurance Program (NFIP) provides federally backed flood insurance in exchange for communities enacting floodplain regulations. Participation and good standing under NFIP are prerequisites to grant funding eligibility under the Robert T. Stafford Act. Smith County and the jurisdictions of Bullard, Hideaway, Lindale, Noonday, Troup, Tyler and Whitehouse participate in the NFIP and have adopted regulations that meet the NFIP requirements. The jurisdictions of Arp, New Chapel Hill and Winona do not participate. At the time of the preparation of this plan, Smith County and the jurisdictions of Bullard,

Hideaway, Lindale, Noonday, Troup, Tyler and Whitehouse were in good standing with NFIP requirements.

4.10.2 State and Regional

Texas Division of Emergency Management

The TDEM is a division within the Texas Department of Public Safety and has its roots in the civil defense programs established during World War II. It became a separate organization through the Texas Civil Protection Act of 1951, which established the Division of Defense and Disaster Relief in the Governor's Office to handle civil defense and disaster response programs. The division was collocated with the Department of Public Safety (DPS) in 1963. The division was renamed the Division of Disaster Emergency Services in 1973. After several more name changes, it was designated an operating division of the Texas Department of Public Safety in 2005. Legislation passed during the 81st session of the Texas Legislature in 2009 formally changed the name to TDEM. TDEM operates according to the Texas Disaster Act of 1975 (Chapter 418 of the Texas Government Code).

TDEM's is "charged with carrying out a comprehensive all-hazard emergency management program for the state and for assisting cities, counties, and state agencies in planning and implementing their emergency management programs. A comprehensive emergency management program includes pre- and post-disaster mitigation of known hazards to reduce their impact; preparedness activities, such as emergency planning, training, and exercises; provisions for effective response to emergency situations; and recovery programs for major disasters."

Texas Commission on Environmental Quality

The TCEQ has jurisdiction over rule changes to dams as 99% of dams are under state regulatory authority. Those regulations are implemented by the TCEQ Dam Safety Program, which monitors and regulates both private and public dams in Texas. The program periodically inspects dams that pose a high or significant hazard and makes recommendations and reports to dam owners to help them maintain safe facilities. The primary goal of the state's Dam Safety Program is to reduce the risk to lives and property from the consequences of dam failure.

In 2008, TCEQ proposed several rule changes including the definition of dams and dam classifications. According to the new definition, a dam in Texas is a barrier with a "height greater than or equal to 25 feet and a maximum storage (top of dam) capacity of 15 acre-feet; a height greater than 6 feet and a maximum storage capacity greater than or equal to 50 acre-feet; or one that poses a threat to human life or property in the event of failure, regardless of height or maximum storage capacity."

Texas Water Development Board

The Texas Water Development Board (TWDB) was created in 1957 but its history dates back to a 1904 constitutional amendment authorizing the first public development of water resources. The TWDB mission is "to provide leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water for Texas." TWDB provides water planning, data collection and dissemination, financial assistance, and technical assistance services.

TWDB financial assistance programs are funded through state-backed bonds, a combination of state bond proceeds and federal grant funds, or limited appropriated funds. Since 1957, the Texas State Legislature and voters approved constitutional amendments authorizing TWDB to issue up to \$10.93 billion in Texas Water Development Bonds. In 1987, TWDB added the Clean Water State Revolving Fund (CWSRF) to its portfolio of financial assistance programs. Low-interest loans from the CWSRF finance costs associated with the planning, design, construction, expansion, or improvement of wastewater treatment facilities, wastewater recycling and reuse facilities, collection systems, stormwater pollution control projects, and nonpoint source pollution control projects. Funded in part by federal grant money, CWSRF provides loans

at interest rates lower than the market can offer to any eligible applicant. CWSRF offers 20-year loans using either a traditional long-term, fixed-rate or a short-term, variable-rate construction period loan that converts to a long-term, fixed-rate loan on project completion.

Texas State Soil and Water Conservation Board

The Texas State Soil and Water Conservation Board (TSSWCB) is the state agency that administers Texas' soil and water conservation law and coordinates conservation and nonpoint source water pollution abatement programs. The TSSWCB was created in 1939 by the Texas Legislature to organize the state into 216 soil and water conservation districts (SWCD) and to serve as a centralized agency for communicating with the Texas Legislature as well as other state and federal entities. The TSSWCB is the lead state agency for the planning, management, and abatement of agricultural and silvicultural (forestry) nonpoint source water pollution, and administers the Water Supply Enhancement Program. Each SWCD is an independent political subdivision of state government. Local SWCDs are actively involved throughout the state in soil and water conservation activities such as operation and maintenance of flood control structures.

Texas Bureau of Economic Geology

The University of Texas at Austin, Bureau of Economic Geology serves as the State Geological Survey of Texas. The bureau conducts research focusing on the intersection of energy, environment, and economy. The bureau partners with federal, state, and local agencies, academic institutions, industry, nonprofit organizations, and foundations to conduct high-quality research and to disseminate the results to the scientific and engineering communities as well as to the broad public. The Geophysical Log Facility (GLF) is the official well log repository for the Railroad Commission of Texas, which by law receives a copy of geophysical logs from every new, deepened, or plugged well drilled in Texas since September 1985.

Texas Forest Service

Texas Forest Service (TFS) was created in 1915 by the 34th Legislature as an integral part of the Texas A&M University System. It is mandated by law to assume direction of all forest interests and all matters pertaining to forestry within the jurisdiction of the state. TFS administers the Community Wildfire Protection Plan (CWPP) to reduce related risks to life, property, and the environment. Its Fire Control Department provides leadership in wildland fire protection for state and private lands in Texas and reduces wildfire-related loss of life, property, and critical resources.

The intention of the TFS CWPP is to reduce the risk of wildfire and promote ecosystem health. The plan also is intended to reduce home losses and provide for the safety of residents and firefighters during wildfires. It has the following goals.

Goals:

- Provide for the safety of residents and emergency personnel
- Limit the number of homes destroyed by wildfire
- Promote and maintain healthy ecosystems
- Educate citizens about wildfire prevention

CWPPs are developed to mitigate losses from wildfires. By developing a CWPP, a community is outlining a strategic plan to mitigate, prepare, respond, and recover.

Texas Department of State Health Services

The mission of the Department of State Health Services is to protect and preserve the health of the citizens of Texas. Public health nurses provide a variety of services including immunizations, preventive assessments of children and the elderly, and a full range of services designed to assist individuals and groups to attain and maintain good health and to cope with illnesses.

East Texas Council of Governments

ETCOG helps local communities work cooperatively to improve the conditions and well-being of East Texans. The ETCOG includes the following counties: Anderson, Camp, Cherokee, Gregg, Harrison, Henderson, Marion, Panola, Rains, Rusk, Smith, Upshur, Van Zandt, and Wood. ETCOG provides services and programs including 911 emergency communications, air quality, homeland security, resource conservation, transportation planning, and criminal justice training.

4.10.3 Smith County

The Smith County government is made up of the following offices and departments (Smith County of Texas, 2017):

- Commissioners' Court
- County Attorney
- County Clerk
- Treasurer
- District Attorney
- Court Collections
- Fire Marshal/Office of Emergency Management
- Sheriff's Office
- Facility Services
- Human Resources
- Information Technology
- Indigent Health Care
- Extension Office (Texas AgriLife)
- Elections
- Juvenile Services
- Purchasing
- Records Services
- Road and Bridge
- Veteran Services

Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

Smith County Subdivision Regulations, 2009 (as amended)

The Smith County Subdivision Regulations established rules, regulations, and standards governing the subdivision of land within the unincorporated areas of Smith County. On February 23, 2009, acting pursuant to Section 232, Texas Local Government Code, the Smith County Subdivision Regulations established the legal provisions, bond requirements, platting procedures, design standards, and water regulations for dividing property within the county.

Smith County's Flood Damage Prevention Order, 2008 revised

The Flood Damage Prevention Order established the Smith County Commissioners' Court as the governing body to administer the National Flood Insurance Act and Texas Flood Control and Insurance Act. Article 3 General Provisions: Section B states, "The Flood Insurance Study for Smith County," dated March 30, 2007, with accompanying Flood Insurance Rate Maps and Flood Boundary-Floodway Maps and Digital Flood Insurance Rate Maps and any revisions thereto are hereby adopted by reference and declared to be a part of this ordinance. The purpose of the order and attached regulations is to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by regulations designed to: (1) protect human life and health; (2) minimize the expenditure of public money for costly flood control projects; (3) minimize the need for rescue and relief efforts associated with flooding and usually undertaken at public expense; (4) minimize prolonged business interruptions; (5) minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, and streets and bridges located in or near floodplains; and (6) help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas.

The order will be implemented through methods authorized by federal and state law to: (1) restrict or prohibit uses that are dangerous to health, safety, or property in times of flood, or uses that cause excessive

increases in flood heights or velocities; (2) require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction; (3) control the alteration of natural floodplains, stream channels, watercourses, and natural protective barriers which are involved in the accommodation of flood waters; (4) control filling, grading, dredging, and other development which may increase flood damage; and (5) prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands.

Smith County Floodplain Map

The current FEMA floodplain maps for issuing permits went into effect on April 16, 2014.

Smith County Basic Emergency Operations Plan, 2008

The purpose of the Smith County Basic Emergency Operations Plan (EOP) (including a base plan and 22 functional annexes) is to:

- Identify the roles, responsibilities and actions required of county departments and other agencies in preparing for and responding to major emergencies and disasters
- Provide a framework for coordinating, integrating, and administering the EOPs and related programs of local, state, and federal governments
- Provide for the integration and coordination of volunteer agencies and private organizations involved in emergency response and relief efforts
- The EOP covers the county and the cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Troup, Whitehouse, and Winona.

Smith County Fire Marshal/Office of Emergency Management

The Fire Marshal's Office mission is to ensure that all state and county regulations related to fire, explosions, or damages of any kind caused by fire or explosion are enforced. The office has the capability to investigate the cause, origin, and circumstances of each fire that occurs within the county that destroys or damages property. The Fire Marshal's Office coordinates with the following fire departments with jurisdictions within Smith County. All are volunteer fire departments (VFD) except the City of Tyler and City of Whitehouse have both paid and volunteer staff.

- | | |
|-----------------------|------------------------------|
| • Arp VFD | • Noonday VFD |
| • Chapel Hill VFD | • Red Springs VFD |
| • Dixie VFD | • Troup VFD |
| • Flint-Gresham VFD | • Tyler Fire Department |
| • Jackson Heights VFD | • Whitehouse Fire Department |
| • Lindale VFD | • Winona VFD |

The Office of Emergency Management (OEM) assists Smith County in preparing for, responding to, and recovering from disasters. The OEM works year-round with city departments, regional emergency management and public safety officials, and elected officials to develop a plan to lessen the impact of disasters on county residents. In addition, communication is maintained with state and federal agencies for coordination in the event of large disasters, natural or manmade.

Smith County Emergency Medical Services

The entire Smith County planning area and the majority of East Texas counties is covered by East Texas Medical Center Regional Healthcare System for emergency medical services. In addition to a fleet of ambulances, the system operates three helicopters and one is stationed in Tyler.

4.10.4 City of Arp

The City of Arp government is made up of the following offices and departments (Arp, 2017):

- City Secretary
- Court Clerk
- Mayor
- Police
- Water Utilities

The City of Arp does not have ordinances in place except for the International Fire Code of 2002. There are no specific departments or additional ordinances to discuss. The city will examine their existing mitigation capabilities to expand on and improve upon integration with this plan update.

4.10.5 City of Bullard

The City of Bullard is located within Smith and Cherokee Counties and its government is made up of the following offices and departments (Bullard, 2017):

- City Manager
- City Secretary
- Code Compliance
- Communications and Marketing
- Development Services
- Finance
- Human Resources
- Municipal Court
- Parks and Recreation
- Police Department
- Utilities

Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

City of Bullard Code of Ordinances

The City of Bullard, Code of Ordinances was codified with ordinance # 2012-0209-6, adopted February 9, 2012. Some of the chapters in the City of Bullard, Code of Ordinances have provisions related, directly or indirectly, to hazard mitigation. These provisions are discussed below:

Chapter 8 - Buildings and Building Regulations

- Provisions under this chapter include:
 - Building permit requirements
 - Adoption of the International Building Code, 2009 edition

Chapter 10 – Planning and Zoning

- Division A. Subdivision Rules
 - Area and Activities Subject to Subdivision Rules.
- Division D. Flooding and Flood Damage Prevention provisions under this chapter include:
 - Description of enforcement, authorization, and purpose of the Standard for Floodplain Management
 - Flood Damage Prevention Ordinance, revised April 2014, Ordinance No. 2014-0408
 - Methods of reducing flood losses
 - Basis for establishing the areas of special flood hazard and permitting requirements
 - Designation, duties, and responsibilities of the floodplain administrator

- Permit and variance procedures for a floodplain development permit
- Construction standards for new construction and substantial improvements to minimize flood damage

Chapter 12 – Fire Prevention and Protection

- Provisions under this chapter include:
 - Adoption of the International Fire Code, 2006 edition
 - Prohibit any outdoor burning when atmospheric or local circumstances make such fires hazardous
 - Regulations on the use, possession, and sale of fireworks

City of Bullard 2030 Comprehensive Plan

This plan outlines a vision for the future and identifies goals, policies, and an initial implementation program to guide the community toward its envisioned future. The goals focus around community character; land use and community development; and city infrastructure.

4.10.6 City of Hideaway

The City of Hideaway is comprised of the gated residential community of Hide-A-Way Lakes. The government is made up of the following offices and departments:

- City Secretary
- Mayor

The Hide-A-Way Lake Club, Inc. is responsible for maintaining construction standards for buildings, roads, and drainage through the authority in Article V, Section 13 of the By-Laws, revised June 17, 2016. The By-Laws have provisions that are related, directly or indirectly, to hazard mitigation and the city will examine these capabilities to expand on and improve upon integration with this plan update. These provisions are discussed below:

- Adoption of the International Residential Code, 2000 edition
- Building permits and fee schedule, revised 11/15/04

4.10.7 City of Lindale

The City of Lindale government is made up of the following offices and departments:

- Administration - City Manager and City Secretary
- Community Development – Animal Control, Building and Inspections, Code Enforcement, Fees
- Municipal Court
- Police Department
- Public Works
- Water Utilities

Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

City of Lindale Code of Ordinances, updated 2013

The City of Lindale, Code of Ordinances was codified with ordinance # 06-2012, adopted August 7, 2012 and includes supplement 2013 S-4. Some of the chapters in the City of Lindale, Code of Ordinances have provisions related, directly or indirectly, to hazard mitigation (Lindale, 2017). These provisions are discussed below:

Title XV: Land Usage

- Provisions under this chapter include:
 - Building permit requirements
 - Adoption of the International Building Code, 2006 edition
 - Flood Damage Prevention Ordinance, revised 2009, Ordinance No. 01-2009
 - Subdivision Code
 - Zoning

City of Lindale Second Century Comprehensive Plan, 2005

The City was incorporated in 1905 and the citizens wanted to envision the “second century” with this comprehensive, long-range growth plan. The document has been prepared to serve as a policy document to guide decision-making processes related to growth and development. In particular, it includes planning bases, community form, community design guidelines, community infrastructure and services, and implementation resources.

4.10.8 City of New Chapel Hill

The City of New Chapel Hill is a bedroom community to the City of Tyler. The government is made up of a Mayor, City Council, and a City Secretary. The city does not collect any revenue thus it does not provide any services to its citizens nor maintain any infrastructure. The roads are maintained by Smith County. The city will provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

4.10.9 City of Noonday

The City of Noonday is also a bedroom community to the City of Tyler. It incorporated in 1981 and has subsequently only had three mayors. The government is composed of the Board of Aldermen, Mayor, Mayor Pro-tem, City Secretary, and Fire Department. It does have a Floodplain Prevention Ordinance and it adheres to the International Building Code, 2006 (Noonday, 2017). The city will provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

4.10.10 City of Troup

The City of Troup is located within Smith and Cherokee Counties and the government is made up of the following offices and departments (City of Troup, 2017):

- City Manager
- City Secretary
- Police Department
- Public Works

Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

City of Troup Code of Ordinances

The City of Troup, Code of Ordinances, Ordinance No. 2014-0729-02, adopted 7/29/14. Some of the chapters have provisions related, directly or indirectly, to hazard mitigation. These provisions are discussed below (Code of Ordinances, 2014):

Chapter 1 – General Provisions

- Emergency Management Program

Chapter 3 - Building Regulations

- Building permit requirements
- Adoption of the International Building Code, 2006 edition, Ordinance 2009-0714-04, adopted 7/14/09
- Building Official
- Flood Damage Prevention, Ordinance 2008-0916-10, adopted 9/16/08

Chapter 5 – Fire Prevention and Protection

- Outdoor Burning, authorization to issue burn bans
- It is unlawful discharge, storage, or sell fireworks

Chapter 10 – Subdivision Regulations

- Subdivision Ordinance 005-B adopted 7/12/01

4.10.11 City of Tyler

The City of Tyler is the county seat and the largest city in the county. The government is made up of the following offices and departments (City of Tyler, 2017):

- | | | |
|-------------------------|------------------------------|---|
| • Airport | • Historic Preservation | • Police |
| • Animal Services | • Human Resources | • Purchasing |
| • Building Services | • Information Technology | • Risk Management |
| • City Clerk | • Innovation/ Lean Six Sigma | • Stormwater Management Program |
| • City Manager's Office | • Keep Tyler Beautiful | • Streets |
| • City University | • Legal | • Solid Waste |
| • Code Enforcement | • Liberty | • Traffic Engineering |
| • Communications | • Library | • Tyler Area Metropolitan Planning Organization |
| • Development Services | • Main Street | • Tyler Transit |
| • Engineering Services | • Municipal Court | • Tyler TV 3 |
| • Finance Department | • Neighborhood Services | • Tyler Water Utilities |
| • Fire | • Parks and Recreation | • Vehicle Services |
| • GIS | • Planning | • Volunteer Services |

The City also has multiple regular and periodic boards that are a part of the city administration. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more details on existing mitigation capabilities to expand on and improve upon integration with this plan update.

City of Tyler Fire Department and Emergency Management Division

There are 10 fire stations throughout the city and Tyler Pounds Regional Airport protecting a growing 55 square mile area in Smith County. The Emergency Management Division is managed by the Tyler Fire Department Chief as the Emergency Management Coordinator and is assisted by the Fire Department staff. The City of Tyler has its own Emergency Management Plan with 22 functional annexes.

Tyler 1st Comprehensive Plan

This plan was first adopted in November 2007 and updated in April 2014. The outlined 2030 vision is for Tyler to be nationally known for its sense of community, commitment to a robust business environment, quality medical care, excellent institutions, and the beauty of its public places. For the 2014, 5-year update, the plan focused on parks, open space, recreation and lakes; housing, neighborhoods and community identity; business and economy; transportation and circulation; public facilities and services; future land use; and education.

Storm Water Management Program, revised 2015

This revised plan addresses the best management practices of five categories in particular: sanitary sewer systems, on-site sewage facilities, illicit discharges and dumping, animal sources, and residential education.

Tyler's Code of Ordinances has chapters that are related, directly or indirectly, to hazard mitigation (Tyler Code of Ordinances, 2017). Tyler Unified Development Code, Chapter 10 of Tyler Code of Ordinances, was last amended on November 8, 2017. Some of the articles have provisions directly or indirectly, to hazard mitigation that are discussed below (Tyler, 2017):

Chapter 6 – Buildings and Structures

- Building code, 2006 edition of the International Building Code, as amended, Ordinance No. 0-2006-101, 12/13/06.
- Schedule of permit fees

Chapter 10 Article II – Zoning Districts

- Zoning Districts amended 6/8/11 to include residential; commercial and mixed use; industrial; and overlay and special purposes districts.

Chapter 10 Article IV – Subdivision Design and Improvements

- Establishes the procedures and standards for subdivisions development within the city.

Chapter 10 Article VII – Environmental Regulations

- Promotes low impact development alternative to stormwater management
- Stormwater Management Plan requirements shall be prepared to meet the ordinance requirements
- Flood Damage Prevention, Ordinance No. 0-215-67; 6/24/15 as amended
- Development Permit, Ordinance No. 0-2015-67; 6/24/15
- Floodplain Administrator

4.10.12 City of Whitehouse

The City of Whitehouse government is made up of the following offices and departments (Whitehouse, 2015):

- | | |
|---------------------------|------------------------|
| • City Manager | • Municipal Court |
| • City Secretary | • Parks and Recreation |
| • Code Enforcement | • Police Department |
| • Finance/Human Resources | • Public Works |
| • Fire Department | • Utilities |

The City of Whitehouse, Code of Ordinances, Supplement Ordinance No. 14-0225-02, adopted 2/23/14. Some of the chapters have provisions related, directly or indirectly, to hazard mitigation and the city will provide more details on capabilities to expand on and improve upon integration with this plan update. These provisions are discussed below (Whitehouse, 2014):

Title XV. Land Usage

Chapter 150 Building Regulations

- Building permit requirements
- Adoption of the International Building Code and International Residential Code, 2012 editions, Ordinance 12-0529-02, passed 5/29/12
- Building Official

Chapter 151 Flood Damage Prevention

- Flood Damage Prevention, Ordinance No. 08-1027-02, adopted 10/27/08
- Development Permit
- Floodplain Administrator

Chapter 152 Subdivision Regulations

- Subdivision Ordinance No. 486, passed 2/24/04

Chapter 153 Comprehensive Planning

- Building Inspections, review of final plats and construction plans

Chapter 154 Zoning Code

- Zoning Ordinance No. 13-0521-01 as amended, passed 5/21/13

Whitehouse Vision 2020 Comprehensive Plan, adopted 2006

This comprehensive plan was developed with an extensive outreach to bring community members into the planning process. It was adopted in 2006 as a guidance document for future planning.

4.10.13 City of Winona

The government is composed of the Mayor, Mayor Pro-tem, Board of Aldermen, and City Secretary (Winona, 2017). Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities to expand on and improve upon integration with this plan update.

City of Winona Code of Ordinances

Some of the chapters in the City of Winona Code of Ordinances, codified Ordinance No. 174, on 9/18/12 have provisions related, directly or indirectly, to hazard mitigation. These provisions are discussed below (Winona, 2012):

Chapter 6 - Buildings and Building Regulations

- Building permit requirements
- Adoption of the International Building Code, 2009 edition (Ordinance 149, adopted 5/18/10).

Chapter 12 – Emergency Management

- Adopted the National Incident Management System, Ordinance No. 112, adopted 3/1/04

Chapter 16 – Fire Prevention and Protection

- Adoption of the International Fire Code, 2006 edition (Ordinance 2010-02, sec. 1, adopted 2/19/10).
- Regulations on the use, possession, and sale of fireworks (Ordinance 35, adopted 8/17/1987)
- No outdoor burning during burn bans, red flag warnings, or any other burn ban or prohibition (Ordinance No. 127, adopted 10/18/2006).

Chapter 18 – Flood Prevention and Control

- Description of enforcement, authorization, and purpose of the Standard for Floodplain Management (Ordinance 131, adopted 8/21/07)
- Methods of reducing flood losses (Ordinance 131, adopted 8/21/07)
- Basis for establishing the areas of special flood hazard and permitting requirements (Ordinance 131, adopted 8/21/07)
- Designation, duties, and responsibilities of the floodplain administrator (Ordinance 131, adopted 8/21/07)
- Permit and variance procedures for a floodplain development permit (Ordinance 131, adopted 8/21/07)

Chapter 5. HAZARD MITIGATION CAPABILITIES ASSESSMENT

The planning team performed an inventory and analysis of existing authorities and capabilities called a “capability assessment.” A capability assessment creates an inventory of an agency’s mission, programs and policies, and evaluates its capacity to carry them out. The county and cities used this capabilities assessment to identify mitigation actions to strengthen their ability to mitigate the effects of a natural hazard.

5.1 SMITH COUNTY

5.1.1 Legal and Regulatory Capabilities

Table 5-1 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Smith County.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	No	State of Texas does not enable counties to utilize zoning.
Subdivision ordinance	Yes	Smith County Subdivision Ordinance, 2009 Revised, established rules, regulations and standards governing the subdivision of land within the unincorporated areas of Smith County.
Growth management	No	
Floodplain ordinance	Yes	Flood Damage Prevention Order, 2008 Revised. Article 3 General Provisions: Section B states, “The Flood Insurance Study for Smith County,” dated March 30, 2007, with accompanying Flood Insurance Rate Maps and Flood Boundary-Floodway Maps and Digital Flood Insurance Rate Maps and any revisions thereto are hereby adopted by reference and declared to be a part of this ordinance.
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	No	
Erosion or sediment control program	No	
Stormwater management	Yes	Interlocal Agreement between Smith County and the City of Tyler for regulations on storm water management, 2008.
Site plan review requirements	No	
Capital improvement plan	No	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	The Floodplain Administration (County Engineer) works in conjunction with FEMA and keeps a copy of the flood elevation certificates on file in its office.

Note:
FEMA Federal Emergency Management Agency

5.1.2 Administrative and Technical Capabilities

Table 5-2 identifies the county personnel responsible for activities related to mitigation and loss prevention in Smith County.

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	Engineering support is only outsourced if required for FEMA grant requirements.
Engineer/professional trained in construction practices related to buildings or infrastructure	No	
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	No	
Floodplain manager	Yes	Floodplain Administrator (County Engineer)
Emergency manager	Yes	Fire Marshal/Office of Emergency Management
Grant writer	No	Outsourced as needed
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts. There are no outdoor warning sirens in the unincorporated county.
Other	No	

Note:

FEMA Federal Emergency Management Agency

GIS Geographic Information System

5.1.3 Financial Capabilities

Table 5-3 identifies financial tools or resources that Smith County could use to help fund mitigation activities.

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activities	No

Withhold spending in hazard prone areas	No
Other	No

5.2 CITY OF ARP

5.2.1 Legal and Regulatory Capabilities

Table 5-4 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Arp.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	No	
Subdivision ordinance	No	
Growth management	No	
Floodplain ordinance	No	
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	The City has adopted the International Fire Code of 2002. (Adopted in 11-10-03)
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	No	
Capital improvement plan	No	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	No	

Note:

FIS Flood Insurance Study

5.2.2 Administrative and Technical Capabilities

Table 5-5 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Arp.

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	

Personnel Resources	Yes/No	Department/Position
Engineer/professional trained in construction practices related to buildings or infrastructure	No	
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	No	
Floodplain manager	No	
Emergency manager	No	
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts. There is one outdoor warning siren behind the high school baseball field located on Highway 135.
Other	No	

Note:

GIS Geographic Information System

5.2.3 Financial Capabilities

Table 5-6 identifies financial tools or resources that the City of Arp could use to help fund mitigation activities.

Table 5-6. City of Arp Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	No
Capital improvements project funding	No
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activities	No
Withhold spending in hazard prone areas	No
Other	No

5.3 CITY OF BULLARD

5.3.1 Legal and Regulatory Capabilities

Table 5-7 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Bullard.

Table 5-7. City of Bullard Regulatory Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	Bullard 2030 Comprehensive Plan, adopted September 2011
Zoning ordinance	Yes	Bullard, Code of Ordinance, Chapter 10, Planning and Zoning
Subdivision ordinance	Yes	Bullard, Code of Ordinance, Chapter 10, Planning and Zoning
Growth management	Yes	Growth management is managed through the combination of the 2030 Comprehensive Plan, zoning ordinances, and subdivision ordinances.
Floodplain ordinance	Yes	Bullard, Code of Ordinance, Chapter 10, Planning and Zoning Revised April 2014, Ordinance No. 2014-0408
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	Adopted the International Building Code and International Residential Code (2009 editions)
Erosion or sediment control program	No	
Stormwater management	No	(Working on stormwater permit with TCEQ – July 2017)
Site plan review requirements	Yes	The responsibility is primarily managed by Code Enforcement
Capital improvement plan	Yes	Capital improvement program
Economic development plan	Yes	Bullard 2030 Comprehensive Plan, adopted September 2011
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	The Code Enforcement Officer keeps records of flood elevation certificates on file in his office.

Note:

FIS Flood Insurance Study

TCEQ Texas Commission on Environmental Quality

5.3.2 Administrative and Technical Capabilities

Table 5-8 identifies the personnel responsible for activities related to mitigation and loss prevention in the City of Bullard.

Table 5-8. City of Bullard Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Contract City Engineer
Engineer/professional trained in construction practices related to buildings or infrastructure	Yes	Contract Inspector
Planner/engineer/scientist with an understanding of natural hazards	No	

Personnel Resources	Yes/No	Department/Position
Personnel skilled in GIS	No	
Full-time building official	Yes	Code Enforcement Officer
Floodplain manager	Yes	Code Enforcement Officer
Emergency manager	Yes	
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts. There are no outdoor warning sirens.
Other		

Note:

GIS Geographic Information System

5.3.3 Financial Capabilities

Table 5-9 identifies financial tools or resources that the City of Bullard could use to help fund mitigation activities.

Table 5-9. City of Bullard Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activities	Yes
Withhold spending in hazard prone areas	Yes
Other	No

5.4 CITY OF HIDEAWAY

5.4.1 Legal and Regulatory Capabilities

Table 5-10 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Hideaway.

Table 5-10. City of Hideaway Regulatory Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	No	

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Subdivision ordinance	No	
Growth management	No	
Floodplain ordinance	Yes	Resolution passed November 17, 2008.
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	Adopted the International Residential Code (2000 edition)
Erosion or sediment control program	Yes	Erosion and sediment control is managed by Hideaway Lake Club Inc.
Stormwater management	Yes	Stormwater management is managed by Hideaway Lake Club Inc.
Site plan review requirements	Yes	Building Official
Capital improvement plan	No	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	

Note:

FIS Flood Insurance Study

5.4.2 Administrative and Technical Capabilities

Table 5-11 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Hideaway.

Table 5-11. City of Hideaway Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	These services are contracted by Hideaway Lake Club Inc. as needed.
Engineer/professional trained in construction practices related to buildings or infrastructure	No	These services are contracted by Hideaway Lake Club Inc. as needed.
Planner/engineer/scientist with an understanding of natural hazards	No	These services are contracted by Hideaway Lake Club Inc. as needed.
Personnel skilled in GIS	No	
Full-time building official	No	Under contract as needed
Floodplain manager	Yes	These services are contracted by Hideaway Lake Club Inc. as needed.
Emergency manager	Yes	Emergency Management Coordinator
Grant writer	No	Outsourced to a local grant writer as needed
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org

Personnel Resources	Yes/No	Department/Position
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts There are no outdoor warning sirens in the city.
Other		

Note:

GIS Geographic Information System

5.4.3 Financial Capabilities

Table 5-12 identifies financial tools or resources that the City of Hideaway could use to help fund mitigation activities.

Table 5-12. City of Hideaway Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	No
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activities	Yes
Withhold spending in hazard prone areas	Yes
Other	No

5.5 CITY OF LINDALE

5.5.1 Legal and Regulatory Capabilities

Table 5-13 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Lindale.

Table 5-13. City of Lindale Regulatory Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	City of Lindale Second Century Comprehensive Plan, 2005
Zoning ordinance	Yes	Lindale Zoning Ordinance as amended May 2012
Subdivision ordinance	Yes	Subdivision regulations Section 1-22(c)
Growth management	Yes	Growth management is managed through the combination of the Second Century Comprehensive Plan, zoning ordinances, and subdivision ordinances.
Floodplain ordinance	Yes	Flood Prevention Ordinance, No. 01-2009, passed 1-20-2009
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	Adopted the International Building Code and International Residential Code (2006 editions)

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	Yes	The responsibility is primarily managed by the Administrative Officer.
Capital improvement plan	Yes	Capital improvement is managed through the annual budget cycle.
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	

Note:

FIS Flood Insurance Study

5.5.2 Administrative and Technical Capabilities

Table 5-14 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Lindale.

Table 5-14. City of Lindale Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	
Engineer/professional trained in construction practices related to buildings or infrastructure	No	
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	Yes	
Floodplain manager	Yes	
Emergency manager	No	
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts
Other		

Note:

GIS Geographic Information System

5.5.3 Financial Capabilities

Table 5-15 identifies financial tools or resources that the City of Lindale could use to help fund mitigation activities.

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activities	Yes
Withhold spending in hazard prone areas	Yes
Other	No

5.6 CITY OF NEW CHAPEL HILL

5.6.1 Legal and Regulatory Capabilities

Table 5-16 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of New Chapel Hill.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	No	
Subdivision ordinance	No	
Growth management	No	
Floodplain ordinance	No	
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	No	
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	No	
Capital improvement plan	No	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	No	

Note:

FIS Flood Insurance Study

5.6.2 Administrative and Technical Capabilities

Table 5-17 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of New Chapel Hill.

Table 5-17. City of New Chapel Hill Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	
Engineer/professional trained in construction practices related to buildings or infrastructure	No	
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	No	
Floodplain manager	No	
Emergency manager	No	
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts
Other		

Note:

GIS Geographic Information System

5.6.3 Financial Capabilities

Table 5-18 identifies financial tools or resources that the City of New Chapel Hill could use to help fund mitigation activities.

Table 5-18. City of New Chapel Hill Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	No
Capital improvements project funding	No
Authority to levy taxes for specific purposes	No

Financial Resources	Accessible/Eligible to Use (Yes/No)
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activities	No
Withhold spending in hazard prone areas	No
Other	No

5.7 CITY OF NOONDAY

5.7.1 Legal and Regulatory Capabilities

Table 5-19 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Noonday.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	No	
Subdivision ordinance	No	
Growth management	No	
Floodplain ordinance	Yes	Ordinance #49
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	International Building Code 2006
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	No	
Capital improvement plan	No	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	Kept in City Office

Note:

FIS Flood Insurance Study

5.7.2 Administrative and Technical Capabilities

Table 5-20 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Noonday.

Table 5-20. City of Noonday Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	
Engineer/professional trained in construction practices related to buildings or infrastructure	No	
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	No	
Floodplain manager	Yes	Mayor
Emergency manager	Yes	Mayor
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts. There are no outdoor warning sirens in the city.
Other		

Note:

GIS Geographic Information System

5.7.3 Financial Capabilities

Table 5-21 identifies financial tools or resources that the City of Noonday could use to help fund mitigation activities.

Table 5-21. City of Noonday Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	Yes, with city council approval
Authority to levy taxes for specific purposes	Yes, with city council approval
Fees for water, sewer, gas, or electric services	No
Impact fees for new development	No
Incur debt through general obligation bonds	Yes, with bond approval
Incur debt through special tax bonds	Yes, with bond approval
Incur debt through private activities	No
Withhold spending in hazard prone areas	No
Other	No

5.8 CITY OF TROUP

5.8.1 Legal and Regulatory Capabilities

Table 5-22 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Troup.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	Yes	Chapter 14 Zoning Ordinance. Ordinance No. 2010-0413-01, adopted April 2010.
Subdivision ordinance	Yes	Chapter 10 Subdivision Regulations, Ordinance No. 005-B, adopted 7/12/01
Growth management	No	
Floodplain ordinance	Yes	Adopted January 1979; revised Ordinance 2006-0711-01, adopted 7/11/06
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	Adopted the International Building Code and International Residential Code (2006 editions)
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	Yes	Building Official
Capital improvement plan	No	
Economic development plan	Yes	Troup Community Development Corporation Downtown Master Plan, draft 2017
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	The Code Enforcement Officer keeps records of flood elevation certificates on file in his office.

Notes:

FIS Flood Insurance Study

5.8.2 Administrative and Technical Capabilities

Table 5-23 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Troup.

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	Under contract as needed.

Personnel Resources	Yes/No	Department/Position
Engineer/professional trained in construction practices related to buildings or infrastructure	No	Under contract as needed.
Planner/engineer/scientist with an understanding of natural hazards	No	Under contract as needed.
Personnel skilled in GIS	No	
Full-time building official	No	Under contract as needed.
Floodplain manager	Yes	City Manager
Emergency manager	Yes	Mayor
Grant writer	No	Under contract as needed.
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts. There are two outdoor warning sirens: 1. 300 Block of E. McKay St. and 2. 900 Block of W. Noble St.
Other		

Notes:

GIS Geographic Information System

5.8.3 Financial Capabilities

Table 5-24 identifies financial tools or resources that the City of Troup could use to help fund mitigation activities.

Table 5-24. City of Troup Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activities	No
Withhold spending in hazard prone areas	Yes
Other	No

5.9 CITY OF TYLER

5.9.1 Legal and Regulatory Capabilities

Table 5-25 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Tyler.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	Tyler 1st Comprehensive Plan, Adopted November 2007, Updated April 2014.
Zoning ordinance	Yes	Zoning regulations are included in Article II, Tyler Unified Development Code
Subdivision ordinance	Yes	Subdivision regulations are included in Article IV, Tyler Unified Development Code
Growth management	Yes	Growth management is managed through the combination of the Tyler 1st Comprehensive Plan, zoning ordinances, and subdivision ordinances.
Floodplain ordinance	Yes	Ordinance No. 0-215-67; 6/24/15 as amended
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	Stormwater Management Program
Building code	Yes	Adopted the International Building Code (2006 edition) and International Residential Code (2009 edition)
Erosion or sediment control program	Yes	The responsibility is primarily managed by the Streets Department.
Stormwater management	Yes	Interlocal Agreement between Smith County and the City of Tyler for regulations on storm water management, 2008.
Site plan review requirements	Yes	The responsibility is primarily managed by Building Services.
Capital improvement plan	Yes	Capital improvement is managed through the annual budget cycle.
Economic development plan	Yes	Industry Growth Initiative, 2010
Local emergency operations plan	Yes	City of Tyler Emergency Management Plan (EMP)
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	The Development Services Engineer keeps records of flood elevation certificates on file in his office.

Notes:

FIS Flood Insurance Study

5.9.2 Administrative and Technical Capabilities

Table 5-26 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Tyler.

Table 5-26. City of Tyler Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Planning Department
Engineer/professional trained in construction practices related to buildings or infrastructure	Yes	Building Services, Engineering Services
Planner/engineer/scientist with an understanding of natural hazards	Yes	Engineering Services
Personnel skilled in GIS	Yes	GIS Department
Full-time building official	Yes	Chief Building Official
Floodplain manager	Yes	Development Services Engineer
Emergency manager	No	
Grant writer	No	
Other personnel	Yes	Community Development Manager
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	There are 32 outdoor warning sirens located at strategic locations throughout the city. The warning system allows for both tone and voice alerts. There are three different warning tones used for Attack, Fallout, and Natural/Technological Emergency Warnings. Residents can also register via Code Red for emergency situation and critical community alerts.
Other		No

Notes:

GIS Geographic Information System

5.9.3 Financial Capabilities

Table 5-27 identifies financial tools or resources that the City of Tyler could use to help fund mitigation activities.

Table 5-27. City of Tyler Financial Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes, water and sewer
Impact fees for new development	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activities	No
Withhold spending in hazard prone areas	Yes
Other	No

5.10 CITY OF WHITEHOUSE

5.10.1 Legal and Regulatory Capabilities

Table 5-28 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Whitehouse.

Table 5-28. City of Whitehouse Regulatory Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Yes	Whitehouse Vision 2020 Comprehensive Plan, adopted 2006
Zoning ordinance	Yes	Zoning Ordinance No. 13-0521-01 as amended, passed 5/21/13
Subdivision ordinance	Yes	Subdivision Ordinance No. 486, passed 2/24/04
Growth management	No	
Floodplain ordinance	Yes	Ordinance No.08-1027-02, 10/27/08. Code of Ordinances, Title XV. Land Usage, Chapter 151. Flood Damage Prevention
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	Adopted the International Building Code and International Residential Code (2012 editions)
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	Yes	
Capital improvement plan	Yes	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	The City Manager keeps records of flood elevation certificates

Notes:

FIS Flood Insurance Study

5.10.2 Administrative and Technical Capabilities

Table 5-29 identifies the city personnel responsible for activities related to mitigation and loss prevention in the City of Whitehouse.

Table 5-29. City of Whitehouse Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	
Engineer/professional trained in construction practices related to buildings or infrastructure	No	

Personnel Resources	Yes/No	Department/Position
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	No	
Floodplain manager	Yes	City Manager
Emergency manager	No	
Grant writer	No	
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts.
Other	No	

Note:

GIS Geographic Information System

5.10.3 Financial Capabilities

Table 5-30 identifies financial tools or resources that the City of Whitehouse could use to help fund mitigation activities.

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	No
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes for water and sewer
Impact fees for new development	Yes
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	Yes
Incur debt through private activities	Yes
Withhold spending in hazard prone areas	No
Other	No

5.11 CITY OF WINONA

5.11.1 Legal and Regulatory Capabilities

Table 5-31 lists regulatory and planning tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Winona.

Table 5-31. City of Winona Regulatory Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	No	
Zoning ordinance	No	
Subdivision ordinance	No	
Growth management	No	
Floodplain ordinance	Yes	Ordinance No. 131, 8/21/2007. Code of Ordinances, Chapter 18 – Flood Prevention and Control
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	Adopted the International Building Code and International Residential Code (2009 editions)
Erosion or sediment control program	No	
Stormwater management	No	
Site plan review requirements	Yes	Permitting process. Approved by Mayor or any official designated by the city council.
Capital improvement plan	No	
Economic development plan	No	
Local emergency operations plan	Yes	Smith County Basic Emergency Operations Plan, 2008 covers the county and local municipalities.
Other special plans	Yes	2017 Tornado/Severe Weather Response Plan covers the county and local municipalities.
Flood insurance study or other engineering study for streams	Yes	FIS Report for Smith County and Incorporated Areas, April 16, 2014 Revised.
Elevation certificates	Yes	Kept with Code Enforcement Officer

Note:

FIS Flood Insurance Study

5.11.2 Administrative and Technical Capabilities

Table 5-32 identifies the personnel responsible for activities related to mitigation and loss prevention in the City of Winona.

Table 5-32. City of Winona Administrative and Technical Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	No	
Engineer/professional trained in construction practices related to buildings or infrastructure	No	
Planner/engineer/scientist with an understanding of natural hazards	No	
Personnel skilled in GIS	No	
Full-time building official	No	
Floodplain manager	Yes	Code Enforcement Officer
Emergency manager	No	

Personnel Resources	Yes/No	Department/Position
Grant writer	No	Outsourced
Other personnel	No	
GIS data: Hazard areas	Yes	www.smithcountymapsite.org
GIS data: Critical facilities	Yes	www.smithcountymapsite.org
GIS data: Building footprints	Yes	www.smithcountymapsite.org
GIS data: Land use	Yes	www.smithcountymapsite.org
GIS data: Links to Assessor's data	Yes	www.smithcountymapsite.org
Warning systems/services (Reverse 911 callback, cable override, outdoor warning signals)	Yes	Residents can register via Code Red for emergency situation and critical community alerts. There is one outdoor warning siren located at Municipal Ball Park on Dallas Street.
Other		No

Note:
GIS Geographic Information System

5.11.3 Financial Capabilities

Table 5-33 identifies financial tools or resources that the City of Winona could use to help fund mitigation activities.

Financial Resources	Accessible/Eligible to Use (Yes/No)
Community Development Block Grants	No
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	No
Incur debt through general obligation bonds	Yes
Incur debt through special tax bonds	No
Incur debt through private activities	No
Withhold spending in hazard prone areas	No
Other	No

PART 2
RISK ASSESSMENT

Chapter 6.

IDENTIFIED HAZARDS OF CONCERN AND RISK ASSESSMENT METHODOLOGY

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. It allows emergency management personnel to establish early response priorities by identifying potential hazards and vulnerable assets. The process focuses on the following elements:

- **Hazard identification** - Use all available information to determine what types of disasters may affect a jurisdiction, how often they can occur, and their potential severity.
- **Vulnerability identification** - Determine the impact of natural hazard events on the people, property, environment, economy, and lands of the region.
- **Cost evaluation** - Estimate the cost of potential damage or cost that can be avoided by mitigation.

The risk assessment for this hazard mitigation plan update evaluates the risk of natural hazards prevalent in the planning area and meets requirements of the DMA (44 CFR, Section 201.6(c)(2)).

6.1 IDENTIFIED HAZARDS OF CONCERN

For this plan, the Steering Committee considered the full range of natural hazards that could impact the planning area and then listed hazards that present the greatest concern. The process incorporated review of state and local hazard planning documents, as well as information on the frequency, magnitude, and costs associated with hazards that have impacted or could impact the planning area. Anecdotal information regarding natural hazards and the perceived vulnerability of the planning area’s assets to them was also used. Table 2-1 lists the hazards identified in the previous *Smith County Hazard Mitigation Action Plan, 2011-2016* and the hazard ranking. Based on the review, this plan addresses the following hazards of concern:

- Dam Failure
- Drought / Extreme Heat
- Earthquake
- Flood
- Hurricane / Tropical Storm
- Severe Storms (Hail, Lightning and Wind)
- Tornado
- Wildfire
- Winter Storms (including Ice Storms)

Several of these hazards were profiled together because of their common occurrence or damage assessments, such as drought and extreme heat and severe storms with thunderstorms, lightning, hail and high winds.

The following hazards are profiled in the *State of Texas Hazard Mitigation Plan*; however, the Steering Committee decided not to profile hazards listed in Table 6-1 for the stated reasons. Hazards not identified for inclusion at this time may be addressed during future evaluations and updates.

Hazard	Reason for Omission
Coastal Erosion	Geographic location. Smith County is an inland location and negligible potential for occurrence.
Expansive Soil	Lack of risk to the Smith County planning area and participating jurisdictions.
Land Subsidence	Probability and potential impacts are negligible risk.
Levees	There are no levees in Smith County nor neighboring counties that are acknowledged by the USACE National Levee Database System.

Note: USACE U.S. Army Corps of Engineers

6.2 CLIMATE CHANGE

Climate includes patterns of temperature, precipitation, humidity, wind, and seasons. Climate plays a fundamental role in shaping natural ecosystems, and the human economies and cultures that depend on them. The term “climate change” refers to changes over a long period of time. It is generally perceived that climate change will have a measurable impact on the occurrence and severity of natural hazards around the world. Impacts include the following:

- Stronger and more frequent severe / intense thunderstorms and tornados
- The risk of drought and the frequency, intensity, and duration of heat waves are expected to increase.
- More extreme precipitation is likely, increasing the risk of flooding.
- The world’s average temperature is expected to increase.

Climate change will affect communities in a variety of ways. Impacts could include an increased risk for extreme events such as drought, storms, flooding, and wildfires; more heat-related stress; and the spread of existing or new vector-borne disease into a community. In many cases, communities are already facing these problems to some degree. Climate change influences the frequency, intensity, extent, or magnitude of the problems.

Each chapter addressing one of the hazards of concern includes a section with a qualitative discussion on the probable impacts of climate change for that hazard. While many models are being developed to assess the potential impacts of climate change, none are currently available to support hazard mitigation planning. As these models are developed in the future, this risk assessment may be enhanced to better measure these impacts.

6.3 METHODOLOGY

The risk assessments in Chapter 7 through Chapter 15 describe the risks associated with each identified hazard of concern. Each chapter describes the hazard, the planning area’s vulnerabilities, and probable event scenarios. The following steps were used to define the risk of each hazard:

- **Identify and profile each hazard** - The following information is given for each hazard:
 - Geographic areas most affected by the hazard
 - Extent used to measure the hazards
 - Past events in planning area
 - Warning time likely to be available for response
- **Determine exposure to each hazard** - Exposure was evaluated by overlaying hazard maps, when available, with an inventory of structures, facilities, and systems to identify which of them would be exposed to each hazard. When hazard mapping was not available, a more qualitative discussion of exposure is presented.
- **Assess the vulnerability of exposed facilities** - Vulnerability of exposed structures and infrastructure was evaluated by interpreting the probability of occurrence of each event and assessing structures, facilities, and systems that are exposed to each hazard. Tools such as geographic information system (GIS) and FEMA’s hazard-modeling program Hazus, were used to perform this assessment for the flood and hurricane hazards. Outputs similar to those from Hazus were generated for other hazards, using maps generated through GIS.

6.4 RISK ASSESSMENT TOOLS

6.4.1 Hazus- Flood and Hurricane

Overview

In 1997, FEMA developed the standardized Hazards U.S. (Hazus) model to estimate losses caused by earthquakes and identify areas that face the highest risk and potential for loss. Hazus was later expanded into a multi-hazard methodology with new models for estimating potential losses from hurricanes and floods.

Hazus is a GIS-based software program used to support risk assessments, mitigation planning, and emergency planning and response. It provides a wide range of inventory data, such as demographics, building stock, critical facility, transportation and utility lifeline, and multiple models to estimate potential losses from natural disasters. The program maps and displays hazard data and the results of damage and economic loss estimates for buildings and infrastructure. Its advantages include the following:

- Provides a consistent methodology for assessing risk across geographic and political entities.
- Provides a way to save data so that they can readily be updated as population, inventory, and other factors change and as mitigation planning efforts evolve.
- Facilitates review of mitigation plans because it helps to ensure that FEMA methodologies are incorporated.
- Supports grant applications by calculating benefits using FEMA definitions and terminology.
- Produces hazard data and loss estimates that can be used in communication with local stakeholders.
- Is administered by the local government and can be used to manage and update a hazard mitigation plan throughout its implementation.

Levels of Detail for Evaluation

Hazus provides default data for inventory, vulnerability, and hazards; this default data can be supplemented with local data to provide a more refined analysis. The model can carry out three levels of analysis, depending on the format and level of detail of information about the planning area:

- **Level 1** – All of the information needed to produce an estimate of losses is included in the software’s default data. These data are derived from national databases and describe in general terms the characteristic parameters of the planning area.
- **Level 2** – More accurate estimates of losses require more detailed information about the planning area. To produce Level 2 estimates of losses, detailed information is required about local geology, hydrology, hydraulics, and building inventory, as well as data about utilities and critical facilities. This information is needed in a GIS format.
- **Level 3** – This level of analysis generates the most accurate estimate of losses. It requires detailed engineering and geotechnical information to customize it for the planning area.

Application for This Plan

This risk assessment was conducted using Hazus analysis and GIS-based methodology. The default Hazus inventory database for Smith County contains 2010 U.S. Census data and 2014 RS Means Square Foot Costs. This enabled a Hazus Level 2 analysis to be performed on some of the profiled hazards. The following methods were used to assess specific hazards for this plan:

Flood - A Level 2 flood analysis was performed using Hazus. This involved developing new flood depth grids from current effective FEMA Digital Flood Insurance Rate Maps (DFIRM) and U.S. Geological Survey (USGS) 10-meter Digital Elevation Models.

Hurricane - A Hazus Level 2 analysis was performed to assess hurricane and tropical storm risk and exposure for coastal and near coastal communities. The 100-year probabilistic option in the Hazus hurricane module was used for analysis of this hazard.

6.4.2 Other Hazards of Concern

For hazards of concern that are not directly modeled in Hazus, future losses could not be estimated. However, Hazus is able to map hazard areas and calculate exposures if geographic information is available on the locations of the hazards and inventory data. Areas and inventory susceptible to some of the hazards of concern were mapped and exposure was evaluated. For other hazards, a qualitative analysis was conducted using the best available data. Locally relevant information was gathered from a variety of sources. Frequency and severity indicators include past events and the expert opinions of geologists, emergency management specialists, and others. The primary data sources were the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information, augmented with state and federal data sets. Additional data sources for specific hazards were as follows:

- **Dams** – U.S. Army Corps of Engineers Dam Inventory Database
- **Drought** - National Drought Mitigation Center
- **Extreme Heat** - Western Regional Climate Center, Census of Agriculture, U.S. Department of Agriculture (USDA) Risk Management Agency
- **Hail, Lightning, Tornado, Wind, and Winter Weather** - Data provided by NOAA National Climatic Data Center storm events database.
- **Wildfire** - Information on wildfire hazards areas was provided by the Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP), USGS Federal Wildfire History, Fire Program Analysis-Fire Occurrence Database (FPA-FOD), and USDA Wildfire Hazard Potential (WHP) data.

Chapter 7. DAM FAILURE

DAM FAILURE HAZARD	
Jurisdiction	Dam Failure
Smith County	16
City of Arp	0
City of Bullard	0
City of Hideaway	54
City of Lindale	22
City of New Chapel Hill	8
City of Noonday	0
City of Tyler	16
City of Troup	6
City of Whitehouse	10
City of Winona	0

7.1 HAZARD PROFILE

Water is an essential natural resource and one of the most efficient ways to manage and control water resources is through dam construction. A dam in Texas is a water storage, control or diversion structure that impounds water upstream with a “height greater than or equal to 25 feet and a maximum storage (top of dam) capacity of 15 acre-feet; a height greater than 6 feet and a maximum storage capacity greater than or equal to 50 acre-feet; or one that poses a threat to human life or property in the event of failure, regardless of height or maximum storage capacity” as defined by Texas Commission on Environmental Quality (TCEQ, 2017).

The majority of dams and lakes in Texas benefit users for water supplies for drinking, irrigation, and industrial uses; flood control; hydroelectric power; recreation; and navigation. However, despite the benefits and importance of dams to our public works infrastructure, many safety issues exist for dams as with any complex infrastructure; the most serious threat is dam failure. Approximately 93% of the dams in Smith County are privately owned.

Causes of Dam Failure

Dam failure is a collapse or breach in a dam. While most dams have storage volumes small enough that failures have little or no repercussions, dams with large storage amounts can cause significant downstream flooding. Dam failures typically occur from any one or combination of the following:

- Prolonged periods of rainfall and flooding, which cause most failures
- Overtopping of the primary dam structure, which can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.

DEFINITIONS

Dam Failure — A collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.

Emergency Action Plan — Owners of high and significant hazard dams are required by law to submit an EAP to TCEQ. The plan specifies actions the dam owner should take to alleviate problems at a dam. It contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show emergency management authorities the critical areas for action in case of an emergency (TCEQ, 2016)

High-Hazard Dam — Dams where failure or operational error cause loss of human life in the breach inundation area downstream of the dam. Excessive economic losses to public facilities, agricultural, industrial, or commercial facilities, main highways, and railroad lines.(TCEQ, 2016)

Significant-Hazard Dam — Dams where failure or operational error will result in possible loss of human life in the breach inundation area downstream of the dam. Economic losses may include damage to isolated homes, secondary highways, railroad lines, and interruption of service or use of public utilities (TCEQ, 2016).

Low-Hazard Dam — Dams where failure or operational error where no loss of human life is expected and no permanent habitable structures are located downstream of the dam. The economic loss is minimal and the dam is located in a rural area with occasional farm or agricultural damages.

- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can also cause dam failure.
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components.
- Failure of upstream dams in the same drainage basin.
- Secondary results from earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures, and sabotage.

7.1.1 Location

According to U.S. Army Corps of Engineer's National Inventory of Dams, there are 112 dams in Smith County; eight are classified as high-hazard, 15 as significant-hazard, 89 low-hazard, and two unknown-hazards. Table 7-1 lists all 112 dams in Smith County by hazard class (high, significant, and low) potential to affect downstream areas. Figure 7-1 shows locations of all dams in Smith County sorted by their hazard class. Appendix B has map locations and flood risk areas near all the high- and significant-hazard dams in the county.

Table 7-1. Dams in Smith County

Name	National ID #	Hazard Class ^a	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
Hamrick Lake Dam	Tx00283	High	Private	Earth	Recreation	Tri-Prairie Creek	26	1115
Hide A Way Lake No 1 Dam	Tx00261	High	Private	Earth	Recreation	Hubbard Branch	43	4261
Howell Club Lake Dam	Tx00282	High	Private	Earth	Recreation	Sandy Bottom Creek	31	1204
Mud Creek Dam	Tx00244	High	City Of Tyler	Earth	Water Supply	Mud Creek	60	85010
North Lake Dam	Tx00246	High	City Of Overton	Earth	Recreation	Tr-Rabbit Cr	23	387
Pessink Lake Dam	Tx07255	High	Private	Earth	Recreation	Tr-Roddy Branch	17.6	50
Pleasure Acres Lake Dam	Tx00277	High	Private	Earth	Recreation	Tr-Prairie Creek	10.3	1218
Whitehouse Dam	Tx00245	High	Private	Earth	Water Supply	Prairie Creek	50	85810
Bellwood Lake Dam	Tx00252	Significant	City Of Tyler	Earth	Irrigation, Water Supply	Indian Creek	28	9600
Greenbriar Lake Dam	Tx00251	Significant	Private	Earth	Recreation	Tr-Indian Creek	29	1260
Hide A Way Lake No 2 Dam	Tx00295	Significant	Private	Earth	Recreation	Hubbard Branch	43	2800
Holly Tree Lake Dam	Tx00288	Significant	Private	Earth	Recreation	Born Branch	21	422
Jl Williams Lake Dam	Tx05964	Significant	Private	Earth	Recreation	Tr-Allen Branch	36	613
Lost Pine Lake Dam	Tx00257	Significant	Private	Earth	Recreation	Tr-Indian Creek	23	568
Maxie Wilson Dam	Tx09070	Significant	Private	Earth	Unknown	Tr-Indian Creek	19.7	14
Pinedale Lake Dam	Tx00278	Significant	Private	Earth	Recreation	Born Branch	23	490

Name	National ID #	Hazard Class ^a	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
Pinkerton Lake Dam	Tx05214	Significant	Private	Earth	Irrigation	Tr-Prairie Creek	23	102
Prairie Creek Dam	Tx06025	Significant	Private	Earth	Recreation	Praire Creek	30	200
Shangri La Lake Dam	Tx00254	Significant	Private	Earth	Recreation	West Mud Creek	26	190
Sky Lake Dam	Tx04430	Significant	Private	Earth	Recreation	Tr-Village Creek	34	1500
Timber Lake Dam	Tx00254	Significant	Private	Earth	Recreation	Born Branch	31	856
Tyler State Park Lake Dam	Tx00266	Significant	Texas Parks & Wildlife Department	Earth	Recreation	Tr-Little Saline Creek	50	1600
Youth With A Mission Dam No 4	Tx04433	Significant	Private	Earth	Recreation	Tr-Duck Creek	39	150
American Legion Club Lake Dam	Tx00292	Low	Private	Earth	Recreation	Tr-North Prairie Creek	12	336
Amis Dam	Tx06094	Low	Private	Earth	Recreation	Tr-Allen Branch	32	116
Arp Club Lake Dam	Tx00274	Low	Private	Earth	Recreation	Beaver Run Draw	20	625
Barn Lake Dam	Tx06098	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Old Sabine River Channel	23	123
Bell Sand Dam	Tx04864	Low	Private	Earth	Other	Tr-Black Fork Creek	16	88
Brewer Lake Dam	Tx00270	Low	Private	Earth	Recreation	Wiggins Creek	18	144
Brookshire Lake Dam	Tx00242	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Neches	24	153
Brown Lake No 1 Dam	Tx00291	Low	Private	Earth	Recreation	Tr-Sabine River	21	101
Brown Lake No 2 Dam	Tx00289	Low	Private	Earth	Recreation	Tr-Sabine River	26	90
Butler Lake Dam	Tx00250	Low	Private	Earth	Recreation	Rattlesnake Creek	20	200
Campbell Lake Dam	Tx00306	Low	Private	Earth	Recreation	Brushy Branch	20	1100
Club 13 Lake Dam	Tx00255	Low	Private	Earth	Recreation	Tr-Butler Creek	28	324
Cowan Dam	Tx06087	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Saline Creek	21	87
Cumberland Lake Dam	TX80086	Low	N/A	Earth	Unknown	W Mud Creek	16	96
Dale Dam	Tx06077	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Harris Creek	25	48
Dodds Lake Dam	Tx05104	Low	Private	Earth	Recreation	Tr-Mud Creek	13	104

Name	National ID #	Hazard Class ^a	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
Dogwood Hollow Lake Dam	Tx00276	Low	Private	Earth	Recreation	Tr-Gilley Creek	21	160
Federal Dam	Tx00267	Low	Private	Earth	Recreation	Tr-Black Fork Creek	12	200
Fernwood Lake Dam	Tx00286	Low	Private	Earth	Recreation	Prairie Creek	26	333
Furse Dam	Tx06093	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-West Mud Creek	26	102
Garden Lake Dam	Tx09614	Low	Private	Earth	Unknown	Tr-Butler Creek	14	24
Garden Valley Dam No 3	Tx06366	Low	Private	Earth	Recreation	Millbreak Creek	12	60
Green Lake Dam	Tx00287	Low	Private	Earth	Recreation	Tr-Sabine River	19	114
Greys Lake Dam	Tx00280	Low	Private	Earth	Recreation	Tr-Wigging Creek	15	192
Grove Club Dam	Tx00241	Low	Private	Earth	Recreation	Bell Branch	22	495
Harris Chapel Lake Dam	Tx00298	Low	Private	Earth	Water Supply	Tr-Duck Creek	21	281
Harris Dam	Tx06084	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Mud Creek	25	101
Hashimi Dam	Tx07436	Low	Private	Other	Unknown	Tr-Mud Creek	18	63
Hidden Hill Dam	Tx00259	Low	Private	Earth	Recreation	Tr-Indian Creek	19	170
Hideaway Fishing Lake No 1 Dam	Tx09458	Low	Private	Earth	Recreation	Hubbard Branch	13	60
Hitts Lake Dam	Tx00269	Low	Private	Earth	Irrigation	Hitts Creek	26	1380
Holders Lake Dam	Tx00285	Low	Private	Earth	Recreation	Tr-Caney Creek	19	281
Holiday Pines Lake Dam	Tx00305	Low	Private	Earth	Recreation	Tr-Village Creek	31	700
Horseshoe Club Lake Dam	Tx00275	Low	Private	Earth	Recreation	Hankins Creek	34	405
Horseshoe Lake North Dam	Tx06382	Low	Private	Earth	Irrigation	Off Ch-Sabine River	11	193
Horseshoe Lake South Dam	Tx06383	Low	Private	Earth	Irrigation	Off Ch-Sabine River	11	193
House Lake Dam	Tx00264	Low	Private	Earth	Recreation	Long Brake Creek	18	209
Hunter Brush Dam	Tx00248	Low	Private	Earth	Irrigation	Rattlesnake Creek	20	240
Jackson Lake Dam	Tx04772	Low	Private	Earth	Irrigation	Rattlesnake Creek	16	443
Jones Lake Dam	Tx00262	Low	Private	Earth	Water Supply	Tr-Prairie Creek	18	130
L B Wilson Lake Dam	Tx05103	Low	Private	Earth		Tr-Mud Creek	20	128
Lake No 1 Dam	Tx00297	Low	Private	Earth	Irrigation	Macs Creek	21	586

Name	National ID #	Hazard Class ^a	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
Lake Park Dam	Tx00253	Low	Private	Earth	Recreation	Off Ch-Willow Creek	16	850
Lake Placid Dam	Tx00256	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Butler Creek	18	774
Lane Dam	Tx06097	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Duck Creek	21	150
Lenox Lake Dam	Tx00271	Low	Private	Earth	Recreation	Tr-Black Fork Creek	16	110
Lightfoot Dam	Tx06086	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Bell Branch	20	123
Lindale Club Dam	Tx00293	Low	Private	Earth	Recreation	Macs Creek	14	685
Lorraine Club Lake Dam	Tx00294	Low	Private	Earth	Recreation	North Prairie Creek	25	221
Lou Ella Lake Dam	Tx07150	Low	Private		Recreation	Tr-W Mud Creek	25	275
Lower Lake Dam	Tx04436	Low	University of Texas at Tyler	Earth	Recreation	Tr-Gilley Creek	35	81
Marsh Lake Dam	Tx00302	Low	Private	Earth	Water Supply	Tr-Candy Creek	13	68
Miller Lake Dam	Tx00300	Low	Private	Earth	Water Supply	Tr-Rock Creek	12	58
Mosley Lake Dam	Tx00301	Low	Private	Earth	Water Supply	Tr-Village Creek	24	216
Oak Hollow Dam	Tx07227	Low	Private			Tr-West Mud Creek	16	43
Peveto Dam	Tx00258	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Neches River	21	139
Pinehurst Farm Lake Dam	Tx00290	Low	Private	Earth	Recreation	Tr-Harris Creek	20	152
Pineland Lake Dam	Tx00281	Low	Private	Earth	Recreation	Tr-Sunstroke Creek	22	405
Piney Woods Resort Dam	Tx05980	Low	Private	Earth	Recreation	Tr-Lynn Creek	39	312
Pleasant Retreat Acres Dam	Tx00260	Low	Private	Earth	Recreation	Tr-Indian Creek	26	160
Plunk Lake Dam	Tx00308	Low	Private	Earth	Water Supply	Tr-Dry Creek	18	103
Potter Lake Dam	Tx05102	Low	Private	Earth		Tr-Auburn Creek	19	100
Powell Lake Dam	Tx00263	Low	Private	Earth	Water Supply	Tr-Neches River	14	504
Prouty Lake Dam	Tx07276	Low	Private	Earth	Unknown	Tr-Duck Creek	25	68

Name	National ID #	Hazard Class ^a	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
Reeves Lake Dam	Tx00307	Low	Private	Earth	Water Supply	Tr-Brushy Branch	16	90
Reynolds Lake Dam	Tx05101	Low	Private	Earth	Unknown	Duck Creek	17	60
Russwood Acres Lake Dam	Tx05889	Low	Private	Earth	Recreation	Tr-Butler Creek	19	110
Rw Dennan Lake Dam	Tx00273	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Rabbit Creek	22	160
Smith Lake Dam	Tx00299	Low	Private	Earth	Water Supply	Tr-Duck Creek	18	95
South Overton Dam	Tx00247	Low	City of Overton	Earth	Recreation	Tr-Rabbit Creek	15	146
Spring Lake Dam	Tx00268	Low	Private	Earth	Irrigation	Hitts Creek	23	230
Spring Lake Dam No 2	Tx05946	Low	Private	Earth	Recreation	Tr-Caney Creek	30	483
Starr Lake Dam	Tx00249	Low	Upper Sabine SWCD	Earth	Recreation	Tr-Neches	19	182
Swan Lake Dam	Tx00265	Low	Private	Earth	Recreation	Tr-Chinquapin Creek	37	416
Timberline Lake Dam	Tx04430	Low	Private	Earth	Recreation	Tr-Davis Branch	18	53
Tom Clay Lake Dam	Tx00299	Low	Private	Earth	Recreation	Tr-Neches	10	320
Tomlin Lake Dam	Tx00254	Low	Private	Earth	Recreation	Stevenson Branch	24	192
Tyler Pipe Industries Dam No 1	Tx04430	Low	Private	Earth	Other	Tr-Little Saline Creek	7	58
Tyler Terminal Dam	Tx06042	Low	Private	Earth	Other	Tr-Blackfork Creek	12	550
Valley Club Lake Dam	Tx0303	Low	Private	Earth	Recreation	Rock Creek	15	200
Van Lake Dam	Tx00304	Low	City of Van	Earth	Water Supply	Tr-Village Creek	36	2050
Venum And Benard Dam	Tx06096	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Rabbit Creek	23	154
West Laka Dam	Tx06099	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Tr-Old Sabine River Channel	31	35
Wilson Lake Dam	Tx00272	Low	Private	Earth	Fire Protection, Stock, Or Fish Pond	Simon Branch	19	241
World Challenge Lake No 1 Dam	Tx04435	Low	Private	Earth	Recreation	Tr-Duck Creek	34	53

Name	National ID #	Hazard Class ^a	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
World Challenge Lake No 2 Dam	Tx04434	Low	Private	Earth	Recreation	Tr-Duck Creek	36	190
World Challenge Lake No 3 Dam	Tx04431	Low	Private	Earth	Recreation	Tr-Duck Creek	28	72
Young Lake Dam	Tx00284	Low	Private	Earth	Recreation	Tr-Sunstroke Creek	21	244
Youth With A Mission Dam No 5	Tx04768	Low	Private	Earth	Recreation	Tr-Duck Creek	31	112

Note: Tr- Tributary; Ch-Channel

Upper Sabine SWCD – Soil and Water Conservation District

Source: U.S. Army Corps of Engineers, 2017; Stanford National Performance of Dams Program, 2017

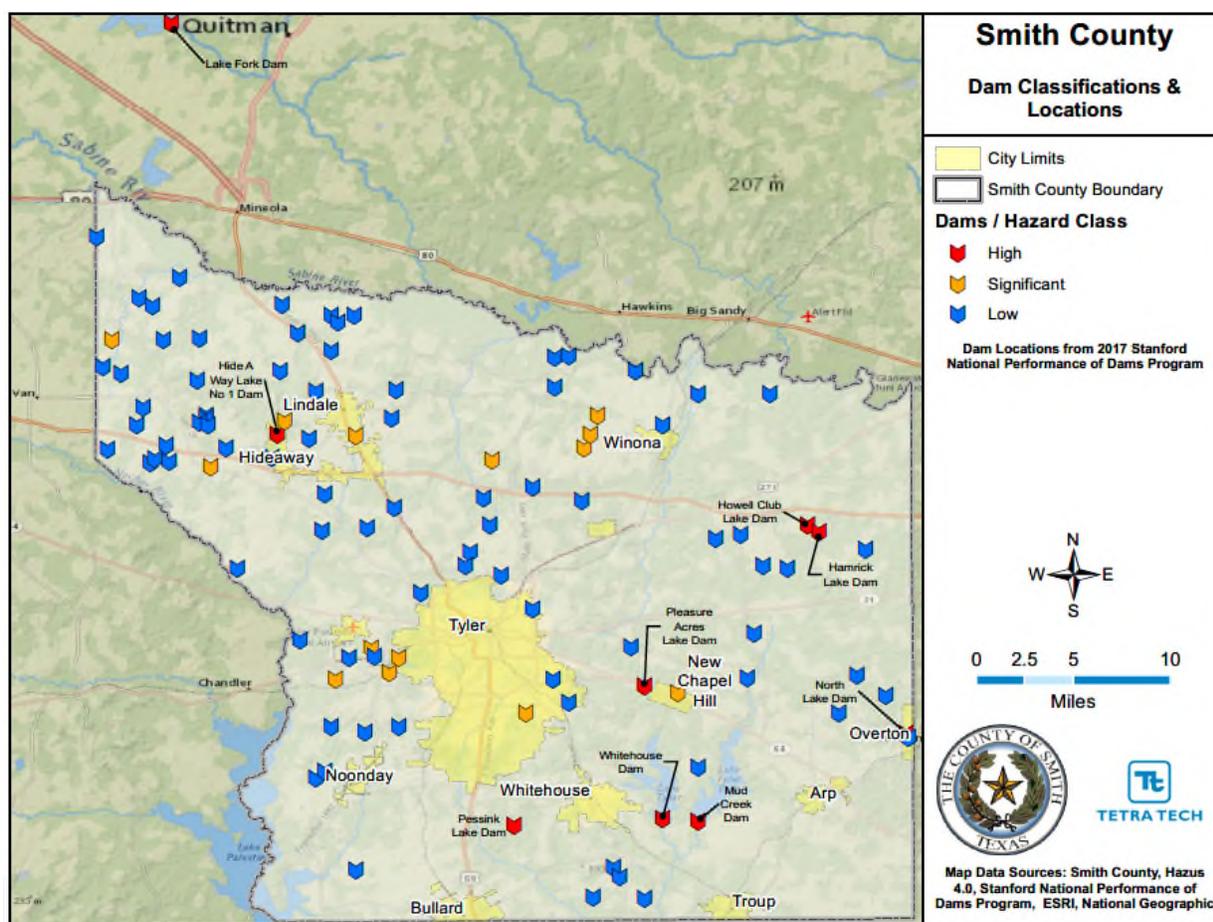


Figure 7-1. Dam Locations in Smith County

Dams Upstream of Planning Area

Emergency Action Plans for two upstream dams are on file with the Smith County Emergency Manager Coordinator. One is for the Iron Bridge Dam that is located partially in Van Zandt and Rains Counties on Lake Tawakoni. The Iron Bridge Dam and Lake Project was funded by a water supply agreement with the City of Dallas to provide municipal and industrial water. In addition to its use for water supply, Lake Tawakoni has become a recreation center with 200 miles of shoreline.

The second is for the Lake Fork Dam is located about 5 miles northwest of Quitman in Wood County on Lake Fork Creek and Caney Creek, tributaries of the Sabine River (see top left corner of Figure 7-1). Though most of the reservoir is on northwestern Wood County, it also inundates land in Rains and Hopkins Counties. At 27,690 acres and 315 miles of shoreline, the Lake Fork Reservoir is one of the largest lakes in Texas. See Table 7-2 for additional dam specifications.

Table 7-2. Dams Upstream of Smith County

Name	National ID #	Hazard Class	Owner	Dam Type	Purpose	Water Course	Height (Feet)	NID Storage
Iron Bridge Dam	TX00491	High	Sabine River Authority	Earth	Water supply; recreation	Sabine River	85	1,660,023
Lake Fork Dam	TX04388	High	Sabine River Authority	Earth	Water supply; recreation	Lake Fork Creek and Caney Creek	25.9	1,269,599

Source: U.S. Army Corps of Engineers, 2017; Stanford National Performance of Dams Program, 2017

7.1.2 Extent

TCEQ has developed the extent or magnitude of a dam failure event described in terms of the classification of damages that could result from a dam's failure as shown in Table 7-3. The hazard classification system is based only on the potential consequences of a dam failure; not the probability of such failures or the condition of the dam.

The worst-case scenario for the Smith County planning area would be to see up to a high hazard dam failure; this could cause loss of life and excessive economic losses in the inundation area. The extent of the flood waters can vary based on dam size capacity, topography, weather and soil conditions, and the cause of the dam failure. The communities of Hideaway, Lindale, New Chapel Hill, Tyler, and the unincorporated county can expect to have up to 3 to 5 feet of flood waters inundate their floodplain areas from a dam failure (see Table 7-4 for dam impacts).

Table 7-3. TCEQ Dam Hazard Extent Classification

Hazard Category	Human Impact	Economic Impact
Low	No loss of life expected (no lives or permanent habitable structures in the inundation area)	Minimal economic loss (failure may cause damage to occasional farms, agricultural improvements, and minor highways)
Significant	Loss of life is possible (1 to 6 lives or 1 to 2 permanent habitable structures in the inundation area)	Appreciable economic loss (failure may cause damage to isolated homes, secondary highways, minor railroads, or cause interruption of public services)
High	Loss of life is expected (7 or more lives or 3 or more permanent habitable structures in the inundation area)	Excessive economic losses (failure may cause damage to public, agricultural, industrial, or commercial facilities or utilities, and main highways or railroads)

Source: TCEQ, 2017

7.1.3 Past Events

There have been no previous major dam failure occurrences in Smith County.

An extreme precipitation event occurred April 17–30, 2016 and the county is included in FEMA-DR-4269-TX for flooding (this event is further outlined in Chapter 10, Flood) that caused a rise in the rivers and lakes in the county, but no dam failures occurred.

7.1.4 Warning Time

Warning time for dam failure varies depending on the cause of the failure and if the dam owner has an up-to-date Dam Emergency Actions Plan (EAP) with specific actions and call notification procedures in place. In events of extreme precipitation, evacuations can be planned with sufficient time. In the event of a structural failure due to earthquake, there may be no warning time. A dam's structural type also affects warning time. Earthen dams do not tend to fail completely or instantaneously. Once a breach is initiated, discharging water erodes the breach until either the reservoir water is depleted or the breach resists further erosion. Concrete gravity dams also tend to have a partial breach as one or more monolith sections are forced apart by escaping water. The time of breach formation ranges from a few minutes to a few hours (USACE 1997).

EAPs for all high-hazard dams that would affect Smith County are on file with TCEQ and the county emergency coordinator has copies of six EAPs on file. Additionally, possible evacuation routes in the event of a failure have been identified.

7.2 VULNERABILITY AND IMPACTS

Overall, dam failure impacts would likely be rare and limited in the Smith County planning area, with 10 to 25% of the planning area affected during a failure event. Roads closed from flood waters out of their banks could result in transportation disruptions. After the consultant team presented the dam information profile and analyses (including general background, historical occurrences, extent, and vulnerability), to the Steering Committee, the risk analysis was discussed among the participating members. Through these discussions and analysis, the committee decided that Smith County, and the Cities of New Chapel Hill, Tyler, Troup and Whitehouse have a low vulnerability rating, and that the Cities of Arp, Bullard, Noonday, and Winona have “no exposure” to impacts. The City of Hideaway, a lake community, feels it could have high impacts, and the City of Lindale feels it could have medium level of impacts from a dam failure.

There are 112 dams in the Smith County planning area; eight are classified as high-hazard, 15 as significant-hazard, 89 low-hazard, and two unknown-hazards dams. While low-hazard dams are those at which failure or mis-operation are not anticipated to result in loss of human live, they are projected to cause limited or no economic or environmental losses, but but damage to agriculture is possible due to the number of low-hazard dams in the planning area. Because of this situation, low-hazard dams are not evaluated in the vulnerability section.

Flooding from intense rain events is the most prominent cause of dam failure. If the dam failure is extensive, a large amount of water would enter the downstream waterway forcing the water out of its banks. There may be significant environmental effects from flood waters carrying and dispersing debris and hazardous materials downstream that can contaminate the ecosystem. If the event is severe, debris carried downstream can block traffic flow, cause power outages, and disrupt local utilities, such as water and wastewater.

Dam failure inundation mapping for the planning area was not available digitally to allow Hazus loss estimations to be modeled, thus annualized losses were not estimated. Neither is a breakdown of potential dollar losses for critical facilities or critical infrastructure provided. If a high-hazard dam should fail, however, the severity of impact could result in fatalities, and damage to homes and infrastructure.

Table 7-4 provides the water course, jurisdiction and assets that would be impacted in the event of failure of the high- and significant-hazard dams. This information was obtained from EAP documents, USACE National Inventory of Dams, local knowledge, and Google Earth software.

Table 7-4. Dams Impacts in Smith County

Name	National ID #	Hazard Class	Water Course	Nearest Downstream City	Distance to Nearest City (miles)	Assets Downstream
Hamrick Lake Dam	Tx00283	High	Tri-Prairie Creek	None	-	Unknown number of properties in unincorporated county
Hide A Way Lake No 1 Dam	Tx00261	High	Hubbard Branch	Hideaway	0	Residential structures; Lake Golf Clubhouse
Howell Club Lake Dam	Tx00282	High	Sandy Bottom Creek	None	-	Unknown number of properties in unincorporated county
Mud Creek Dam (Lake Tyler East)	Tx00244	High	Mud Creek	None	-	FM 346 E, Hwy 110, CR 2138, Hwy 135, FM 2064, US Hwy 79, Hwy 204, and US Hwy 84. Properties on CR 2138 between CR 2186 to Hwy 110 S, Sorrel Dr, CR 2141, CR 2140, and Hwy 110 between CR 2236 and CR 2186, FM 346 between 3341 to CR 2147.
North Lake Dam	Tx00246	High	Tr-Rabbit Cr	None	-	State Hwy 135S; rural homes
Pessink Lake Dam	Tx07255	High	Tr-Roddy Branch	None	-	Rural homes
Pleasure Acres Lake Dam	Tx00277	High	Tr-Prairie Creek	New Chapel Hill	1	County Road 220, State Hwy 64E, rural homes
Whitehouse Dam (Lake Tyler)	Tx00245	High	Prairie Creek	None	-	FM 346 E, Hwy 110, CR 2138, Hwy 135, FM 2064, US Hwy 79, Hwy 204, and US Hwy 84. Properties on CR 2138 between CR 2186 to Hwy 110 S, Sorrel Dr, CR 2141, CR 2140, and Hwy 110 between CR 2236 and CR 2186.
Bellwood Lake Dam	Tx00252	Significant	Indian Creek	Tyler	0	Spur 164, CR 1139, Dean Road, and FM 2774; Spur 364 bridge at Indian Creek, homes along Indian Drive and CR 1250, railroad tracks along Indian Creek.
Greenbriar Lake Dam	Tx00251	Significant	Tr-Indian Creek	Tyler	0	18 residents are on the EAP notification list for dam failure.
Hide A Way Lake No 2 Dam	Tx00295	Significant	Hubbard Branch	Hideaway	0	Hideaway residents, rural homes
Holly Tree Lake Dam	Tx00288	Significant	Born Branch	None	-	Rural homes
Jl Williams Lake Dam	Tx05964	Significant	Tr-Allen Branch	Tyler	8.5	State Hwy 110, rural homes
Lost Pine Lake Dam	Tx00257	Significant	Tr-Indian Creek	Tyler	7	CR 1134, W South Loop 49
Maxie Wilson Dam	Tx09070	Significant	Tr-Indian Creek	None	-	Rural homes

Name	National ID #	Hazard Class	Water Course	Nearest Downstream City	Distance to Nearest City (miles)	Assets Downstream
Pinedale Lake Dam	Tx00278	Significant	Born Branch	Tyler	10	Rural homes
Pinkerton Lake Dam	Tx05214	Significant	Tr-Prairie Creek	Tyler	-	County Road 220, rural homes
Prairie Creek Dam	Tx06025	Significant	Praire Creek	Lindale	.5	U.S. Hwy 69S
Shangri La Lake Dam	Tx00254	Significant	West Mud Creek	Tyler	0	Subdivision properties
Sky Lake Dam	Tx04430	Significant	Tr-Village Creek	Van	4	Rural homes
Timber Lake Dam	Tx00254	Significant	Born Branch	None	-	Rural homes
Tyler State Park Lake Dam	Tx00266	Significant	Tr-Little Saline Creek	None	-	Rural homes; state park
Youth With A Mission Dam No 4	Tx04433	Significant	Tr-Duck Creek	Tyler	17	Rural homes

Source: U.S. Army Corps of Engineers, 2017; Google Earth, 2017

Community Perception of Vulnerability

See front page of current chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigations actions for this hazard vulnerability.

7.3 PROBABILITY OF FUTURE EVENTS

The Steering Committee members assessed the future probability of a major occurrence of a dam failure based on their jurisdiction's proximity to high-hazard dams, their knowledge of the structural integrity of the nearby dams and that no recorded historical events have occurred in the Smith County planning area.

Smith County, City of Lindale, and the City of Tyler all ranked the probability of a future event as likely, meaning an event is possible to occur in the next 100 years. The City of Hideaway ranked the probability as high, meaning a dam failure is likely to occur within the next 25 years since it is a lake community with two high-hazard dams. The Cities of New Chapel Hill, Troup, and Whitehouse felt that the probability was low of a dam failure to occur within 100 years. The Cities of Arp, Bullard, Noonday, and Winona said they had "no exposure" to dam failure, mainly based on no high-hazard dams upstream for these jurisdictions.

7.4 CLIMATE CHANGE IMPACTS

Dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hydrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream.

Dams are constructed with safety features known as "spillways." Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as "design failures," result in increased discharges downstream and increased flooding potential. Although climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failures.

7.5 ISSUES

The most significant issue associated with dam failure involves the properties and populations in the inundation zones. Flooding as a result of a dam failure would significantly impact these areas. There is often limited warning time for dam failure. These events are frequently associated with other natural hazard events such as earthquakes, or severe weather, which limits their predictability and compounds the hazard. Important issues associated with dam failure hazards include the following:

- Federally regulated dams have an adequate level of oversight and sophistication in the development of emergency action plans for public notification in the unlikely event of failure. However, the protocol for notification of downstream citizens of imminent failure needs to be tied to local emergency response planning.
- Mapping for federally regulated dams is already required and available; however, mapping for non-federally regulated dams that estimates inundation depths is needed to better assess the risk associated with dam failure from these facilities.
- The concept of residual risk associated with structural flood control projects should be considered in the design of capital projects and the application of land use regulations.
- Security concerns should be addressed and the need to inform the public of the risk associated with dam failure is a challenge for public officials.

Chapter 8. DROUGHT AND EXTREME HEAT

DROUGHT AND EXTREME HEAT RANKING		
Jurisdiction	Drought	Extreme Heat
Smith County	54	54
City of Arp	36	36
City of Bullard	54	54
City of Hideaway	7	7
City of Lindale	12	12
City of New Chapel Hill	51	51
City of Noonday	54	54
City of Troup	36	36
City of Tyler	39	39
City of Whitehouse	54	54
City of Winona	36	36
See Chapter 16 for more information on hazard ranking.		

DEFINITIONS

Drought — The cumulative impacts of several dry years on water users. It can include deficiencies in surface and subsurface water supplies and generally impacts health, well-being, and quality of life.

Meteorological Drought — Precipitation's departure from normal over some period of time. Meteorological measurements are the first indicators of drought and are usually region-specific.

Agricultural Drought — Inadequate soil moisture for a particular crop at a particular time.

Hydrological Drought — Deficiencies in surface and subsurface water supplies. It is measured as stream flow and as lake, reservoir, and groundwater levels.

Socioeconomic Drought — Drought impacts on health, well-being, and quality of life.

Extreme Heat — Summertime weather that is substantially hotter or more humid than average for a location at that time of year.

8.1 HAZARD PROFILE

Drought

Drought is a normal phase in the climatic cycle of most geographical areas. According to the National Drought Mitigation Center, drought originates from a deficiency of precipitation over an extended period, usually a season or more. This results in a water shortage for some activity, group, or environmental sector. Drought is the result of a significant decrease in water supply relative to what is “normal” in a given location. Unlike most disasters, droughts normally occur slowly but last a long time.

Defining when drought begins is a function of the impacts of drought on water users, and includes consideration of the supplies available to local water users as well as the stored water they may have available in surface reservoirs or groundwater basins. Different local water agencies have different criteria for defining drought conditions in their jurisdictions. Some agencies issue drought watch or drought warning announcements to their customers. Determinations of regional or statewide drought conditions are usually based on a combination of hydrologic and water supply factors.

Precipitation and runoff into the area lakes and dams is the main source of Texas' water supply. Precipitation is the only naturally reoccurring/renewable water supply for Smith County. Annual precipitation in the populated areas of the planning area is approximately 46 inches per year. There are various streams and tributaries contributing to water supply in the area. This supply is stored in four forms throughout the state: streamflow, reservoir water, soil moisture, and groundwater.

Extreme Heat

Severe, excessive summer heat is characterized by a combination of exceptionally high temperatures and humidity. When these conditions persist over a period of time, it is called a heat wave. Many areas of the country are susceptible to heat waves, including Northeast Texas and Smith County.

Major human risks associated with severe summer heat include heatstroke, heat exhaustion, and heat cramps. Most at risk are outdoor workers, the elderly, children, and people in poor physical health. The effects of severe summer heat are always more pronounced in urbanized areas than in rural areas. Within

urbanized areas, pervasive heat is exacerbated by what is known as the heat island effect, in which concrete and metal infrastructure absorbs radiant heat energy from the sun during the day and emits that heat energy during the night. This cyclical process essentially traps the heat in urbanized areas and makes them as much as 10 degrees warmer than surrounding areas.

During summer months, Smith County is frequently affected by severe heat hazards. Daily high temperatures range into the upper 90s and low 100s. Moderate to high relative humidity levels are prevalent in the county. The heat index (a measure of discomfort that combines temperature and humidity) can move into dangerous levels. Many people begin to experience extreme discomfort or physical distress when the heat index reaches 105 degrees.

Severe summer heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornadoes and floods, the Centers for Disease Control and Prevention reports that from 2006 to 2010, excessive heat exposure caused 3,332 deaths in the United States. Heat-related deaths were reported most frequently among males (69 percent) and adults aged 65 years and older (25 percent).

8.1.1 Location

Drought

Due to Texas' humid sub-tropical to semi-arid conditions, drought is a natural but unpredictable occurrence in the state. However, because of natural variations in climate and precipitation sources, it is rare for all of Texas to be deficient in moisture at the same time. Single season droughts over some portion of the state are quite common.

Droughts occur regularly in Northeast Texas and are a normal condition, but can vary greatly in their intensity and duration. According to the 2012 Census of Agriculture, of the 950 square miles (608,000 acres) of land in Smith County, almost 50 percent (302,339 acres) is used for agricultural purposes. In 2012, there were 2,961 farms with an average size of 102 acres per farm. Although the entire planning area in Smith County is at risk for drought, the agricultural areas are more vulnerable to the immediate effects of drought.

Extreme Heat

The entire planning area is at risk for extreme heat events. There is no distinct geographic boundary to excessive summer heat. Excessive heat can occur in every participating jurisdiction within Smith County.

The record highs for Texas occurs during May through October. During 2011, the City of Tyler experienced the hottest all-time summer average temperature of 90.2°F. This record implies temperature highs of 100 and lows of 80 that summer.

8.1.2 Extent

Drought

The National Oceanic and Atmospheric Administration (NOAA) has developed Palmer Drought Indices that are used to measure the extent of drought. The ***Palmer Z Index*** measures short-term drought on a monthly basis. The ***Palmer Drought Severity Index*** attempts to measure the duration and intensity of the long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (for example, reservoir levels, groundwater levels, etc.) take longer to develop and it takes longer to recover from them. The ***Palmer Hydrological Drought Index***, was developed to quantify the long term hydrological effects. These Palmer Drought Indices classifications are listed in Table 8-1 and Table 8-2 depicts the magnitude of drought indices.

Table 8-1. Palmer Drought Classification Indices

Drought Index	Drought Condition Classifications						
	Extreme	Severe	Moderate	Normal	Moderately Moist	Very Moist	Extremely Moist
Palmer Z Index	-2.75 and below	-2.00 to -2.74	-1.25 to -1.99	-1.24 to +.99	+1.00 to +2.49	+2.50 to +3.49	n/a
Palmer Drought Severity Index	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.9	+3.00 to +3.9	+4.00 and above
Palmer Hydrological Drought Index	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.9	+3.00 to +3.9	+4.00 and above

Table 8-2. Palmer Drought Category Descriptions

Category	Description	Possible Impacts	Palmer Drought Severity Index
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	-5.0 or less

Source: NDMC, 2017

Drought is a slow-onset hazard, but over time can have damaging effects on crops, municipal water supplies, recreation, and wildlife. The worst case scenario for the Smith County planning area is to see up to D4, Exceptional Drought conditions that extends over a number of years, the direct and indirect economic impact can be significant.

Drought warnings are issued by the State Drought Preparedness Council, as directed by H.B. 2660, based upon input from NOAA, the Office of the State Climatologist, the U.S. Geological Survey, the Texas Water Development Board, the Texas Commission on Environmental Quality, and the Texas Agricultural Statistics Service. Warnings encompass five “levels of concern” and take into account assessments of climatology, agriculture, and water availability for each of 10 climatic regions of the state.

Drought is monitored nationwide by the National Drought Mitigation Center (NDMC). Indicators are used to describe broad scale drought conditions across the U.S. Indicators correspond to the intensity of drought. Figure 8-1 shows the drought conditions in Texas and in particular, Smith County, as of February 2018. The Smith County average was at low risk in February 2018 with the western half of the county at low/dry and the eastern half of the county designated “no drought”.

Source: NDMC, 2017

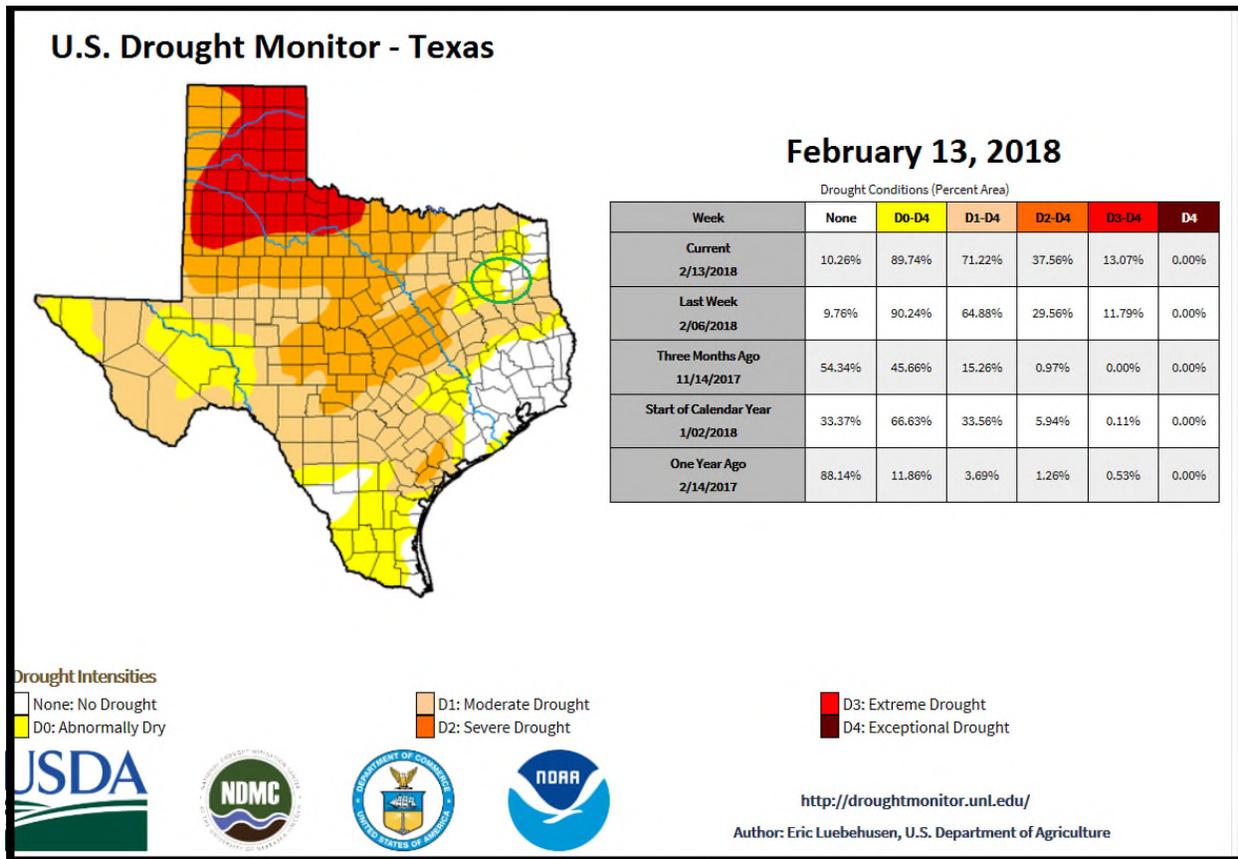


Figure 8-1. U.S. Drought Monitor Texas, February 2018

Note: Green circle shows location of Smith County.

The U.S. Forest Service and the Texas Forest Service use the Keetch-Byram Drought Index to determine the fire potential based on daily water balance, precipitation and soil moisture. Figure 8-2 shows the Texas Drought Index according to Keetch-Byram Drought Index, which uses a color-coded rating classification with a scale of 0 to 800 (low risk to high risk). Smith County was at a low risk in February 2018.

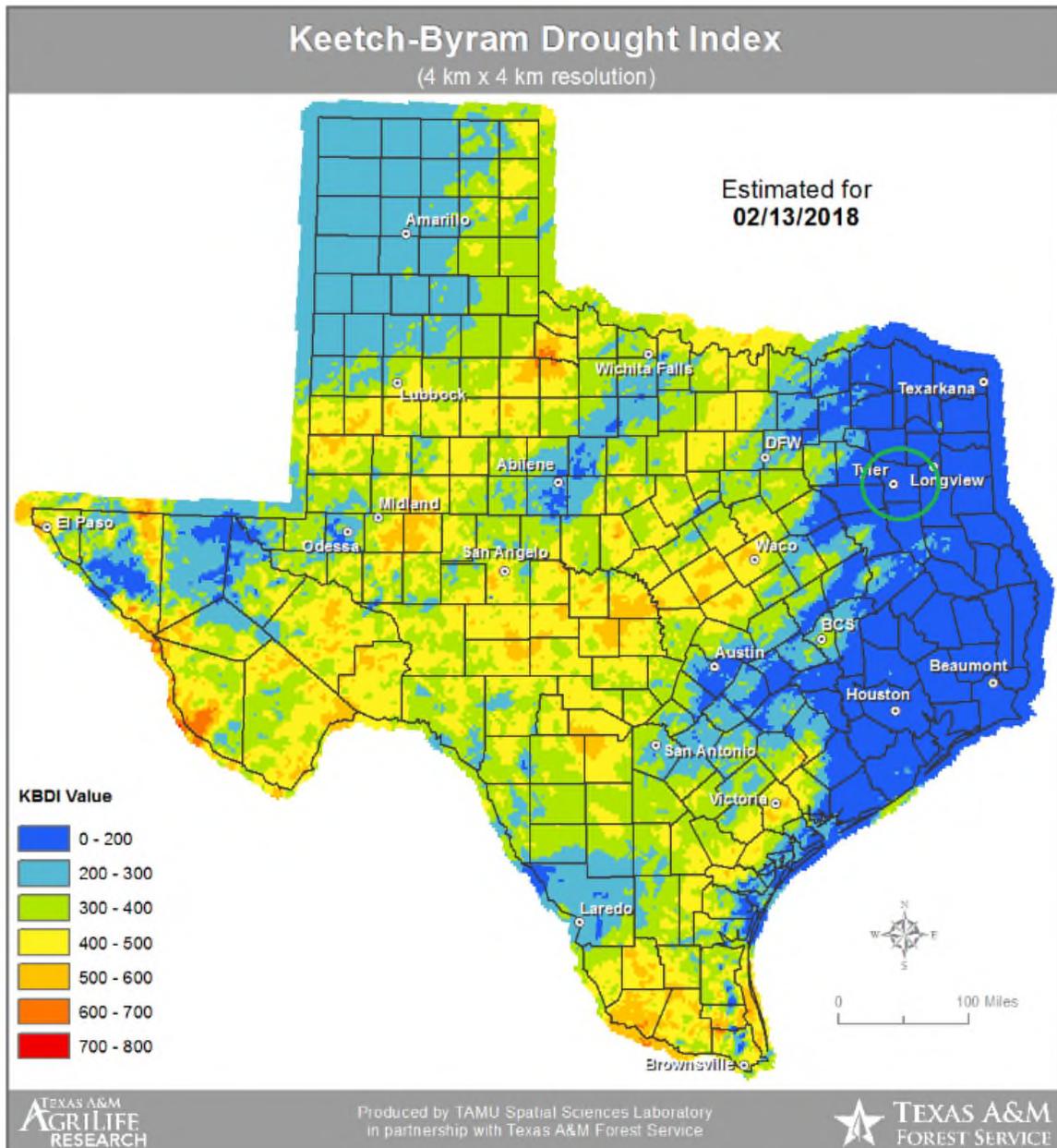


Figure 8-2. Keetch-Byram Drought Index, February 2018

Note: Green circle shows location of Smith County.

Extreme Heat

Heat index tables (see Figure 8-3) are commonly used to provide information about how hot it feels, which is based on the interactions between several meteorological conditions. Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15 degrees Fahrenheit (°F). Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

The worst-case scenario for the Smith County planning area would be to see up to an extreme heat wave that lasts several weeks with 100° and above during the day with high humidity and then evening lows only dropping into the 90s°. In this scenario, people and animals do not get a chance to cool off their bodies and rest from the heat.

Source: NOAA NWS, 2017

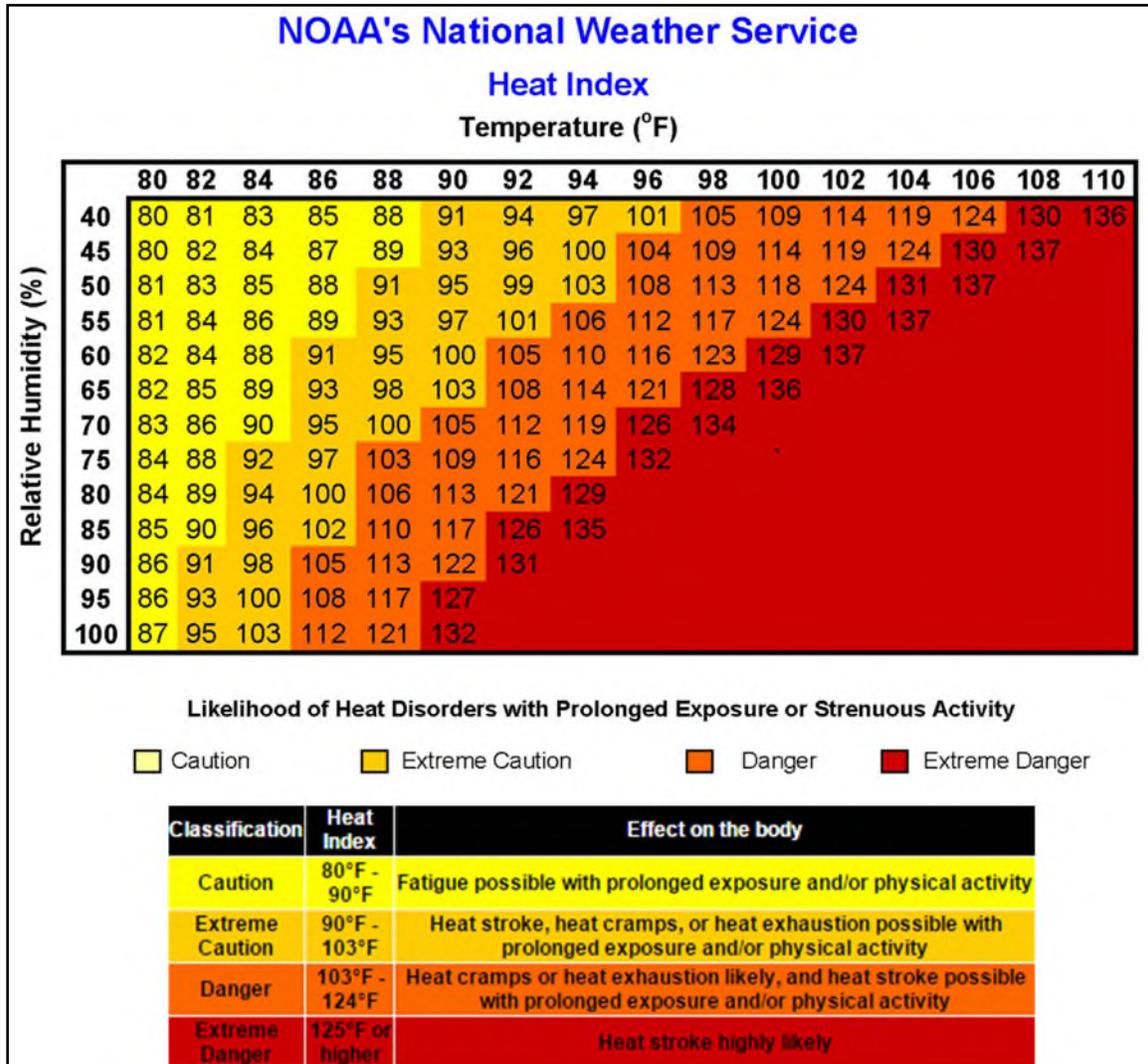


Figure 8-3. Heat Index Table

8.1.3 Past Events

Drought

According to the Texas Water Resources Institute and the NOAA National Centers for Environmental Information (NCEI) storm event database, Smith County experienced drought conditions in 2010, 2011, 2012, 2013, 2015, and 2016 during this plan update timeframe of 2008 through 2017. No property damage amounts nor injuries/fatalities were recorded.

- **2016 Drought**—Drought conditions occurred in November – December with Smith County being classified at D2 – Severe Drought conditions.

- **2015 Drought**—This year had a very wet spring but drought conditions developed in August – September and Smith County was classified at D2 – Severe Drought conditions.
- **2013 Drought**—Drought conditions occurred during the summer months with most of Northeast Texas being classified with D2 Severe or D3 Extreme Drought conditions. Then, beneficial rain fell during September and drought classifications were removed.
- **2012 Drought**—The drought conditions only persisted into March of 2012 when much needed rainfall occurred and Northeast Texas was removed from the D2 Severe Drought status.
- **2011 Drought**—Texas officially experienced the driest 12-month period in the state’s history between October 2010 and September 2011 with an average rainfall of 11.18 inches. The drought conditions lasted the entire year; by July, the entire Northeast Texas area was in D4 Exceptional Drought conditions.
- **2010 Drought**— While much of Northeast Texas was downgraded to the D1 Moderate Drought category during the month of November, a very dry December resulted in much of Northeast Texas being upgraded to D2 Severe Drought and D3 Extreme Drought categories during the month of December. Once again, many counties saw burn bans throughout the month as the fire danger was very high across the region. The City of Tyler’s monthly rainfall was 1.07 inches. The departure from normal was -3.72 inches. The yearly rainfall through December was 31.04 inches. The yearly departure from normal through December was -14.23 inches.

USDA Disaster Declarations

Agriculture-related disasters and disaster declarations are common in the United States, and the U.S. Department of Agriculture (USDA) Farm Service Agency provides assistance for losses resulting from drought, flood, fire, freeze, tornadoes, pest infestation, and other natural disasters. Many counties have been designated disaster areas in the past several years of record crop production. The U.S. Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to them. Between 2012 and 2017, the period for which data were available, Smith County was included in 12 USDA secretarial disaster declarations (related to drought) (USDA, 2017):

Table 8-3. USDA Secretarial Disasters

Year	Type	Declaration Number
2017	Drought, high winds, wildfire, excessive heat, insects	S4155
2015	Drought, high winds, wildfire, excessive heat, insects	S3814
2015	Drought, high winds, wildfire, excessive heat, insects	S3890
2015	Drought, high winds, wildfire, excessive heat, insects	S3895
2015	Drought, high winds, wildfire, excessive heat, insects	S3905
2015	Drought, high winds, wildfire, excessive heat, insects	S3908
2015	Drought	S3920
2013	Drought, high winds, wildfire, excessive heat, insects	S3555
2013	Drought, high winds, wildfire, excessive heat, insects	S3570
2013	Drought, high winds, wildfire, excessive heat, insects	S3578
2013	Drought	S3681
2012	Drought, high winds, wildfire, excessive heat, insects	S3288

Source USDA, 2017

The Drought Impact Reporter

The National Drought Mitigation Center developed the Drought Impact Reporter in response to the need for a national drought impact database for the United States. Information comes from a variety of sources:

on-line, drought-related news stories and scientific publications, members of the public who visit the website and submit a drought-related impact for their region, members of the media, and staff of government agencies. The Drought Impact Reporter contains information of 46 impacts from droughts that specifically affected Smith County between 2008 and April 30, 2017 (DIR, 2017) and these have a high probability of continuing. The following are the categories and reported number of impacts. Note that some impacts have been assigned to more than one category.

- Agriculture—30
- Business and Industry—2
- Energy—2
- Fire—7
- Plants and Wildlife—14
- Relief, Response, and Restrictions—12
- Society and Public Health—2
- Water Supply and Quality—13

Extreme Heat

According to the NOAA National Centers for Environmental Information (NCEI) storm event database, Smith County experienced 13 extreme heat events in 2009, 2011, 2015, and 2016 during this plan update timeframe of 2008 through 2017. No property or crop damages were recorded, but one fatality occurred in Troup on June 24, 2009. A 37 year-old man died due to a heat-related illness while working outdoors. Since there is no distinct geographic boundary to excessive summer heat, these historical occurrences are for all the participating jurisdictions within this plan update.

Table 8-4 contains temperature summaries related to extreme heat for the Tyler weather station. These temperatures are experienced throughout the entire planning area. In recent history, the month of August 2011 recorded the highest number of days over 90°F and the month of July 1998, was a close second.

Table 8-4. Monthly Highest Temperature Extremes for Planning Area, 1984-2012

	Monthly Highest Mean Temperature	Year Recorded	Number of Days > 90°F
January	56.6°F	2006	0.0
February	59.3°F	2000	0.1
March	65.6°F	2012	0.1
April	72.2°F	2006	0.8
May	79.5°F	1998	5.8
June	85.8°F	1998	19.2
July	89.7°F	1998	26.4
August	91.0°F	2011	26.6
September	82.5°F	2005	14
October	74.0°F	2004	1.8
November	61.4°F	2005	0.0
December	57.4°F	1984	0.0

Source: WRCC, 2017

USDA Risk Management Agency

According to the USDA Risk Management Agency, payments for insured crop losses in Smith County as a result of excessive heat conditions between 2011 and 2016 caused \$52,996 in crop losses that affected 23 acres. These claims occurred in 2011 and 2016.

8.1.4 Warning Time

Drought

Droughts are climatic patterns that occur over long periods of time. Only generalized warnings can take place because there are numerous variables that scientists have correlated well enough to make accurate predictions. Empirical studies conducted over the past century have shown that meteorological drought is never the result of a single cause. It is the result of many causes, often synergistic in nature.

Scientists at this time do not know how to predict drought more than a month in advance for most locations. Predicting drought depends on the ability to forecast precipitation and temperature. Anomalies of precipitation and temperature may last from several months to several decades. How long these anomalies last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, and the accumulated influence of weather systems on the global scale.

Texas is semi-arid to humid sub-tropical, thus, drought is a regular and natural occurrence in the state. The main source of water supply in the state is precipitation and much of this occurs in the spring and fall. Some snowfall does occur in the wintertime. Although drought conditions are difficult to predict, low levels of spring precipitation may act as an indicator that drought conditions are occurring.

Extreme Heat

NOAA issues watch, warning, and advisory information for extreme heat. Extreme heat is a regular and natural occurrence in the state.

8.2 VULNERABILITY AND IMPACT

Drought

The impact of drought can be wide-reaching and may be economic, environmental, or societal. The most significant impacts associated with drought in Smith County are those related to water-intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. An ongoing drought may leave this area more prone to wildfires. Drought conditions can also cause soil to compact, increasing an area's susceptibility to flooding, and reduce vegetation cover, which exposes soil to wind and erosion. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted, water wells become less productive during drought and can dry up, and water levels in streams and groundwater decline.

Notable incidents that impacted Smith County from the Drought Impact Reporter (DIR, 2017) include:

- Restricted outdoor burning
- Livestock producers bought hay
- Trees stressed by drought
- Increased wildfire hazard
- Livestock were sold
- Quality of fruit declined

During this plan update planning timeframe, 2008 – 2017, the planning area experienced six drought periods, but no damages were recorded in the NCEI storm event database. All the planning partners are vulnerable to drought conditions, but Hideaway and Lindale Steering Committee members feel the impacts

are low in their communities. The rest of the planning partners do feel that this hazard has moderate to high impacts on their population, property, and economy.

Environmental impact from drought are associated with damage to plants, animals, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; loss of biodiversity; and soil erosion. Some of the effects are short-term and conditions quickly return to normal following the end of the drought. Other environmental effects linger for some time or may even become permanent. Wildlife habitat, for example, may be degraded through the loss of wetlands, lakes, and vegetation. However, many species will eventually recover from this temporary aberration. The degradation of landscape quality, including increased soil erosion, may lead to a more permanent loss of biological productivity. Although environmental losses are difficult to quantify, growing public awareness and concern for environmental quality has forced public officials to focus greater attention and resources on these effects.

Economic impact will be largely associated with industries that use water or depend on water for their business. For example, landscaping businesses were affected in the droughts of the past as the demand for service significantly declined because landscaping was not watered. Agricultural industries will be impacted if water usage is restricted for irrigation. The tourism sector may also be impacted.

Extreme Heat

During this plan update planning timeframe, 2008 – 2017, the planning area experienced 13 extreme heat periods with one fatality, but no damage amounts were recorded in the NCEI storm event database.

All the planning partners are vulnerable to extreme heat, but Hideaway and Lindale Steering Committee members feel the impacts are low in their communities. The rest of the planning partners do feel that this hazard has moderate to high impacts on their population, property, and economy.

According to the U.S. Environmental Protection Agency (EPA), young children (because they are more likely to be left in cars unattended), the elderly and people with physical or mobility constraints, cognitive impairments, economic constraints, and social isolation are more susceptible to the adverse effects of excessive heat events. Actual percentages of vulnerable populations are listed in Table 8-5 for each planning partner. Data were not available for individuals for physical, mobility, nor economic constraints.

Overall, Texas has an estimated 18.6% of greater risk population age groups. Smith County's greater risk population is above the state average at 21.3%. The participating jurisdictions with the highest percent of greater risk population are Hideaway, Winona, and New Chapel Hill.

Table 8-5. Populations at Greater Risk by Jurisdiction

Jurisdiction	Total Population	Population Under 5	Population 65 and Older	Total Greater Risk Population	Percentage of Greater Risk Population
Smith County	225,290	15,194	32,773	47,967	21.3%
City of Arp	1,002	46	162	208	20.8%
City of Bullard	2,994	117	254	371	12.4%
City of Hideaway	3,127	24	1,522	1,546	49.4%
City of Lindale	5,853	286	903	1,189	20.3%
City of New Chapel Hill	620	37	138	175	28.2%
City of Noonday	709	21	153	174	24.5%
City of Troup	1,920	146	254	400	20.8%
City of Tyler	104,798	6,934	14,734	21,668	20.7%
City of Whitehouse	8,269	676	738	1,414	17.1%
City of Winona	602	91	87	178	29.6%

Agriculture

According to the 6-year period from the USDA’s Risk Management Agency, the amount of claims paid for crop damage as a result of extreme heat in Smith County was \$52,996. According to the 2016 Texas Insurance Profile from the USDA’s Risk Management Agency, 88 percent of the insurable crops in Texas are insured with USDA crop insurance. To estimate losses to insurable crops that are not insured, the 88 percent crop insurance coverage was factored in to provide an adjusted estimate of losses. According to this calculation, estimated annualized losses are over \$10,037 (see Table 8-6).

Considering the value of crops from the 2012 Census of Agriculture as baseline crop exposure, the estimated annual losses from extreme heat were determined to be low compared to the value of the insurable crops.

Table 8-6. Estimated Insurable Annual Crops Lost Resulting from Extreme Heat

6-Year Extreme Heat Insurance Paid	Adjusted 6-Year Drought Losses (considering 88% insured)	Estimated Annualized Losses	2012 Value of Crops
\$52,996	\$60,223	\$10,037	\$59,512,000

Source: USDA, 2012; USDA RMA, 2016; USDA, 2016

Community Perception of Vulnerability

See the first page of this chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

8.3 PROBABILITY OF FUTURE EVENTS

Drought

The probability of a future drought in Smith County and the participating jurisdictions is “High,” with an event possible every 2 to 3 years. According to information from the NOAA National Centers for Environment Institute, the planning area had six documented drought periods between 2008 and 2017. Based on this historical information, the probability of a future drought occurring in any given year is over 60 percent.

The Steering Committee members assessed the future probability on drought based on their jurisdictional knowledge. Smith County and the Cities of Bullard, New Chapel Hill, Nooday, Troup, Whitehouse, and Winona all ranked the probability of a future event as likely to occur within 25 years. The Cities of Arp, Lindale, and Tyler ranked the probability of a future event as likely to occur within the next 100 years and the City of Hideaway ranked it as a low probability of future occurrence.

Extreme Heat

On average, Smith County and the participating jurisdictions have experienced 95 days per year where temperatures exceed 90°F so the probability of extreme heat events is expected to be very likely in any given year (based on the Tyler station for Western Regional Climate Center). When temperatures reach 90°F and above, people are vulnerable to heat cramps, heat exhaustion, and heat stroke. Pets and livestock are also vulnerable to heat-related injuries. Crops can be vulnerable as well.

Smith County and the participating jurisdictions can expect similar numbers of hot days in the future (95 days per year are highly likely).

The Steering Committee members assessed the future probability on extreme heat based on their jurisdictional knowledge. Smith County and the Cities of Bullard, New Chapel Hill, Nooday, Troup, Whitehouse, and Winona all ranked the probability of a future event as likely to occur within 25 years. The

Cities of Arp, Lindale, and Tyler ranked the probability of a future event as likely to occur within the next 100 years and the City of Hideaway ranked it as a low probability of future occurrence.

8.4 CLIMATE CHANGE IMPACTS

Drought

The long-term effects of climate change on regional water resources are unknown, but global water resources are already experiencing the following stresses without climate change:

- Growing populations
- Increased competition for available water
- Poor water quality
- Environmental claims
- Uncertain reserved water rights
- Groundwater overdraft
- Aging urban water infrastructure

With a warmer climate, droughts could become more frequent, more severe, and longer-lasting. The 2011 drought in Texas reached a record \$7.62 billion in agriculture losses, making it the most costly drought in history. It was more than \$3.5 billion higher than the 2006 drought loss estimate, which previously was the costliest drought on record in Texas (Texas A&M, 2012). More frequent extreme events such as droughts could be more cause for concern than the long-term change in temperature and precipitation averages.

The best advice to water resource managers regarding climate change is to start addressing current stresses on water supplies and build flexibility and robustness into any system. Flexibility helps to ensure a quick response to changing conditions, and robustness helps people prepare for and survive the worst conditions. With this approach to planning, water system managers will be better able to adapt to the impacts of climate change.

Extreme Heat

According to EPA's *What Climate Change Means for Texas* (EPA, 2016), Texas can expect three to four times as many days per year above 100 degrees and nighttime temperatures are rising substantially. This will cause certain populations including children, elderly, the sick, and the poor to be more vulnerable to heat stroke and dehydration and affect people's cardiovascular and nervous systems.

8.5 ISSUES

The following are extreme heat and drought-related issues:

- Identification and development of alternative water supplies.
- Utilization of groundwater recharge techniques to stabilize the groundwater supply.
- The probability of increased drought frequencies and durations due to climate change.
- The promotion of active water conservation even during non-drought periods.
- Increasing vulnerability to drought over time as demand for water from different sectors increases.
- The effects of climate change may result in an increase in frequency of extreme heat events.
- The effects of recent droughts have exposed the vulnerability of the planning area's economy to drought events.
- Wildlife habitat management for landowners.
- Human health impacts from droughts and extreme heat.
- Monitoring and evaluating risks to power supply and water rights.
- Development and update of mitigation- or response-based drought plans.

Chapter 9. EARTHQUAKE

EARTHQUAKE HAZARD	
Jurisdiction	Earthquake
Smith County	13
City of Arp	12
City of Bullard	18
City of Hideaway	0
City of Lindale	0
City of New Chapel Hill	6
City of Noonday	6
City of Tyler	7
City of Troup	6
City of Whitehouse	12
City of Winona	6
See Chapter 16 for more information on hazard ranking.	

DEFINITIONS

Earthquake — The shaking of the ground caused by an abrupt shift of rock along a fracture in the earth or a contact zone between tectonic plates.

Epicenter — The point on the earth’s surface directly above the hypocenter of an earthquake. The location of an earthquake is commonly described by the geographic position of its epicenter and by its focal depth.

Fault — A fracture in the earth’s crust along which two blocks of the crust have slipped with respect to each other.

Focal Depth — The depth from the earth’s surface to the hypocenter.

Hypocenter — The region underground where an earthquake’s energy originates.

Liquefaction — – the loss of strength in loosely packed, saturated sediments in response to strong shaking, potentially causing major damage during an earthquake.

9.1 HAZARD PROFILE

An earthquake is a sudden release of energy from the earth’s crust that creates seismic waves. Tectonic plates become stuck, putting a strain on the ground. When the strain becomes so great that rocks give way, fault lines occur. At the earth’s surface, earthquakes may manifest themselves by a shaking or displacement of the ground, which may lead to loss of life and destruction of property. Size of an earthquake is expressed quantitatively as magnitude and local strength of shaking as intensity. The inherent size of an earthquake is commonly expressed using a magnitude.

Earthquakes tend to reoccur along faults, which are zones of weakness in the crust. Even if a fault zone has recently experienced an earthquake, there is no guarantee that all the stress has been relieved. Another earthquake could still occur.

Earthquakes can last from a few seconds to over 5 minutes; they may also occur as a series of tremors over several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties generally result from falling objects and debris, because the shocks shake, damage, or demolish buildings and other structures. Disruption of communications, electrical power supplies and gas, sewer and water lines should be expected. Earthquakes may trigger fires, dam failures, landslides, or releases of hazardous material, compounding their disastrous effects.

Small, local faults produce lower magnitude quakes, but ground shaking can be strong and damage can be significant in areas close to the fault. In contrast, large regional faults can generate earthquakes of great magnitudes but, because of their distance and depth, they may result in only moderate shaking in an area.

The severity of earthquakes is influenced by several factors, including the depth of the quake, the geology in the area, and the soils. The severity of soil liquefaction is dependent on the soil grain size, thickness, compaction, and degree of saturation.

9.1.1 Location

While the planning area does face some earthquake hazard, this hazard is very small in comparison to many other areas and states including California, Missouri, Montana, South Carolina, and Washington that have experienced historical earthquakes with magnitudes exceeding M7.

In northeast Texas, earthquakes have occurred with magnitudes between M4 and M4.8 within or along the boundaries of producing oil and gas fields; earthquakes are also sometimes triggered by the disposal of fluid wastes in deep wells. Of course, it is seldom possible to prove unequivocally that any particular earthquake is caused by humans. The majority of petroleum fields and injection wells do not cause earthquakes, and the majority of human-caused earthquakes are small and harmless (UTIG, 2013)

9.1.2 Extent

Earthquakes are typically classified in one of two ways: by the amount of energy released, measured as **magnitude**; or by the impact on people and structures, measured as **intensity**. The worst case scenario for the Smith County planning area is an earthquake up to an >4 magnitude with Mercalli intensity scale in the range of V based on historical events in nearby counties.

Magnitude

Currently the most commonly used magnitude scale is the moment magnitude (M_w) scale, with the following classifications of magnitude:

- Great $M_w > 8$
- Major $M_w = 7.0 - 7.9$
- Strong $M_w = 6.0 - 6.9$
- Moderate $M_w = 5.0 - 5.9$
- Light $M_w = 4.0 - 4.9$
- Minor $M_w = 3.0 - 3.9$
- Micro $M_w < 3$

Estimates of moment magnitude roughly match the local magnitude scale (ML) commonly called the Richter scale. One advantage of the M_w scale is that, unlike other magnitude scales, it does not saturate at the upper end. That is, there is no value beyond which all large earthquakes have about the same magnitude. For this reason, M_w scale is now the most often used estimate of large earthquake magnitudes.

Intensity

Currently, the most commonly used intensity scale is the modified Mercalli intensity scale, with ratings defined in Figure 9-1 (U.S. Geological Survey [USGS] 1989):

Source: USGS, 1989

Magnitude	Mercalli	Description	Earthquake Effects
2	I	Instrumental	Not felt except by a very few under especially favorable conditions.
	II	Feeble	Felt only by a few persons at rest, especially on upper floors of buildings.
3	III	Slight	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
	IV	Moderate	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
4	V	Rather Strong	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5	VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
	VII	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6	VIII	Destructive	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
7	IX	Ruinous	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
	X	Disastrous	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
8	XI	Very Disastrous	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
	XII	Catastrophic	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Figure 9-1. Modified Mercalli Intensity Scale

9.1.3 Past Events

Most past earthquakes in Texas have been of low magnitude and the few high magnitude events have occurred in west Texas, or the Panhandle area, not close to the planning area. According to the USGS Earthquake Hazard Program, there have not been any earthquake events in Smith County. Figure 9-2 shows the location of recorded and documented earthquake events in Texas.

Source: UTIG, TDEM, and USDE 2013

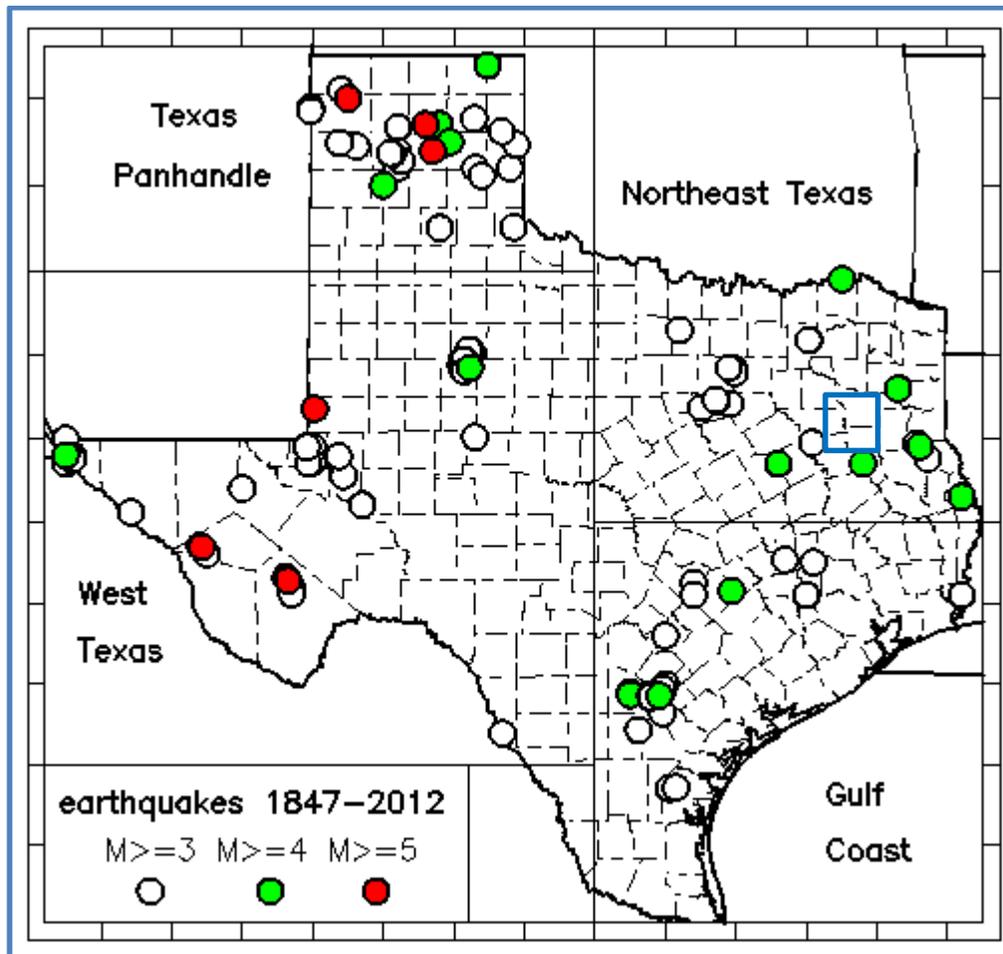


Figure 9-2. Past Texas Earthquakes with Magnitudes Exceeding M3

Note: Approximate location of Smith County in blue square.

Earthquakes have occurred nearby and residents in Smith County may have felt them. According to USGS here is a list of nearby earthquakes:

- September 2, 2013: 4.2M with an epicenter northwest of Timpson, Texas (Shelby County).
- May 31, 1997: 3.4M with an epicenter 9 miles northeast of Greenville, Texas (Hunt County).
- November 6, 1981: 3.2M with an epicenter 4 miles north of Jacksonville, Texas (Cherokee County).

It is also possible in northeast Texas, for a >7.0M earthquake with an epicenter in Oklahoma or the Missouri-Tennessee area to be felt in Smith County.

9.1.4 Warning Time

There is no current reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that use the low energy waves that precede major earthquakes. These potential warning systems give approximately 40 seconds notice that a major earthquake is about to occur. The warning time is very short but it could allow for someone to get under a desk, step away from a hazardous material they are working with, or shut down a computer system.

9.2 VULNERABILITY AND IMPACT

All structures, people, and infrastructure within the Smith County planning area are vulnerable to earthquake damage; however, there is a low risk of occurrence. As discussed under the probability section, the probability of a 5.0 magnitude or greater earthquake in the next 100 years is 4%. Although a damaging event is unlikely, the potential impacts could be costly in the urban communities of the county. Most structures in Smith County are not built to withstand earthquake shaking, but because of the relatively low magnitude of a possible earthquake, property damage would likely be minor.

Due to no previous earthquake events in the planning area and the rare likelihood that such an earthquake event may occur for Smith County and the participating jurisdiction, annualized economic losses were not figured. Smith County and the participating jurisdictions do not expect any impact from loss of functionality for critical facilities and infrastructures, utility, transportation, and other essential services.

Smith County could be affected by incoming evacuees from an earthquake in the New Madrid region (northeastern Arkansas, southeastern Missouri, and western Tennessee). This influx of people could result in a shortage of short-term lodging, such as hotel rooms and extended stay establishments.

Community Perception of Vulnerability

The Steering Committee members from the Cities of Hideaway and Lindale feel that their critical facilities and infrastructure are not impacted by earthquakes and do not expect to be impacted in the future. Thus they believe they have “no exposure” to the hazard. The rest of the planning partner members believe they only have low risk to earthquakes.

See the first page of this chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

9.3 PROBABILITY OF FUTURE EVENTS

USGS has created ground motion maps based on current information about several fault zones. These maps show the peak ground acceleration (PGA) that has a certain probability (4% of being exceeded in a 50-year period, as shown on Figure 9-3. The PGA is measured in numbers of g’s (the acceleration associated with gravity). The USGS ground motion map projects the Smith County planning area to have a peak acceleration of 0.04g. This intensity produces only a weak ground shaking and is likely to cause no damage. At this intensity, shaking might not be felt or felt indoors by a few persons, especially on upper floors. Hanging objects or doors may swing and trees, structures, or bodies of water may sway. Dizziness or nausea can also be experienced.

There is a low probability of an earthquake occurring in Smith County within the next 100 years. According to USGS, there have been no recorded earthquake events in the Smith County planning area. It is possible for Smith County residents to feel an earthquake originating in other counties or a major earthquake in neighboring states.

The Steering Committee members assessed the future probability of an earthquake based on their jurisdictional knowledge. All jurisdictions ranked it as low probability of future occurrence except the Cities of Hideaway and Lindale ranked it as “no exposure”.

Source: Smith County, USGS, ESRI

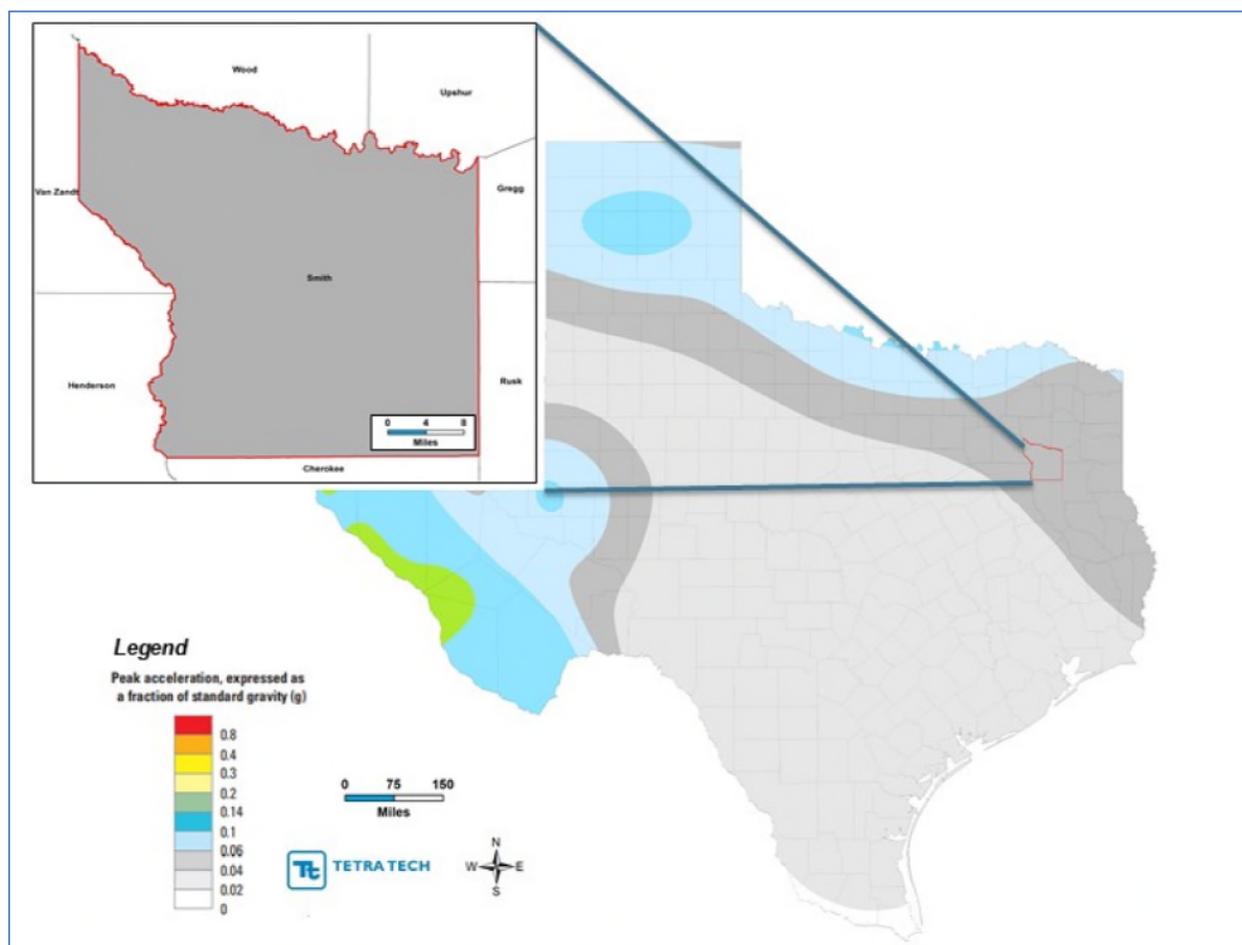


Figure 9-3. Earthquake Peak Ground Acceleration

9.4 CLIMATE CHANGE IMPACTS

The impacts of global climate change on earthquake probability are unknown. Some scientists say that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the earth's crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity according to research into prehistoric earthquakes and volcanic activity. National Aeronautics and Space Administration (NASA) and USGS scientists found that retreating glaciers in southern Alaska may be opening the way for future earthquakes there (NASA 2004).

Secondary impacts of earthquakes could be magnified by climate change. Soils saturated by repetitive storms could experience liquefaction during seismic activity due to their increased saturation. Dams storing increased volumes of water because of changes in the hydrograph could fail during seismic events. There are currently no models available to estimate these impacts.

9.5 ISSUES

Important issues associated with an earthquake include but are not limited to the following:

- Many structures within the planning area were built prior to 1994, when seismic provisions became uniformly applied through building code changes.

- Critical facility owners should be encouraged to create or enhance continuity of operations plans using the information on risk and vulnerability contained in this plan.
- Geotechnical standards should be established that take into account the probable impacts from earthquakes in the design and construction of new or enhanced facilities.
- Earthquakes could trigger other natural hazard events such as dam failures which could severely impact the county.
- A worst-case scenario would be the occurrence of a large seismic event during a flood or high-water event. Failures could happen at multiple locations, increasing the impacts of the individual events.
- The cost of retrofitting buildings to meet earthquake seismicity standards may be cost-prohibitive.
- Dams located in the county may not have been engineered to withstand probable seismic events.
- Information regarding liquefaction susceptibility of soils in the planning area is lacking.

Chapter 10. FLOOD

FLOOD HAZARD	
Jurisdiction	
Smith County	28
City of Arp	51
City of Bullard	18
City of Hideaway	24
City of Lindale	30
City of New Chapel Hill	24
City of Noonday	6
City of Tyler	21
City of Troup	12
City of Whitehouse	28
City of Winona	24
See Chapter 16 for more information on hazard ranking.	

10.1 HAZARD PROFILE

Floods generally result from excessive precipitation, and the severity of a flooding event is typically determined by a combination of several major factors, including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface. Generally, floods are long-term events that may last for several days.

Riverine flooding, the primary type of flooding in Smith County because of its inland location, is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. It is natural and inevitable as it is the overbank flooding of rivers and streams, typically resulting from large-scale weather systems that generate prolonged rainfall over a wide geographic area. Some river floods occur seasonally when winter or spring rainfalls fill river basins with too much water, too quickly. Torrential rains from decaying hurricanes or tropical systems can also produce river flooding.

Texas has the most flash flood deaths of any state in the country. Although the Smith County planning area lies northeast of the “Flash Flood Alley” area of Texas, it is still susceptible to flash flood events every year. Factors contributing to flash floods in the area include its location between the Rocky Mountains and the moisture-laden Gulf of Mexico. As weather systems stall and dissipate over Texas, they drop intense rains over small areas.

Flooding in the Smith County planning area is mostly caused by slow-moving thunderstorms, thunderstorms repeatedly moving over the same area, or heavy rains from hurricanes and tropical storms. Flash floods can occur within a few minutes or after hours of excessive rainfall. These rain events are most often microbursts, which produce a large amount of rainfall in a short amount of time. Flash floods, by their nature, occur suddenly but usually dissipate within hours. According to the National Weather Service,

DEFINITIONS

Flood — The inundation of normally dry land resulting from the rising and overflowing of a body of water.

Floodplain — The land area along the sides of a river that becomes inundated with water during a flood.

1-Percent-Annual-Chance (100-Year)

Floodplain — The area flooded by the flood that has a 1-percent chance of being equaled or exceeded in a given year. The 1-percent-annual-chance flood is the standard used by most federal and state agencies.

0.2-Percent-Annual-Chance (500-Year)

Floodplain — The area flooded by the flood that has a 0.2-percent chance of being equaled or exceeded in a given year.

Regulatory Floodway — Channel of a river or other water course and adjacent land areas that must be reserved for discharge of the base flood without cumulatively increasing water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure no increases in upstream flood elevations.

Return Period — The average number of years between occurrences of a hazard (equal to the inverse of the annual likelihood of occurrence).

Riparian Zone — The area along the banks of a natural watercourse.

Smith County experienced 31 to 50 flash flood events between 1986 to 1999 (Floodsafety.com, 2000). Despite their sudden nature, the NWS is usually able to issue hazardous weather outlooks, watches, and warnings in advance of a flood.

10.1.1 Location

Smith County lies mainly within the Neches River Basin but the northern section of the county lies within the Sabine River Basin following the Sabine River. The Neches River starts in neighboring Van Zandt County and runs along the western border of Smith County and then continues south. The Sabine River starts in Hunt County and flows southeast forming the northern border of Smith County (see Figure 10-1).

Some local waterbodies include the Black Fork Creek and Tributaries, Butler Creek, Gilley Creek and Tributary, Harris Creek, Henshaw Creek, Indian Creek, Ray Creek, Shackelford Creek, West Mud Creek and Tributaries, Wiggins Creek, and Willow Creek (FIS, 2014). Lake Tyler and Lake Tyler East are the primary water supply reservoirs.

In addition to the riverine flooding, Smith County and the participating jurisdictions experience urban flooding caused by urbanization which can increase the runoff potential of an area.

Flash flooding occurs in those locations of the planning area that are low-lying or do not have adequate drainage to carry away the amount of water that falls during intense rainfall events. According the NCEI and reports from the Steering Committee members, the following locations have a history of flash flooding events: unincorporated county, Highway 110 at Mud Creek northwest of Troup; Farm to Market Road 1804 from east of Highway 69 northeast of Lindale to the Sabine River; roads in Whitehouse and Troup; County Road 121 east of Bullard; and County Road 294 just northwest of Arp.

Source: UTA, USGS, 2010

Note: Smith County is located within the black square.



Figure 10-1. Texas River Basins

The floodplain boundary extents for the creeks, streams, rivers, and lakes have been mapped by FEMA in the county. The resulting Digital Flood Insurance Rate Maps, or DFIRMs provide an official depiction of flood hazard risks and risk premium zones for each community and for properties located within it. The published DFIRMs within Smith County became effective on April 16, 2014.

FEMA has identified flood zones in the unincorporated county and all the incorporated jurisdictions on the DFIRMs in Figure 10-2 through Figure 10-12. The county-level map is provided first and the remaining maps are provided in alphabetical order by city.

Smith County

The main flooding sources in Smith County include Black Fork Creek and Tributaries, Butler Creek, Gilley Creek and Tributary, Harris Creek, Henshaw Creek, Indian Creek, Ray Creek, Shackelford Creek, West Mud Creek and Tributaries, Wiggins Creek, and Willow Creek.

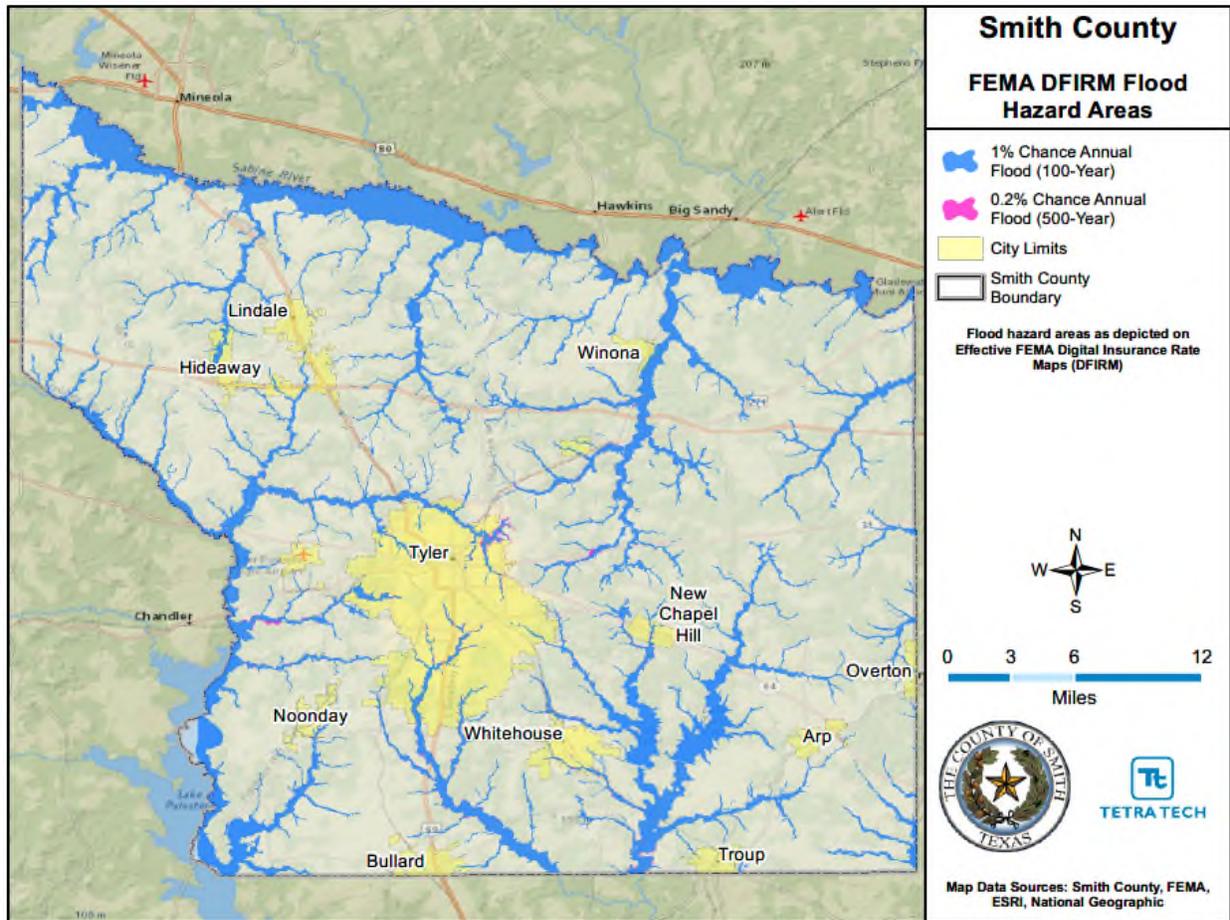


Figure 10-2. Smith County DFIRM

City of Arp

The City of Arp is located in the southeast corner of the county, approximately 19 miles from Tyler. As shown on the map below, narrow floodplains from small tributaries are present in the annexed portion of the city.

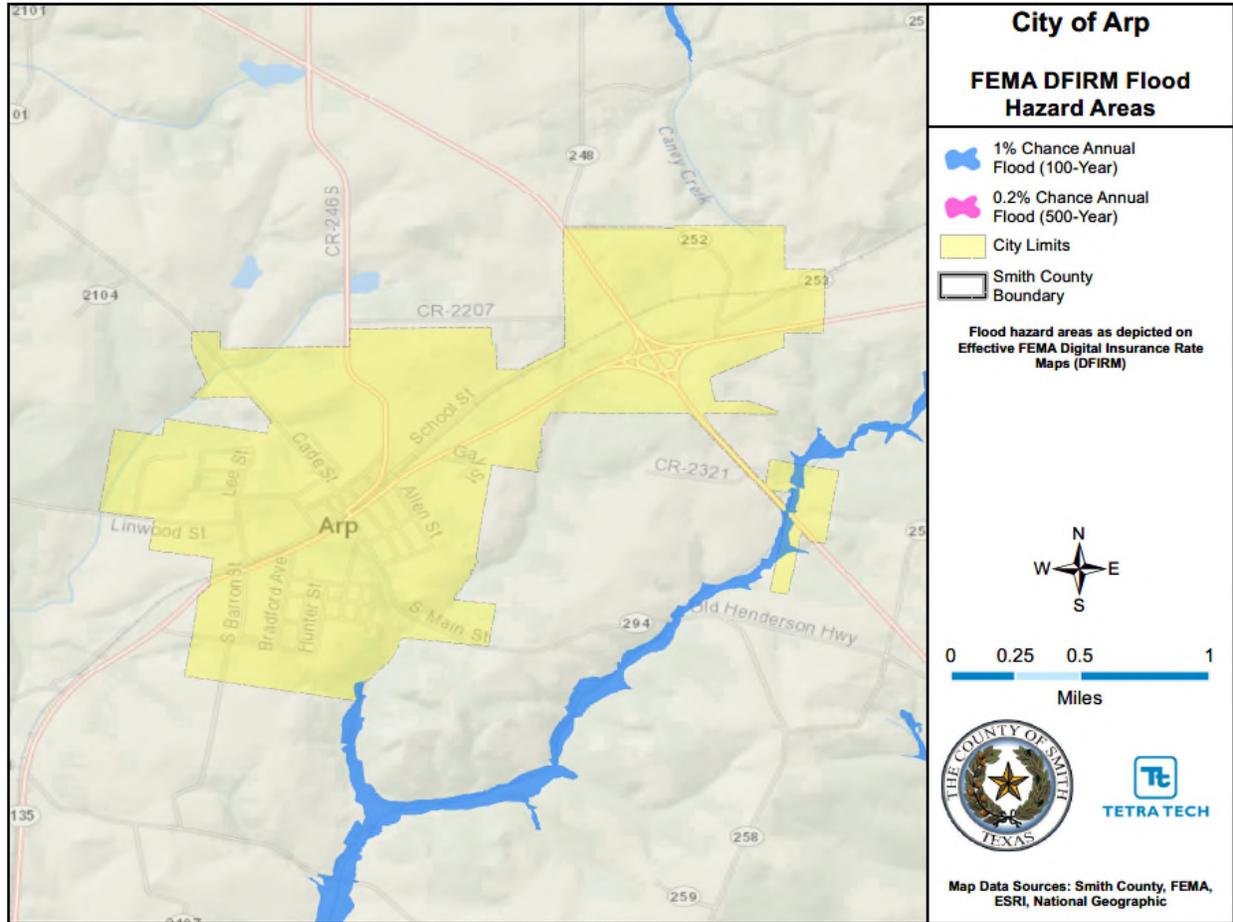


Figure 10-3. City of Arp DFIRM

City of Bullard

The City of Bullard is directly south of Tyler along U.S. Highway 69. The portion of the city in Smith County only has a narrow floodplain from a small tributary.

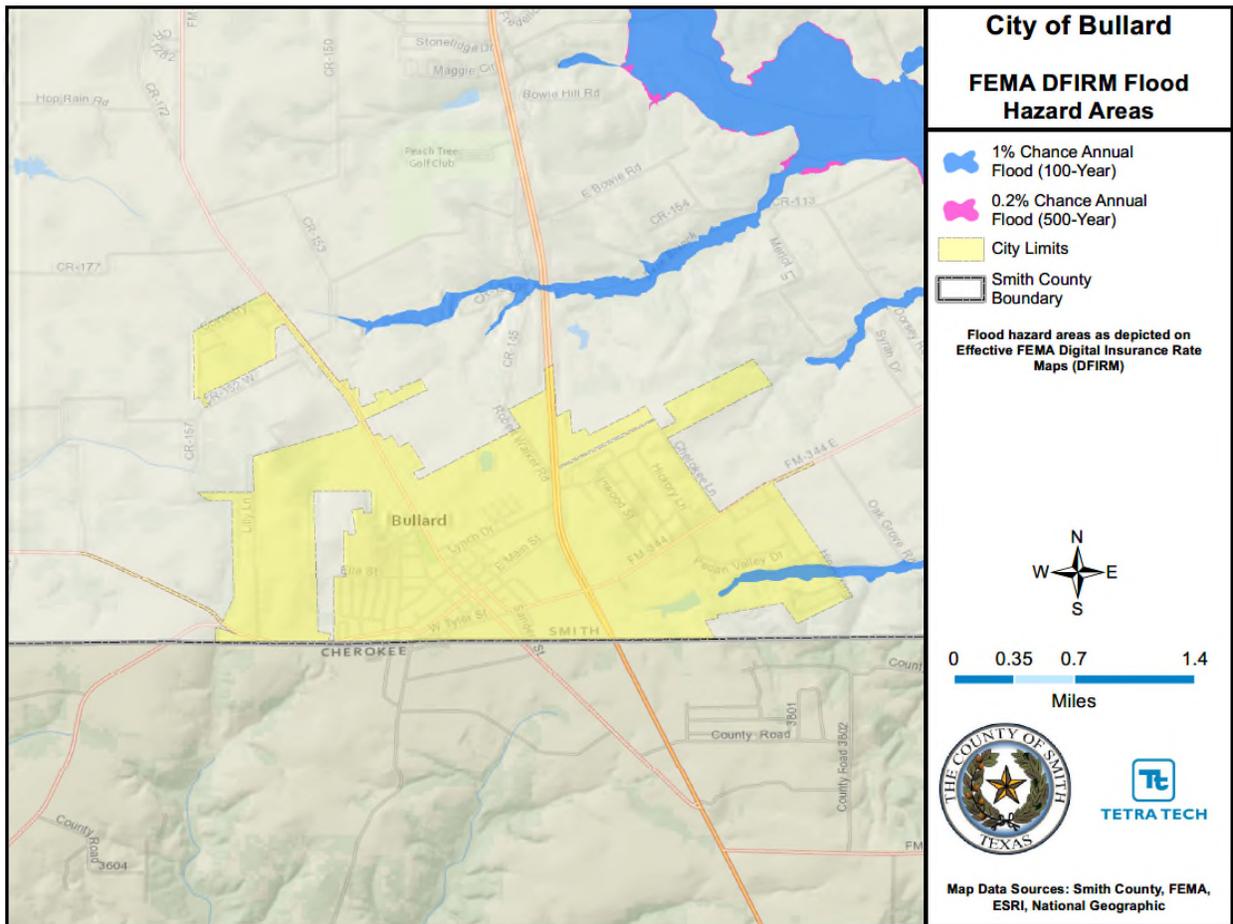


Figure 10-4. City of Bullard DFIRM

City of Hideaway

The City of Hideaway is a lake community that is located 16 miles northwest of Tyler. The lakes are fed by the Sabine River tributaries.

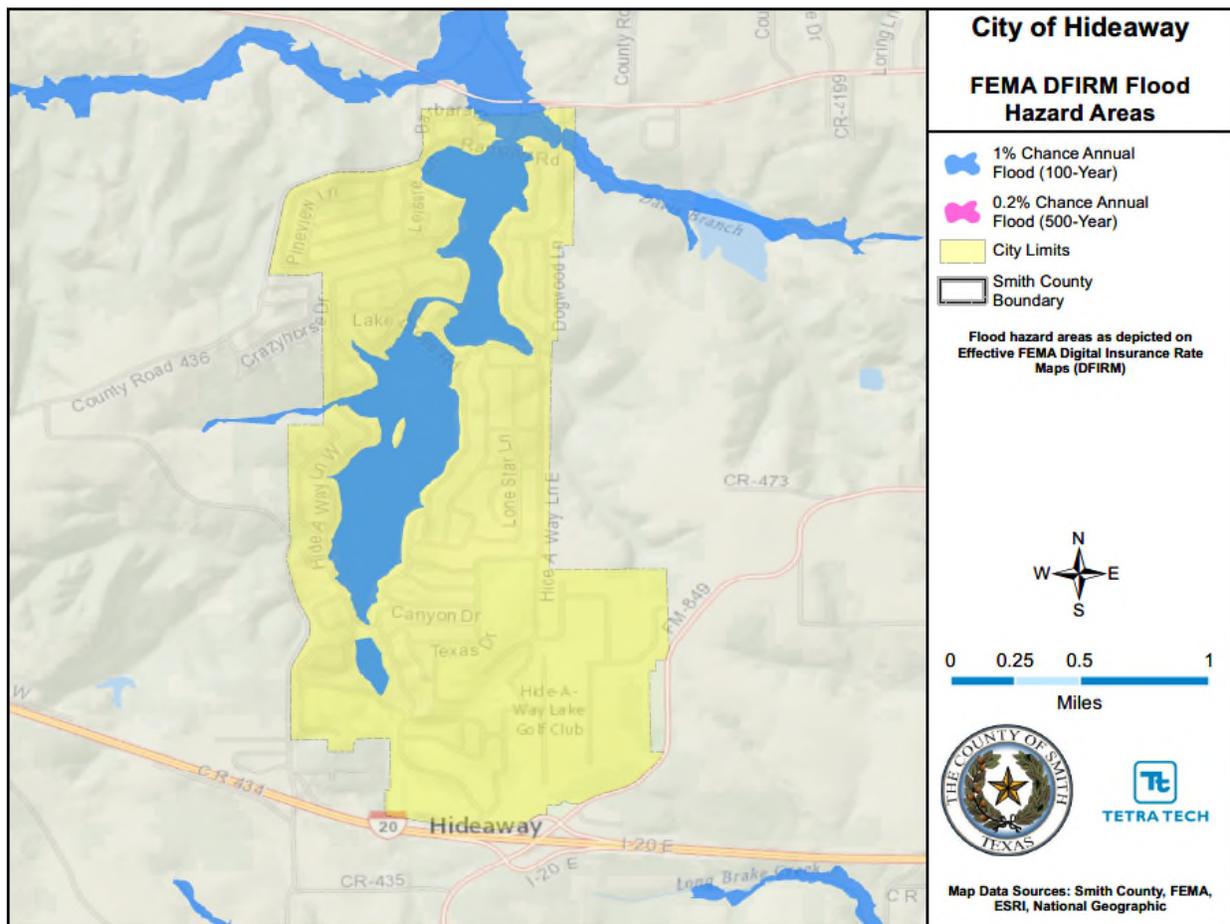


Figure 10-5. City of Hideaway DFIRM

City of Lindale

The City of Lindale is approximately 14 miles northwest of Tyler along U.S. Highway 69. Narrow floodplains from small tributaries are the only 1% chance annual floodplains with the city limits.

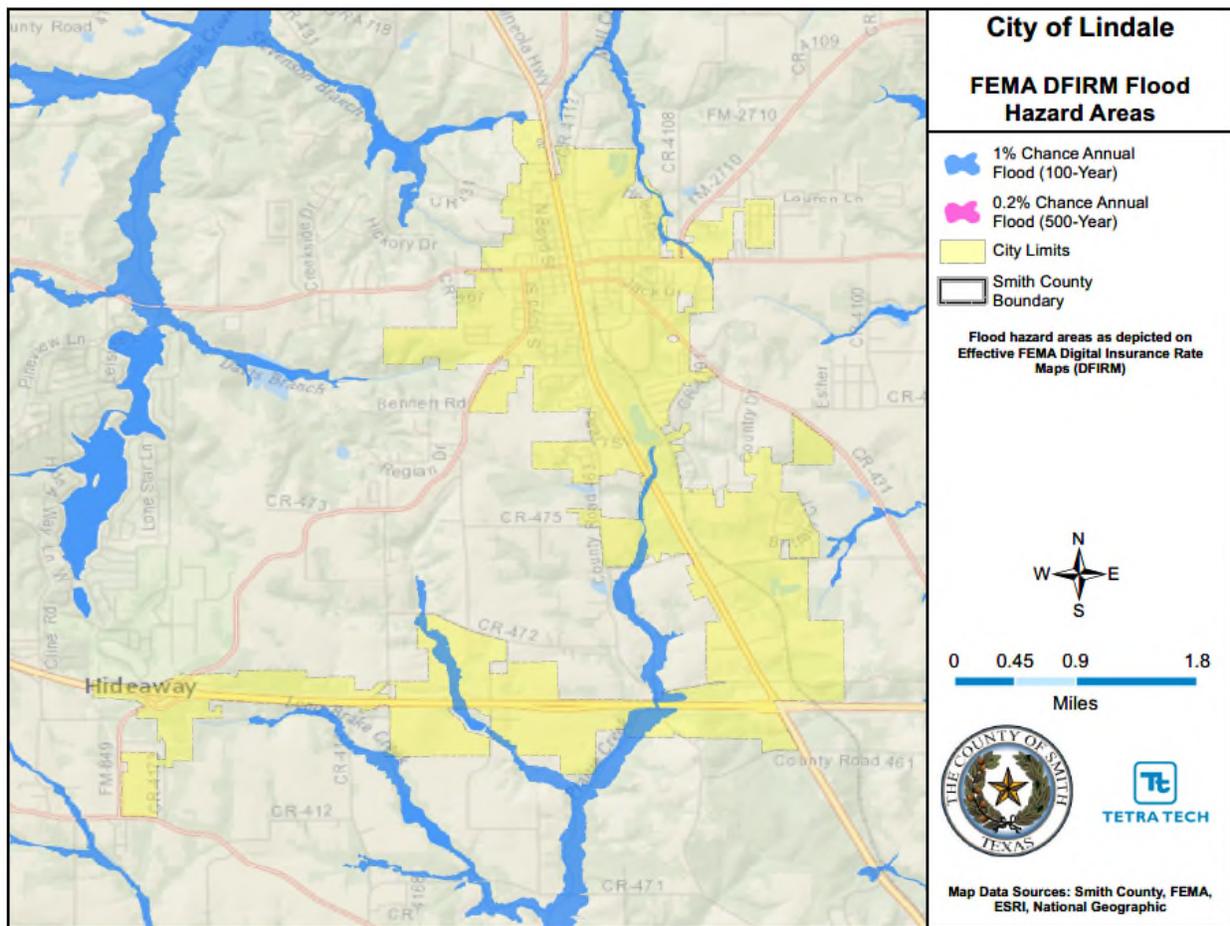


Figure 10-6. City of Lindale DFIRM

City of New Chapel Hill

New Chapel Hill is a bedroom community located on the southeast side of Tyler. Prairie Creek runs through city center and the Pleasure Acres Lake is located just west of the city.

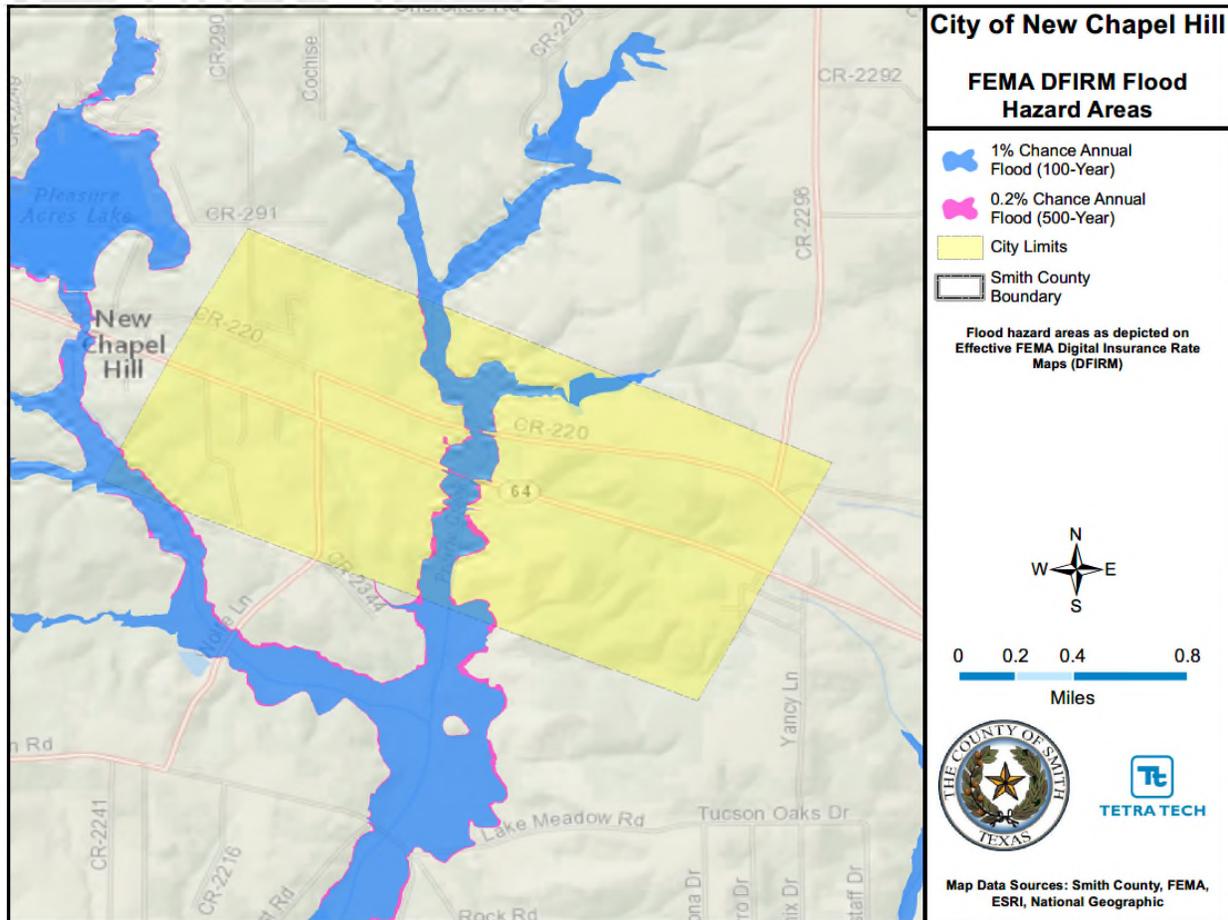


Figure 10-7. City of New Chapel Hill DFIRM

City of Noonday

The City of Noonday is located approximately 11 miles southwest of Tyler. The city has only a small portion on the southeast side within the 1% chance annual flood zone.

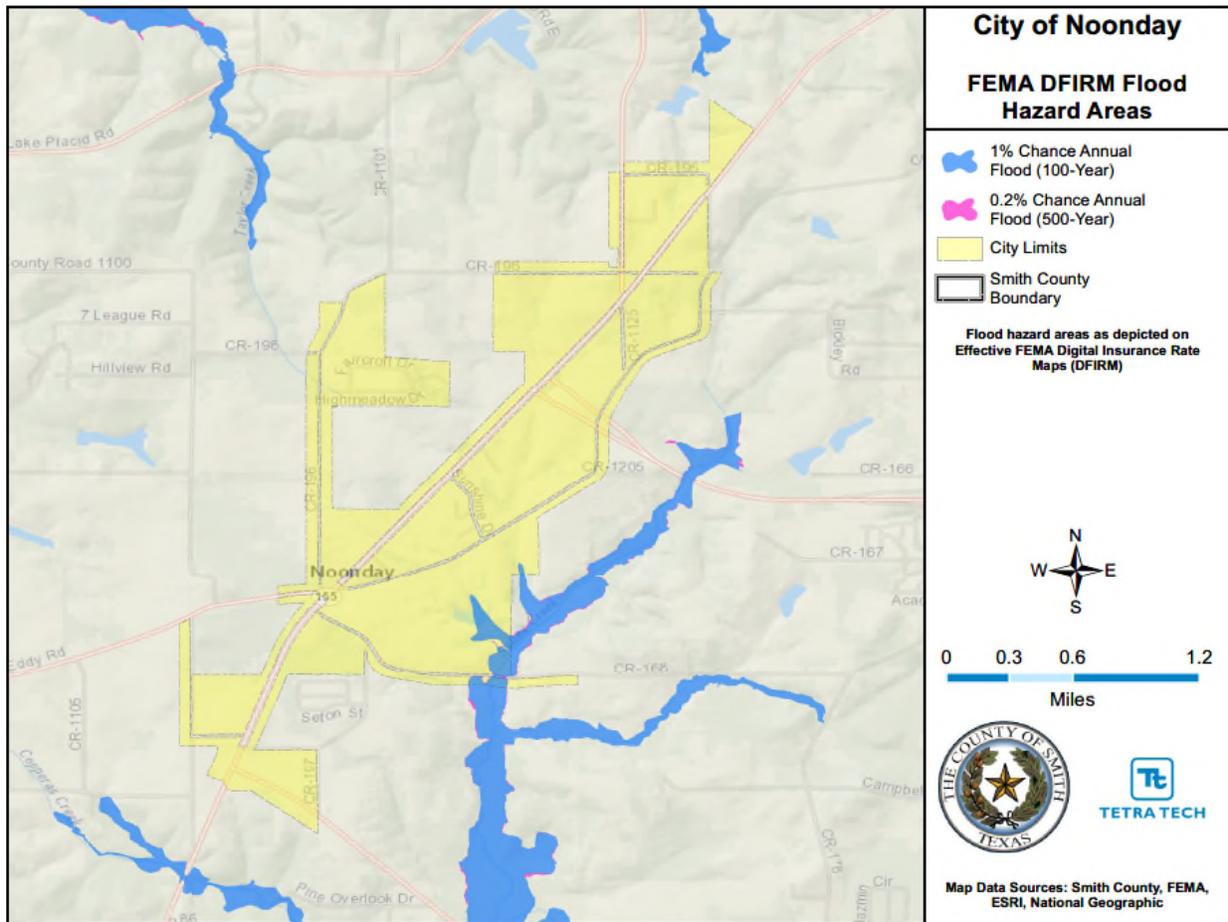


Figure 10-8. City of Noonday DFIRM

City of Troup

The City of Troup is located 19 miles south of Tyler with only part of the city in Smith County. There is a small narrow floodplain from a tributary within the city.

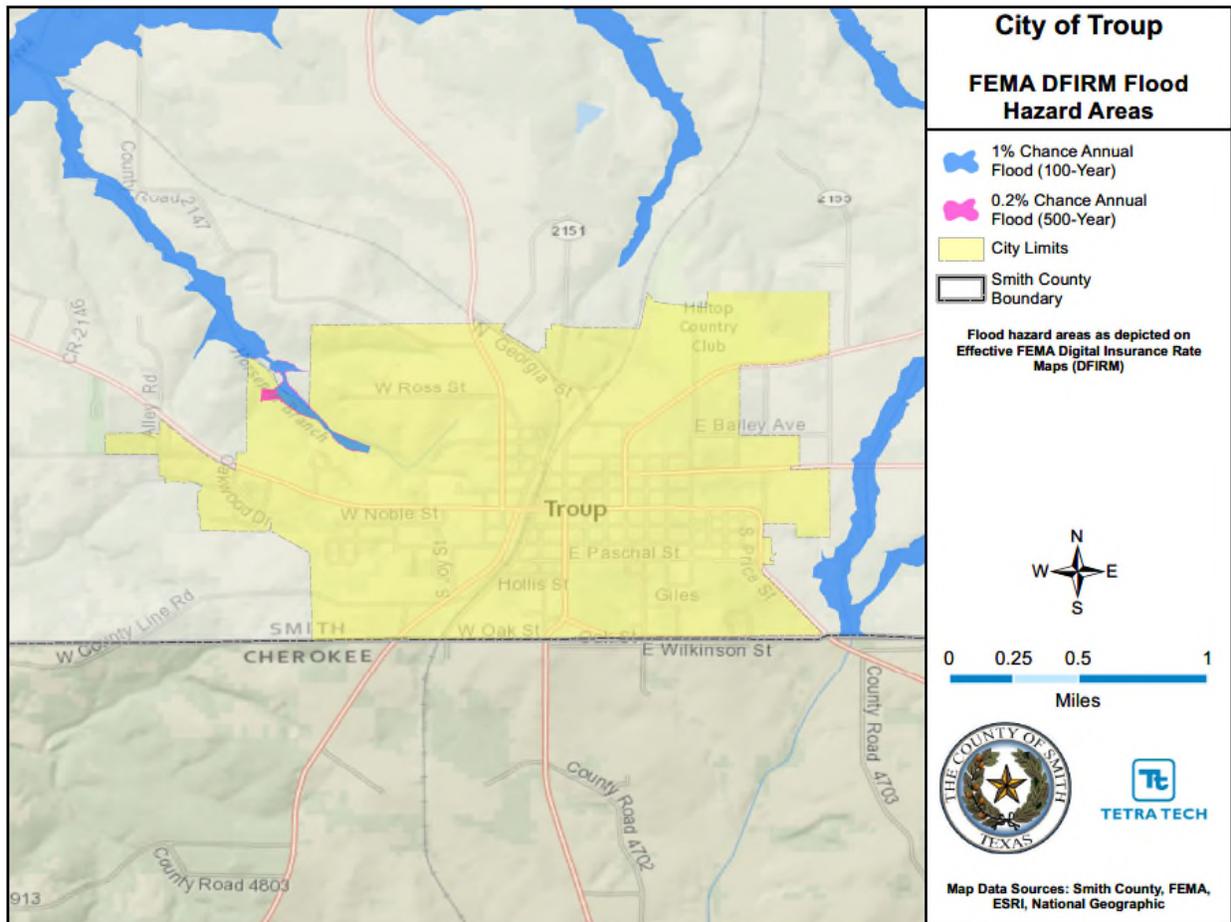


Figure 10-9. City of Troup DFIRM

City of Tyler

The City of Tyler is centrally located within Smith County and it is largest city in the county. There are multiple creeks and tributaries within the city that cause urbanized flooding.

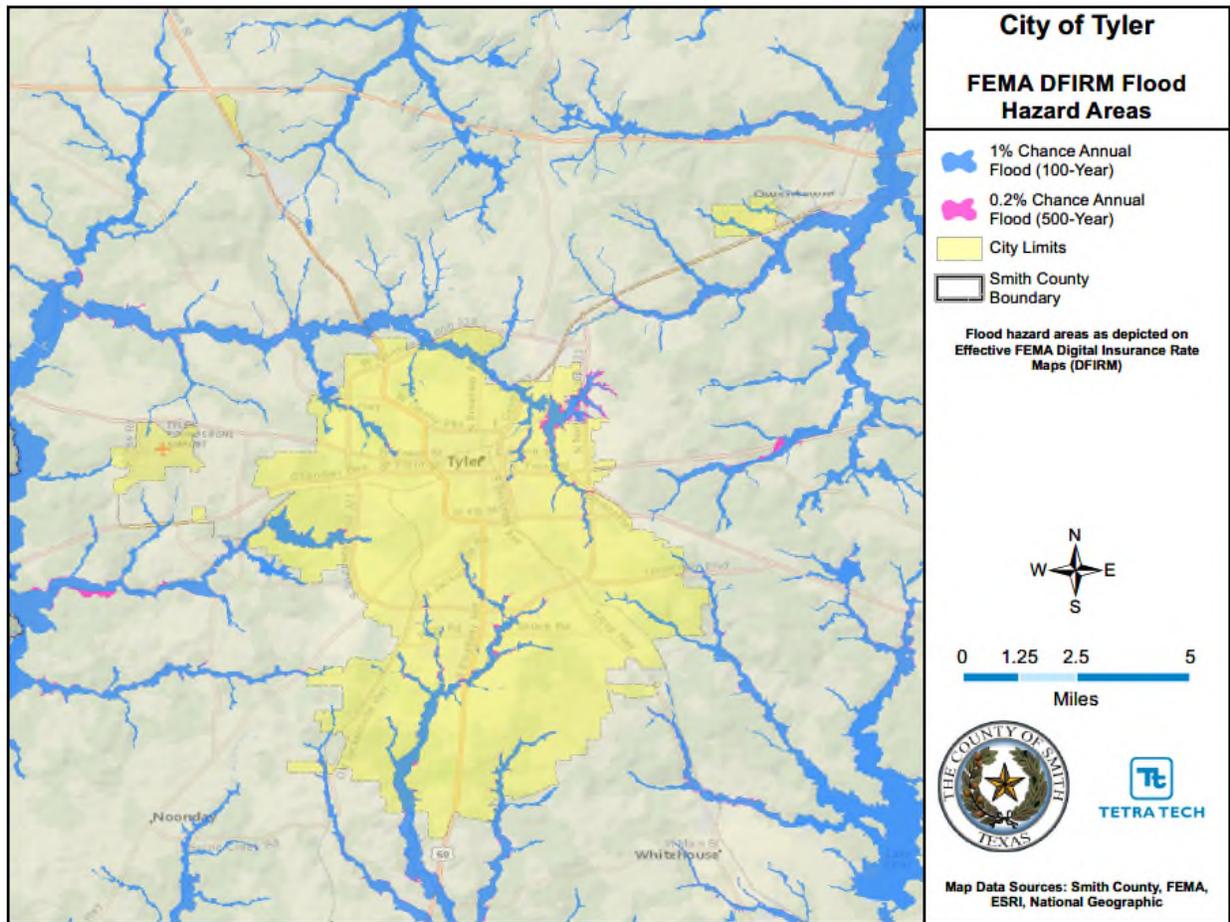


Figure 10-10. City of Tyler DFIRM

City of Whitehouse

The City of Whitehouse is located 10 miles south of Tyler along Highway 110. Hill Creek flows along the north portion of the city and feeds into Lake Tyler just east of the city. The small tributaries are narrow bands of 1% chance annual flood on the southern portion of the city.

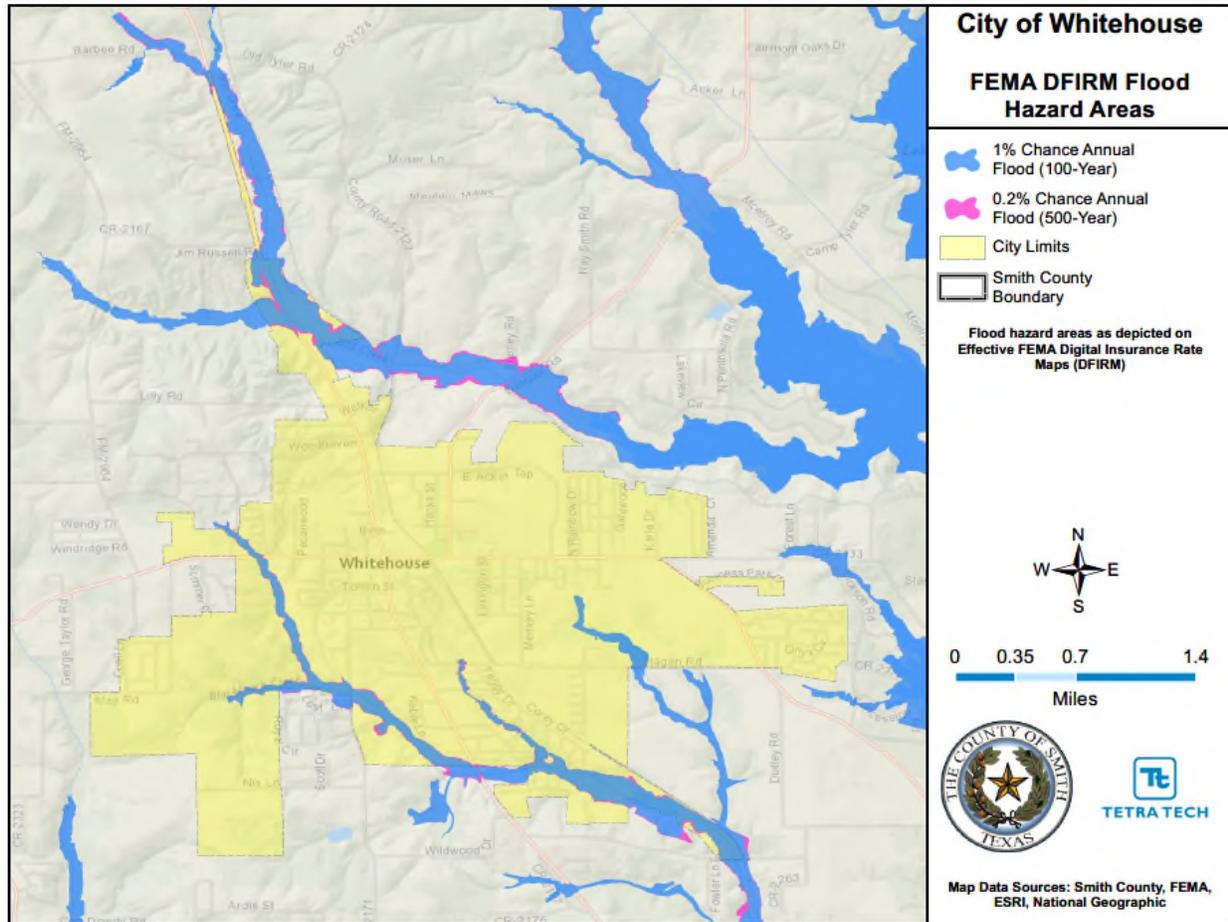


Figure 10-11. City of Whitehouse DFIRM

City of Winona

The City of Winona is located approximately 14 miles northeast of Tyler. The 1% chance annual flood area runs along the eastern city limits that are fed by the Sabine River.

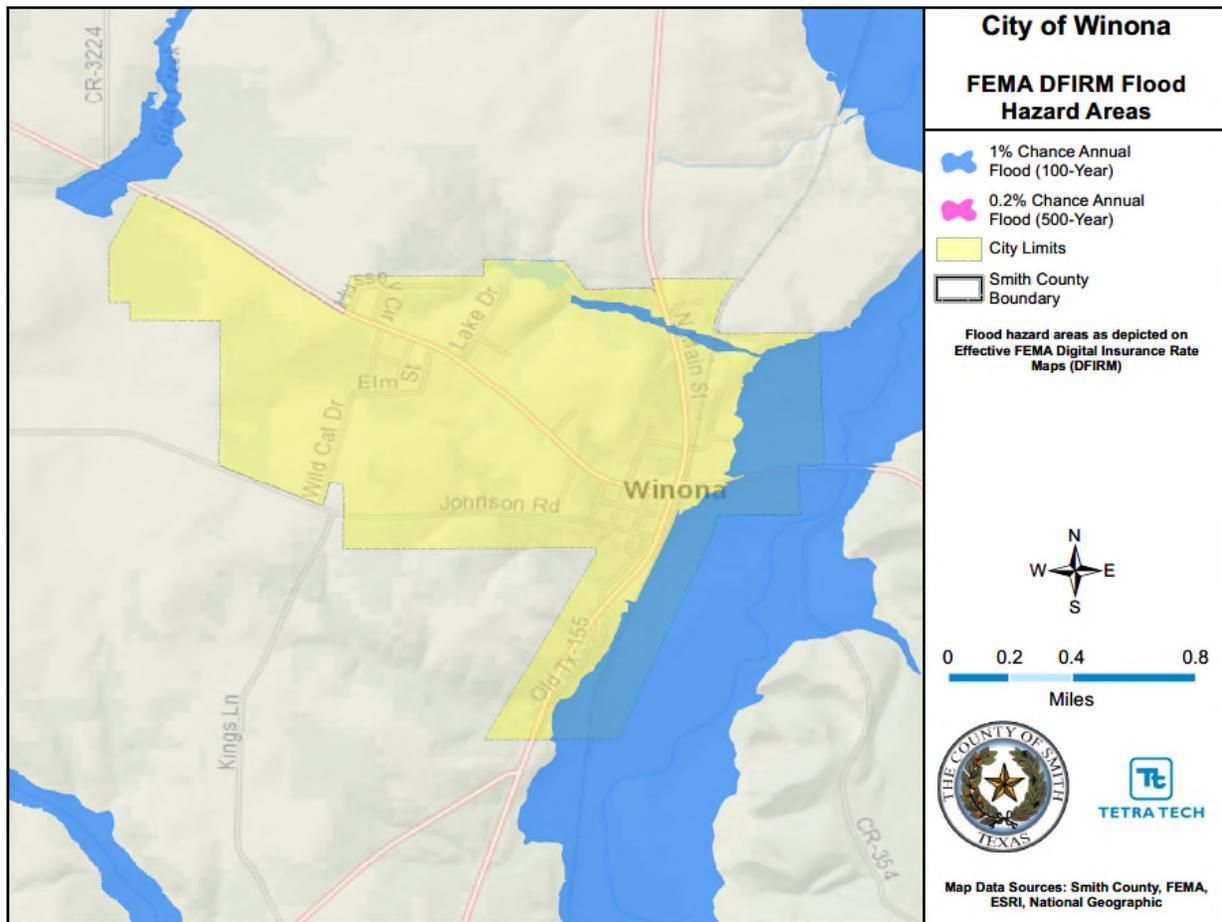


Figure 10-12. City of Winona DFIRM

10.1.2 Extent

The severity of a flood event is typically determined by a combination of several factors including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and degree of vegetative clearing and impervious surface. Generally, floods are long-term events that may last for several days.

Estimating the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area. FEMA categorizes areas on the terrain according to how the area will convey the discharge of flood water. The extent of flood damage can be expected to be greater in the areas where a base flood can occur. A base flood is defined by FEMA as a flood having a 1-percent-annual-chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the "100-year flood." The base flood is the national standard used by the National Flood Insurance Program (NFIP) and all federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Flood zones are the categories that are mapped on Flood Insurance Rate Maps. Table 10-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm.

Table 10-1. Flood Zones

Intensity	Zone	Description
High	Zone A	<p>Zone A is interchangeably referred to as the 100-year flood, the 1-percent-annual-chance flood, or the Special Flood Hazard Area (SFHA), or more commonly, the base flood. Zone A is the area where the base flood will occur, and there constitutes a threat to the planning areas.</p> <p>Areas with a 1-percent-annual-chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.</p>
Moderate to Low	Zone X	<p>Area with a 0.2-percent-annual-chance (500-Year) floodplain — The area inundated by the flood that has a 0.2-percent chance of being equaled or exceeded in a given year.</p>

Source: FEMA, 2017

Structures built in the SFHA are subject to damage by rising waters and floating debris. Moving flood water exerts pressure on everything in its path and causes erosion of soil and solid objects. Utility systems such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, if not elevated above the base flood elevation, may also be damaged.

The possible extent of flooding is also monitored by U.S. Geological Survey (USGS) river and lake gauges. There are two USGS gauges in particular that are monitored for flood depth in the Smith County planning area. One is at Lake Tyler, USGS 08034000, monitoring the lake levels and thus the dam over flow. The second is along the Sabine River near Hawkins, Texas, USGS 08019200, in Wood County (north of the planning area).

Lake Tyler, USGS 08034000, gauge readings in Figure 10-13 show the extent of reservoir water surface elevations and historical flood stage levels above the red capacity line. Currently, the lake is at capacity and it peaked most recently in 2016 (USGS, 2018).

Sabine River, USGS 08019200, gauge readings in Figure 10-14 show the extent of Sabine River annual peak streamflow. The most recent peak streamflow was in 2016 (USGS, 2018a).

The worst case scenario for the Smith County planning area is to see up to a 1-percent-annual-chance flood with 5 to 10 feet of water in each participating community.

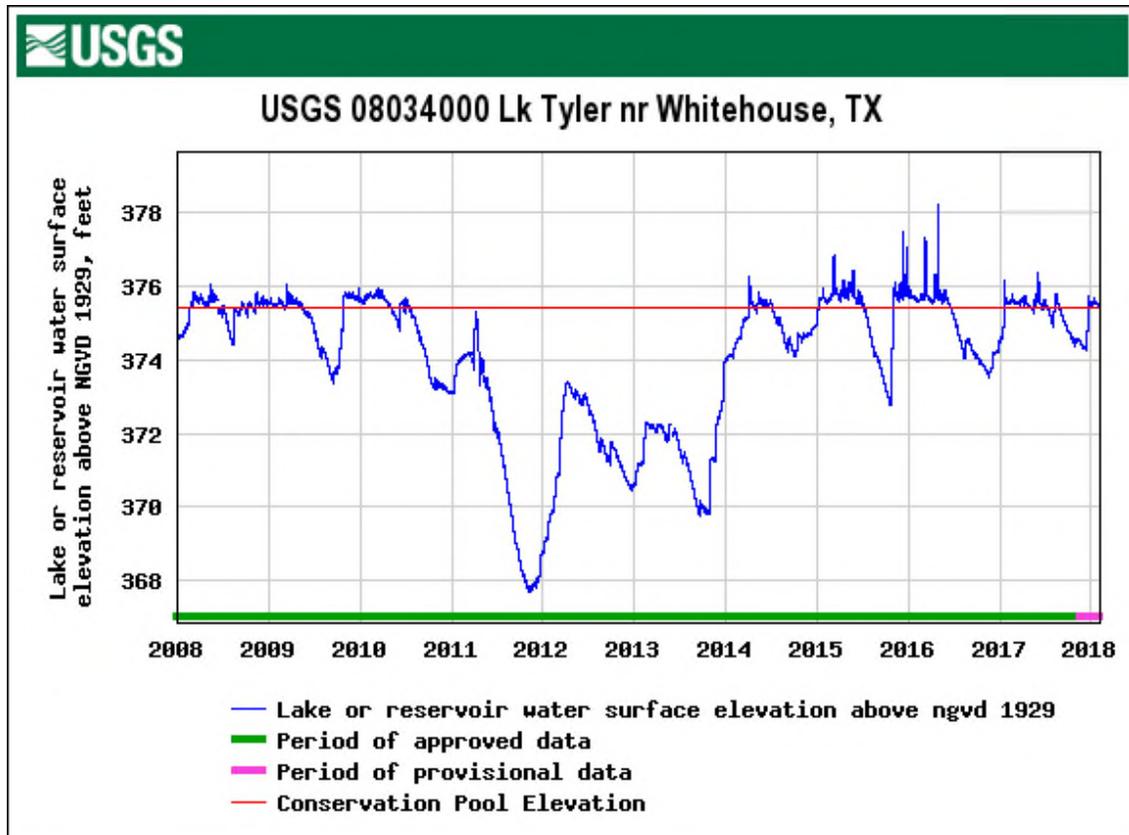


Figure 10-13. USGS Lake Tyler Gauge, 2008-2017

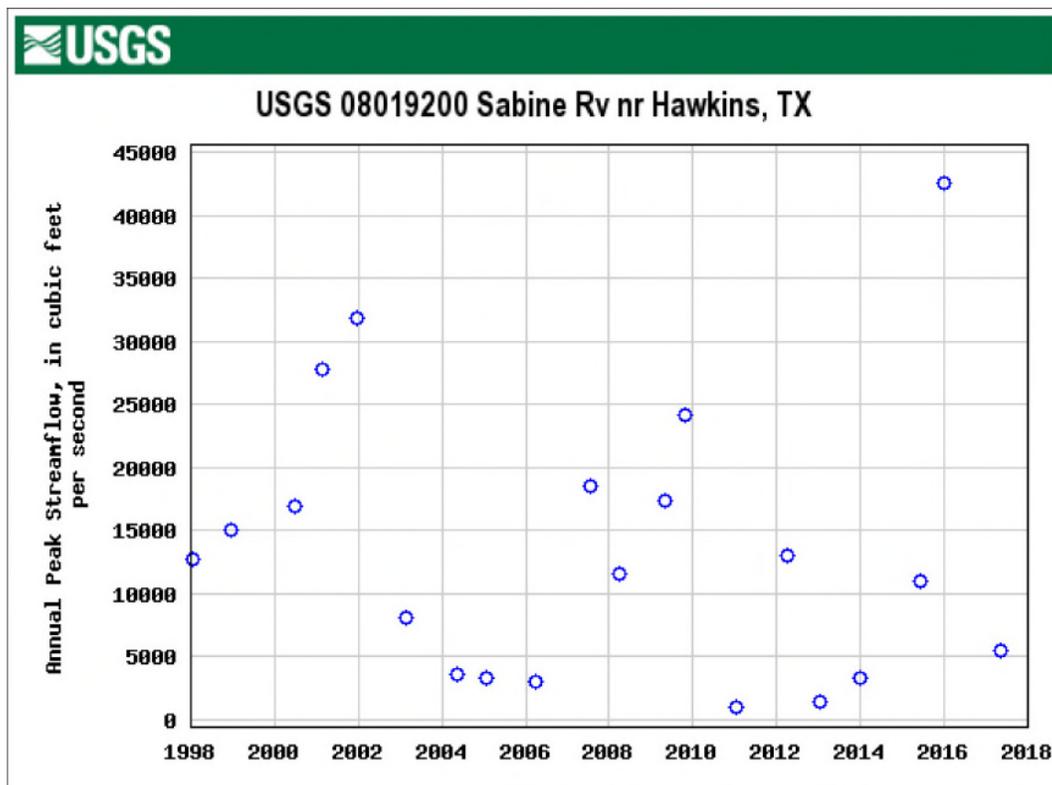


Figure 10-14. USGS Sabine River Gauge, 1998-2017

The National Weather Service has various flash flooding product that are issued to the public to provide information regarding the possible extent of upcoming and current flash flood threats (see Table 10-2).

Table 10-2. NWS Flash Flooding Products

Product	What It Means	You Should...
Hazardous Weather Outlook	Will there be any threat of flash flooding in the next several days?	If there is a threat of flash flooding, check back later for updated forecasts and possible watches and warnings.
Flash Flood Watch	There is a threat of flash flooding within the next 48 hours, either as a result of heavy rain or the threat of a dam break.	Monitor weather conditions closely, especially if you live in an area prone to flash flooding.
Flash Flood Warning	There is an immediate threat for flash flooding in the warned area, especially in low-lying and poor drainage areas.	If you live in an area susceptible to flash flooding, be prepared to evacuate and head to higher ground. Be very cautious when driving in the warned area, especially at night or while it is still raining. You may not be able to see a flooded road until it is too late!
Areal Flood Warning	The threat of flash flooding is over, but there is still significant standing water in the affected area.	Areal flood warning will typically list locations and roads impacted by the flooding. Try to avoid these locations until the water has receded.

Source: NWS, 2017

10.1.3 Past Events

The National Centers for Environmental Information (NCEI) storm events database includes flash flood and heavy rain events (no flood events were recorded). These occurred in the Smith County planning area during this plan update timeframe of 2008 through 2017 and are listed in Table 10-3, as well as other events from local resources and experts. Twenty-one events were recorded, events occurring on the same day in different jurisdictions, were recorded as one event.

Since 1965, there have been three Presidential Disaster Declarations that included flooding in the planning area. There is one included in this plan update timeframe, FEMA-DR-4269-DR for the April 29, 2016 event.

Table 10-3. Historical Flood Events in Smith County

Location	Date	Type	Death	Injury	Estimated Property Damage
Lindale	6/4/2017	Flash Flood	0	0	0
Lake Tyler, Lindale, Whitehouse, Troup, Arp, Bullard	4/29/2016 (FEMA-DR-4269)	Flash Flood	0	0	0
Countywide	3/9/2016	Flash Flood	0	1	0
Noonday	12/27/2015	Flash Flood	0	1	0
Noonday	12/13/2015	Flash Flood	0	0	0
Troup	5/30/2015	Flash Flood	0	0	0
Western Smith County	5/11/2015	Flash Flood	0	0	\$50,000
Gresham	3/9/2015	Flash Flood	0	0	0
Southeast Smith County	4/6/2014	Flash Flood	0	0	\$10,000
Southern Smith County	10/31/2013	Flash Flood	0	0	\$5,000

Location	Date	Type	Death	Injury	Estimated Property Damage
Northern Smith County	9/20/2013	Flash Flood	0	0	\$5,000
Wood Spgs	8/17/2012	Flash Flood	0	0	0
Bullard	3/20/2012	Flash Flood	0	0	0
Tyler, Lindale	6/10/2010	Flash Flood	0	0	\$75,000
Noonday	6/10/2010	Heavy Rain	0	1	\$193,000
Noonday	10/22/2009	Flash Flood	0	0	0
Lindale	8/1/2009	Flash Flood	0	0	0
Lindale	9/9/2008	Flash Flood	0	0	0
Bullard	8/11/2008	Flash Flood	0	0	0
Troup, Tyler	8/12/2008	Flash Flood	0	0	0
Gresham	3/9/2015	Flash Flood	0	0	0
Total			0	2	\$338,000

Notable past events in the Smith County planning area are described below:

- April 29, 2016 – FEMA-DR-4269-TX** – Severe thunderstorms started during predawn hours and continued all day. Widespread flash flooding developed as heavy rainfall moved repeatedly over the same areas. A total of 10 tornadoes touched down across East Texas and Southwest Arkansas, include a 27-mile-long track tornado near Lindale. Multiple roads were closed due to flooding such as: Highway 110 at Mud Creek northwest of Troup; Farm to Market Road 1804 from east of Highway 69 northeast of Lindale to the Sabine River; numerous roads flooded and closed in Whitehouse and Troup; County Road 121 east of Bullard; and County Road 294 just northwest of Arp.

Top Daily Rain Events

Table 10-4 lists the top 24 hour rain events from the Tyler Climate Station, 1984 to 2017. Flash flooding can be caused by intense rainfall over a brief period.

Month	Year	Amount (Inches)	Month	Amount (Inches)	Year
January	1998	3.71	July	4.68	2007
February	1986	5.48	August	6.47	2008
March	2016	4.61	September	4.83	2013
April	2007	3.99	October	8.02	1985
May	2015	3.86	November	4.54	2008
June	2010	7.38	December	3.36	1987

Source: WRCC, 2018

USDA Risk Management Agency

According to USDA Risk Management Agency, payments for insured crop losses in Smith County as a result of excessive moisture conditions between 2011 and 2016 caused \$4,484 in annualized crop losses that affected 39 acres. These claims occurred in 2015.

10.1.4 Warning Time

Due to the sequential pattern of meteorological conditions needed to cause serious flooding, it is unusual for a flood to occur without warning. Warning times for floods can be between 24 and 48 hours. Flash

flooding can be less predictable, but by paying attention to NWS's Hazardous Weather Outlook, residents can be warned in advanced of potential flash flooding danger.

10.2 VULNERABILITY AND IMPACTS

Many of the areas exposed to flooding may not experience serious flooding or flood damage. This section describes vulnerabilities in terms of population, property, and critical facilities and infrastructure. The exposure and vulnerability analysis was performed at the census-block level. This methodology is likely to overestimate impacts from the modeled 1-percent-annual-chance flood event as it is assumed that both structures and the population are evenly spread throughout census blocks.

Hazus was used to assess the risk and vulnerability to flooding in the planning area. The model used census data at the block level and FEMA floodplain data, which has a level of accuracy acceptable for planning purposes. Where possible, the Hazus default data were enhanced using GIS data from local, state, and federal sources.

10.2.1 Exposure

Population

Population counts of those living in the floodplain within the planning area were generated by estimating the percent of residential buildings in each jurisdiction within the 1-percent-annual-chance flood hazard areas and multiplying this by the total population within the planning area. This approach yielded an estimated population in the planning area of 9,335 living within the 1-percent-annual-chance flood area (4.44 percent of the total planning area population). Table 10-5 lists population estimates by jurisdiction living in the 1-percent-annual-chance flood hazard areas.

Property

Table 10-5 summarizes the estimated value of exposed buildings in the planning area in the 1-percent-annual-chance flood area. The Hazus model inventory data estimated \$44 million worth of building and contents exposure to the 1-percent-annual-chance flood area, representing 3.03% of the total replacement value of the planning area.

Table 10-5. Exposure Within the 1-Percent-Annual-Chance Flood

	Value Exposed			% of Total Replacement Value	Population Exposed ^a	% of 2010 Total Population
	Structure	Contents	Total			
Arp	\$157 K	\$81 K	\$238 K	0.02%	2	0.21%
Bullard	\$1.6 M	\$0.7 M	\$2.3 M	0.70%	21	0.86%
Hideaway	\$29.2 M	\$16.3 M	\$45.5 M	6.20%	130	4.41%
Lindale	\$6.7 M	\$4.4 M	\$11.1 M	1.20%	55	1.14%
New Chapel Hill	\$4.2 M	\$2.3 M	\$6.5 M	7.60%	50	8.35%
Noonday	\$1.2 M	\$0.6 M	\$1.8 M	1.30%	12	1.75%
Troup	\$464 K	\$374 K	\$838 K	0.40%	7	0.38%
Tyler	\$443 M	\$284 M	\$727 M	3.70%	3,257	3.32%
Whitehouse	\$29.3 M	\$18.7 M	\$48 M	3.90%	242	3.10%
Winona	\$1.5 M	\$0.7 M	\$2.2 M	1.70%	11	1.89%
Unincorporated	\$532 M	\$307 M	\$838 M	6.6%	5,537	6.18%
Total	\$75,296,000	\$44,746,000	\$120,042,000	3.03%	9,335	4.44%

^a Exposure numbers based on 2010 Census Block data multiplied by percentage of 100-year floodplain in each census block.

Critical Facilities and Infrastructure

Table 10-6 summarizes the number of critical facilities and infrastructure in the 1-percent-annual-chance flood area.

Jurisdiction	Medical and Health Services	Emergency Services	Educational Facilities	Other Critical Facilities	Utilities / Communication	Transportation Infrastructure	Total
Arp	0	0	0	0	0	0	0
Bullard	0	0	0	0	0	0	0
Hideaway	0	0	0	0	0	0	0
Lindale	0	0	0	0	1	0	1
New Chapel Hill	0	0	0	0	0	0	0
Noonday	0	0	0	0	0	0	0
Troup	0	0	0	0	0	0	0
Tyler	0	0	0	1	0	3	4
Whitehouse	0	0	0	0	1	1	2
Winona	0	0	0	0	0	0	0
Unincorporated County	1	0	0	0	3	64	68
Total	1	0	0	1	5	68	75

10.2.2 Impacts

Many of the areas exposed to flooding may not experience serious flooding or flood damage. This section describes impacts in terms of population, property, infrastructure, and agriculture. The analysis was performed at the census-block level. This methodology is likely to overestimate impacts from the modeled 1-percent-annual-chance flood event as it is assumed that both structures and the population are evenly spread throughout census blocks.

Population

Impacts on persons in the planning area were estimated for the 1-percent-annual-chance flood event through the Hazus analysis. Table 10-7 summarizes the results.

Jurisdiction	Estimated Displaced Population	% of 2010 Total Population
Arp	0	0.00%
Bullard	4	0.16%
Hideaway	70	2.38%
Lindale	42	0.87%
New Chapel Hill	10	1.67%
Noonday	1	0.15%
Troup	2	0.11%
Tyler	2,188	2.23%
Whitehouse	83	1.06%
Winona	3	0.51%

Jurisdiction	Estimated Displaced Population	% of 2010 Total Population
Unincorporated County	2,356	2.63%
Total	4,759	2.26%

Note: Bullard and Troup populations only include the portion in Smith County

Floods and their aftermath present numerous threats to public health and safety:

- **Unsafe food**—Floodwaters contain disease-causing bacteria, dirt, oil, human and animal waste, and farm and industrial chemicals. Their contact with food items, including food crops in agricultural lands, can make that food unsafe to eat. Refrigerated and frozen foods are affected during power outages caused by flooding. Foods in cardboard, plastic bags, jars, bottles, and paper packaging may be unhygienic with mold contamination.
- **Contaminated drinking and washing water and poor sanitation**—Flooding impairs clean water sources with pollutants. The pollutants also infiltrate into the groundwater. Flooded wastewater treatment plants can be overloaded, resulting in backflows of raw sewage. Private wells can be contaminated by floodwaters. Private sewage disposal systems can become a cause of disease if they overflow.
- **Mosquitoes and animals**—Floods provide new breeding grounds for mosquitoes in wet areas and stagnant pools. The public should dispose of dead animals that can carry viruses and diseases only in accordance with guidelines issued by local animal control authorities. Leptospirosis—a bacterial disease associated predominantly with rats—often accompanies floods in developing countries, although the risk is low in industrialized regions unless cuts or wounds have direct contact with disease-contaminated floodwaters or animals.
- **Mold and mildew**—Excessive exposure to mold and mildew can cause flood victims—especially those with allergies and asthma—to contract upper respiratory diseases, triggering cold-like symptoms. Molds grow in as short a period as 24 to 48 hours in wet and damp areas of buildings and homes that have not been cleaned after flooding, such as water-infiltrated walls, floors, carpets, toilets and bathrooms. Very small mold spores can be easily inhaled by human bodies and, in large enough quantities, cause allergic reactions, asthma episodes, and other respiratory problems. Infants, children, elderly people and pregnant women are considered most vulnerable to mold-induced health problems.
- **Carbon monoxide poisoning**—In the event of power outages following floods, some people use alternative fuels for heating or cooking in enclosed or partly enclosed spaces, such as small gasoline engines, stoves, generators, lanterns, gas ranges, charcoal or wood. Built-up carbon monoxide from these sources can poison people and animals.
- **Hazards when reentering and cleaning flooded homes and buildings**—Flooded buildings can pose significant health hazards to people entering them. Electrical power systems can become hazardous. Gas leaks can trigger fire and explosion. Flood debris—such as broken bottles, wood, stones and walls—may cause injuries to those cleaning damaged buildings. Containers of hazardous chemicals may be buried under flood debris. Hazardous dust and mold can circulate through a building and be inhaled by those engaged in cleanup and restoration.
- **Mental stress and fatigue**—People who live through a devastating flood can experience long-term psychological impact. The expense and effort required to repair flood-damaged homes places severe financial and psychological burdens on the people affected. Post-flood recovery can cause anxiety, anger, depression, lethargy, hyperactivity, and sleeplessness. There is also a long-term concern among the affected that their homes can be flooded again in the future.

Current loss estimation models such as Hazus are not equipped to measure public health impacts such as these. The best preparation for these effects includes awareness that they can occur, education of the public on prevention, and planning to deal with them during responses to flood events.

Property

Hazus calculates losses to structures from flooding by looking at depth of flooding and type of structure. Impacted structures are those with finished floor elevations below the flood event water surface elevation. These structures are the most likely to receive significant damage in a flood event. Using historical flood insurance claim data, Hazus estimates the percentage of damage to structures and their contents by applying established damage functions to an inventory. For this analysis, local data on facilities were used instead of the default inventory data provided with Hazus. The analysis is summarized in Table 10-8 for the 1-percent-annual-chance flood event.

Table 10-8. Loss Estimates for 1-Percent-Annual-Chance Flood

Jurisdiction	Estimated Losses by Replacement Value			% of Total Replacement Value
	Structure	Contents	Total	
Arp	\$1 K	\$0 K	\$1 K	<0.01%
Bullard	\$38 K	\$21 K	\$59 K	0.02%
Hideaway	\$4.1 M	\$3.0 M	\$7.1 M	1.00%
Lindale	\$649 K	\$528 K	\$1.2 M	0.13%
New Chapel Hill	\$253 K	\$144 K	\$397 K	0.46%
Noonday	\$17 K	\$9 K	\$26 K	0.02%
Troup	\$18 K	\$22 K	\$40 K	0.02%
Tyler	\$87 M	\$93 M	\$180 M	0.91%
Whitehouse	\$3.3 M	\$3.9 M	\$7.2 M	0.59%
Winona	\$56 K	\$30 K	\$86 K	0.07%
Unincorporated County	\$58 M	\$43 M	\$101 M	0.79%
Total	\$153,432,000	\$143,654,000	\$297,086,000	0.40%

Note: Losses based on 2010 Census Block data analysis in Hazus 4.0
Bullard and Troup losses only include the portion in Smith County.

Critical Facilities and Infrastructure

Hazus was used to estimate the flood loss potential to critical facilities exposed to the flood risk. Using depth/damage function curves, it estimates the percent of damage to the building and contents of critical facilities. This helps to gauge how long the planning area could have limited usage of facilities deemed critical to flood response and recovery. The Hazus critical facility results for 1-percent-annual-chance flood event is as follows (see Table 10-8):

- **1-percent-annual-chance flood event**—On average, critical facilities would receive 25.02 percent damage to the structure and 63.44 percent damage to the contents during a 1-percent-annual-chance flood event.

Table 10-9. Estimated Damage to Critical Facilities and Infrastructure from 1%-Annual-Chance Flood

Types of Critical Facilities and Infrastructure	Number of Facilities Affected	Average % of Total Value Damaged		Days to 100% Functionality
		Structure	Content	
Medical and Health Services	0	N/A	N/A	N/A
Emergency Services	0	N/A	N/A	N/A
Educational Facilities	0	N/A	N/A	N/A
Other Critical Facilities	1	40.31	63.44	N/A
Utilities / Communication	5	34.54	N/A	N/A

Types of Critical Facilities and Infrastructure	Number of Facilities Affected	Average % of Total Value Damaged		Days to 100% Functionality
		Structure	Content	
Transportation Infrastructure	9	0.22	N/A	N/A
Total	15	25.02	63.44	N/A

Note: N/A Not applicable

Agriculture

According to the 6-year period from the USDA’s Risk Management Agency, the amount of claims paid for crop damage as a result of excessive moisture in Smith County was \$26,901. According to the 2016 Texas Insurance Profile from the USDA’s Risk Management Agency, 88 percent of the insurable crops in Texas are insured with USDA crop insurance. To estimate losses to insurable crops that are not insured, the 88 percent crop insurance coverage was factored in to provide an adjusted estimate of losses. According to this calculation, estimated annualized losses are over \$5,095 (see Table 10-10).

Considering the value of crops from the 2012 Census of Agriculture as the baseline crop exposure, the estimated annual losses was determined to be low compared to the value of the insurable crops.

Table 10-10. Estimated Insurable Annual Crops Lost Resulting from Excessive Moisture

6-Year Excessive Moisture Insurance Paid	Adjusted 6-Year Losses (considering 88% insured)	Estimated Annualized Losses	2012 Value of Crops
\$26,901	\$30,569	\$5,095	\$59,512,000

Source: USDA, 2012; USDA RMA, 2016; USDA, 2016

Community Perception of Vulnerability

The City of Arp ranked flood as a “high” hazard and the jurisdictions of Smith County, Hideaway, Lindale, New Chapel Hill, Tyler, Whitehouse, and Winona ranked flood as a “medium” hazard. The Cities of Bullard, Noonday, and Troup ranked flood as a “low” hazard.

See the first page of this chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

National Flood Insurance Program Participation

Participants in the NFIP must, at a minimum, regulate development in floodplain areas in accordance with NFIP criteria. Before issuing a permit to build in a floodplain, participating jurisdictions must ensure that three criteria are met:

- New buildings and those undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain development must not aggravate existing flood problems or increase damage to other properties.
- New floodplain development must exercise a reasonable and prudent effort to reduce its adverse impacts on threatened salmonid species.

Smith County and all incorporated cities in the county that participate in the NFIP, are currently in good standing with the provisions of the NFIP. Compliance is monitored by FEMA regional staff and by the Texas Water Development Board under a contract with FEMA. Maintaining compliance under the NFIP is an important component of flood risk reduction. All planning partners that participate in the NFIP have identified initiatives to maintain and continue their compliance and good standing.

Table 10-11 provides details on NFIP participation for the communities in the planning area as well as the number of policies in force, amount of insurance in force, number of closed losses, and total payments for each jurisdiction, where applicable. The claims information is for the period from January 1, 1978 to November 30, 2017.

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Table 10-11. National Flood Insurance Program Statistics

Jurisdiction	NFIP Participation (Yes/No)	Current Effective Map Date	Program Entry Date	Policies in Force	Insurance in Force	# of Closed Losses	Value of Claims Paid (\$)
Smith County	Yes	04/16/14	07/02/81	217	\$58,653,000	42	\$1,097,391
Arp	No	04/16/14	N/A	N/A	N/A	N/A	N/A
Bullard	Yes	04/16/14	04/24/79	5	\$1,260,000	2	\$31,235
Hideaway	Yes	04/16/14	12/31/08	0	0	0	0
Lindale	Yes	04/16/14	03/06/09	3	\$875,000	0	0
New Chapel Hill	No	04/16/14	N/A	N/A	N/A	N/A	N/A
Noonday	Yes	04/16/14	10/27/08	0	0	0	0
Troup	Yes	04/16/14	01/23/79	0	0	0	0
Tyler	Yes	04/16/14	08/01/80	365	\$103,494,600	129	\$2,090,459
Whitehouse	Yes	04/16/14	02/13/79	22	\$5,652,700	3	\$41,848
Winona	No	04/16/14	N/A	N/A	N/A	N/A	N/A

Note: NFIP National Flood Insurance Program
 N/A Not applicable
 Source: FEMA NFIP CSB, 2017; NFIP, 2017

Repetitive Loss

A **repetitive loss property** is defined by FEMA as an NFIP-insured property that has experienced the following since 1978, regardless of any changes in ownership:

- Two paid losses in excess of \$1,000 within any rolling 10-year period

A **severe repetitive loss property** as defined as a “single family property” (consisting of one-to-four residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which:

-
- Four or more separate claim payments have been paid under flood insurance coverage with the amount of each claims payments exceeding \$5,000 and with cumulative amounts of such claims payments exceeding \$20,000; or
 - At least two separate claims payments have been made with the cumulative amount of such claims exceeding the fair market value of the property on the day before each loss.

There are no repetitive nor severe repetitive loss properties that meet the above definitions, within unincorporated Smith County nor any of the participating jurisdictions according to the Smith County Floodplain Administrator.

10.3 PROBABILITY OF FUTURE EVENTS

With the history of flooding in the planning area, it is likely that flooding of various levels will continue to occur. According to NCEI, in the 10-year timeframe for this plan update, there were 21 events. This translates to approximately two events per year. Therefore, the probability rating is “high.”

The Steering Committee members assessed the future probability on flood based on their jurisdictional knowledge. The Cities of Arp, Lindale, Tyler and Winona all ranked the probability of a future event as likely to occur with the next 25 years. Smith County and the Cities of Bullard, Hideaway, New Chapel Hill, Troup and Whitehouse all ranked the probability of a future event as likely to occur within next 100 years. The City of Noonday ranked it as a low probability of future occurrence.

10.4 CLIMATE CHANGE IMPACTS

Use of historical hydrologic data has long been the standard of practice for designing and operating water supply and flood protection projects. For example, historical data are used for flood forecasting models. This method of forecasting assumes that the climate of the future will be similar to that of the period of historical record. However, the hydrologic record cannot be used to predict changes in frequency and severity of extreme climate events such as floods. Going forward, model calibration or statistical relation development must happen more frequently, new forecast-based tools must be developed, and a standard of practice that explicitly considers climate change must be adopted. Climate change is already impacting water resources, and resource managers have observed the following:

- Historical hydrologic patterns can no longer be solely relied upon to forecast the water future.
- Precipitation and runoff patterns are changing, increasing the uncertainty for water supply and quality, flood management, and ecosystem functions.
- Extreme climatic events will become more frequent, necessitating improvement in flood protection, drought preparedness, and emergency response.

High frequency flood events (for example, 10-year floods) in particular will likely increase with a changing climate. Scientists project greater storm intensity, resulting in more direct runoff and flooding. Changes in watershed vegetation and soil moisture conditions will likewise change runoff and recharge patterns. As stream flows and velocities change, erosion patterns will also change, altering channel shapes and depths, possibly increasing sedimentation behind dams, and affecting habitat and water quality. With potential increases in the frequency and intensity of wildfires due to climate change, there is potential for more floods following fire, which increase sediment loads and water quality impacts.

As hydrology changes, what is currently considered a 100-year flood may strike more often, leaving many communities at greater risk. Planners will need to factor a new level of safety into the design, operation, and regulation of flood protection facilities such as dams, floodways, and bypass channels, as well as the design of local sewers and storm drains.

10.5 ISSUES

The major issues for flooding are the following:

- Flash flooding that occurs with little or no warning will continue to impact the planning area.
- The duration and intensity of storms contributing to flooding issues may increase due to climate change.
- Flooding may be exacerbated by other hazards, such as wildfires.
- The promotion of flood insurance as a means of protecting private property owners from the economic impacts of frequent flood events should continue.
- More information is needed on flood risk to support the concept of risk-based analysis of capital projects.
- Ongoing flood hazard mitigation will require funding from multiple sources.
- There needs to be a coordinated hazard mitigation effort between jurisdictions affected by flood hazards in the planning area.
- Floodplain residents need to continue to be educated about flood preparedness and the resources available during and after floods.
- Existing floodplain-compatible uses such as agricultural and open space need to be maintained. There is constant pressure to convert these existing uses to more intense uses within the planning area during times of moderate to high growth.
- The economy affects a jurisdiction's ability to manage its floodplains. Budget cuts and personnel losses can strain resources needed to support floodplain management.

Chapter 11. HURRICANE / TROPICAL STORM

HURRICANE / TROPICAL STORM HAZARD	
Jurisdiction	Hurricane / Tropical Storm
Smith County	7
City of Arp	12
City of Bullard	17
City of Hideaway	0
City of Lindale	6
City of New Chapel Hill	24
City of Noonday	6
City of Tyler	51
City of Troup	24
City of Whitehouse	51
City of Winona	6
See Chapter 16 for more information on hazard ranking.	

DEFINITIONS

Hurricane — A tropical cyclone with maximum sustained surface winds (using the U.S. 1-minute average) of 64 knots (kt) (74 miles per hour [mph]) or more.

Tropical Storm — A tropical cyclone with maximum sustained surface wind speed (using the U.S. 1-minute average) ranging from 34 kt (39 mph) to 63 kt (73 mph).

Tropical Depression — A tropical cyclone with maximum sustained surface wind speed (using the U.S. 1-minute average) ranging from 4 kt (5 mph) to 63 kt (73 mph).

11.1 HAZARD PROFILE

According to NOAA, tropical cyclones are classified into three main categories (by intensity): hurricanes, tropical storms, and tropical depressions.

Hurricanes are any closed circulation developed around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere.

Hurricanes are areas of disturbed weather in the tropics with closed isobars and strong and very pronounced rotary circulation. An area of clear weather called an “eye” is present in the center of the circulation. To qualify as a hurricane, the wind speed is 74 miles per hour (mph) or more. Hurricanes are classified into categories based on wind speed and the potential damage they cause. Thunderstorm rain resulting in urban flooding, battering wave action, intense sea level rise, localized coastal erosion, and significant winds are associated with hurricanes.

A tropical storm is a tropical cyclone in which the maximum sustained surface wind speeds range from 39 to 73 mph. At this time the tropical cyclone is assigned a name. During this time, the storm itself becomes more organized and begins to become more circular in shape, resembling a hurricane.

11.1.1 Location

Tyler, Texas is over 200 miles inland from the Gulf of Mexico. A recorded event can occur anywhere in the plan update area, moving inland from the Gulf of Mexico, but the hurricane events usually become tropical depressions or tropical storms by the time they reach the Smith County planning area.

11.1.2 Extent

Hurricanes and tropical storms are classified according to the Saffir-Simpson Hurricane Wind Scale from Category 1 to Category 5 by sustained wind intensity. Table 11-1 lists a description of each category.

A worst case scenario for the Smith County planning area is a hurricane with up to a Category 2 with sustained winds of 110 mph or higher because of their inland location.

Table 11-1. Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds (miles per hour)	Category
1	74-95	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (Major)	111-129	Devastating damage will occur: Well-built frame homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (Major)	130-156	Catastrophic damage will occur: Well-built frame homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (Major)	157 or higher	Catastrophic damage will occur: A high percentage of frame homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Note: Other non-hurricane classifications are tropical storms (39-73 miles per hour) and tropical depressions (5-38 miles per hour)
 Source: NOAA, National Hurricane Center, 2017

11.1.3 Past Events

Due to Smith County planning area being an interior location (over 200 miles inland), they are not exposed directly to hurricanes. The hurricanes usually fade and downgrade to tropical storms or tropical depressions as they move away from the coast. Since 1965, Smith County has been included in five Presidential Emergency Management (EM) Declarations and two Disaster (DR) Declarations for hurricanes in the planning area. Three are included in this plan update timeframe (FEMA-DR-1791-TX and FEMA-EM-3294-TX for Hurricane Ike and FEMA-EM-3290-TX for Hurricane Gustav).

According to NCEI, Smith County was impacted by one Gulf of Mexico hurricane-related event during this plan update timeframe – Hurricane Ike (no impacts were recorded from Hurricane Gustav). It was considered a tropical storm when it reached the planning area.

September 12 -13, 2008 – FEMA-DR-1791-TX and FEMA-EM-3294-TX. Hurricane Ike came onshore across extreme southeast Texas during the late night hours of September 12th and the pre-dawn hours of September 13th. The storm made good progress northward during the day of September 13th and brought tropical storm force winds to much of northeast Texas and northwest Louisiana and extreme southwest Arkansas. The storm produced widespread downed trees and power lines along with structural damage either from the winds or from downed trees which fell on top of structures. Power outages were widespread across a three-state area of northeast Texas, northwest Louisiana, and southwest Arkansas. Southwest Electric Power Company (SWEPCO) which provides electricity to a good portion of northeast Texas, northwest Louisiana, and southwest Arkansas said that the number of outages peaked at 187,000 customers.

In particular, tropical storm force winds resulted in numerous trees and power lines downed throughout Smith County. Trees were reported down between the Cities of Whitehouse and Tyler, Texas. Power outages were widespread as well resulting from all the downed trees and trees across power lines. Some roads across the county were impassable. A tree was downed on a home on Glenview Avenue near the University of Texas Tyler Campus. One occupant was reported trapped inside and had minor injuries. At one point in time over 100 roads were blocked by fallen trees in the City of Tyler alone. Several homes were destroyed and several more heavily damaged as trees fell across the county. One tree injured a person in a car. Twelve homes were reported damaged by trees with two being destroyed and one commercial building destroyed in Troup. There were 58 locations across the county where power lines were downed. It was estimated that this event caused over \$2 million in property damage with two known injuries.

Historical events indicate that a hurricane will affect the Smith County planning area as tropical storms, hail, lightning, or related weather events (high winds, tornado). These hazards are discussed in more detail in Chapter 12.

11.1.4 Warning Time

Meteorologists can often predict the likelihood and path of a hurricane or tropical storm. Meteorologists can give several days of warning before a storm. However, meteorologists cannot predict the exact time of onset, location, or severity of the storm. At times, warning for the onset of severe weather may be limited.

11.2 VULNERABILITY AND IMPACT

11.2.1 Exposure

Property, population, and the natural environment are all exposed to hurricanes and tropical storms, however, by the time such an event reaches Smith County it will be more closely classified as a tropical storm, depression, or related event (such as hail, high winds, or lightning). The entire population of the planning area would be affected by the tropical storm or tropical depression to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of functions of utilities could impact populations that suffered no direct damage from an event. Table 11-2 lists the exposed structures and population to hurricanes, tropical storms, and tropical depressions in the Smith County planning area.

Table 11-2. Building Exposure by Jurisdiction

Jurisdiction	Value Exposed			2016 Population
	Structure	Contents	Total	
Arp	\$75,582	\$45,645	\$121,227	1,002
Bullard	\$208,096	\$115,861	\$323,957	2,994
Hideaway	\$480,814	\$252,890	\$733,704	3,127
Lindale	\$550,301	\$343,305	\$893,606	5,853

Jurisdiction	Value Exposed			2016 Population
	Structure	Contents	Total	
New Chapel Hill	\$55,713	\$30,872	\$86,585	620
Noonday	\$88,383	\$47,488	\$135,871	709
Troup	\$13,308	\$6,853	\$20,161	1,920
Tyler	\$136,932	\$93,493	\$230,425	104,798
Whitehouse	\$11,801,117	\$8,052,550	\$19,853,667	8,269
Winona	\$772,244	\$454,349	\$1,226,593	602
Unincorporated	\$8,024,090	\$4,710,727	\$12,734,817	95,396
Total	\$22,286,441	\$14,206,213	\$36,492,654	225,290

Note: Bullard and Troup exposures only include the portion in Smith County.
 Source: Hazus 4.0

11.2.2 Impacts

The Hazus protocol was used to assess the vulnerability of the planning area to hurricanes and tropical storms. The model used U.S. Census data at the tract level and modeled storms initiated in the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and eastern and central Pacific Ocean.

Hazus calculates losses to structures from hurricanes by considering wind speeds, winds tracks, and amount of precipitation. Using historical storm data, Hazus estimates probabilistic storm scenarios. The historical storm database contains precomputed wind fields and storm tracks for Category 3, 4, and 5 land falling hurricanes from 1900 to 2010. For this analysis, a probabilistic Hazus hurricane scenario was selected. Peak gust wind speeds for the 100-year probabilistic scenario are between 59 and 65 mph for the planning area (Figure 11-1). Less than 1% of the buildings (mostly residential) are expected to sustain moderate damages for this scenario. Countywide, the economic loss estimated for this probabilistic hurricane scenario is approximately \$4,100,000, which represents less than 0.03% of the total replacement value of the building value for Smith County and the planning partners. Table 11-3 lists the impact in terms of dollar losses for all the planning partners (mapped in Figure 11-2) and the estimated displaced population.

Table 11-3. Losses from 100-Year Probabilistic Hurricane Scenario

Jurisdiction	Estimated Losses by Replacement Value			% of Total Replacement Value	Estimated Displaced Population
	Structure	Contents	Total		
Arp	\$23,400	\$7,000	\$30,400	0.03%	0
Bullard	\$124,000	\$19,700	\$143,700	0.04%	0
Hideaway	\$131,700	\$61,400	\$193,100	0.03%	0
Lindale	\$109,600	\$28,200	\$137,800	0.02%	0
New Chapel Hill	\$19,700	\$8,600	\$28,300	0.03%	0
Noonday	\$61,900	\$12,400	\$74,300	0.05%	0
Troup	\$5,400	\$1,500	\$6,900	0.03%	0
Tyler	\$45,000	\$11,700	\$56,700	0.02%	0
Whitehouse	\$3,000,000	\$1,100,000	\$4,100,000	0.02%	0
Winona	\$313,900	\$69,400	\$383,300	0.03%	0
Unincorporated County	\$11,200	\$1,500,000	\$12,700	<0.01%	0
Total	\$3,100,000	\$1,000,000	\$4,100,000	0.03%	0

Note: Losses based on 2010 Census Block data analysis in Hazus 4.0
 Bullard and Troup losses only includes portion in Smith County.

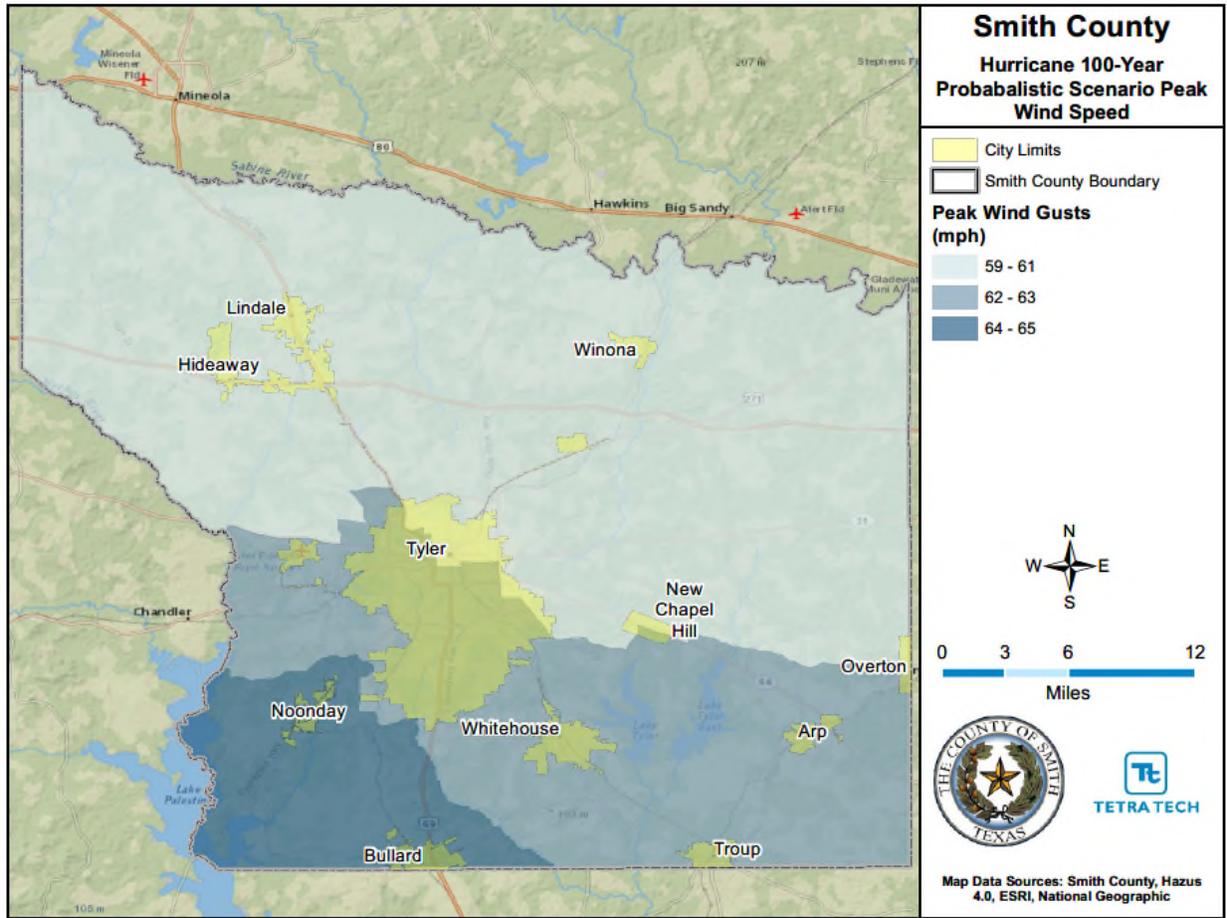


Figure 11-1. 100-Year Probabilistic Peak Wind Gusts for Smith County

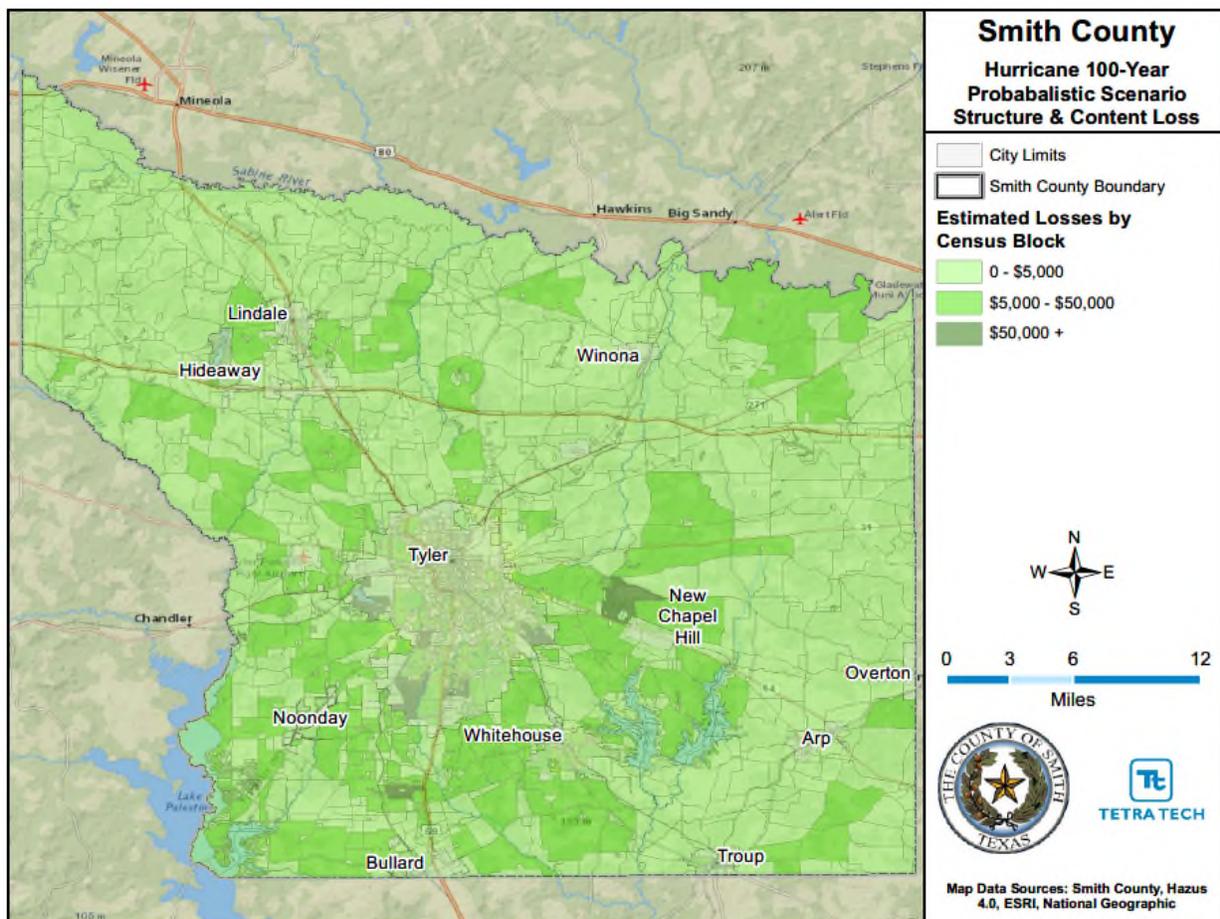


Figure 11-2. 100-Year Probabilistic Scenario Structure and Content Loss for Smith County

Community Perception of Vulnerability

The Cities of Tyler and Whitehouse ranked hurricane / tropical storm as a high hazard and the jurisdictions of New Chapel Hill and Troup ranked it as a medium hazard. The jurisdictions of Smith County, Arp, Bullard, Lindale, Nooday, and Winona ranked it as a low hazard.

The City of Hideaway ranked it as no exposure to hurricane / tropical storm because they feel that critical facilities and infrastructure are not impacted by hurricane /tropical storm and do not expect to be impacted in the future. They believe they would only be affected by related events (such as hail, high winds, or lightning) that are discussed in other chapters.

See the first page of this chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

11.3 PROBABILITY OF FUTURE EVENTS

With the history of hurricanes being down-graded to tropical storms in the planning area, it is likely that various flooding and high wind impacts will continue to occur. According to NCEI, in the 10-year timeframe for this plan update, there was one event. This translates to a 10% chance of future events.

The Steering Committee members assessed the future probability of a hurricane/tropical storm based on their jurisdictional knowledge. The Cities of Tyler and Whitehouse ranked the probability of a future event as likely to occur with the next 25 years while the City of Troup ranked the probability of a future event as

likely to occur within next 100 years. Smith County and the Cities of Arp, Bullard, Hideaway, Lindale, Noonday, and Winona all ranked it as low probability of future occurrence.

11.4 CLIMATE CHANGE IMPACTS

It is unclear whether climate change will increase or decrease the frequency of hurricanes and tropical storms, but warmer ocean surface temperatures and higher sea levels are expected to intensify their impacts. Hurricanes are subject to various climate change-related influences. Warmer sea surface temperatures could intensify tropical storm wind speeds, potentially delivering more damage if they make landfall. Based on sophisticated computer modeling, scientists expect a 2 to 11% increase in average maximum wind speed, with increased frequency of intense storms. Rainfall rates during these storms are also projected to increase by approximately 20%.

In addition, sea level rise is likely to make future coastal storms, including hurricanes, more damaging. Globally averaged, sea level is expected to rise by 1 to 4 feet during the next century, which will amplify coastal storm surge.

11.5 ISSUES

Important issues associated with a hurricane / tropical storm include the following:

- Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to severe weather events such as hurricanes and tropical storms.
- Redundancy of power supply must be evaluated.
- The potential for isolation after a severe storm event is high.
- Flash flooding that occurs with little or no warning will continue to impact the planning area.
- The promotion of flood insurance as a means of protecting private property owners from the economic impacts of frequent flood events should continue.
- Roads and bridges blocked by debris or otherwise damaged might isolate populations.
- The impacts of climate change on the frequency and severity of hurricanes and tropical storms are not well understood.

Chapter 12. SEVERE STORM (HAIL, LIGHTNING AND WIND)

HAIL, HIGH WINDS, AND LIGHTNING RANKING			
Jurisdiction	HAIL	LIGHTNING	WIND
Smith County	51	51	51
City of Arp	54	54	54
Town of Bullard	54	54	54
City of Hideaway	54	54	54
City of Lindale	51	51	51
City of New Chapel Hill	51	51	51
City of Noonday	54	54	54
City of Troup	36	36	36
City of Tyler	51	51	51
City of Whitehouse	51	51	51
City of Winona	30	30	30
See Chapter 16 for more information on hazard ranking.			

DEFINITIONS

Severe Local Storm — Small-scale atmospheric systems, including tornadoes, thunderstorms, windstorms, ice storms, and snowstorms. These storms may cause a great deal of destruction and even death, but their impact is generally confined to a small area. Typical impacts are on transportation infrastructure and utilities.

Thunderstorm — A storm featuring heavy rains, strong winds, thunder and lightning, typically about 15 miles in diameter and lasting about 30 minutes. Hail and tornadoes are also dangers associated with thunderstorms. Lightning is a serious threat to human life. Heavy rains over a small area in a short time can lead to flash flooding.

Windstorm — A storm featuring violent winds. Windstorms tend to damage ridgelines that face into the wind.

12.1 HAZARD PROFILE

A thunderstorm is a rain event that contains thunder, hail, lightning and wind. A thunderstorm is classified as “severe” when it contains one or more of the following: hail with a diameter of three-quarter inch or greater, winds gusting in excess of 50 knots (kt) (58 mph), or tornadoes. For this hazard mitigation plan, each component of a

thunderstorm (lightning, hail, and winds) will be profiled below. Thunderstorms or severe storms are not Texas State Hazards per the Texas State Mitigation Plan Update 2013. ‘Thunderstorm’ is used in this section as a descriptive term to qualify hail, wind, and lightning atmospheric events. Thunderstorms are described below for general reference information and not a profiled hazard.

Three factors cause thunderstorms to form: moisture, rising unstable air (air that keeps rising when disturbed), and a lifting mechanism to provide the disturbance. The sun heats the surface of the earth, which warms the air above it. If this warm surface air is forced to rise (hills or mountains can cause rising motion, as can the interaction of warm air and cold air or wet air and dry air) it will continue to rise as long as it weighs less and stays warmer than the air around it. As the air rises, it transfers heat from the surface of the earth to the upper levels of the atmosphere (the process of convection). The water vapor it contains begins to cool and it condenses into a cloud. The cloud eventually grows upward into areas where the temperature is below freezing. Some of the water vapor turns to ice and some of it turns into water droplets. Both have electrical charges. Ice particles usually have positive charges, and rain droplets usually have negative charges. When the charges build up enough, they are discharged in a bolt of lightning, which causes the sound waves we hear as thunder. Thunderstorms have three stages (see Figure 12-1):

The **developing stage** of a thunderstorm is marked by a cumulus cloud that is being pushed upward by a rising column of air (updraft). The cumulus cloud soon looks like a tower (called towering cumulus) as the updraft continues to develop. There is little to no rain during this stage but occasional lightning. The developing stage lasts about 10 minutes.

The thunderstorm enters the **mature stage** when the updraft continues to feed the storm, but precipitation begins to fall out of the storm, and a downdraft begins (a column of air pushing downward). When the downdraft and rain-cooled air spread out along the ground, they form a gust front, or a line of gusty winds.

The mature stage is the most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes. The storm occasionally has a black or dark green appearance.

Eventually, a large amount of precipitation is produced and the updraft is overcome by the downdraft beginning the **dissipating stage**. At the ground, the gust front moves out a long distance from the storm and cuts off the warm moist air that was feeding the thunderstorm. Rainfall decreases in intensity, but lightning remains a danger.

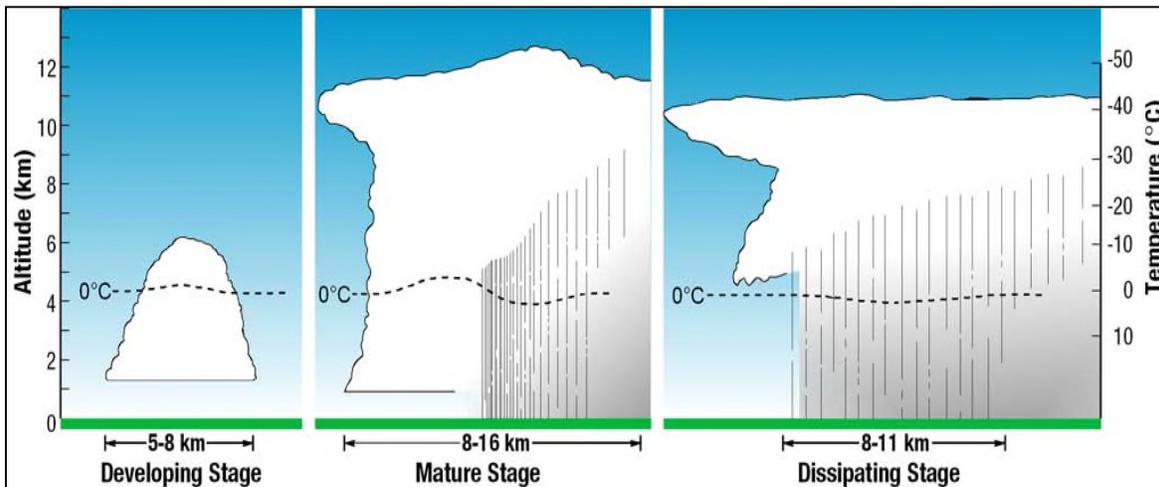


Figure 12-1. Thunderstorm Life Cycle

Hail

Hail occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. Recent studies suggest that super-cooled water may accumulate on frozen particles near the back-side of a storm as they are pushed forward across and above the updraft by the prevailing winds near the top of the storm. Eventually, the hailstones encounter downdraft air and fall to the ground.

At the time when the updraft can no longer support the hailstone, it will fall down to the earth. For example, a 1/4" diameter or pea-sized hail requires updrafts of 24 mph, while a 2 3/4" diameter or baseball-sized hail requires an updraft of 81 mph. The largest hailstone recorded in the United States was found in Vivian, South Dakota on July 23, 2010, measuring 8 inches in diameter, almost the size of a soccer ball. Soccer-ball-sized hail is the exception, but even small pea-sized hail can do damage.

Hailstorms in Texas cause damage to property, crops, and the environment, and kill and injure livestock. In the United States, hail causes more than \$1 billion in damage to property and crops each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are the other types of property most commonly damaged by hail.

The National Weather Service (NWS) classifies hail as non-severe and severe based on hail diameter size. Descriptions and diameter sizes are provided in Table 12-1.

Lightning

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. When lightning strikes, electricity shoots through the air and causes vibrations creating the sound of thunder. Lightning is a dangerous and unpredictable weather hazard in the United States and in Texas. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines, and electrical systems. Lightning also causes forest and brush fires as well as deaths and injuries to livestock and other animals.

Intra-cloud lightning is the most common type of discharge. Usually, it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers.

Although not as common, cloud-to-ground lightning is the most damaging and dangerous form of lightning. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat.

Wind

The NWS wind speed threshold for a severe thunderstorm is a surface wind speed of 58 mph or greater. There are seven types of damaging winds:

- **Straight-line winds**—Any thunderstorm wind that is not associated with rotation; this term is used mainly to differentiate from tornado winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.
- **Downdrafts**—A small-scale column of air that rapidly sinks toward the ground.
- **Downbursts**—A strong downdraft with horizontal dimensions larger than 2.5 miles resulting in an outward burst of damaging winds on or near the ground. Downburst winds may begin as a microburst and spread out over a wider area, sometimes producing damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.
- **Microbursts**—A small concentrated downburst that produces an outward burst of damaging winds at the surface. Microbursts are generally less than 2.5 miles across and short-lived, lasting only 5 to 10 minutes, with maximum wind speeds up to 168 mph. There are two kinds of microbursts: wet and dry. A wet microburst is accompanied by heavy precipitation at the surface. Dry microbursts, common in places like the high plains and the intermountain west, occur with little or no precipitation reaching the ground.
- **Gust front**—A gust front is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Sometimes the winds push up air above them, forming a shelf cloud or detached roll cloud.
- **Derecho**—A derecho is a widespread thunderstorm wind caused when new thunderstorms form along the leading edge of an outflow boundary (the boundary formed by horizontal spreading of thunderstorm-cooled air). The word “derecho” is of Spanish origin and means “straight ahead.” Thunderstorms feed on the boundary and continue to reproduce. Derechos typically occur in summer when complexes of thunderstorms form over plains, producing heavy rain and severe wind. The damaging winds can last a long time and cover a large area.
- **Bow Echo**—A bow echo is a linear wind front bent outward in a bow shape. Damaging straight-line winds often occur near the center of a bow echo. Bow echoes can be 200 miles long, last for several hours, and produce extensive wind damage at the ground.

12.1.1 Location

Severe storm events (hail, lightning, and wind) have the potential to happen anywhere in the planning area.

Hail

Hailstorms vary tremendously in terms of size, location, intensity, and duration but are considered frequent occurrences throughout the Smith County planning area. It is assumed that all of the jurisdictions are uniformly exposed to hail events just as they are exposed to the thunderstorms that produce the hail events.

Lightning

Lightning strikes in association with thunderstorms vary in terms of size, intensity, duration, and impacts, but are considered frequent occurrences throughout the Smith County planning area. It is assumed that all of the jurisdictions are uniformly exposed to thunderstorm events and the associated impact lightning. According to information calculated from Vaisala’s National Lightning Detection Network, the planning area can experience 4 to 8 lightning strikes per square kilometer per year within orange shaded area (Figure 12-2). The dispersion of lightning strikes in Smith County is assumed to be uniform across the planning area although elevation and local topography may play a role.



Source: Vaisala, 2016

Note: Black square indicates Smith County

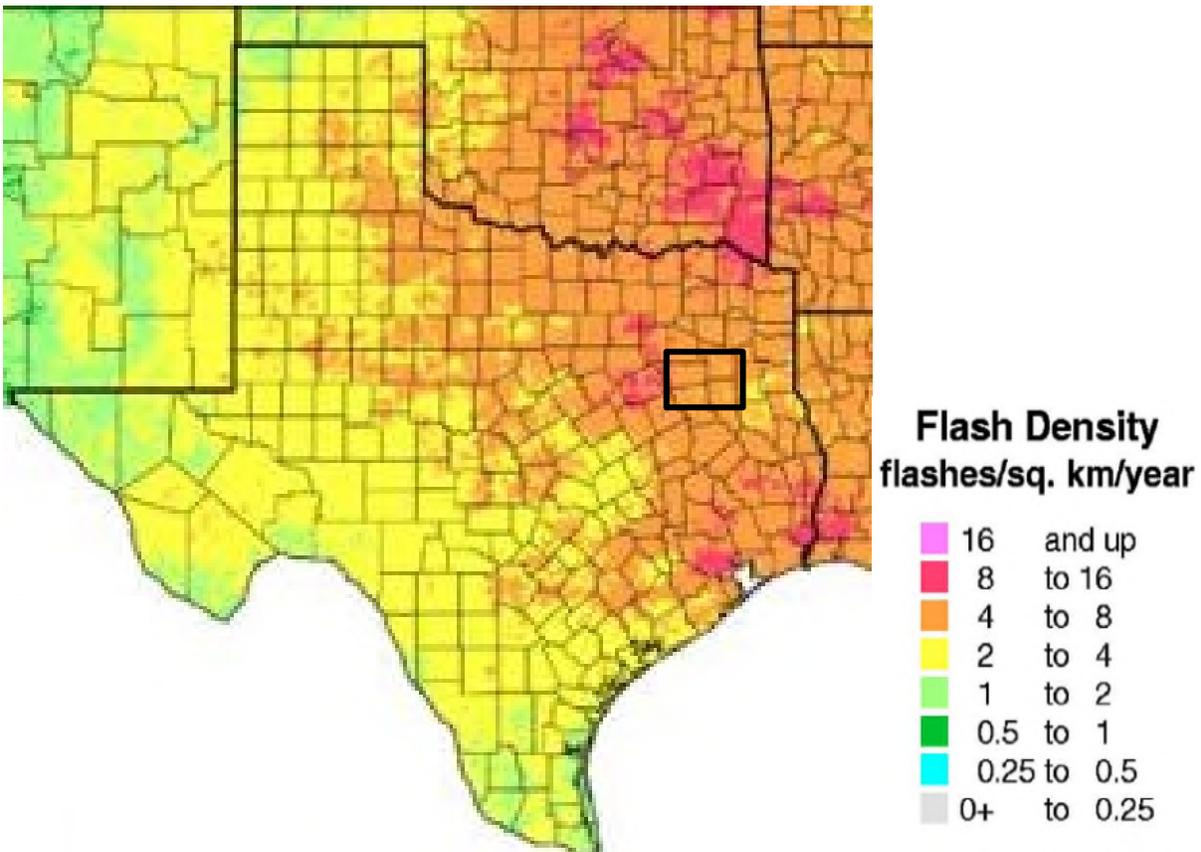


Figure 12-2. Lightning Density Scale

Wind

The entire Smith County planning area is exposed to high winds. Windstorms vary in terms of size, intensity, duration, and impact. High winds associated with thunderstorms are frequent occurrences throughout the planning area. They have the ability to cause damage over 100 miles from the center of storm activity. Winds impacting walls, doors, windows, and roofs, may cause structural components to fail. Figure 12-3 shows the U.S. wind zones and that Smith County is located in Zone III which can have winds up to 200 mph.

Source: FEMA P-361, 2015

Note: Black square indicates approximate location of Smith County

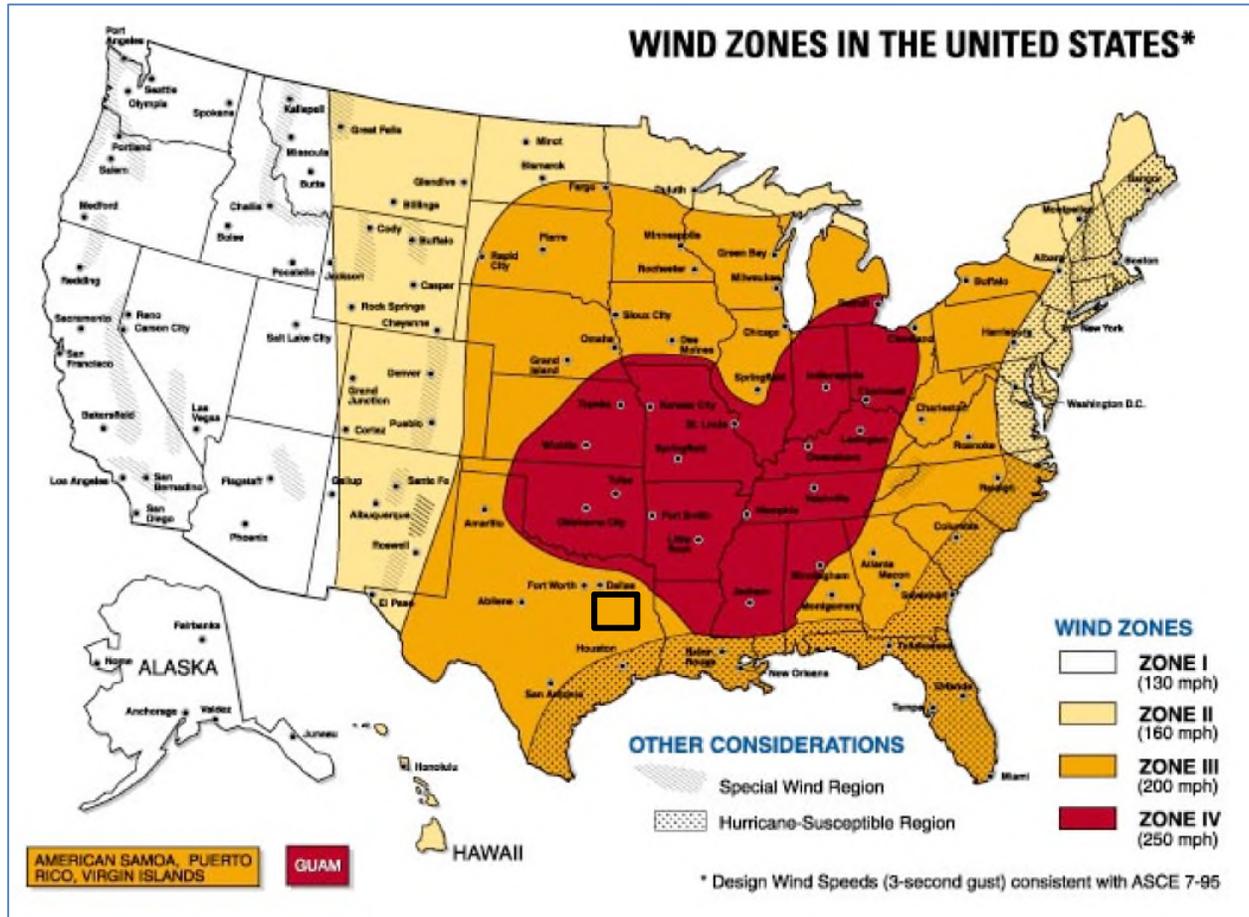


Figure 12-3. Wind Zones in the U.S.

12.1.2 Extent

Hail

The NWS classifies a storm as “severe” if there is hail three-quarters of an inch in diameter (approximate size of a penny) or greater, based on radar intensity or as seen by observers. The intensity category of a hailstorm depends on hail size and the potential damage it could cause, as depicted in the Hail Intensity and Magnitude Scale in Table 12-1.

Table 12-1. Hail Intensity and Magnitude Scale

Size Code	Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
H0	Hard Hail	5-9	0.2-0.4	Pea	No damage
H1	Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
H2	Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
H3	Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	31-40	1.2-1.6	Pigeon's egg	Widespread glass damage, vehicle bodywork damage
H5	Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
H8	Destructive	76-90	3.0-3.5	Large orange > Soft ball	Severe damage to aircraft bodywork
H9	Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Note: mm millimeters
 Source: NOAA, 2017.

Lightning

The extent for lightning can be expressed in terms of the number of strikes in an interval. NOAA categorizes lightning activity levels (LAL) on a scale from 1 to 6. LAL rankings reflect the frequency of cloud-to-ground lightning either forecast or observed as defined in Table 12-2.

Table 12-2. NOAA Lightning Activity Levels

LAL	Cloud and Storm Development	Lightning Strikes / 15 Minutes
1	No thunderstorm	0
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Dry lightning, similar to LAL 3 except thunderstorms are dry.	

Source: NOAA, 2017

The NCEI does not include the LAL for the historical lightning events included in Table 12-2. According to the National Lightning Detection Network, Smith County can experience an average of 32 lightning strikes per day which equates to 1.36 strikes per hour or 0.02 strike per minute. This would put Smith County in the LAL 2 range.

Wind

The strength of thunderstorm winds can vary from a light breeze to over 100 mph. Windstorms produced by cold fronts and gravity waves have been known to produce winds over 60 mph. The Beaufort wind scale exhibits the range in impacts of wind speeds as shown in Table 12-3.

Thunderstorm winds can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Wind storms in the Smith County planning area are rarely life threatening, but do disrupt daily activities, cause damage to buildings, and structures, and increase the potential for other hazards, such as wildfires. Winds can also cause trees to fall, particularly those killed by insects or wildfire, creating a hazard to property or those outdoors.

Table 12-3. Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft., whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft., white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft.), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high waves (30-45 ft.), foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced	

Source: NOAA, 2017

A worst case scenario for the Smith County planning area is up to a severe storm event with H10 category hailstones the size of melons, with lightning activity levels >25 strikes per 15 minutes, and high winds in the 48-55 knots range causing considerable structural damage.

12.1.3 Past Events

Since 1965, Smith County has been included in nine Presidential Disaster (DR) Declarations for severe storms in the planning area (see Table 4-1). Three are included in this plan update timeframe (FEMA-DR-4269-TX and FEMA-DR-4245-TX and FEMA-DR-4223-TX). Some of the damages that resulted in the declarations were from tornadoes and flooding that accompanied a severe storm.

The NCEI reported 211 total thunderstorm events for the Smith County planning area from January 2008 through December 2017. Of the reported events, there was approximately \$1,272,740 in property damage and no injuries or fatalities.

Table 12-4. Thunderstorm Summary for Smith County (2008-2017)

Hazard type	Total Events	Events with Damage	Property Damage	Injuries	Fatalities
Hail	89	3	\$55,500	0	0
Lightning	9	8	\$295,200	0	0
Wind	113	29	\$922,040	0	0
Totals	211	40	\$1,272,740	0	0

Source: NCEI, 2017

Hail

Table 12-5 shows the number of events and maximum size hail recorded by jurisdiction.

Table 12-5. Hail Historical Events Summary (2008-2017)

Jurisdiction	Number of Events	Maximum Size (inches)	Property Damage	Crop Damage	Injuries	Fatalities
Arp	1	0.88	\$0	\$0	0	0
Bullard	4	4.25	\$50,000	\$0	0	0
Hideaway	0	0	\$0	\$0	0	0
Lindale	10	3.25	\$0	\$0	0	0
New Chapel Hill	0	0	\$0	\$0	0	0
Noonday	8	1.75	\$0	\$0	0	0
Troup	0	0	\$0	\$0	0	0
Tyler	21	1.75	\$0	\$0	0	0
Whitehouse	4	2.75	\$0	\$0	0	0
Winona	2	1.50	\$0	\$0	0	0
Unincorporated	39	2.75	\$5,500	\$0	0	0
Total	89		\$55,500	\$0	0	0

Source: NCEI, 2017

Notable past events in the Smith County planning area are described below:

- **April 26, 2011** – Recorded 3.25-inch hail in City of Lindale that caused property damage.
- **February 5, 2008** – Recorded 4.25-inch hail in City of Bullard that caused widespread damage to vehicles and property.

Lightning

According to National Lightning Detection Network, the Smith County planning area experiences an average of 32 lightning strikes per day or 1.36 strikes per hour or 0.02 strikes per minute. The NCEI's storm events database as well as locally available data, indicated there were no casualty nor injury reports from lightning in the Smith County planning area between 2008 and 2017. Table 12-6 shows the historical recorded lightning events by jurisdiction that caused an estimated \$295,200 in property damage. Lightning strikes have caused house fires, oil tanks and powerlines to explode, and trees to topple over.

Table 12-6. Lightning Historical Events Summary (2008-2017)

Jurisdiction	Number of Events	Property Damage	Crop Damage	Injuries	Fatalities
Arp	0	\$0	\$0	0	0
Bullard	0	\$0	\$0	0	0
Hideaway	0	\$0	\$0	0	0
Lindale	2	\$30,000	\$0	0	0
New Chapel Hill	0	\$0	\$0	0	0
Noonday	0	\$0	\$0	0	0
Troup	0	\$0	\$0	0	0
Tyler	3	\$100,000	\$0	0	0
Whitehouse	0	\$0	\$0	0	0
Winona	0	\$0	\$0	0	0
Unincorporated	4	\$165,200	\$0	0	0
Total	9	\$295,200	\$0	0	0

Source: NCEI, 2017

Notable past events in the Smith County planning area are described below:

- **April 27, 2015** – Lightning struck a home in the unincorporated county within Cooks Crossing subdivision that caused a house fire.
- **June 9, 2014** – Lightning struck a home in the unincorporated county that sparked a fire that destroyed the home.
- **June 6, 2008** – Lightning struck a two-story home inside a gated community in City of Tyler. It caused a two-alarm fire.

Winds

High winds occur year round in the Smith County planning area. In the spring and summer, which are generally warm and humid in Texas, high winds often accompany severe thunderstorms. The NCEI reported 113 wind events for the Smith County planning area from January 2008 through December 2017. Table 12-7 shows the number of events and maximum wind speed recorded by jurisdiction. The number of events below add up to more than 113 events because each jurisdiction was included in the Smith (zone) for wind events in the NCEI storm database.

Table 12-7. Wind Historical Events Summary (2008-2017)

Jurisdiction	Number of Events	Maximum Wind (kt / mph)	Property Damage	Crop Damage	Injuries	Fatalities
Arp	7	65 / 75	\$0	\$0	0	0
Bullard	6	54 / 62	\$100,000	\$0	0	0
Hideaway	4	45 / 52	\$0	\$0	0	0
Lindale	15	57 / 66	\$110,000	\$0	0	0
New Chapel Hill	4	45 / 52	\$0	\$0	0	0

Jurisdiction	Number of Events	Maximum Wind (kt / mph)	Property Damage	Crop Damage	Injuries	Fatalities
Noonday	6	52 / 60	\$0	\$0	0	0
Troup	7	57 / 66	\$5,000	\$0	0	0
Tyler	43	56 / 62	\$323,040	\$0	0	0
Whitehouse	11	61 / 70	\$5,000	\$0	0	0
Winona	6	54 / 62	\$0	\$0	0	0
Unincorporated	42	65 / 75	\$379,000	\$0	0	0
Total	151		\$922,040	\$0	0	0

Note: kt Knots
 Mph Miles per hour

Source: NCEI, 2017

Notable past events in the Smith County planning area are described below:

- **July 23, 2014** – Wind gusts ranged from 50 to 70 mph with this mesoscale convective system which produced tree damage and caused power outages. A 60-foot pine tree fell on a home between Tyler and New Chapel Hill.
- **June 28, 2011** – Numerous trees were downed across the northern portion of Smith County. Some of these trees fell onto homes.
- **February 12, 2008** – On Highway 192 just southwest of Tyler, a roof was blown off a business.

Although these high winds may not be life-threatening, they can disrupt daily activities, cause damage to building and structures, and increase the potential damage of other hazards. Wind resource information is shown in Figure 12-4. as a proxy for typical wind speeds. Wind resource information is estimated by the National Renewable Energy Laboratory (NREL) to identify areas that are suitable for wind energy applications. The wind resource is expressed in terms of wind power classes, ranging from Class 1 (lowest) to Class 7 (highest). Each class represents a range of mean wind power density or approximate mean wind speed at specified heights above the ground (in this case, 50 meters above the ground surface). Table 12-8 identifies the mean wind power density and speed associated with each classification. Figure 12-4. shows the wind power class potential density for Smith County classified as “Poor.”

Table 12-8. Wind Power Class and Speed

Rank	Wind Power Class	Wind Power Density at 50 meters (W/m ²)	Wind Speed at 50 meters (mph)
Poor	1	0-200	0-12.5
Marginal	2	200-300	12.5-14.3
Fair	3	300-400	14.3-15.7
Good	4	400-500	15.7-16.8
Excellent	5	500-600	16.8-17.9
Outstanding	6	600-800	17.9-19.7
Superb	7	800-2,000	19.7-26.6

Notes: mph Miles per hour
 W/m² Watts per square meter

Source: NREL Wind Energy Resource Atlas of the United States

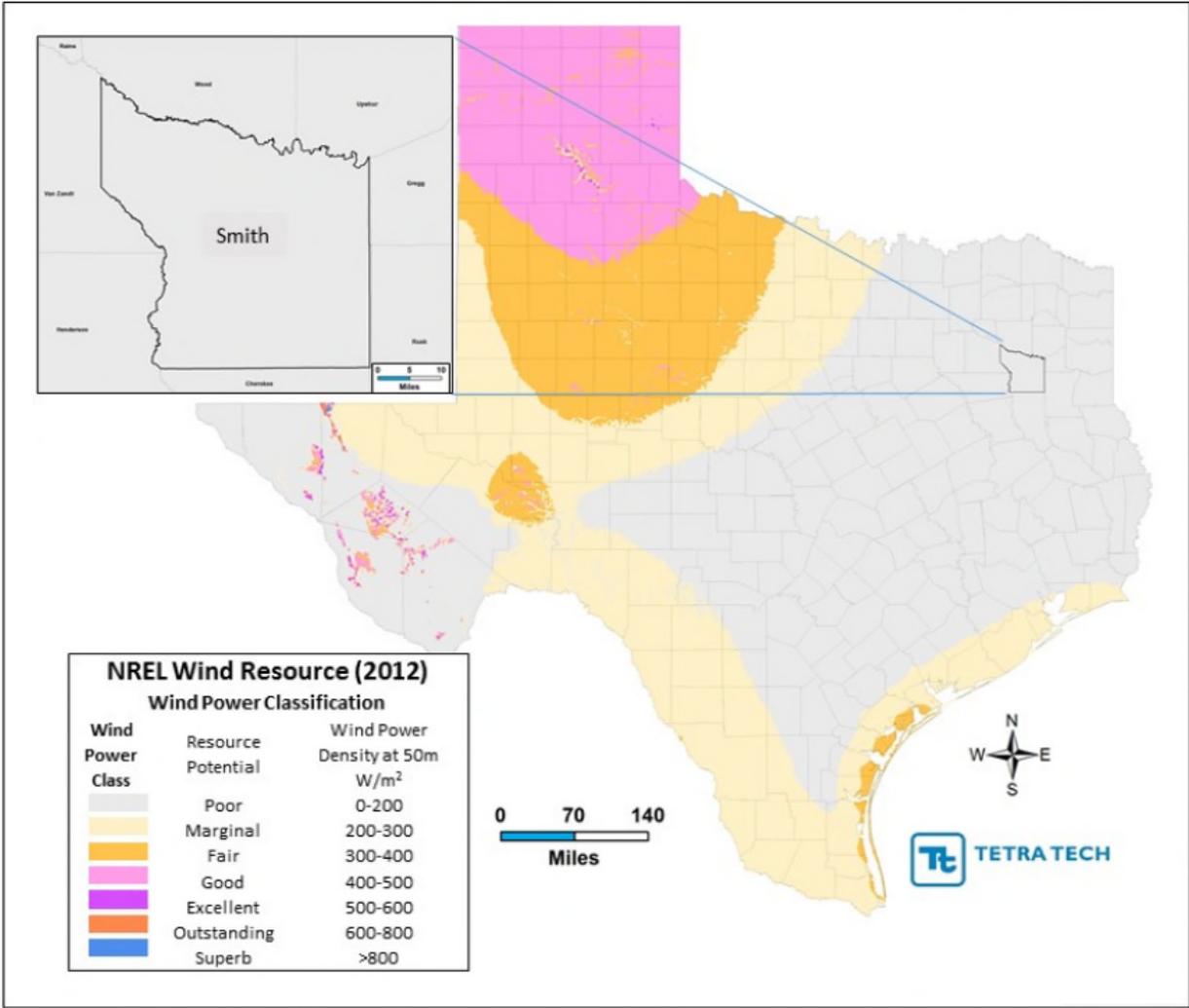


Figure 12-4. Texas Wind Power

12.1.4 Warning Time

Meteorologists can often predict the likelihood of a severe storm. This can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time. Weather forecasts for the planning area are reliable. However, at times, the warning for the onset of severe weather may be limited.

12.2 VULNERABILITY AND IMPACTS

12.2.1 Exposure

In general, assets in the entire planning area are vulnerable to thunderstorms, hail, lightning and wind including people, crops, vehicles, and built structures. Certain areas are more exposed due to geographic location and local weather patterns. Populations with large stands of trees or overhead power lines may be more susceptible to wind damage and black out, while populations in low-lying areas are at risk for possible flooding. It is not uncommon for residents living in more remote areas of the county to be isolated after such events. Table 11-2 in the Hurricane / Tropical Storm Chapter shows that there is \$36.5 million in exposed property within the county as well as the total population of 225,290.

It is estimated that most of the residential structures were built without the influence of a structure building code with provisions for wind loads. Wind pressure can create a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Conversely, passing currents can create lift and suction forces that act to pull building components and surfaces outward. The effects of winds are magnified in the upper levels of multi-story structures. As positive and negative forces impact the building’s protective envelope (doors, windows, and walls), the result can be roof or building component failures and considerable structural damage.

All of these buildings are considered to be exposed to the hail, lightning, and wind hazards, but structures in poor condition or in particularly vulnerable locations (located on hilltops or exposed open areas) may risk the most damage. The frequency and degree of damage will depend on specific locations.

All future development will be affected by severe storms. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. Land use policies identified in master plans and enforced through zoning code and the permitting process also address many of the secondary impacts of the severe weather hazard. With these tools, the planning partnership can be well equipped to deal with future growth and the associated impacts of severe weather.

12.2.2 Impacts

Loss estimations for hail, lightning and wind hazards are not based on damage functions, because no such damage functions have been generated. Instead, loss estimates were developed representing projected damages (annualized loss). Table 12-9 lists the property loss estimates for hail, lightning and wind events. These annualized losses are less than \$50,000 annually and can be deemed “negligible.” Negligible loss hazards are still included despite minimal annualized losses because of the potential for a high value damaging event.

Table 12-9. Loss Estimates for Hail, Lightning, and Wind Events

	Annual Rate of Occurrence	Average Loss Expectancy	Annualized Loss
Hail			
Smith County	9.56	\$18,500	\$5,968
Lightning			
Smith County	0.96	\$36,878	\$31,722
Wind			

	Annual Rate of Occurrence	Average Loss Expectancy	Annualized Loss
Smith County	12.1	\$3,173	\$9,895

Most lightning damages occur to electronic equipment located inside buildings. But structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damage to crops if fields burn. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes. There have not been any fatalities in Smith County from lightning strikes.

Thunderstorm winds and hail can cause damage to property, vehicles, trees, and crops.

Community Perception of Vulnerability

All of the jurisdictions except Troup and Winona ranked hail, lightning, and wind as high hazards. The Cities of Troup and Winona ranked them as medium hazards.

See the first page of this chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

12.3 PROBABILITY OF FUTURE EVENTS

NCEI-reported damaging lightning events occurred nine times from 2008 through 2017. Since lightning accompanies thunderstorms, it can be assumed that lightning occurs more often than damages are reported. These rates of occurrence are expected to continue in the future.

Based on NCEI data, there have been 89 hail events and 113 thunderstorm wind events. This translates to an annual average of 9.56 and 12.1 events per year, respectively. Based on this history, damaging hail and thunderstorm wind occur in the planning area multiple times each year making the probability for damaging events high in any given year.

All of the planning partners agreed with this high probability factor.

12.4 CLIMATE CHANGE IMPACTS

Climate change presents a significant challenge for risk management associated with severe weather. The frequency of severe weather events has increased steadily over the last century. NCEI states the U.S. has sustained 219 weather and climate disasters since 1980 where the damages/costs reached or exceeded \$1 billion (including consumer price index [CPI] adjustments to 2017). The total cost of these 219 events exceeds \$1.5 trillion (this includes the initial cost estimates for Hurricanes Harvey, Irma and Maria) (NOAA, 2018).

According to Southern Climate Impacts Planning Program concerning Texas, growing evidence points to stronger summer storm systems. Studies have not been done to conclude that severe storms, including hail, lightning, and strong winds, are increasing. However, with summer temperatures becoming warmer and humidity levels increasing, an increase in the likelihood of these hazards is plausible (SCIPP, 2017).

12.5 ISSUES

Important issues associated with a severe weather in the planning area include the following:

- Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to severe weather events such as windstorms.
- Redundancy of power supply must be evaluated.
- The capacity for backup power generation is limited.
- The potential for isolation after a severe storm event is high.
- There is limited information available for local weather forecasts.
- The lack of proper management of trees may exacerbate damage from high winds.

Chapter 13. TORNADO

TORNADO HAZARD	
Jurisdiction	TORNADO
Smith County	54
City of Arp	54
City of Bullard	54
City of Hideaway	54
City of Lindale	36
City of New Chapel Hill	51
City of Noonday	54
City of Tyler	54
City of Troup	26
City of Whitehouse	54
City of Winona	36
See Chapter 16 for more information on hazard ranking.	

DEFINITIONS

Tornado — Funnel clouds that generate winds up to 500 mph. They can affect an area up to three-quarters of a mile wide, with a path of varying length. Tornadoes can come from lines of cumulonimbus clouds or from a single storm cloud. They are measured using the Fujita Scale (ranging from F0 to F5), or the Enhanced Fujita Scale.

13.1 HAZARD PROFILE

A tornado is a narrow, violently rotating column of air that extends from the base of a cumulonimbus cloud to the ground. The visible sign of a tornado is the dust and debris that is caught in the rotating column made up of water droplets. Tornadoes are the most violent of all atmospheric storms. Tornadoes can be induced by hurricanes. The following are common ingredients for tornado formation:

- Very strong winds in the mid and upper levels of the atmosphere
- Clockwise turning of the wind with height (that is, from southeast at the surface to west aloft)
- Increasing wind speed in the lowest 10,000 feet of the atmosphere (for example, 20 mph at the surface and 50 mph at 7,000 feet)
- Very warm, moist air near the ground with unusually cooler air aloft
- A forcing mechanism such as a cold front or leftover weather boundary from previous shower or thunderstorm activity

Tornadoes can form from individual cells within severe thunderstorm squall lines. They also can form from an isolated super-cell thunderstorm. Weak tornadoes can sometimes occur from air that is converging and spinning upward, with little more than a rain shower occurring in the vicinity.

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour, and damage paths can be more than 1 mile wide and 50 miles long. Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also generate a tremendous amount of flying debris or “missiles,” which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, less spectacular damage is much more common.

13.1.1 Location

Recorded tornadoes in the planning area are typically small to average size and short-lived. They can occur anywhere in the Smith County planning area. Figure 13-1 shows tornado damage in the City of Lindale on April 29, 2016. Figure 13-2 shows the location of previous tornado events in the Smith County planning area.

Source: Tyler Morning Telegraph



Figure 13-1. EF2 Tornado Damage in Lindale, 2016

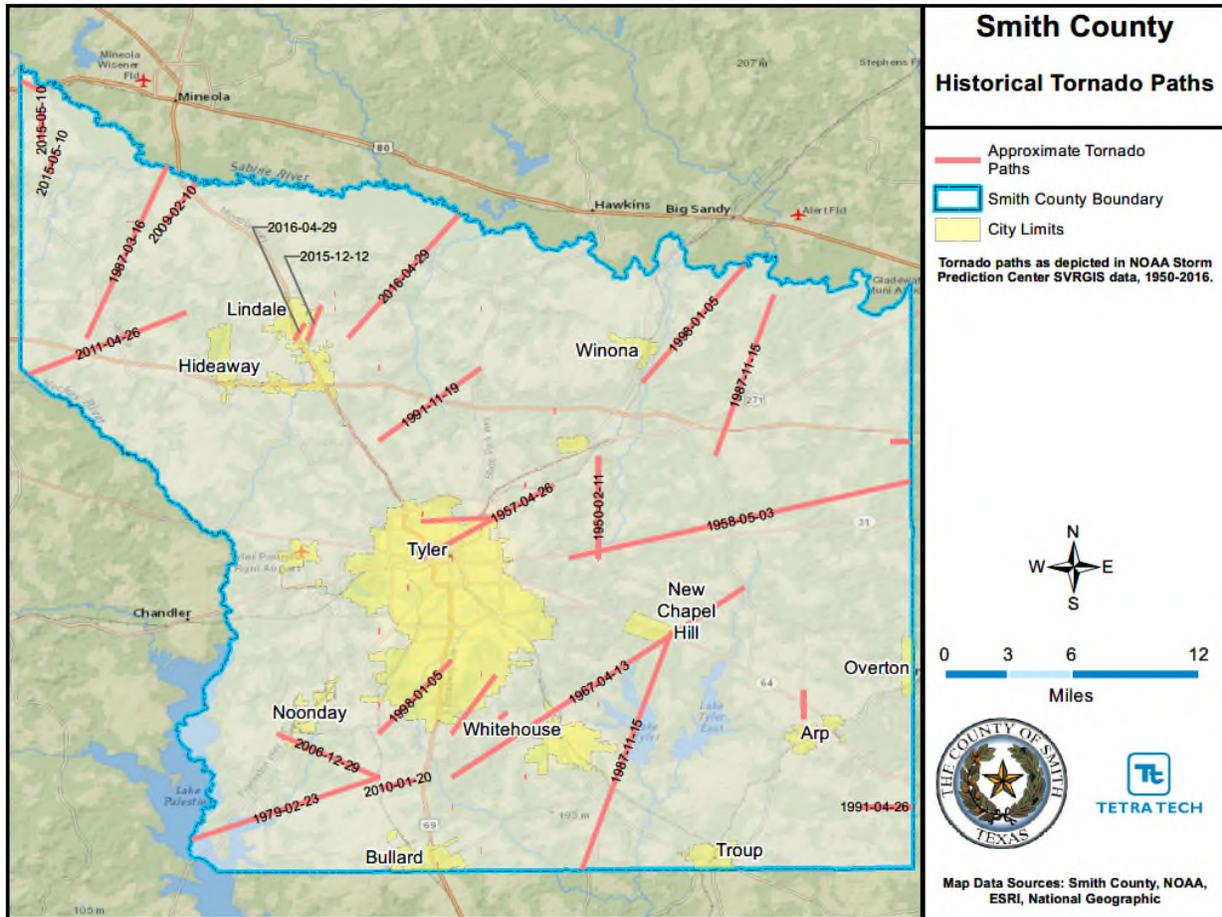


Figure 13-2. Tornado Events in Smith County (1950-2017)

13.1.2 Extent

The Enhanced Fujita Scale, or EF Scale (Table 13-1), is the current scale for rating the strength of tornadoes in the United States; magnitude is estimated via the damage left behind. Implemented in February 2007, it replaced the Fujita Scale. The scale has the same basic design as the original Fujita Scale, six categories from zero to five, representing increasing degrees of damage. The new scale takes into account how most structures are designed, and is thought to be more accurate representation of the surface wind speeds in the most violent tornadoes.

The worst case scenario for the Smith County planning area is to see up to an EF5 tornado in a densely developed and populated area.

Table 13-1. Enhanced Fujita Scale

Enhanced Fujita Category	Wind Speed (mph)	Potential Damage
EF0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.

Enhanced Fujita Category	Wind Speed (mph)	Potential Damage
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings, such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 yards; high-rise buildings have significant structural deformation; incredible phenomena will occur.

Note: mph miles per hour
Source: NOAA

13.1.3 Past Events

Since 1965, Smith County has been included in three Presidential Disaster (DR) Declarations for tornadoes in the planning area (see Table 4-1). None are included in this plan update timeframe and some of the damages that resulted in the declarations might be from accompanying flooding and severe storms.

The NCEI recorded 14 tornadoes that touched down in the Smith County planning area from January 2008 through December 2017. Of these events, there was \$1.470 million in recorded property damage and no injuries or fatalities (see Table 13-2.)

Table 13-2. Tornado Historical Events Summary (2008-2017)

Jurisdiction	Number of Events	Highest Magnitude	Property Damage	Crop Damage	Injuries	Fatalities
Arp	1	EF1	\$30,000	\$0	0	0
Bullard	0			\$0	0	0
Hideaway	0			\$0	0	0
Lindale	1	EF2	\$300,000	\$0	2	0
New Chapel Hill	0			\$0	0	0
Noonday	0			\$0	0	0
Troup	0			\$0	0	0
Tyler	2	EF0	\$0	\$0	0	0
Whitehouse	0			\$0	0	0
Winona	0			\$0	0	0
Unincorporated	10	EF2	\$1,140,000	\$0	0	0
Total	14		\$1,470,000	\$0	2	0

Source: NCEI, 2017

Notable past events in the Smith County planning area are described below:

- April 29, 2016** – A long track multi-vortex EF2 tornado with peak winds estimated between 120-125 mph touched down just east of Lindale near the intersection of County Road 499 and County Road 4100. The tornado traveled northeast resulting in extensive damage to trees along its path. The tornado was strongest between Farm to Market Road 16 and Farm to Market Road 2710, where a cell phone tower, a house, and two mobile homes sustained major damage from estimated EF2 tornado winds. This tornado remained on the ground as it crossed a heavily wooded area and the Sabine River into southeast Wood County.

- **May 10, 2015** – A damage survey performed in Smith County Texas determined that the damage in the county was consistent with that of an EF1 tornado. The most extensive damage was located east of County Road 1253 as well as County Road 460 and County Road 458. Several outbuildings and barns were damaged or destroyed. Other damage consisted of numerous trees snapped or uprooted.
- **January 20, 2010** – A weak EF0 tornado first touched down in a subdivision along Southern Trace Circle where shingles were peeled off several homes and a trampoline was thrown up onto a home. Several fences were blown down as well. The tornado continued east onto Walnut Hill Drive where sporadic tree damage was observed as well as some minor damage to several homes along the street. The tornado lifted before reaching US 69. Maximum winds are estimated at 65-70 mph.

13.1.4 Warning Time

The NOAA Storm Prediction Center issues tornado watches and warnings for Smith County. Watches and warnings are described below:

- Tornado Watch - Tornadoes are possible. Remain alert for approaching storms. Watch the sky and stay tuned to NOAA all hazards weather radio, commercial radio, or television for information.
- Tornado Warning - A tornado has been sighted or indicated by weather radar. Take shelter immediately.

Once a warning has been issued, residents may have only a matter of seconds or minutes to seek shelter.

13.2 VULNERABILITY AND IMPACTS

13.2.1 Exposure

In general, assets in the entire planning area are vulnerable to tornadoes including people, crops, vehicles, and built structures. Certain areas are more exposed due to geographic location and local weather patterns. Table 11-2 in the Hurricane / Tropical Storm Chapter shows that there is \$36.5 million in exposed property within the County as well as the total population of 225,290.

All buildings are considered to be exposed to tornadoes, but structures in poor condition, modular homes or in particularly vulnerable locations (located on hilltops or exposed open areas) may risk the most damage. The frequency and degree of damage will depend on specific locations.

All future development will be affected by severe storms. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. Land use policies identified in master plans and enforced through zoning codes and the permitting process also address many of the secondary impacts of the severe weather hazard. With these tools, the planning partnership can be well equipped to deal with future growth and the associated impacts of severe weather.

13.2.2 Impacts

Loss estimation for tornadoes is not based on damage functions, because no such damage functions have been generated. Instead, loss estimates were developed representing projected damages (annualized loss). Table 12-9 lists the property loss estimates for tornado events, which are included with hail, lightning, and wind losses. These annualized losses are less than \$50 annually and can be deemed “negligible.” Negligible loss hazards are still included despite minimal annualized losses because of the potential for a high-value damaging event.

Table 13-3. Loss Estimates for Tornado Events

	Annual Rate of Occurrence	Average Loss Expectancy	Annualized Loss
Smith County	1.4	\$133,636	\$147,000

The damage caused by strong tornadoes can be extensive for site-built homes as well as manufactured homes. National Weather Service research of tornado sites has shown that manufactured homes are more susceptible.

The enhanced Fujita scale identifies wind speeds that would completely destroy structures. For single-family site-built homes, winds in excess of 170 miles per hour (EF4) are needed. For a single-wide manufactured home, that drops to 127 miles per hour (EF2), and for a double-wide manufactured home, 134 miles per hour (EF2).

The highest number of manufactured homes within the planning area is in the unincorporated portion of the county, followed by the City of Tyler and Whitehouse respectively. Table 13-4 lists the number of manufactured homes along with the ratio of manufactured homes as compared to the number of housing units in each jurisdiction.

Table 13-4. Manufactured Homes by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Manufactured Homes to Housing Ratio
Arp	398	91	22.90%
Bullard	977	61	6.20%
Hideaway	1,944	0	0.00%
Lindale	2,212	0	0.00%
New Chapel Hill	272	31	11.40%
Noonday	304	42	13.80%
Troup	800	98	12.30%
Tyler	42,037	686	1.60%
Whitehouse	2,914	308	10.60%
Winona	333	55	16.50%
Smith County	88,145	10,602	12.00%

Source: U.S. Census Bureau, 2015 5-Year American Community Survey

Community Perception of Vulnerability

All of the jurisdictions except Lindale, Troup and Winona ranked tornado as a high hazard. The Cities of Lindale, Troup and Winona ranked tornado as a medium hazard.

See the first page of this chapter for a summary of hazard rankings for Smith County planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

13.2.3 Probability of Future Events

Tornadoes may occur in any month and at any hour of the day, but they occur with the greatest frequency during the late spring and early summer months, and between the hours of 4:00 pm and 8:00 pm.

Table 13-2 lists 14 recorded tornadoes rated EF0 to EF2. Therefore, on average, a small to medium sized tornado can occur anywhere in the county once a year. Smith County and participating jurisdictions can expect tornados up to a category EF2 (as based on historical records).

All of the planning partners agreed with this high probability factor except the City of Troup. The City of Troup felt that tornado events are likely to occur within 100 years.

13.3 CLIMATE CHANGE IMPACTS

Climate change impacts on the frequency and severity of tornadoes are unclear. According to the Center for Climate Change and Energy Solutions, “Researchers are working to better understand how the building blocks for tornadoes – atmospheric instability and wind shear – will respond to global warming. It is likely that a warmer, moister world would allow for more frequent instability. However, it is also likely that a warmer world would lessen chances for wind shear. Recent trends for these quantities in the Midwest during the spring are inconclusive. It is also possible that these changes could shift the timing of tornadoes or regions that are most likely to be hit” (Center for Climate and Energy Solutions no date).

13.4 ISSUES

Important issues associated with a tornado in the planning area include the following:

- Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to tornadoes.
- Availability of tornado safe rooms in public buildings.
- Redundancy of power supply must be evaluated.
- The capacity for backup power generation is limited.
- Roads and bridges blocked by debris or otherwise damaged might isolate populations.
- Warning time may not be adequate for residents to seek appropriate shelter or such shelter may not be widespread throughout the planning area.
- The impacts of climate change on the frequency and severity of tornadoes are not well understood.
- Building codes may need to be updated so buildings can withstand strong wind loads or provisions may be added for tornado shelters in high risk areas.

Chapter 14. WILDFIRE

WINTER STORM HAZARD	
Jurisdiction	
Smith County	30
City of Arp	24
City of Bullard	54
City of Hideaway	36
City of Lindale	45
City of New Chapel Hill	24
City of Noonday	24
City of Tyler	51
City of Troup	27
City of Whitehouse	45
City of Winona	36
See Chapter 16 for more information on hazard ranking.	

DEFINITIONS

Conflagration — A fire that grows beyond its original source area to engulf adjoining regions. Wind, extremely dry or hazardous weather conditions, excessive fuel buildup, and explosions are usually the elements behind a wildfire conflagration.

Interface Area — An area susceptible to wildfires and where wildland vegetation and urban or suburban development occur together. An example would be smaller urban areas and dispersed rural housing in forested areas.

Wildfire — Fires that result in uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property in non-urban areas. Because of their distance from firefighting resources, they can be difficult to contain and can cause a great deal of destruction.

14.1 HAZARD PROFILE

A wildfire event can rapidly spread out of control and occurs most often in the summer and early fall, when the brush is dry and flames can move unchecked through a highly vegetated area. Wildfires can start as a slow burning fire along the forest floor, killing and damaging trees. The fires often spread more rapidly as they reach the tops of trees, with wind carrying the flames from tree to tree. Usually, dense smoke is the first indication of a wildfire.

A wildfire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. It often begins unnoticed and spreads quickly, lighting brush, trees and homes on fire. Wildfires can be ignited by lightning or by human activity such as smoking, campfires, equipment use, and arson.

Texas has seen a significant increase in the number of wildfires in the past 30 years, which included wildland and interface or intermix fires. Wildland fires are fueled almost exclusively by natural vegetation while interface or intermix fires are urban/wildland fires in which vegetation and the built-environment provide the fuel.

Fire hazards present a considerable risk to vegetation and wildlife habitats. Short-term loss caused by a wildfire can include the destruction of timber, wildlife habitat, scenic vistas, and watersheds. Long-term effects include smaller timber harvests, reduced access to affected recreational areas, and destruction of cultural and economic resources and community infrastructure. Vulnerability to flooding increases due to the destruction of watersheds. The potential for significant damage to life and property exists in areas designated as wildland urban interface (WUI) areas, where development is adjacent to densely vegetated areas.

Texas has seen a huge increase in the number of wildfires in the past 30 years. From January 2005 through December 2014 the Texas Forest Service (TFS) has recorded 160,063 fires burning over 9.4 billion acres and 79% of those fires were within 2 miles of a community.

Fire Protection in Smith County

Fire protection in Smith County is divided among the following jurisdictions. All are volunteer fire departments (VFD) except the City of Tyler and City of Whitehouse have both paid and volunteer staff.

- Arp VFD
- Chapel Hill VFD
- Dixie VFD
- Flint-Gresham VFD
- Jackson Heights VFD
- Lindale VFD
- Noonday VFD
- Red Springs VFD
- Troup VFD
- Tyler Fire Department
- Whitehouse Fire Department
- Winona VFD

Vegetation Classes in Smith County

General vegetation for the Smith County planning area is described in Table 14-1. The most common vegetation class in the county is mixed forest.

Table 14-1. Vegetation Classes in Smith County

Class	Acres	% of Area
Barren Land (Rock/Sand/Clay)	3,883	0.6 %
Developed Land	85,835	14%
Developed Open Space	23,612	3.9 %
Crops and Pasture/Hay	162,145	26.7%
Grassland	8	0%
Marsh	375	0.1%
Mixed Forest	259,308	42.8%
Shrub/Scrub	54,876	9.0%
Water	17,536	2.9%
Total	607,578	100%

14.1.1 Location

Texas is one of the fastest growing states in the nation. Much of this growth is occurring in the WUI area, where structures and other human improvements meet and mix with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfires. For Smith County, the Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP) estimated that 127,052 people or 57% of the total county population live within the WUI. The WUI layer reflects housing density depicting where humans and their structures meet or intermix with wildland fuels. Approximately 296,795 acres of Smith County are located as part of the WUI.

The TxWRAP report for the Smith County planning area maps the WUI Response Index, which is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) as seen in Figure 14-1. The TxWRAP report states that the location of people living in the WUI and rural areas is essential for defining potential wildfire impacts to people and homes.

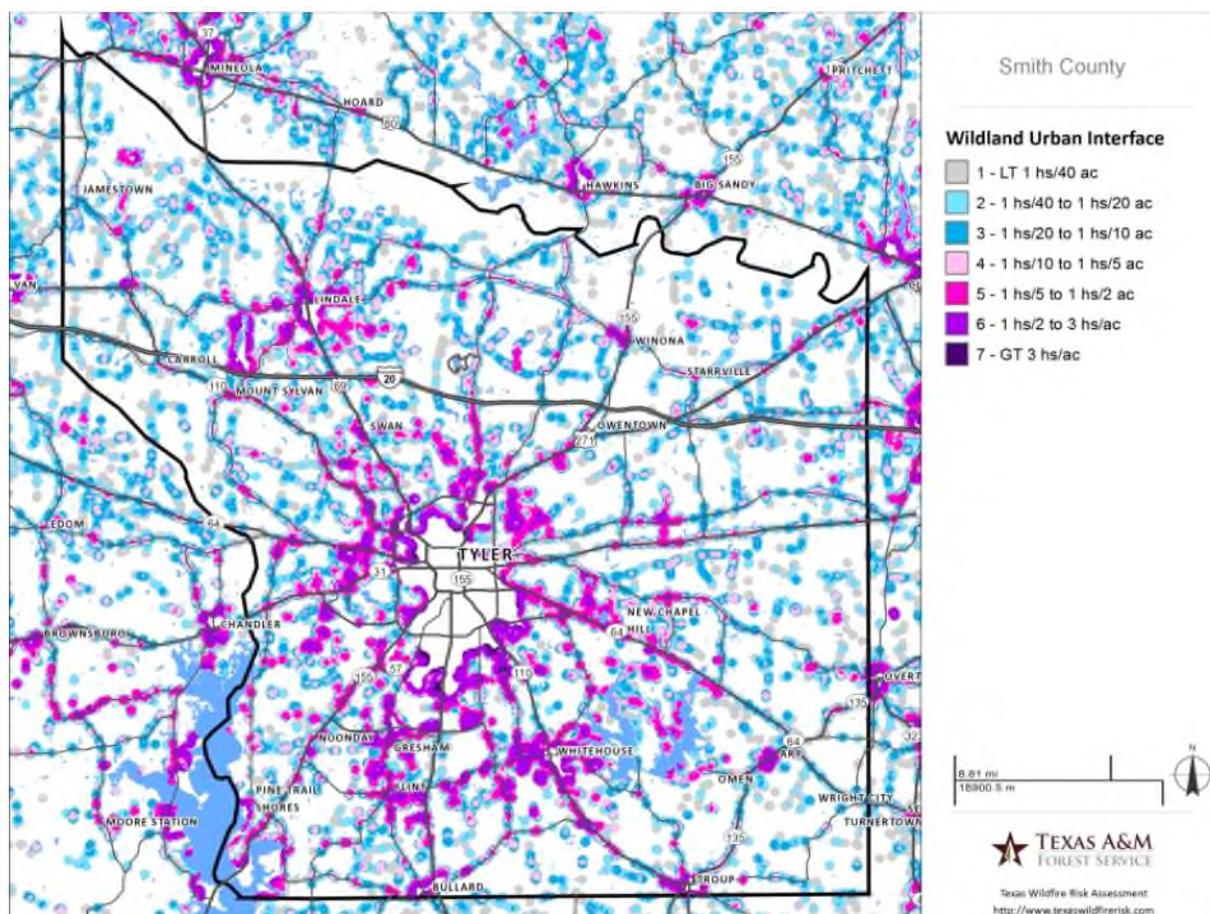


Figure 14-1. Smith County Wildland Urban Interface

14.1.2 Extent

The TxWRAP report for Smith County maps the Fire Intensity Scale (FIS) specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on a weighted average of four percentile weather categories. The minimum class, Class 1, represents very low wildfire intensities and the maximum class, Class 5, represents very high wildfire intensities as seen in Table 14-2. The majority of Smith County is identified as a very low to low on the FIS as seen in Figure 14-2 and all the municipal planning partners’ FIS can be viewed in Figure 14-3 through Figure 14-12.

The worst case scenario for the Smith County planning area is to see up to a Class 5 Wildfire with very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds and a great potential for harm or damage to life and property.

Table 14-2. Texas Forest Service Fire Intensity Ratings

Class	Wildfire Intensity Ratings	Description of Fire
Class 1	Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and nonspecialized equipment.
Class 2	Low	Small flames, usually less than 2 feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.

Class	Wildfire Intensity Ratings	Description of Fire
Class 3	Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozers and plows are generally effective. Increasing potential for harm or damage to life and property.
Class 4	High	Large flames, up to 30 feet in length; short-range spotting common; medium-range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property
Class 5	Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Source: TFS, 2017

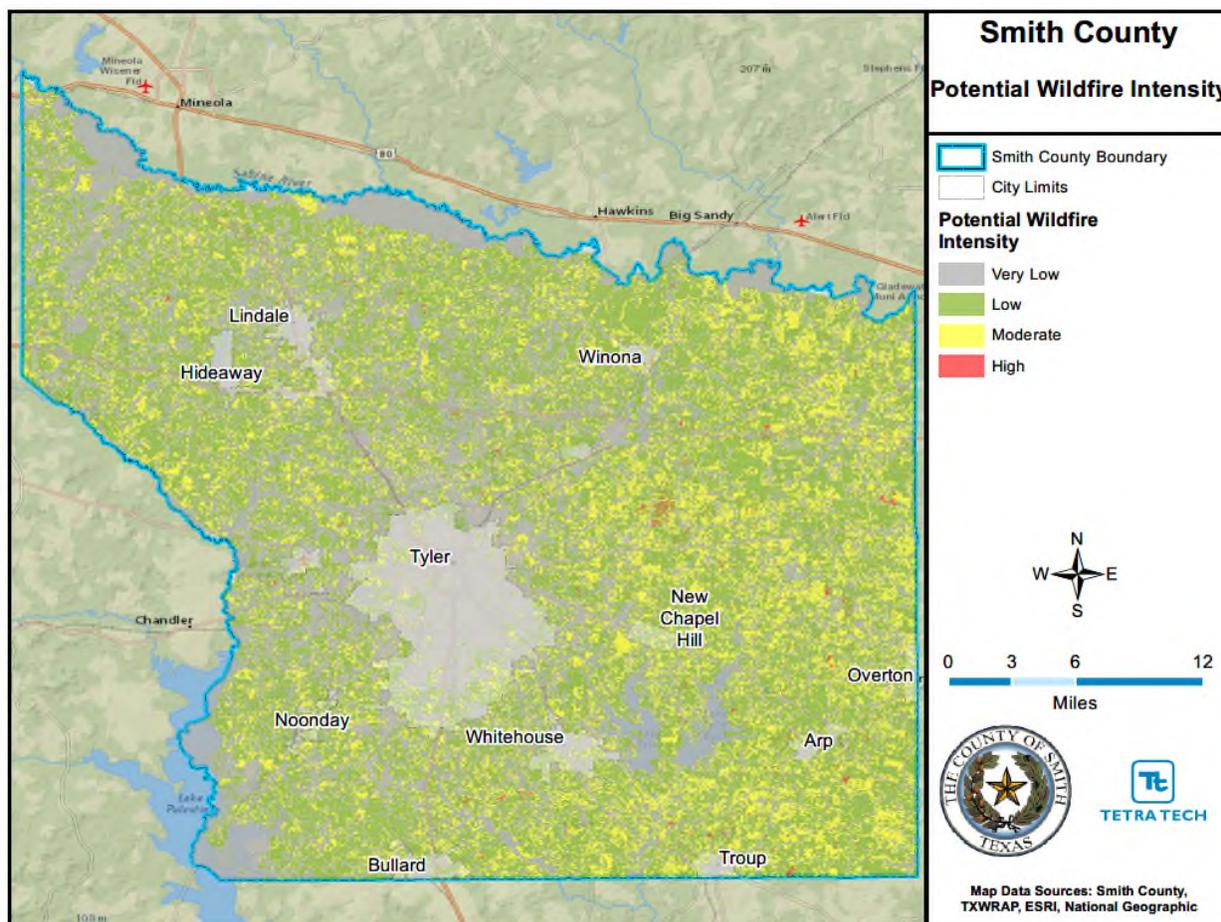


Figure 14-2. Smith County Wildfire Intensity

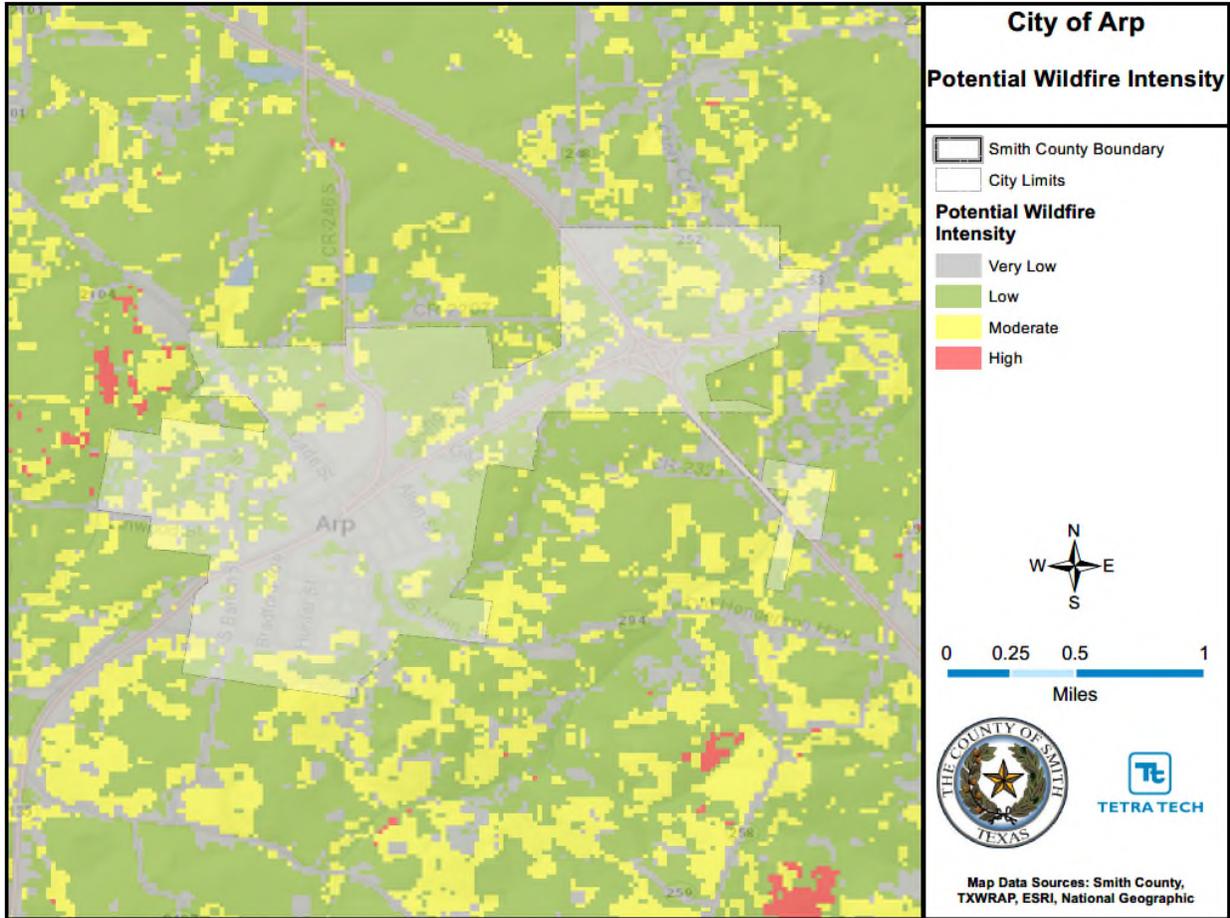


Figure 14-3. City of Arp Wildfire Intensity

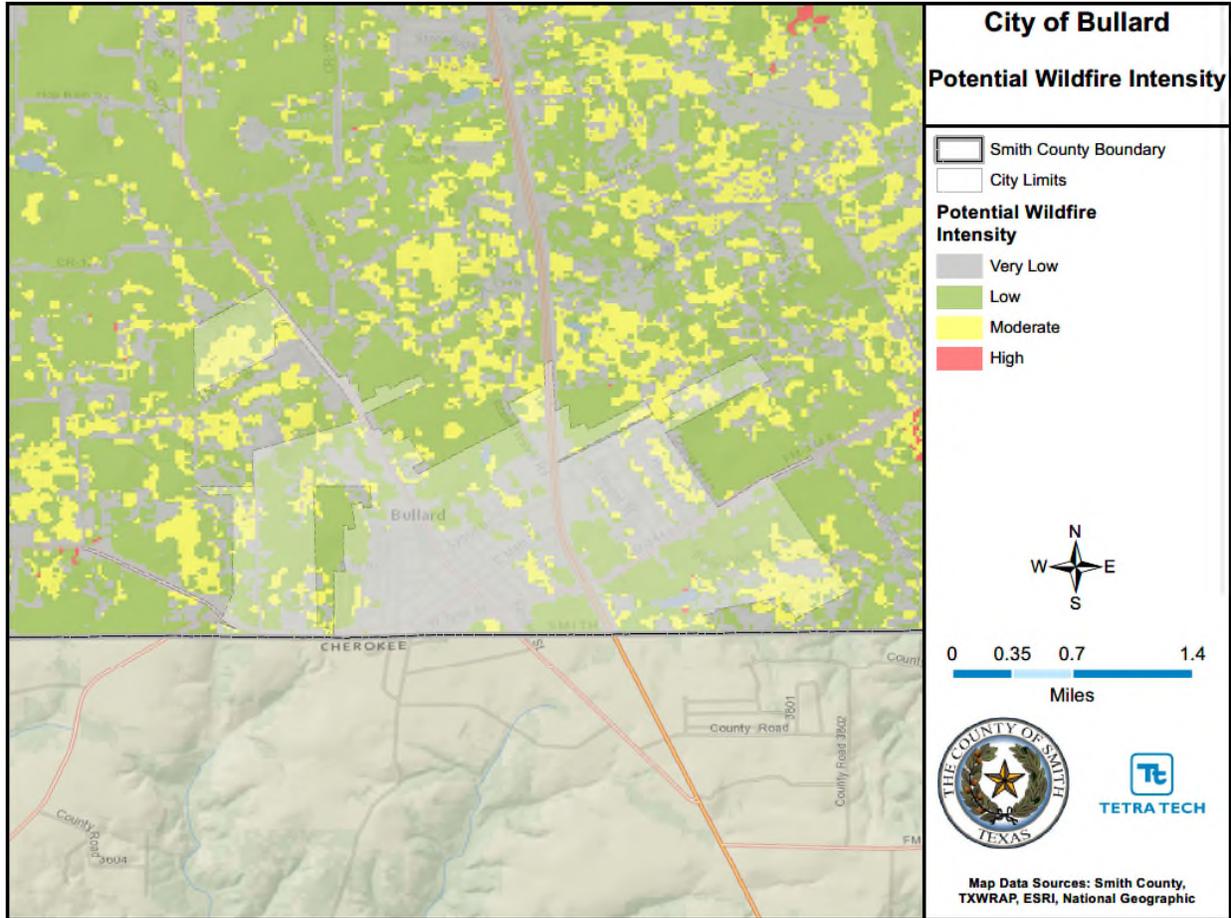


Figure 14-4. City of Bullard Wildfire Intensity

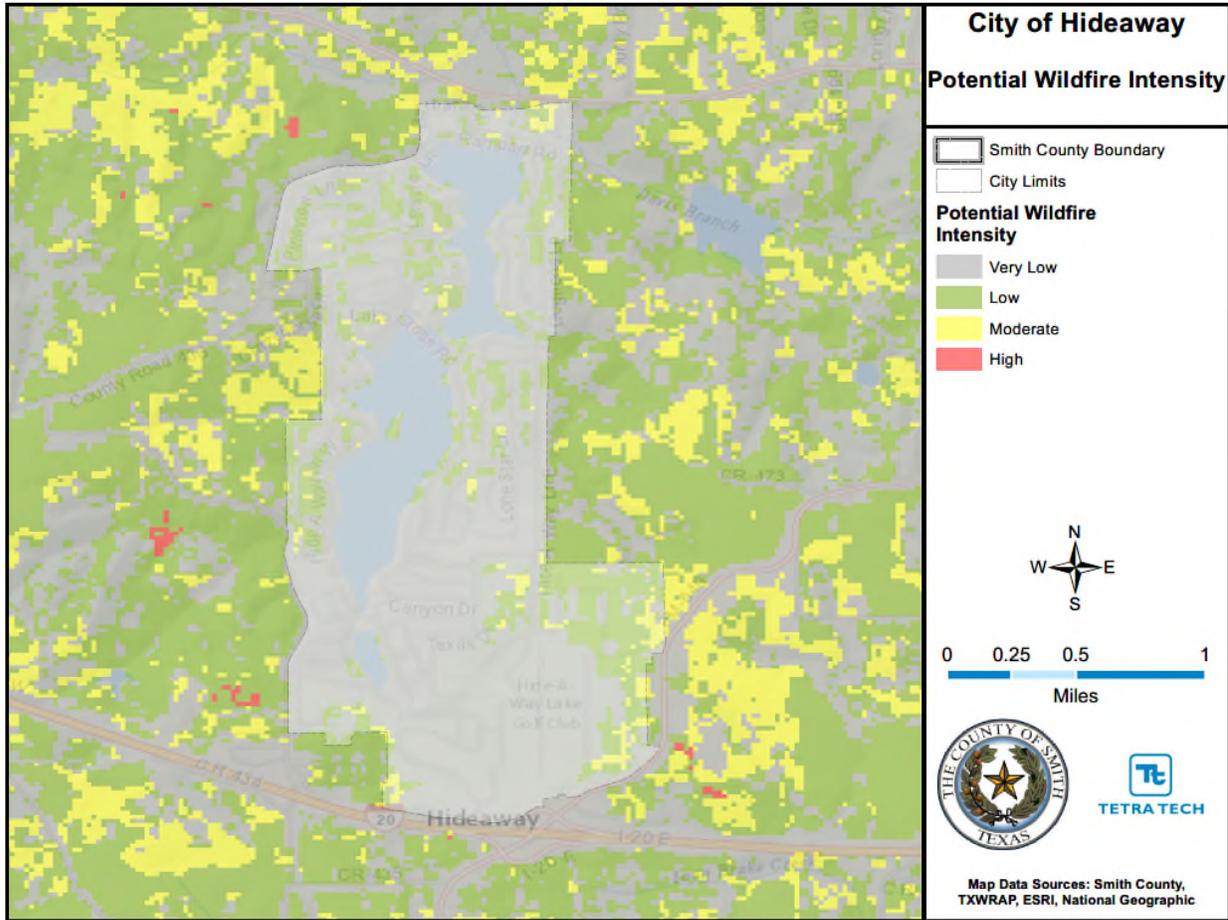


Figure 14-5. City Hideaway Wildfire Intensity

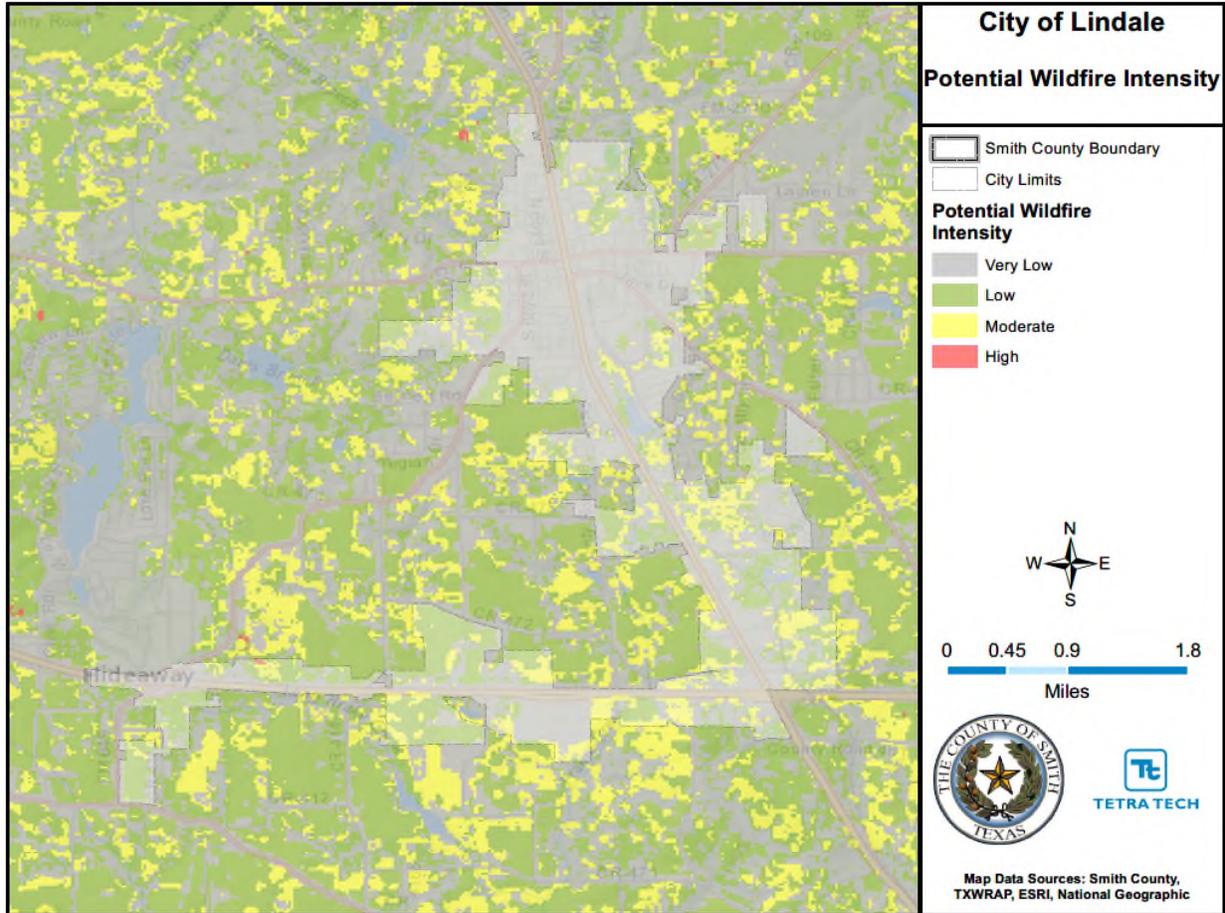


Figure 14-6. City of Lindale Wildfire Intensity

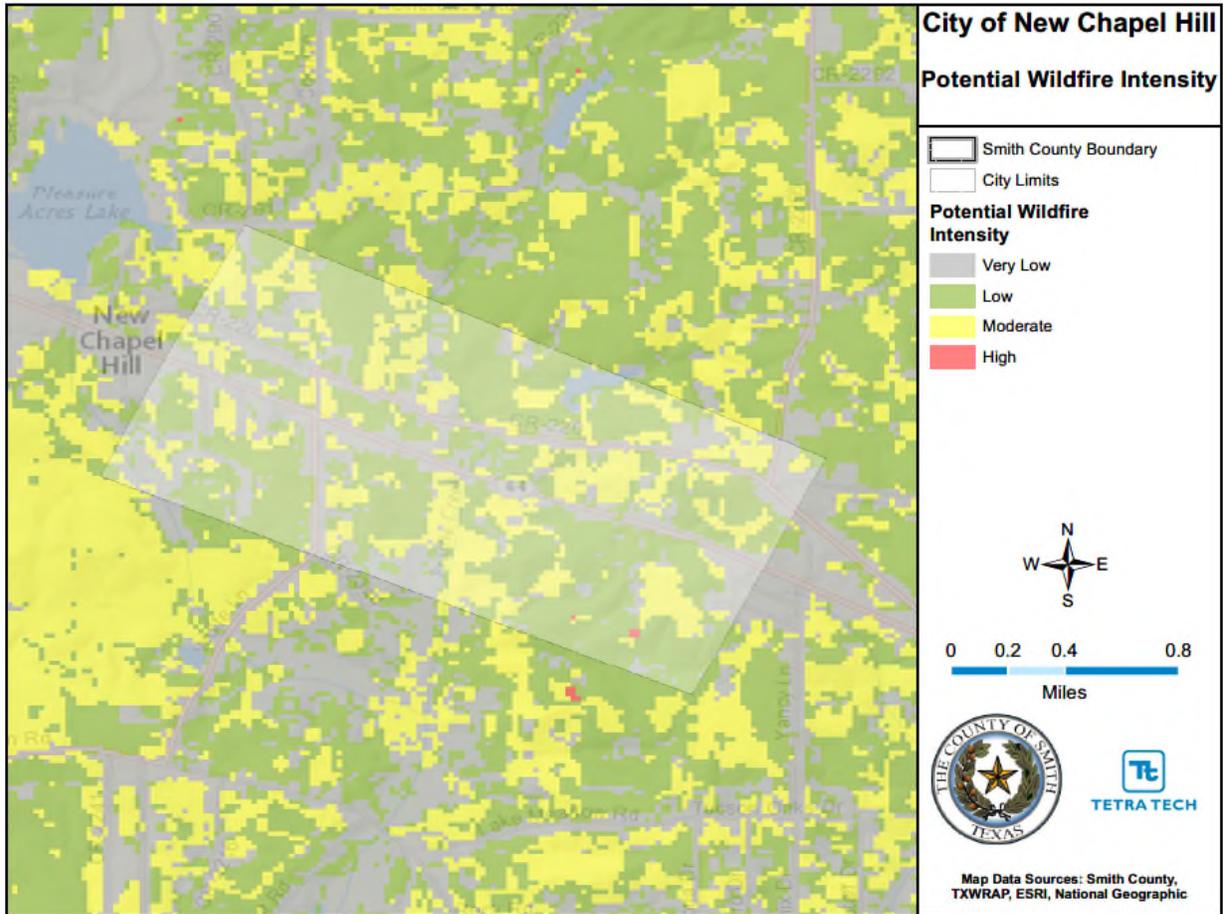


Figure 14-7. City of New Chapel Hill Wildfire Intensity

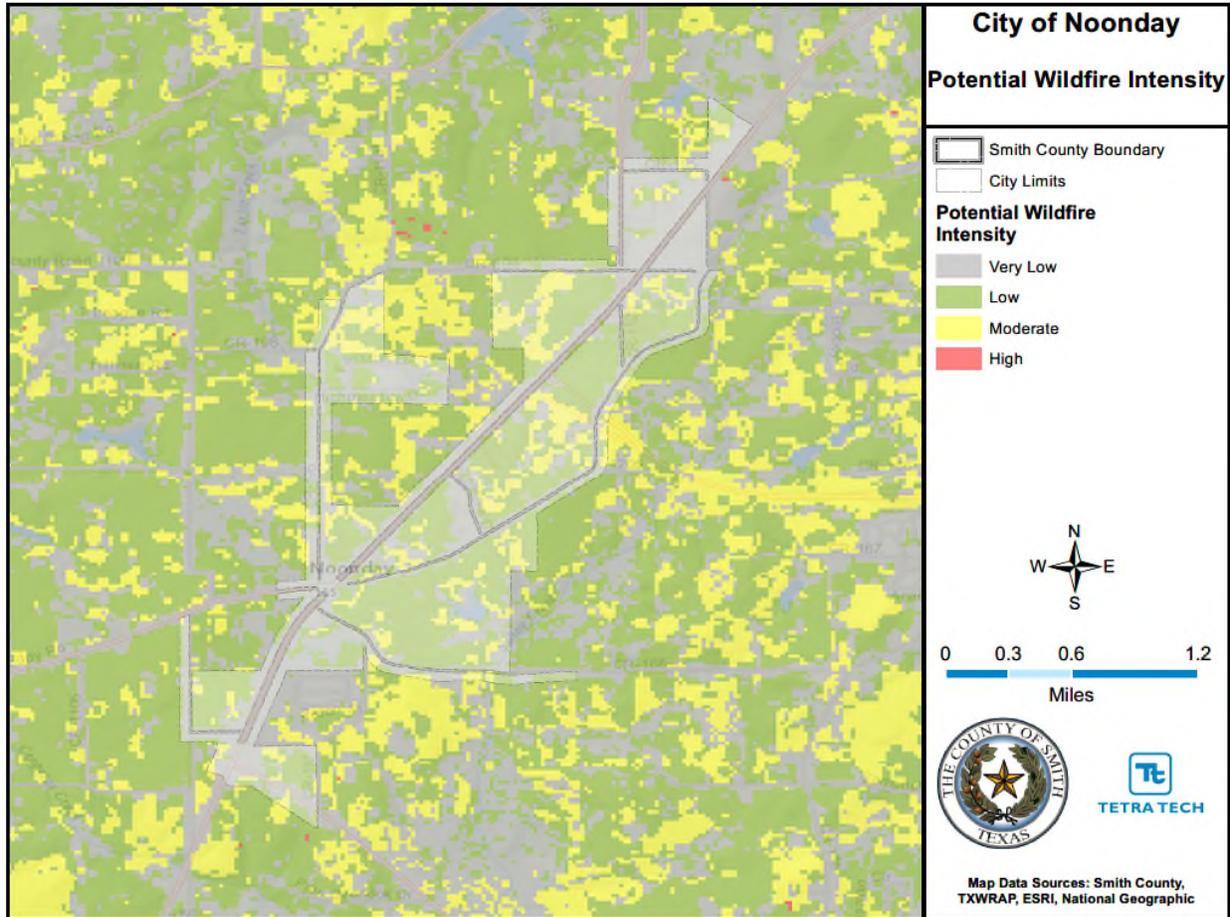


Figure 14-8. City of Noonday Wildfire Intensity

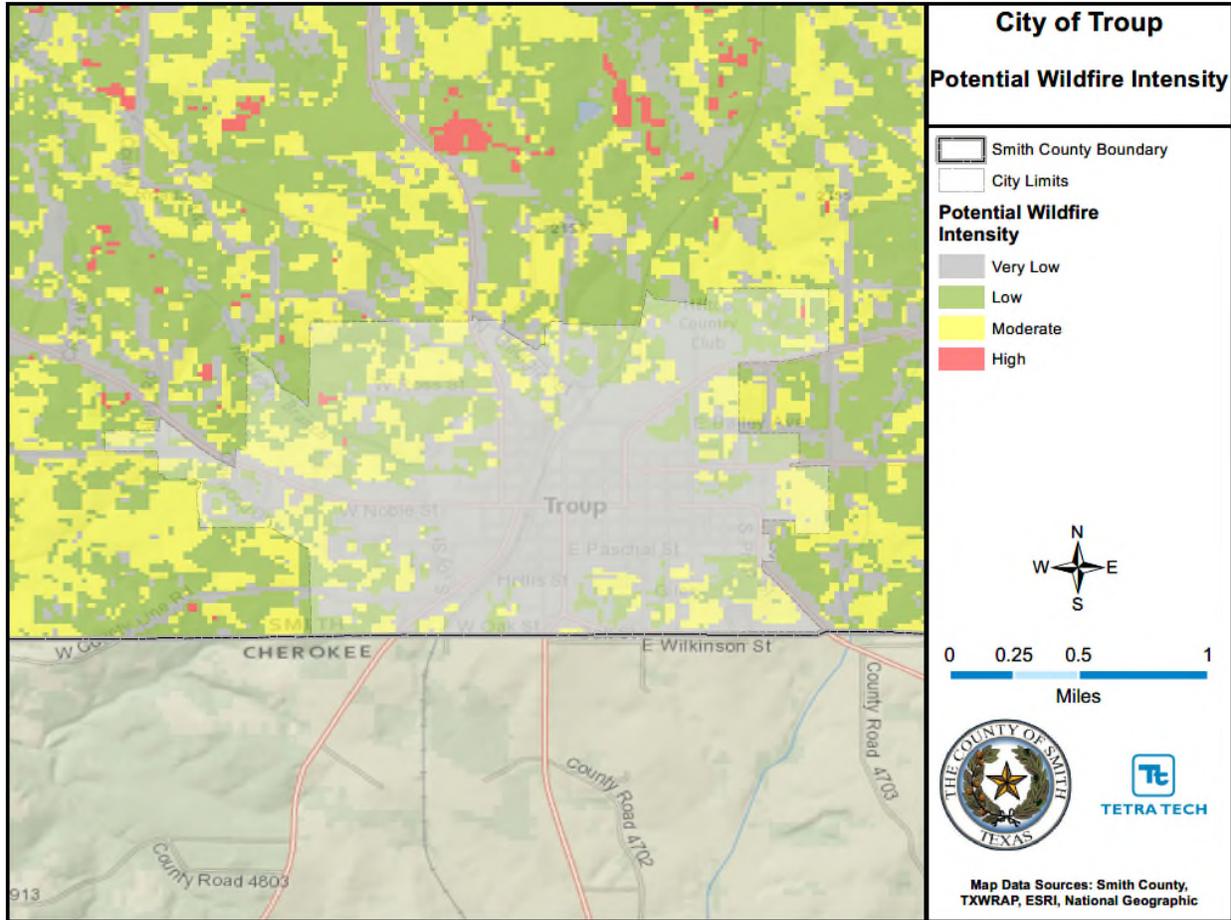


Figure 14-9. City of Troup Wildfire Intensity

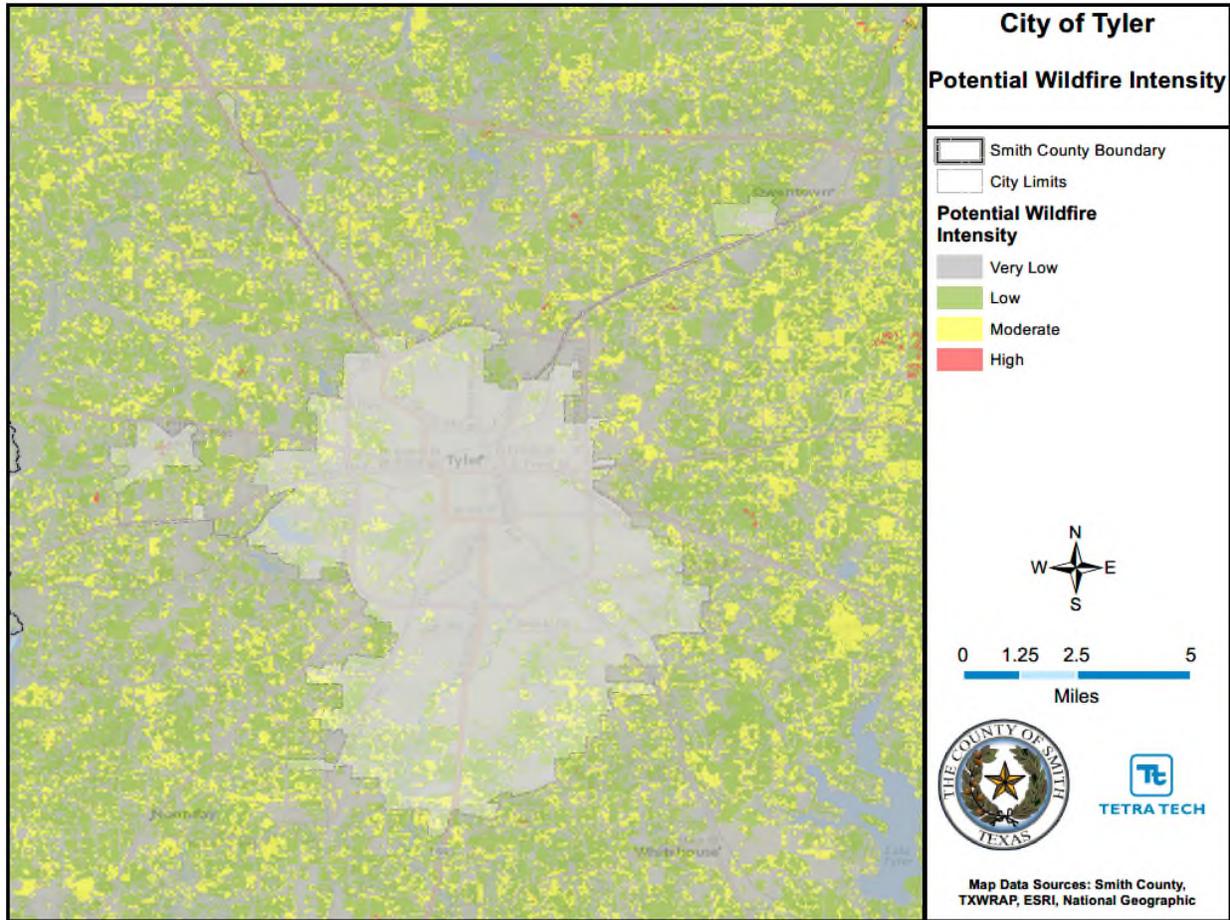


Figure 14-10. City of Tyler Wildfire Intensity

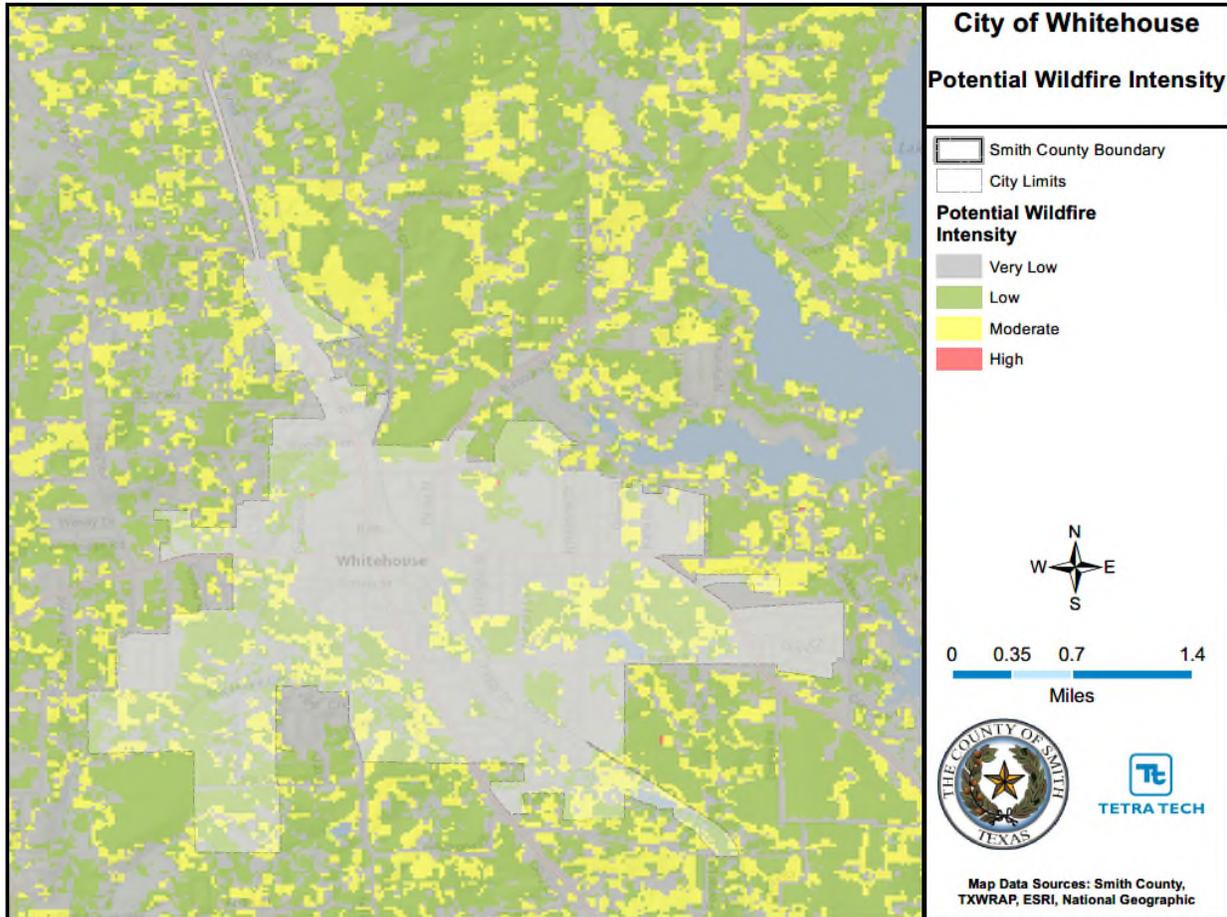


Figure 14-11. City of Whitehouse Wildfire Intensity

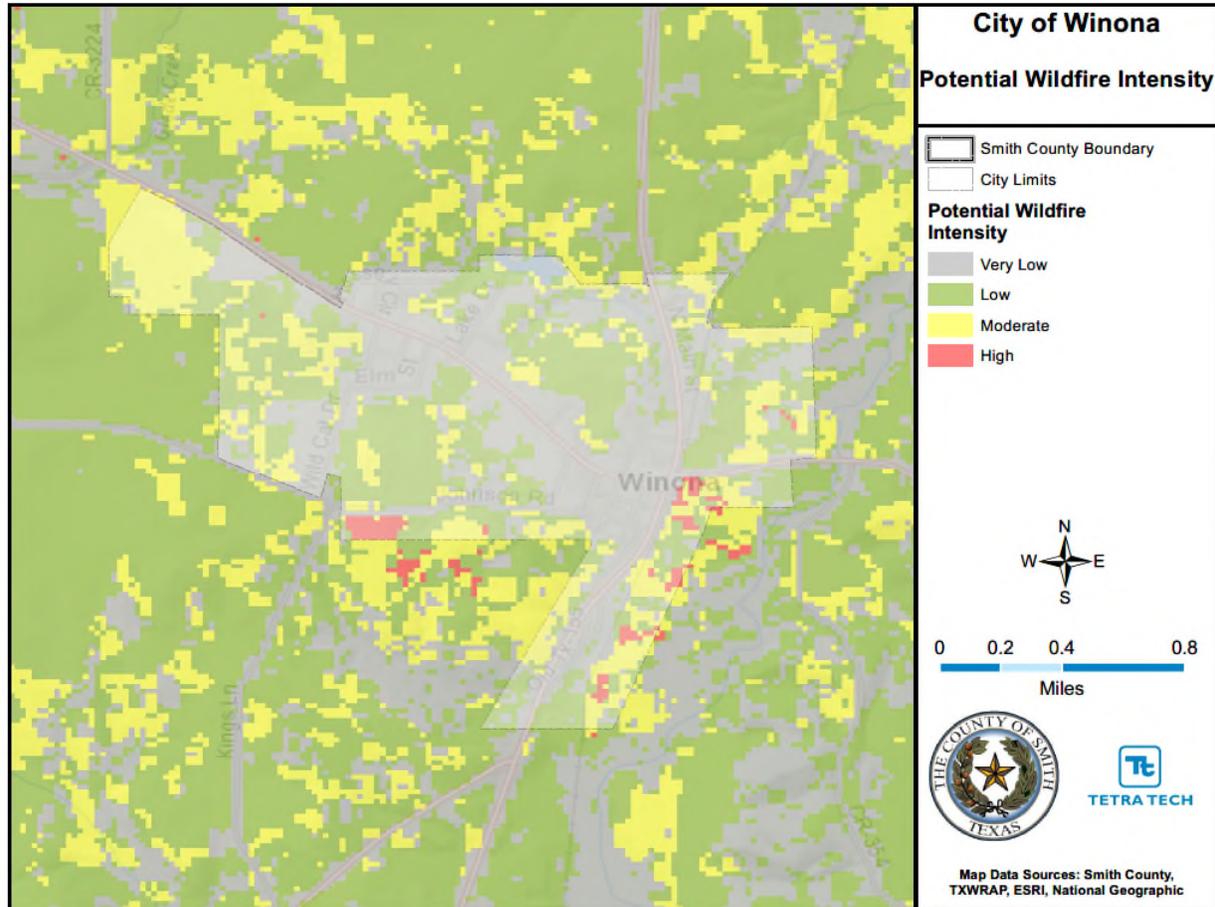


Figure 14-12. City of Winona Wildfire Intensity

14.1.3 Past Events

Since 1965, Smith County has been included in six Presidential Declarations for wildfires in the planning area (see Table 4-1). Two declarations are included in this plan update timeframe:

- FEMA-DR-4029-TX Incident began on August 30, 2011
- FEAM-EM-3284-TX Incident began on March 14, 2008

The Texas Forest Service's Wildfire Risk Assessment Portal reports 35 wildfire events burning 4,803 acres between 2005 and 2015 (fires burning over 50 acres) mainly within unincorporated Smith County.

The NCEI recorded three wildfires in the planning area from January 2008 through December 2017. Of these events, there was \$770,000 recorded in property damage and no injuries or fatalities.

Notable past events in the Smith County planning area are described below:

- **September 8, 2013** - Drought stricken areas east of Tyler, triple-digit afternoon temperatures and gusty winds helped to ignite a fire that began as pieces of a hot tire were thrown off a vehicle and landed in an area of dry grass and pine straw along Farm to Market 2767 near the Jackson Heights area. Those initial flares then spread quickly due to the wind. Volunteer fire departments began evacuating up to 60 homes shortly after the noon hour on September 8th as the fire quickly spread. By the time the fire was contained, it burned 405 acres of grassland and timberland. The fire also

consumed two homes along with multiple outdoor structures including barns and sheds as well as multiple vehicles causing an estimated \$400,000 in property damage.

- **August 8, 2011 - FEMA-DR-4029-TX** – Ambient temperatures around 108 degrees and exceptional drought conditions were the ingredients needed for a major grass fire to turn into a forest fire in eastern Smith County between Tyler and Kilgore, Texas. At least four structures (some homes), and numerous (unknown number) vehicles had burned causing an estimated \$250,000 in damage. County Roads 235 and 236 were shut down from the fire and CR 2305 was being evacuated. A Red Cross shelter was opened for evacuees. All police and fire departments within Smith County were called to assist with evacuation and firefighting efforts. Numerous homes were threatened and air support was utilized from surrounding counties to help fight the fire. This FEMA declaration included 23 designated counties for individual assistance.
- **July 8, 2011** - The Smith County fire department responded to a fire on County Road 272 in Chapel Hill that got out of control. The fire was started purposely as a burn pile in a resident's back yard. With the county suffering under extreme drought conditions, the fire quickly spread to other properties adjacent to the resident. The fire consumed three trailers, a vehicle and a boat. There was no report of injuries but \$120,000 in property damages reported.
- **March 14, 2008 - FEMA-EM-3284-TX** – This emergency declaration included a wide area to assist local communities to battle multiple wildfires throughout the state. Smith County did not experience any significant acres losses.

14.1.4 Warning Time

Wildfires are often caused by humans, intentionally or accidentally. There is no way to predict when one might break out. Because fireworks often cause brush fires, extra diligence is warranted around the Fourth of July when the use of fireworks is highest. Dry seasons and droughts are factors that greatly increase fire likelihood. Dry lightning may trigger wildfires. Severe weather can be predicted, so special attention can be paid during weather events that may include lightning. Reliable NWS lightning warnings are available on average 24 to 48 hours before a significant electrical storm.

If a fire does break out and spreads rapidly, residents may need to evacuate within days or hours. A fire's peak burning period generally is between 1:00 p.m. and 6:00 p.m. Once a fire has started, fire alerting is reasonably rapid in most cases. The rapid spread of cellular and two-way radio communications in recent years has further contributed to a significant improvement in warning time.

14.2 VULNERABILITY AND IMPACTS

Structures, aboveground infrastructure, critical facilities, agricultural area (crops and structures), and natural environments are all vulnerable to the wildfire hazard.

14.2.1 Exposure

Table 14-3 lists the building-related exposure to the wildfire risk categories for the Smith County planning area.

Smith County	Very Low Potential Wildfire Intensity	Low Potential Wildfire Intensity	Moderate Potential Wildfire Intensity	High Potential Wildfire Intensity
Total Area (Acres)	232,413	254,639	119,595	1,373
Estimated Population Exposed	149,734	41,030	18,804	148
Value of Building and Contents	\$27.7 B	\$6.1 B	\$2.8 B	\$19,000

Smith County	Very Low Potential Wildfire Intensity	Low Potential Wildfire Intensity	Moderate Potential Wildfire Intensity	High Potential Wildfire Intensity
Percentage of Replacement Value Exposed	75.8%	16.6%	7.6%	<0.1%

Source: TxWRAP, Hazus

Critical Facilities and Infrastructure

Critical facilities of wood frame construction are especially vulnerable during wildfire events. In the event of wildfire, there would likely be little damage to most infrastructure. Most roads and railroads would be without damage except in the worst scenarios. Power lines are the most at risk from wildfire because most poles are made of wood and susceptible to burning. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed.

Environment

Fire is a natural and critical ecosystem process in most terrestrial ecosystems, dictating in part the types, structure, and spatial extent of native vegetation. However, wildfires can cause severe environmental impacts:

- **Soil Erosion** – The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species** – Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes, and become difficult and costly to control.
- **Disease and Insect Infestations** – Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Endangered Species Habitat** – Catastrophic fires can have devastating consequences for endangered species.
- **Soil Sterilization** – Topsoil exposed to extreme heat can become water repellent, and soil nutrients may be lost. It can take decades or even centuries for ecosystems to recover from a fire. Some fires burn so hot that they can sterilize the soil.

Many ecosystems are adapted to historical patterns of fire occurrence. These patterns, called “fire regimes,” include temporal attributes (frequency and seasonality), spatial attributes (size and spatial complexity), and magnitude attributes (intensity and severity), each of which have ranges of natural variability. Ecosystem stability is threatened when any of the attributes for a given fire regime diverge from its range of natural variability.

14.2.2 Impacts

Loss estimates for wildfire hazard are not based on damage functions, because no such damage functions have been generated. Instead, loss estimates were developed representing projected damages (annualized loss) on historical events. Table 14-4 lists the loss estimates based on historical occurrences.

	Annual Rate of Occurrence	Annualized Acres Burned	Annualized Loss
Smith County	3.5	480.3	\$77,000

Community Perception of Vulnerability

The jurisdictions of Smith County as well as the Cities of Hideaway and Noonday ranked wildfire as a high hazard. The Cities of Arp, Bullard, New Chapel Hill, and Whitehouse ranked it as a medium hazard and the Cities of Lindale, Tyler, Troup, and Winona ranked it a low hazard impact.

See the first page of this chapter for a summary of hazard rankings for Smith County planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

14.3 PROBABILITY OF FUTURE EVENTS

The threat of wildfire is a constant in Texas. From the East Texas Piney Woods to the Davis Mountains of West Texas, wildfires burn thousands, if not millions, of acres each year. Wildfires become especially dangerous when wildland vegetation begins to intermix with homes. Based on previous events and historical records, there is nearly a 100% chance of an event occurring in the unincorporated Smith County and varying factors will determine if they burn into the interface areas of the municipalities.

The jurisdictions of Smith County along with the Cities of Bullard, Hideaway, Noonday, Tyler, and Winona agree that there is high probability of wildfires in the future. The Cities of Arp, Lindale, New Chapel Hill, Troup and Whitehouse feel the probability is medium and wildfire is likely to occur within 100 years.

With more and more people living in the WUI, it is increasingly important for local officials to plan and prepare for wildfires. CWPPs are a proven strategy for reducing the risk of catastrophic wildfires and protecting lives and property.

TFS encourages Texas counties and communities to develop and adopt CWPPs to better prepare their region and citizens for wildfires. Planning for wildfires should take place long before a community is threatened. Once a wildfire ignites, the only option available to firefighters is to attempt to suppress the fire before it reaches a community. A CWPP is unique in that it empowers communities to share the responsibility for selecting the best strategies for protection against wildfire.

The Texas CWPP calls for communities to:

- Know their environment (WUI), assets at risk, fire occurrence and behavior, and overall wildfire risks
- Adopt mitigation strategies from wildfire preventions to fuels reduction to capacity building
- Create and adopt recovery plan strategies

14.4 CLIMATE CHANGE IMPACTS

Fire in western ecosystems is affected by climate variability, local topography, and human intervention. Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot, dry spells create the highest fire risk. Increased temperatures may intensify wildfire danger by warming and drying out vegetation. When climate alters fuel loads and fuel moisture, forest susceptibility to wildfires changes. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

Historically, drought patterns in the West and Midwest are related to large-scale climate patterns in the Pacific and Atlantic Oceans. The El Niño–Southern Oscillation in the Pacific varies on a 5- to 7-year cycle, the Pacific Decadal Oscillation varies on a 20- to 30-year cycle, and the Atlantic Multidecadal Oscillation varies on a 65- to 80-year cycle. As these large-scale ocean climate patterns vary in relation to each other, drought conditions in the U.S. shift from region to region.

Climate scenarios project summer temperature increases between 2 and 5 degrees Celsius (3.6 to 9°F) and precipitation decreases of up to 15% by 2100. Such conditions would exacerbate summer drought and further promote wildfires, releasing stores of carbon and further contributing to the buildup of greenhouse

gases. Forest response to increased atmospheric carbon dioxide – the so-called “fertilization effect” – could also contribute to more tree growth and thus more fuel for fires, but the effects of carbon dioxide on mature forests are still largely unknown. High carbon dioxide levels should enhance tree recovery after fire and young forest regrowth, as long as sufficient nutrients and soil moisture are available, although the latter is in question for many parts of the U.S. because of climate change.

14.5 ISSUES

The major issues for wildfire are the following:

Public education and outreach to people living in or near the fire hazard zones should include information about and assistance with mitigation activities such as defensible space, and advance identification of evacuation routes and safe zones.

- Future growth into interface areas should continue to be managed.
- Area fire districts need to continue to train on WUI events.
- Vegetation management activities should be enhanced.
- Regional consistency of higher building code standards should be adopted such as residential sprinkler requirements and prohibitive combustible roof standards.
- Fire department water supply in high-risk wildfire areas.
- Expand certifications and qualifications for fire department personnel. Ensure that all firefighters are trained in basic wildfire behavior, basic fire weather, and that all company officers and chief level officers are trained in the wildland command and strike team leader level.
- Both the natural and man-made conditions that contribute to the wildland fire hazard are tending to worsen through time.
- Conservative forestry management practices have resulted in congested forests prone to fire and disease.
- The continued migration of inhabitants to remote areas of the county increases the probability of human-caused ignitions from vehicles, grills, campfires, and electrical devices.

Chapter 15. WINTER WEATHER

WINTER STORM HAZARD	
Jurisdiction	
Smith County	30
City of Arp	24
City of Bullard	54
City of Hideaway	36
City of Lindale	45
City of New Chapel Hill	24
City of Nooday	24
City of Tyler	51
City of Troup	27
City of Whitehouse	45
City of Winona	36
See Chapter 16 for more information on hazard ranking.	

DEFINITIONS

Freezing Rain — The result of rain occurring when the temperature is below the freezing point. The rain freezes on impact, resulting in a layer of glaze ice up to an inch thick. In a severe ice storm, an evergreen tree 60 feet high and 30 feet wide can be burdened with up to 6 tons of ice, creating a threat to power and telephone lines and transportation routes.

Severe Local Storm — Small-scale atmospheric systems, including tornadoes, thunderstorms, windstorms, ice storms, and snowstorms. These storms may cause a great deal of destruction and even death, but their impact is generally confined to a small area. Typical impacts are on transportation infrastructure and utilities.

Winter Storm — A storm having significant snowfall, ice, or freezing rain; the quantity of precipitation varies by elevation.

15.1 HAZARD PROFILE

A severe winter storm event is identified as a storm with snow, ice, or freezing rain—all of which can cause significant problems for area residents. Although rare in east Texas, winter weather does occasionally occur. January is the month when snow, sleet, or freezing rain is most likely to be observed; yet, winter weather conditions can occur at any time during the winter and early spring months. The leading cause of death during winter storms is transportation accidents. Hypothermia and frostbite are other dangers from very cold winter temperatures.

Extreme cold often accompanies a winter storm or is left in its wake. It is most likely to occur in the winter months of December, January, and February. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Extreme cold can disrupt or impair communications facilities.

15.1.1 Location

Smith County and the planning partners are susceptible to winter storms; blizzard conditions are primarily in the form of freezing rain, sleet, or ice. Ice accumulation becomes a hazard by creating dangerous travel conditions especially when jurisdictions do not pre-treat the roads and people do not have all-weather tires on their vehicles.

According to the weather station in Tyler, the planning area experiences an average of 30 freezing days. Table 4-2 shows the annual average minimum, maximum, and mean temperature distribution from Tyler.

15.1.2 Extent

Figure 15-1 and Figure 15-2 are two indices used to measure winter storms. The first is the wind chill temperature index (see Figure 15-1). This index describes the relative discomfort or danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin

caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Source: NOAA, NWS

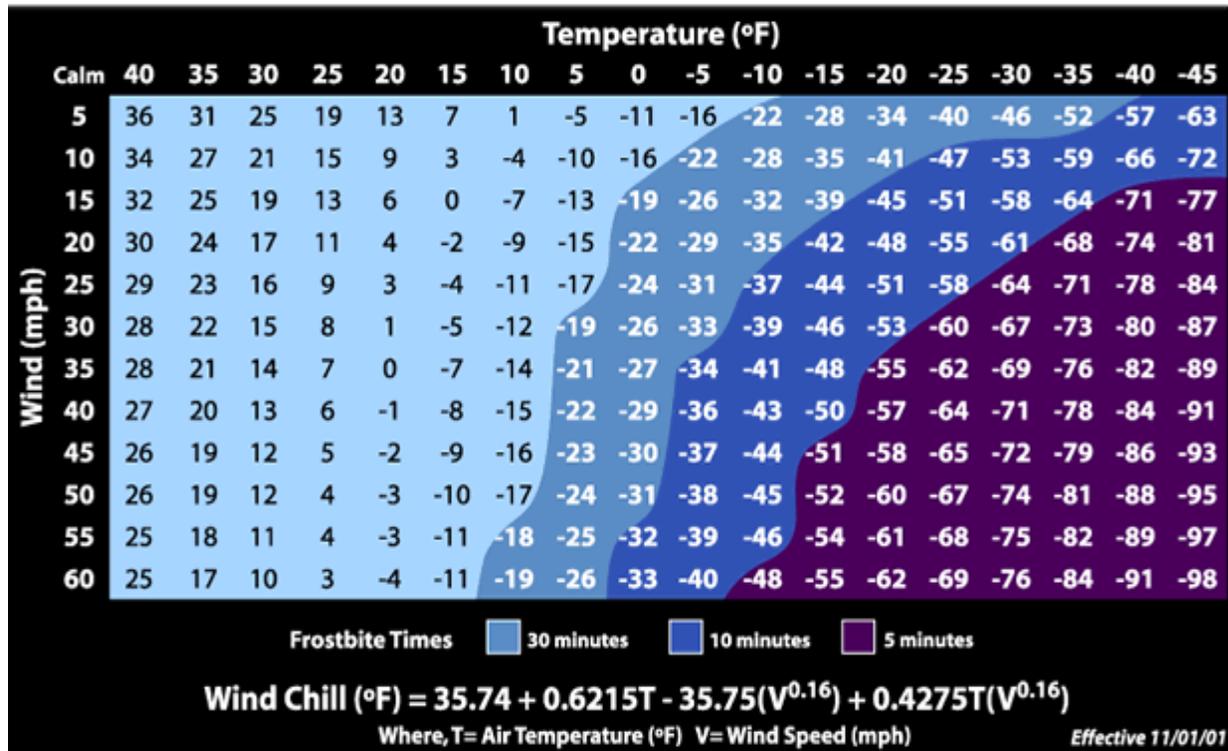


Figure 15-1. National Weather Service Wind Chill Chart

A wind chill watch is issued by the NWS when wind chill warning criteria are possible in the next 12 to 36 hours. A wind chill warning is issued for wind chills of at least -25°F in Midwest.

The worst case scenario for the Smith County planning area and participating jurisdictions is the combination of -15 air temperatures and 35 mph winds that would create up to -48 wind chill. This would result in frost bite within 10 minutes of exposure and lead to hypothermia if precautions are not taken.

The second index is the Sperry-Piltz Ice Accumulation Index, or SPIA Index, which is an ice accumulation and damage prediction index (see Figure 15-2). It is a tool to be used by the National Weather Service, FEMA as well as other agencies and communities for risk management and winter weather preparedness.

The second worst case scenario involves the Smith County planning area and participating jurisdictions receiving up to an one-inch of ice covering everything.

The Sperry-Piltz Ice Accumulation Index, or “SPIA Index” – Copyright, February, 2009

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) <small>*Revised-October, 2011</small>	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
4	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

Figure 15-2. Sperry-Piltz Ice Accumulation Index or SPIA Index

15.1.3 Past Events

Since 1965, Smith County has been included in one Presidential Disaster (DR) Declaration for a severe winter ice storm that occurred in December 2000 in the planning area (see Table 4-1).

NCEI recorded 16 winter weather events within the Smith County area from January 2008 through December 2017, and all the planning partners are exposed to the same weather events. Of these events, there was no recorded property damage and no injuries or fatalities (see Table 15-1.)

Table 15-1. Winter Weather Historical Events Summary (2008-2017)

	Number of Events per Year	Property Damage	Crop Damage	Injuries	Fatalities
2017	0	\$0	\$0	0	0
2016	0	\$0	\$0	0	0
2015	3	\$0	\$0	0	0
2014	2	\$0	\$0	0	0
2013	4	\$0	\$0	0	0
2012	1	\$0	\$0	0	0
2011	2	\$0	\$0	0	0
2010	2	\$0	\$0	0	0
2009	1	\$0	\$0	0	0
2008	1	\$0	\$0	0	0
Total	16	\$0	\$0	0	0

Source: NCEI, 2017

Smith County and the planning partners do not experience severe winter weather events consistently, but winter storms can affect the plan update area. There have not been any category 5 (SPIA Index) ice events in Smith County. Weather events for Smith County and participating communities have been in the 0-2 Index, with an occasional 3 SPIA Index event. SPIA Index events of 0 to 2 can expect ice accumulation up to 0.75 inch and winds less than 35 mph. SPIA Index 3 events can expect ice accumulation up to 1.0 inch and winds greater than 35 mph.

For snowfall, the only historical event recorded during this plan update was on February 11th -12th, 2010. Snow began accumulating during the morning hours of February 11th and did not end until the afternoon hours of February 12th. Snowfall totals across the county ranged from 5 to 10 inches with 5 inches measured at Emerald Bay by Lake Palestine, and 10 inches measured near Lindale. Schools and some businesses were closed and the wet nature of the snow resulted in large tree branches being downed along with some smaller trees across the county.

USDA Risk Management Agency

According to the USDA Risk Management Agency, payments for insured crop losses in Smith County as a result of freeze conditions between 2011 and 2016 caused \$57,733 in annualized crop losses that affected 293 acres. These claims occurred in 2011, 2013, 2014, and 2016.

15.1.4 Warning Time

Meteorologists can often predict the likelihood of a severe winter storm. When forecasts are available, they can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.

15.2 VULNERABILITY AND IMPACTS

The entire planning area is vulnerable to the effects of winter storms. Hazardous driving conditions caused by snow and ice on highways and bridges lead to many traffic accidents and can impact the response of emergency vehicles. The leading cause of death during winter storms is transportation accidents. About 70 percent of winter-related deaths occur in automobiles due to traffic accidents and about 25 percent are from people caught outside in a storm. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. The probability of utility and infrastructure failure increases during winter storms due to freezing rain accumulation on utility poles and power lines. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk are primarily either engaged in outdoor activity or the elderly. Schools often close during extreme cold or ice conditions to protect the safety of children and bus drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such as structural fires and carbon monoxide poisoning.

15.2.1 Exposure

Vulnerable populations are the elderly, low income, linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. These populations face isolation and exposure during severe winter weather events and could suffer more secondary effects from the hazard. Commuters who are caught in storms may be particularly vulnerable. Stranded commuters may be vulnerable to carbon monoxide poisoning or hypothermia.

15.2.2 Impacts

The total property loss reported by the NCEI was \$0.

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms. Businesses can experience loss of income as a result of closure during winter storms.

Loss of Use

Overhead power lines and infrastructure are also vulnerable to damage from winter storms. In particular, ice accumulation during winter storm events can cause damage to power lines due to the ice weight on the lines and equipment, as well as damage caused to lines and equipment from falling trees and tree limbs weighted down by ice. Potential losses would include cost of repair or replacement of damaged facilities, and lost economic opportunities for businesses. Secondary effects from loss of power could include burst water pipes in homes without electricity during winter storms. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazard.

The electric power loss of use estimates provided below were calculated using FEMA's Standard Values for Loss of Service for Utilities published in the June 2009 BCA Reference Guide. These figures are used to provide estimated costs associated with the loss of power in relation to the populations in Smith County's jurisdictions. The loss of use estimates for power failure associated with winter storms are provided as the loss of use cost per person, per day of loss. The estimated loss of use provided for each jurisdiction represents the loss of service of the indicated utility for 1 day for 10 percent of the population. These figures do not take into account physical damages to utility equipment and infrastructure.

Table 15-2. Loss of Use Estimates for Power Failure (One Day)

Jurisdiction	2016 Population	Estimated Affected Population (10%)	Electric Loss of Use Estimate (\$126 per person per day)
Arp	1,002	100	\$12,625.20
Bullard	2,994	299	\$37,724.40
Hideaway	3,127	313	\$39,400.20
Lindale	5,853	585	\$73,747.80
New Chapel Hill	620	62	\$7,812.00
Noonday	709	71	\$8,933.40
Troup	1,920	192	\$24,192.00
Tyler	104,798	10,480	\$1,320,454.80
Whitehouse	8,269	827	\$104,189.40
Winona	602	60	\$7,585.20
Unincorporated	95,396	9,540	\$1,201,989.60
Total	225,290	22,529	\$2,838,654.00

Note: Bullard and Troup exposure only include the portion in Smith County.

Agriculture

According to the 6-year period from the USDA's Risk Management Agency, the amount of claims paid for crop damage as a result of freeze conditions in Smith County was \$346,398. According to the 2016 Texas Insurance Profile from the USDA's Risk Management Agency, 88 percent of the insurable crops in Texas are insured with USDA crop insurance. To estimate losses to insurable crops that are not insured, the 88 percent crop insurance coverage was factored in to provide an adjusted estimate of losses. According to this calculation, estimated annualized losses are over \$65,605 (see Table 15-3).

Considering the value of crops from the 2012 Census of Agriculture as baseline crop exposure, the estimated annual loss was determined to be negligible compared to the value of the insurable crops.

Table 15-3. Estimated Insurable Annual Crops Lost Resulting from Freeze Conditions

6-Year Freeze Conditions Insurance Paid	Adjusted 6-Year Losses (considering 88% insured)	Estimated Annualized Losses	2012 Value of Crops
\$346,398	\$393,634	\$65,605	\$59,512,000

Source: USDA, 2012; USDA RMA, 2016; USDA, 2016

Community Perception of Vulnerability

See the first page of this chapter for a summary of hazard rankings for Smith County and the planning partners in this plan update. Chapter 16 gives a detailed description of these rankings and 17.2 addresses mitigation actions for this hazard vulnerability.

15.3 PROBABILITY OF FUTURE EVENTS

Table 15-1 lists 16 recorded winter weather events during this plan update timeframe. Therefore, on average, a winter weather event occurs one to two times a year and this occurrence may decrease as temperatures rise in the planning area.

The Cities of Bullard, Hideaway, Lindale, Tyler, Troup, Whitehouse, and Winona feel that there is high probability of winter storms in the future. Smith County and the Cities of Arp, New Chapel Hill, and Noonday feel the probability is medium and winter weather is likely to occur within 100 years.

15.4 CLIMATE CHANGE IMPACTS

Southern Climate Impacts Planning Program information concerning Texas points to temperatures increasing by another 3 to 9 degrees Fahrenheit by 2100 and thus less frequent cold winter temperatures. (SCIPP, 2017).

If this trend continues, future occurrences of the extreme cold/wind chill aspects of winter weather should decrease. In addition, high winter temperatures bring higher probability of rain, rather than ice or snow. As a result, the amount of precipitation falling as snow should decrease.

15.5 ISSUES

Important issues associated with a winter storm in the planning area include the following:

- Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to winter weather, particularly freezing temperatures, high winds, and ice.
- Redundancy of power supply must be evaluated.
- The capacity for backup power generation is limited.
- Future efforts should be made to identify populations at risk and identify special needs during winter storm event.

Chapter 16.

PLANNING AREA RISK RANKING

A risk ranking was performed for the hazards of concern described in this plan. This risk ranking assesses the probability of each hazard's occurrence as well as its likely impact on the people, property, and economy of the planning area. The risk ranking was conducted by the Steering Committee based on the hazard risk assessment presented during the second Steering Committee meeting, community survey results, and personal and professional experience with hazards in the planning area. The results are used in establishing mitigation priorities. The hazard rankings were used in establishing mitigation action priorities.

16.1 PROBABILITY OF OCCURRENCE

The probability of occurrence of a hazard is indicated by a probability factor based on likelihood of annual occurrence:

- High (Probability Factor = 3) – Hazard event is likely to occur within 25 years
- Medium (Probability Factor = 2) – Hazard event is likely to occur within 100 years
- Low (Probability Factor = 1) – Hazard event is not likely to occur within 100 years
- No exposure (Probability Factor = 0) – There is no probability of occurrence

The assessment of hazard frequency is generally based on past hazard events in the planning area. The Steering Committee assigned the probabilities of occurrence for each hazard, as shown on Table 16-1.

Table 16-1. Probability of Hazards

Jurisdiction	Smith County	Arp	Bullard	Hideaway	Lindale	New Chapel Hill	Noonday	Tyler	Troup	Whitehouse	Winona
	Probability Factor										
Dam Failure	2	0	0	3	2	1	0	2	1	1	0
Drought	3	2	3	1	2	3	3	2	3	3	3
Extreme Heat	3	2	3	1	2	3	3	2	3	3	3
Earthquake	1	1	1	0	0	1	1	1	1	1	1
Flood	2	3	2	2	3	2	1	3	2	2	3
Hail	3	3	3	3	3	3	3	3	3	3	3
High Winds	3	3	3	3	3	2	3	3	3	3	3
Hurricane/ Tropical Storm	1	1	1	1	1	3	1	3	2	3	1
Lightning	3	3	3	3	3	3	3	3	3	3	3
Tornado	3	3	3	3	3	3	3	3	2	3	3
Wildfire	3	2	3	3	2	2	3	3	2	2	3
Winter Storm	2	2	3	3	3	2	2	3	3	3	3

16.2 IMPACT

Hazard impacts were assessed in three categories based on impacts to: people, property, and the local economy. Numerical impact factors were assigned as follows:

- **People** – Values were assigned based on the percentage of the total *population exposed* to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for simplicity and consistency that all people who live in a hazard zone will be equally impacted when a hazard event occurs. It should be noted that planners can use an element of subjectivity when assigning values for impacts on people. Impact factors were assigned as follows:
 - High (Impact Factor = 3) – 50% or more of the population is exposed to a hazard
 - Medium (Impact Factor = 2) – 25% to 49% of the population is exposed to a hazard
 - Low (Impact Factor = 1) – 24% or less of the population is exposed to the hazard
 - No impact (Impact Factor = 0) – None of the population is exposed to a hazard
- **Property** – Values were assigned based on the percentage of the total *assessed property value* exposed to the hazard event:
 - High (Impact Factor = 3) – 30% or more of the total assessed property value is exposed to a hazard
 - Medium (Impact Factor = 2) – 15% to 29% of the total assessed property value is exposed to a hazard
 - Low (Impact Factor = 1) – 14% or less of the total assessed property value is exposed to the hazard
 - No impact (Impact Factor = 0) – None of the total assessed property value is exposed to a hazard
- **Economy** – Values were assigned based on total impact to the economy from the hazard event and activities conducted after the event to restore the community to previous functions. Values were assigned based on the number of days the hazard impacts the community, including impacts on tourism, businesses, road closures, or government response agencies.
 - High (Impact Factor = 3) – Community impacted for more than 7 days
 - Medium (Impact Factor = 2) – Community impacted for 1 to 7 days
 - Low (Impact Factor = 1) – Community impacted for less than 1 day
 - No impact (Impact Factor = 0) – No community impacts estimated from the hazard event

The impacts of each hazard category were assigned a weighting factor to reflect the significance of the impact. These weighting factors are consistent with those typically used for measuring the benefits of hazard mitigation actions: impact on people was given a weighting factor of 3; impact on property was given a weighting factor of 2; and impact on the economy was given a weighting factor of 1. The impacts for each hazard are summarized in Table 16-2, Table 16-3, and Table 16-4. The total impact factor shown on the tables equals the impact factor multiplied by the weighting factor.

Table 16-2. Impact on People from Hazards

Hazard Event	Smith County	Arp	Bullard	Hideaway	Lindale	New Chapel Hill	Noonday	Tyler	Troup	Whitehouse	Winona
	Total Impact Factor										
Dam Failure	3	0	0	9	3	3	0	3	3	6	0
Drought	9	9	9	3	3	9	9	9	9	9	6
Extreme Heat	9	9	9	3	3	9	9	9	9	9	6
Earthquake	6	6	9	0	0	3	3	3	3	6	3
Flood	6	9	3	6	6	6	3	3	3	6	3
Hail	9	9	9	9	9	9	9	9	6	9	3
High Winds	9	9	9	9	9	9	9	9	6	9	3
Hurricane/ Tropical Storm	3	6	9	0	3	6	3	9	6	9	3
Lightning	9	9	9	9	9	9	9	9	6	9	3
Tornado	9	9	9	9	6	9	9	9	6	9	6
Wildfire	9	9	3	9	3	6	9	3	3	6	3
Winter Storm	9	6	9	6	9	6	6	9	6	9	9

Table 16-3. Impact on Property from Hazards

Hazard Event	Smith County	Arp	Bullard	Hideaway	Lindale	New Chapel Hill	Noonday	Tyler	Troup	Whitehouse	Winona
	Total Impact Factor										
Dam Failure	4	0	0	6	6	4	0	2	2	2	0
Drought	6	6	6	4	2	6	6	6	2	6	4
Extreme Heat	6	6	6	4	2	6	6	6	2	6	4
Earthquake	4	4	6	0	0	2	2	2	2	4	2
Flood	6	6	4	4	2	4	2	2	2	6	4
Hail	6	6	6	6	6	6	6	6	4	6	6
High Winds	6	6	6	6	6	6	6	6	4	6	6

Hazard Event	Smith County	Arp	Bullard	Hideaway	Lindale	New Chapel Hill	Noonday	Tyler	Troup	Whitehouse	Winona
	Total Impact Factor										
Hurricane/Tropical Storm	2	4	6	0	2	4	2	6	4	6	2
Lightning	6	6	6	6	6	6	6	6	4	6	6
Tornado	6	6	6	6	4	6	6	6	4	6	4
Wildfire	6	6	2	6	2	4	6	2	4	4	2
Winter Storm	4	4	6	4	4	4	4	6	2	4	2

Table 16-4. Impact on Economy from Hazards

Hazard Event	Smith County	Arp	Bullard	Hideaway	Lindale	New Chapel Hill	Noonday	Tyler	Troup	Whitehouse	Winona
	Total Impact Factor										
Dam Failure	1	0	0	3	2	1	0	3	1	2	0
Drought	3	3	3	0	1	2	3	3	2	3	2
Extreme Heat	3	3	3	0	1	2	3	3	2	2	2
Earthquake	3	2	3	1	0	1	1	2	1	2	1
Flood	2	2	2	2	2	2	1	2	1	2	1
Hail	2	3	3	3	2	2	3	2	2	2	1
High Winds	2	3	3	3	2	2	3	2	2	2	1
Hurricane/Tropical Storm	2	2	2	0	1	2	1	2	2	2	1
Lightning	2	3	3	3	2	2	3	2	2	2	1
Tornado	3	3	3	3	2	2	3	3	3	3	2
Wildfire	2	3	3	3	1	2	3	1	2	3	1
Winter Storm	2	2	3	2	2	2	2	2	1	2	1

16.3 RISK RATING AND RANKING

The total risk rating for each hazard was calculated by multiplying the probability factor by the sum of the weighted impact factors for people, property, and operations, as summarized in Table 16-5. Based on these ratings, a priority of high, medium, low, or no exposure was assigned to each hazard. The hazards ranked as being of highest concern vary by jurisdiction but generally include hail, high winds, lightning, and tornado.

Several jurisdictions ranked hazards as having “No Exposure” to the natural hazard and thus no mitigation actions were developed for those jurisdictional hazards (see Table 16-5).

Table 16-5. Total Hazard Risk Rating Calculations

Hazard Event	Smith County	Arp	Bullard	Hideaway	Lindale	New Chapel Hill	Noonday	Tyler	Troup	Whitehouse	Winona
Dam Failure	16	0	0	54	22	8	0	16	6	10	0
Drought	54	36	54	7	12	51	54	36	39	54	36
Extreme Heat	54	36	54	7	12	51	54	36	39	54	36
Earthquake	13	12	18	0	0	6	6	7	6	12	6
Flood	28	51	18	24	30	24	6	21	12	28	24
Hail	51	54	54	54	51	51	54	51	36	51	30
High Winds	51	54	54	54	51	51	54	51	36	51	30
Hurricane/ Tropical Storm	7	12	17	0	6	24	6	51	24	51	6
Lightning	51	54	54	54	51	51	54	51	36	51	30
Tornado	54	54	54	54	36	51	54	54	26	54	36
Wildfire	51	36	24	54	12	24	54	18	18	26	18
Winter Storm	30	24	54	36	45	24	24	51	27	45	36

Note: Total Risk Rating = Probability x Impact Weighted Sum (Total Impact Factor People + Total Impact Factor Property + Total Impact Factor Economy)

No Exposure
Low
Medium
High

PART 3
MITIGATION STRATEGY AND PLAN
MAINTENANCE

Chapter 17.

MITIGATION STRATEGY

17.1 GUIDING PRINCIPLE AND GOALS

Hazard mitigation plans must identify goals for reducing long-term vulnerabilities to identified hazards (44 CFR Section 201.6(c)(3)(i)). The Steering Committee established a guiding principle, a set of goals, and measurable objectives for this plan, based on data from the preliminary risk assessment and the results of the public involvement strategy. The guiding principle, goals, and actions in this plan all support each other. Goals were selected to support the guiding principle. Actions were prioritized based on the action meeting multiple objectives.

17.1.1 Guiding Principle

A guiding principle focuses the range of objectives and actions to be considered. This is not a goal because it does not describe a hazard mitigation outcome, and it is broader than a hazard-specific objective. The guiding principle for the Smith County Hazard Mitigation Plan Update is as follows:

To reduce or eliminate the long-term risks to loss of life and property damage in Smith County from natural disasters.

17.1.2 Goals

The following plan goals were determined by the Steering Committee:

- **Goal 1:** Minimize loss of life, and damage to property, the economy and natural resources from natural hazards.
- **Goal 2:** Increase public understanding, support and demand for hazard mitigation.
- **Goal 3:** Build and integrate local mitigation capabilities to encourage individual safety, reduce damage to public buildings and facilitate continuity of emergency services.
- **Goal 4:** Maintain the natural and man-made systems in the county to protect our communities from natural hazards.

17.2 AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

The Steering Committee reviewed a menu of hazard mitigation alternatives that present a broad range of alternatives to be considered for use in the planning area, in compliance with Title 44 Code of Federal Regulations (44 CFR) (Section 201.6(c)(3)(ii)). The menu provided a baseline of mitigation alternatives that are backed by a planning process, are consistent with the planning partners' goals and are within the capabilities of the partners to implement. The Steering Committee reviewed the full range of actions as well as the county's ability to implement the variety of mitigation actions. Hazard mitigation actions recommended in this plan were selected from among the alternatives presented in the menu as well as other projects known to be necessary.

17.2.1 Recommended Mitigation Actions

The Steering Committee planning partners identified actions that could be implemented to provide hazard mitigation benefits. Table 17-1 lists the recommended mitigation actions identifying the mitigation action number (including the previous action number being carried forward in this plan update), title, description, mitigation action ranking, hazards mitigated, action type, applicable goals, responsible department to administer the action, estimated cost, potential funding sources, timeline in months, and benefit to the community (high, medium or low). All of the hazards profiled in this plan are addressed by more than one

mitigation action, except for jurisdictions that ranked the hazard as “No Exposure”. Those jurisdictions are as follows:

- Arp: “No Exposure” to Dam Failure
- Bullard: “No Exposure” to Dam Failure
- Hideaway: “No Exposure” to Earthquake and Hurricane/Tropical Storm
- Lindale: “No Exposure” to Earthquake
- Noonday: “No Exposure” to Dam Failure
- Winona: “No Exposure” to Dam Failure

Mitigation types used for this categorization are as follows:

- Local Plans and Regulations (LPR) – These actions include government authorities, policies, or codes that influence the way land and buildings are being developed and built.
- Structure and Infrastructure Projects (SIP) – These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- Natural Systems Protection (NSP) – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs (EAP) – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These initiatives may also include participation in national programs, such as StormReady and FireWise Communities.

Mitigation action worksheets were developed to provide more information for each recommended mitigation action, including the specific problem being mitigated, alternative actions considered, whether the action applies to existing or future development, the benefits or losses avoided, the department, position, office or agency responsible for implementing the action, the local planning mechanism, and potential funding sources. These worksheets were developed to provide a tool for the planning partners to apply for grants or general funds to complete the mitigation action. An example worksheet for Smith County is shown in Figure 17-1. These worksheets are kept on file with the county and city and can be a valuable resource for annual progress updates and reports.



Smith County Mitigation Action Worksheet

Please complete one worksheet per action with as much detail as possible, using the instructions provided and FEMA examples.

Name of Jurisdiction: _____ Mitigation Action #: _____

Mitigation Action Title: _____

Assessing the Risk	
Hazard(s) addressed: (check all that apply)	<input type="checkbox"/> All Hazards <input type="checkbox"/> Dam Failure <input type="checkbox"/> Drought / Extreme Heat <input type="checkbox"/> Earthquake <input type="checkbox"/> Flood <input type="checkbox"/> Hurricane/Tropical Storm <input type="checkbox"/> Severe Storms / Lightning / Hail / High Winds <input type="checkbox"/> Tornado <input type="checkbox"/> Wildfire <input type="checkbox"/> Winter Storm
Specific problem being Mitigated (describe why action is needed)	
Evaluation of Potential Alternatives	
Alternatives Considered (name of project and reason for not selecting)	1.
	2.
	3.
Action/Project Intended for Implementation	
Describe how action will be implemented (main steps involved)	
Action/Project Type	<input type="checkbox"/> Local Plans and Regulations <input type="checkbox"/> Structure and Infrastructure Project <input type="checkbox"/> Natural Systems Protection <input type="checkbox"/> Education and Awareness Programs
Applicable Goals (refer to list of goals)	<input type="checkbox"/> Goal #1 <input type="checkbox"/> Goal #2 <input type="checkbox"/> Goal #3 <input type="checkbox"/> Goal #4
Applies to existing or future development	<input type="checkbox"/> Existing Development <input type="checkbox"/> Future Development <input type="checkbox"/> Both Existing and Future Development <input type="checkbox"/> Not Applicable
Describe benefits (losses avoided)	<input type="checkbox"/> Life Safety <input type="checkbox"/> Damage Reduction <input type="checkbox"/> Other Describe:
Estimated Cost	<input type="checkbox"/> < \$10,000; <input type="checkbox"/> \$10,000 to \$100,000; <input type="checkbox"/> >\$100,000 Other Amount: \$
Plan for Implementation	
Responsible Department	
Local Planning Mechanism (check all that apply)	<input type="checkbox"/> Capital Improvement Plan <input type="checkbox"/> Comprehensive Plan <input type="checkbox"/> Building Code <input type="checkbox"/> Ordinance <input type="checkbox"/> Other:
Potential Funding Sources	
Timeline for Completion (in months)	
Reporting on Progress (to be implemented after FEMA approval)	
Status/Comment	<input type="checkbox"/> Not Started <input type="checkbox"/> In-progress <input type="checkbox"/> Delayed <input type="checkbox"/> Completed <input type="checkbox"/> No Longer Required Comment:
Completed by: (name, title, phone #) Date:	

Figure 17-1. Sample Mitigation Action Worksheet

17.2.2 Benefit/Cost Review and Prioritization

The action plan must be prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Assistance (HMA) Grant Program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

Fourteen criteria were used to assist in evaluating and prioritizing the mitigation initiatives. For each mitigation action, a numeric rank (0, 1, 2, 3, 4) was assigned for each of the 14 evaluation criteria defined as follows:

- Definitely Yes - 4
- Maybe Yes - 3
- Unknown/Neutral - 2
- Probably No - 1
- Definitely No - 0

The 14 evaluation/prioritization criteria are:

1. Life Safety – How effective will the action be at protecting lives and preventing injuries? The numeric rank for this criterion is multiplied by 2 to emphasize the importance of life safety when evaluating the benefit of the action.
2. Property Protection – How significant will the action be at eliminating or reducing damage to structures and infrastructure? The numeric rank for this criterion is multiplied by 2 to emphasize the importance of property protection when evaluating the benefit of the action.
3. Cost-Effectiveness – Will the future benefits achieved by implementing the action, exceed the cost to implement the action?
4. Technical – Is the mitigation action technically feasible? Will it solve the problem independently and is it a long-term solution? Eliminate actions that, from a technical standpoint, will not meet the goals.
5. Political – Is there overall public support for the mitigation action? Is there the political will to support it?
6. Legal – Does the jurisdiction have the authority to implement the action?
7. Fiscal – Can the project be funded under existing program budgets (i.e., is this action currently budgeted for)? Or would it require a new budget authorization or funding from another source such as grants?
8. Environmental – What are the potential environmental impacts of the action? Will it comply with environmental regulations?
9. Social – Will the proposed action adversely affect one segment of the population? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
10. Administrative – Does the jurisdiction have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
11. Multi-hazard – Does the action reduce the risk to multiple hazards?
12. Timeline - Can the action be completed in less than 5 years (within our planning horizon)?

13. Local Champion – Is there a strong advocate for the action or project among the jurisdiction’s staff, governing body, or committees that will support the action’s implementation?
14. Other Local Objectives – Does the action advance other local objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of other plans and programs?

The numeric results of this exercise are shown on the mitigation action worksheets. An example worksheet for is shown in Figure 17-2. These results were used to identify the benefit of the action to the community as low, medium, or high priority. Table 17-1 shows the benefit of each mitigation action.

The Steering Committee used the results of the benefit/cost review and prioritization exercise to rank the mitigation actions in order of priority, with 1 being the highest priority. The highest priority mitigation actions are shown in red on Table 17-1, medium priority actions are shown in yellow and low priority actions are shown in green.

Prioritization Worksheet		
Mitigation Action #:	_____	
Mitigation Action Title:	_____	
Criteria	Numeric Rank: Definitely Yes = 4 Maybe Yes = 3 Unknown/Neutral = 2 Probably No = 1 Definitely No = 0	Provide brief rationale for numeric rank when appropriate
1. Will the action result in <u>Life Safety</u> ?	x 2 =	
2. Will the action result in <u>Property Protection</u> ?	x 2 =	
3. Will the action be <u>Cost-Effective</u> ? (future benefits exceed cost)		
4. Is the action <u>Technically</u> feasible?		
5. Is the action <u>Politically</u> acceptable?		
6. Does the jurisdiction have the <u>Legal</u> authority to implement?		
7. Is <u>Funding</u> available for the action?		
8. Will the action have a positive impact on the natural <u>Environment</u> ?		
9. Is the action <u>Socially</u> acceptable?		
10. Does the jurisdiction have the <u>Administrative</u> capability to execute the action?		
11. Will the action reduce risk to more than one hazard (<u>Multi-Hazard</u>)?		
12. Can the action be implemented <u>Quickly</u> ?		
13. Is there an Agency/Department <u>Champion</u> for the action?		
14. Will the action meet other <u>Community Objectives</u> ?		
Total		
Priority: Low = <35 Medium = 35-49 High = >50	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	

Figure 17-2. Example Benefit/Cost Review and Prioritization Worksheet

Table 17-1. Recommended Mitigation Actions by Jurisdiction

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
SMITH COUNTY											
1	Purchase and install an electric back-up generator	Purchase and install electric back-up generators at all of the volunteer fire departments which will ensure emergency operations can continue in the event of a power outage from dam failure, earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	1	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Road and Bridge	\$60,000	HMGP	36-48	High
2 (Previous Drought4)	Distribute public awareness information on crop insurance.	We will have insurance information in our office and we will also put it out over social media annually.	3	Drought, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Fire Marshal's Office	\$2,000	County Budget	60	High
3	Take action to complete EAP for all high and significant hazard dams	There are 23 high and significant hazard dams in Smith County. We will work with dam owners in creating EAP for these dams and help reduce the risk associated with dam failure.	4	Dam Failure	●	◆	OEM	\$10,000	County Budget	36	Medium
4	Take action to evaluate earthquake risk due to the drilling and fracking in the area.	The county will collaborate with the cities, TX Oil and Gas Association, TCEQ, insurance rep and other experts to host public sessions on the topic.	7	Earthquake	●	◆	OEM	\$10,000	County Budget	18	Low

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
5	Upgrade Drainage Capacity	Evaluate existing culverts for current condition. The placement, removal, replacement, or repair of old culverts that are clogged with debris, unstable, or unusable due to damage or changing conditions have severely limited the capacity level and structural integrity of the current culverts within Smith County. The priority locations are along County Road 47 and County Road 1139.	2	Dam Failure, Flood, Hurricane/Tropical Storm	 		Road and Bridge	\$900,000	County Budget, HMGP	36	High
6	Purchase All-Hazard NOAA Weather Radios	Purchase NOAA All-Hazard radios for early warning. Place in area schools, business, and critical facilities.	5	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	EM	\$1,000	HMGP	36	Medium
7	Xeriscape around County Buildings	Purchase and plant drought and extreme heat resistant plants around county buildings to minimize water usage.	6	Drought, Extreme Heat			Road and Bridge	\$10,000	County Budget	36	Medium
CITY OF ARP											
1	Purchase and install permanent electric back-up generators	Purchase and install electric back-up generators at City Hall and water pumps located at 400 block of E. Longview, 100 block of Longview and 300 block of N. Main which will ensure operations can continue in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storm, lightning strike, tornado, wildfire, winter storm.	3	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Police Department	\$100,000	HMGP	48	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
2 (Previous Lightning2)	Install Surge Protectors at City Hall	Install surge protectors at City Hall to minimize loss of data and damage to electronics from lightning strike.	4	Lightning	●	◆ ◆	Police Department	\$10,000	City funds	36	Medium
3	Complete Drainage Study and Upgrade Drainage Capacity	Perform study of existing culverts and drainage capabilities in town. Then upgrade drainage capacity where needed.	1	Flood, Hurricane/Tropical Storm	●	◆ ◆	Police Department	\$1,900,000	City funds, HMGP	36	High
4	Purchase and Install Outdoor Warning Siren	An additional outdoor warning siren is needed near downtown area. Purchase and install one.	2	Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Police Department	\$60,000	City funds, HMGP	48	High
5	Xeriscape around City Memorial and Park	Purchase and plant drought and extreme heat resistant plants around City Memorial and Park to minimize water usage.	5	Drought, Extreme Heat	●	◆	Police Department	\$10,000	City funds	60	Medium
6	Construct a Multi-purpose Tornado Safe Room	Secure funding and construct a multi-purpose Tornado Safe Room that could also be a Community Activity Center. The proposed tornado safe room would be built to hold approximately 500 people. It will be hardened by the use of tornado, wind, fire, hail, ground movement, and impact resistant materials (windows, doors, roofing, construction, siding, roof bracings); dry-proofing buildings; upgrading to higher standard insulation; installing lightning rods and	6	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Police Department	\$3,000,000	HMGP, State grants, city funds	60	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		grounding systems; retrofitting for low-flow plumbing; replace landscaping with drought and fire resistant plants; implementing higher standards for foundations to mitigate impacts of earthquake and using R-value building materials to resist heat.									
7 (Previous Drought2)	Replace Water Fixtures with Low Flow Units	The city will replace water fixtures with low flow units at city-owned facilities.	7	Drought	●	◆	Police Department	\$10,000	City funds, State grants	60	Low
8	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	4	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Police Department	\$10,000	City Budget	60	Low
CITY OF BULLARD											
1 (Previous Flood2)	Perform maintenance of storm gutters and storm sewers.	The city will have a full-time employee for Street Department starting in January 2018. Identifying and performing clearing of storm gutters and storm sewers will be a task for the new employee.	1	Flood, Hurricane/Tropical Storm	●	◆	Street Department	\$10,000	City Budget	60	High
2	Upsize Culverts in City	The city will evaluate existing culverts for current condition. The placement, removal, replacement, or repair of old culverts that are clogged with debris, unstable, or unusable due to damage,	2	Flood, Hurricane/Tropical Storm	●	◆	Street Department	\$100,000	City Budget, HMGP	60	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		or changing conditions have severely limited the capacity level and structural integrity of the current culverts. The priority locations for upsizing is near downtown and 8 to 12 culverts are priority.									
3	Purchase and install back-up generator for Well #6	The city will purchase and install a back-up generator for well #6. The electricity can go out on well pump production for many reasons, thus a back-up generator is needed.	3	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	City Manager	\$10,000	City Budget, HMGP	60	Medium
4	Construct a multi-purpose Community Storm Shelter	The city will identify property site for structure. Purchase land if not owned. Design and build to FEMA Storm Shelter standards a structure that could hold emergency management operations, 500 residents approximately, and be used for multi-purposes. It will be hardened by the use of tornado, wind, fire, hail, ground movement, and impact resistant materials (windows, doors, roofing, construction, siding, roof bracings); dry-proofing buildings; upgrading to higher standard insulation; installing lighting rods and grounding systems; retrofitting for low-flow plumbing; replacing landscaping with drought	5	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	City Manager	\$3,000,000	City Budget, HMGP	60	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		and fire resistant plants; implementing higher standards for foundations to mitigate impacts of earthquake and using R-value building materials to resist heat.									
5	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	4	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	City Manager	\$10,000	City Budget	60	High
6	Implement water conservation measures	The city will implement water conservation measures for city-owned structures with low flow fixtures, using metering system to see usage and set alerts for high commercial and homeowner usage.	6	Drought, Extreme Heat	● ●	◆ ◆	City Manager	\$50,000	City Budget, grants	60	High
CITY OF HIDEAWAY											
1	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life will be provided by resident - Dr. J.D. Brown.	3	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Mayor and EM	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	60	High
2	Advertise October as Flood Awareness Month	In the month of October, the city will post FEMA flood maps in lobby of Member Services Bldg. available for all residents	2	Flood	●	◆ ◆	EM and Hide a Way Lake Club Inc. Management	\$10,000	Main. Budget	60	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		to come and learn about flood awareness.									
3	Maintain Dam Reliability	The city will remove trees from earthen dams on Hideaway Lakes #2 and #3 to mitigate erosion and assist with soil adhesion.	1	Dam Failure, Flood	●	◆ ◆	Hide a Way Lake Club Inc. Maintenance Dept.	\$10,000	Maint. Budget	24	High
4	Mandate Freeboard on Hideaway Lakes Dams	Mandate 2 feet of freeboard to be maintained on Hideaway Lakes Dams.	5	Dam Failure, Flood	●	◆ ◆ ◆	Hide a Way Lake Club Inc. Maintenance Dept.	\$10,000	Maint. Budget	24	High
5	Public Awareness of Evacuation Routes from rising water from dam failure.	Exercise with the residents the use of Code Red System to notify residents of impending flooding with the designated egress routes to higher ground.	4	Dam Failure, Flood	●	◆ ◆	EM and Hide a Way Lake Club Inc. Management	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	12	High
6	Develop and implement a program to clear tree limbs near power lines.	Pass ordinance authorizing Mayor's Office to hire contractors to assist Hideaway Club maintenance staff to clear tree limbs to mitigate against tornado, wind and ice storms.	6	Tornado, Wind, Winter Weather	●	◆	Mayor	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	60	Medium
7	Xeriscape around City Building	Purchase and plant drought and extreme heat-resistant plants around city building to minimize water usage.	9	Drought, Extreme Heat	●	◆	Mayor	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	36	Medium
8	Wildfire fuels reduction within city limits.	Parks department will control buildup of wildlands fire fuels by maintaining wildland interface within the city.	8	Wildfire	● ●	◆ ◆	Hide a Way Lake Club Inc. Maintenance and Security Departments	\$10,000	Hideaway Lake Club Inc. and City of Hideaway	24	Medium
9	Storm Proof the Member Services Bldg.	Purchase and install surge protectors and lightning rods, wind and hail impact resistant windows and doors at the Member Services Building. This will	7	Hail, Lightning, Tornado, Wind	●	◆ ◆ ◆	Mayor and Hide a Way Lake Club Inc. Management	\$10,000	City budget	48	Medium

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		protect this critical facility and critical electronic equipment.									
CITY OF LINDALE											
1 (previous Hail2)	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	2	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Community Development	\$10,000	Department Budget	3	High
2 (previous Lightning2 and Hail2)	Adopt and enforce IBC 2015 version and IRC 2015 version and NFPA-70, 2014 version	The city will enforce the measures and guidelines to ensure the safety of natural hazards and incorporate these stricter building codes into other planning efforts such as the Comprehensive Plan. The stricter codes can mitigate the identified hazards, such as tornado, high wind, and impact resistant materials (windows, doors, roof bracings); dry-proofing public buildings for flooding; upgrading to higher standard insulation for extreme heat and winter storms; installing lighting rods and grounding systems on public buildings; retrofitting to low-flow plumbing and replacing landscaping with drought and fire resistant plants; stricter codes for hail and fire resistant roofing and siding; implementing higher standards for foundations.	1	Dam Failure, Drought, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆ ◆	Community Development	\$10,000	Private and public	3	High
3 (previous Flood2)	Incorporate No Adverse Impact "Design	Incorporate "no adverse impact" design requirements in community development. Provide awareness to	4	Flood, Hurricane/Tropical Storm	●	◆ ◆	Community Development	\$10,000	City Budget	18	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
	Requirements" in Flood Ordinance	stakeholders and design engineers; building code adoption and plan approval process.				 					
4 (previous Flood2)	Incorporate "Natural Run-Off" Policies	Incorporate "natural run-off" policies. Calculate cumulative effect of development, increase capacity of storm water drainage systems, institute regular drain system maintenance.	3	Flood, Hurricane/Tropical Storm	 	   	Community Development	\$10,000	City Budget	18	High
CITY OF NEW CHAPEL HILL											
1	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; information posted and available at City Hall and on city website.	1	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather			Mayor/ City Council	\$10,000	Departmental Budget	30	High
2	Purchase and Install Outdoor Warning Siren	The city will purchase and install an outdoor warning siren.	4	Dam Failure, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather			Mayor/ City Council	\$50,000	City Budget	48	Medium
3	Purchase and Install permanent Back-up Generator for Old Fire Station	Purchase and install a permanent back-up generator for Old Fire Station as a safe haven for residents in the event of a power outage from dam failure, earthquake, extreme heat, flood, hail,	2	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropic			Mayor/ City Council	\$50,000	City Budget, HMGP	60	Medium

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
		hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.		al Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather							
4	Reduce Wildfire Fuels	The city will secure a grant to fund the removal of dead trees and brush that surround the city. This will reduce the possibility of a wildfire encroaching into the city.	3	Wildfire	●	◆ ◆	Mayor/ City Council	\$10,000	State and federal grants	60	Medium
5	Xeriscape around City Building	Purchase and plant drought and extreme heat-resistant plants around city building to minimize water usage.	5	Drought, Extreme Heat	●	◆	Mayor/ City Council	\$10,000	City Budget	36	Medium
CITY OF NOONDAY											
1 (previous Hail2)	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life will be available at city hall.	2	Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Mayor	\$10,000	City Budget	60	High
2	Purchase and Install back-up generator for City Hall	Purchase and install an electric back-up generator at City Hall, which is an old school house. This will ensure service to city hall, food pantry, and library in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	1	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Public Works	\$100,000	HMGP	36	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
3	Purchase All-Hazard NOAA Weather Radios	Purchase NOAA All-Hazard radios for early warning. Place in City Hall and other critical facilities.	4	Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	 	 	Administration	\$10,000	FEMA grants	12	Medium
4	Xeriscape around City Buildings	Purchase and plant drought and extreme heat-resistant plants around city buildings to minimize water usage.	3	Drought, Extreme Heat			Public Works	\$10,000	City Budget	36	Medium
CITY OF TYLER											
1 (Previous H2, D1, WS2)	Conduct public outreach to educate homeowners on mitigation techniques for their homes.	Educate the public about ways to reduce the impact of disasters within our community.	2	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Fire Department	\$10,000	Fire Department Budget	12	High
2	Purchase and install permanent back-up generators at buildings designated as critical infrastructure.	Install permanent generators in buildings designated as critical infrastructure.	5	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Fire Department	\$100,000	City General Fund, HMGP	12	Medium

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
3	Establish ordinance that restricts or bans burning within city limits.	Establish ordinance that restricts or bans burning within city limits.	7	Wildfire	 	  	Fire Department	\$10,000	Fire department budget	12	High
4	Wildfire fuels reduction within city limits.	Parks department will control buildup of wildlands fire fuels by maintaining wildland interface within the city.	6	Wildfire	 	 	Park Department	\$10,000	City budget.	24	High
5	Enclose open channels that are identified as potential flood risk.	Enclose open channels that are contributing to flooding. Priority locations are: 1) Ashmore subdivision between Ashmore and Salisbury and 2) Fleishel Ave. between 6th and 8th Streets.	3	Flood, Hurricane/Tropical Storm	 	  	Engineering Department	\$500,000	City 1/2 sales tax fund, HMA grants.	36	High
6	Conduct hydrology studies and survey to identify flood prone areas.	Study areas that are reporting flood damage and general flooding.	4	Dam Failure, Flood, Hurricane/Tropical Storm		 	Engineering Department	\$10,000	City budget	36	High
7	Assist Vulnerable Population During Hazard Events	Complete application for STEAR program and identify at risk population. Promote STEAR on the Tyler Fire Department and city website. https://www.dps.texas.gov/dem/stear/public.htm or dial 211	1	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	 	  	Fire Department	\$10,000	City budget, CDBG, HMA	12	High
8 (Previous D3)	Plant drought and extreme heat resistant vegetation (xeriscaping) around City	The city will plant drought and extreme heat-resistant vegetation around city buildings and properties.	8	Drought, Extreme Heat		 	Engineering Department	\$10,000	City budget	48	Medium

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
	buildings and properties.										
CITY OF TROUP											
1 (previous Flood2)	Adopt and enforce a stricter Floodplain Ordinance	Adopt and enforce a stricter floodplain ordinance that no new structures are allowed in the 100-year floodway. Adopted by City Council action.	6	Flood, Hurricane/Tropical Storm	●	◆	Administration	\$10,000	City Budget	15	Medium
2	Take action to evaluate earthquake risk due to the drilling and fracking in the area.	The city will collaborate with Smith County, TX Oil and Gas Association, TCEQ, insurance rep and other experts to host public sessions on the topic.	7	Earthquake	●	◆	Administration	\$10,000	County Budget	18	Low
3	Detect water pipe leaks and notify customers.	The city will monitor water usage reports to quickly detect and notify customers and public works department of leaks. Public Works will quickly repair visible leaks as requested and private customers are encouraged to do the same. Preserving water supply especially during drought times and for water to be available for wildfire fighting is important.	3	Drought, Wildfire	●	◆	Administration	\$10,000	No additional funds needed	18	Medium
4	Purchase and Install back-up generator for elevated water storage tank critical facility	Purchase and install an electric back-up generator at the elevated tank which will ensure water can be pumped in the event of a power outage from dam failure, earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	1	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆	Administration	\$100,000	HMGP	12	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
5	Purchase All-Hazard NOAA Weather Radios	Purchase NOAA All-Hazard radios for early warning. Place in City Hall and other critical facilities.	2	Dam Failure, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	 	 	Administration	\$10,000	FEMA grants	12	Medium
6	Assist Vulnerable Population During Hazard Events	Organize outreach to vulnerable populations, including outreach to check on vulnerable population and establishing and promoting accessible heating or cooling centers in the community. Create a database to track those individuals at high risk of death, such as the elderly, homeless, and others.	4	Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather			Administration	\$10,000	City Budget	12	Medium
7	Xeriscape around City Buildings	Purchase and plant drought and extreme heat-resistant plants around city buildings to minimize water usage.	5	Drought, Extreme Heat			Public Works	\$10,000	City Budget	36	Medium
CITY OF WHITEHOUSE											
1	Upgrade Stormwater Capacity	Increase stormwater drainage capacity by completing a hydraulic study, evaluating historical water drainage, then construct. Consider the placement, removal, replacement or repair of old culverts that are clogged with debris, unstable, or unusable due to damage, or changing new development have severely limited the capacity level and structural integrity of the current culverts within Whitehouse.	1	Flood, Hurricane/Tropical Storm		 	Public Works	\$900,000	Stormwater Drainage assessment fee \$5.00 a month.	24	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
2	Implement Water Supply Management	The city will update the Drought and Extreme Heat Contingency Plan to include the new water rationing ordinance, complete research on additional water resources and feasibility, and implement water conservation PSAs during extreme heat and drought periods.	2	Drought, Extreme Heat	 	  	City Administration	\$100,000	Unknown	36	High
3	Purchase and Install Outdoor Warning Sirens	The city will purchase and install one additional outdoor warning siren and replace existing sirens.	4	Dam Failure, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		 	Emergency Services	\$100,000	HMGP	36	High
4	Contract with Electrical Provider for Tree Trimming	The city will complete a contract with the electrical provider for tree trimming.	6	Hurricane/Tropical Storm, Tornado, Wildfire, Wind, Winter Weather		 	City Administration	\$100,000	City General funds	12	Low
5	GIS Map, Reassess Zoning, and Develop Ordinance	The city will identify and GIS map the potential hazard events from dam failure, earthquake, riverine and flash flooding, lightning strikes, maximum wind knots, historical tornado paths, urban wildfire interface, and winter storm ice events. Then the city will develop new zoning regulations and ordinances to prevent development in known hazard areas as the city is experiencing fast growth.	3	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather		  	City Administration	\$10,000	City General funds	12	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
6	Conduct public outreach to educate homeowners on mitigation measures for their homes.	Information on methods and materials homeowners can use to minimize the hazards to property and human life; especially as new homes are being built, information will be available via city website and social media.	5	Dam Failure, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆	Emergency Services	\$10,000	Departmental Budget	60	High
CITY OF WINONA											
1	Purchase and Install Back-up Generator for Water Tower Pump House	Purchase and install an electric back-up generator at the water tower pump house in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather.	2	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆ ◆	Mayor	\$100,000	HMGP	48	High
2	Purchase and Install Back-up Generator for Community Center	Purchase and install an electric back-up generator at the Winona Community Center in the event of a power outage from earthquake, extreme heat, flood, hail, hurricane/tropical storms, lightning, tornado, wildfire, wind, and winter weather. It could be a back-up EOC location and house approximately 75 displaced people. It is equipped with a full kitchen and it is built of cinder block thus it can withstand a fire.	3	Earthquake, Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather	●	◆ ◆ ◆	Mayor	\$100,000	HMGP	48	High
3	Conduct public outreach to	Host public forums at community center on methods and materials landlords and	1	Drought, Earthquake,	●	◆ ◆	Mayor	\$10,000	City budget	60	High

AREA-WIDE MITIGATION ACTIONS AND IMPLEMENTATION

Action No.	Title	Description	Mitigation Action Ranking	Hazards Mitigated	Action Type	Applicable Goals	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline in Months	Benefit
	educate homeowners and residents on mitigation measures for their residents.	residents can use to minimize property damage and human life. The city will invite subject matter experts (i.e. county emergency manager, insurance representative, building trade expert, etc.) to speak at the public forums. The city will use the water bill to announce the forum dates.		Extreme Heat, Flood, Hail, Hurricane/Tropical Storm, Lightning, Tornado, Wildfire, Wind, Winter Weather							
4	Purchase and Install Surge Protectors and Lightning Rods at Critical Facilities	Purchase and install surge protectors and lightning rods at water tower pump house and city hall. This will protect critical facilities and critical electronic equipment.	5	Lightning	●	◆ ◆ ◆	Mayor	\$10,000	City budget	48	Medium
5	Increase capacity of storm water system along Main Street area (Hwy 155)	The city will increase the capacity of storm water system along Main Street area (Hwy 155).	4	Flood, Hurricane/Tropical Storm	●	◆ ◆	Mayor	\$800,000	City budget, State and federal grants	48	High
6	Xeriscape around city Buildings	Purchase and plant drought and extreme heat-resistant plants around city buildings to minimize water usage.	6	Drought, Extreme Heat	●	◆	Mayor	\$10,000	City Budget	36	Medium

LEGEND

Action Type: ● EAP ● SIP ● LPR ● NSP

Applicable Goals: ◆ G1 ◆ G2 ◆ G3 ◆ G4

Note:

- EAP Emergency Action Plan
- EOC Emergency Operations Center
- FEMA Federal Emergency Management Agency
- GIS Geography Information System
- HMGP Hazard Mitigation Grant Program
- IBC International Building Code
- IRC International Residential Code

NFPA-70	National Fire Protection Association 70 (National Electrical Code)
NOAA	National Oceanic and Atmospheric Administration
OEM	Office of Emergency Management
STEAR	State of Texas Emergency Assistance Registry
TCEQ	Texas Commission on Environmental Quality

Chapter 18.

PLAN ADOPTION AND MAINTENANCE

18.1 PLAN ADOPTION

A hazard mitigation plan must document that it has been formally adopted by the governing body of the jurisdiction requesting federal approval of the plan (44 CFR Section 201.6(c)(5)). For multi-jurisdictional plans, each jurisdiction requesting approval must document that it has been formally adopted. All planning partners fully met the participation requirements specified by the Steering Committee and will seek Disaster Mitigation Act of 2000 (DMA) compliance under this plan. The plan will be submitted for review to the Texas Division of Emergency Management (TDEM) and then to the Federal Emergency Management Agency (FEMA) Region VI for review and pre-adoption approval. Once pre-adoption approval has been provided, all planning partners will formally adopt the plan. All partners understand that DMA compliance and its benefits cannot be achieved until the plan is adopted. Copies of the resolutions adopting this plan for all planning partners can be found in Appendix G.

18.2 PLAN MAINTENANCE STRATEGY

A hazard mitigation plan must present a plan maintenance process that includes the following (44 CFR Section 201.6(c)(4)): monitoring, evaluating, schedule, process, and continued public participation. This chapter details the formal process that will ensure that the Smith County Hazard Mitigation Plan remains an active and relevant document and that the planning partners maintain their eligibility for applicable funding sources. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every 5 years. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

18.2.1 Monitoring and Evaluating

The annual plan maintenance Steering Committee meetings will include representation from each of the participating jurisdictions, multiple departments within Smith County, and interested stakeholders. As with the Plan Steering Committee all interested and affected entities within the communities are encouraged to participate. With adoption of this plan, the designated Steering Committee members will be tasked with plan monitoring, evaluation and maintenance. The Steering Committee, led by the Smith County Emergency Management Coordinator, agree to:

- Meet annually to monitor and evaluate the implementation of the plan
- Act as a forum for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants
- Pursue the implementation of high priority, low- or no-cost recommended actions
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists
- Monitor and assist in implementation and update of this plan
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters
- Report on plan progress and recommended changes to the Smith County Commissioners Court and governing bodies of participating jurisdictions
- Inform and solicit input from the public

The Steering Committee is an advisory body and can only make recommendations to county and city elected officials. Its primary duty is to see the plan successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information in areas accessible to the public.

18.2.2 Plan Maintenance Schedule

The Steering Committee will meet annually to monitor progress, discuss recent hazard events and changes in development that impact vulnerability, and update the mitigation strategy. The Smith County Emergency Management Coordinator will be responsible for initiating the plan reviews with the Steering Committee and plan to integrate with other regularly schedule emergency management meetings.

In coordination with the other participating jurisdictions, a 5-year written update of the plan will be submitted to TDEM and then to FEMA Region VI per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

18.2.3 Plan Maintenance Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation).

The annual reviews and updates to this plan will include the following:

- Consider changes in vulnerability due to action implementation
- Summary of any natural hazard events that occurred during the performance period and the impact these events had on the planning area
- Review of mitigation success stories
- Review of continuing public involvement and feedback received from the community
- Re-evaluation of the action plan to evaluate whether the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term one because of new funding)
- Recommendations for new projects
- Changes in or potential for new funding options (grant opportunities)
- Impact of any other planning programs or initiatives that involve hazard mitigation
- Monitor the incorporation of the Mitigation Plan into planning mechanisms.
- Post on the Smith County Fire Marshal / OEM website dedicated to the hazard mitigation plan
- Provide information for a press release that will be issued to the local media
- Inform planning partner governing bodies of the progress of actions implemented during the reporting period

- Uses of the progress report will be at the discretion of each planning partner. A template to guide the planning partners in preparing an annual progress report is available in Appendix H. Annual progress reporting is not a requirement specified under 44 CFR. However, it may enhance the planning partnership's opportunities for funding. While failure to implement this component of the plan maintenance strategy will not jeopardize a planning partner's compliance under the DMA, it may jeopardize its opportunity to partner and leverage funding opportunities with the other partners.

In order to best evaluate the mitigation strategy during plan review and update, the participating jurisdictions will follow the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting the action status on an annual basis to the jurisdictional Steering Committee member and providing input on any completion details or whether the action still meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional Steering Committee member will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.
- As part of the annual review process, the Smith County Emergency Management Coordinator will provide the updated Mitigation Strategy with the current status of each mitigation action to the County Board of Supervisors and County Department Heads as well as all Mayors and City Clerks requesting that the mitigation strategy be incorporated, where appropriate in other planning mechanisms.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the Smith County Steering Committee deems appropriate and necessary, and as approved by the Smith County Board of Supervisors and the governing boards of the other participating jurisdictions.

18.2.4 Continuing Public Involvement

The public will continue to be apprised of the plan's progress through the Smith County Fire Marshal / OEM website and other methods as appropriate. This site will not only house the final plan, it will become the one-stop shop for information regarding the plan, the partnership and plan implementation. Copies of the plan will be distributed to the public library system in Smith County Library. Upon initiation of future update processes, a new public involvement strategy will be initiated based on guidance from a new Steering Committee. This strategy will be based on the needs and capabilities of the planning partnership at the time of the update. This strategy will include the use of local media outlets within the planning area to notify the public of the implementation, monitoring, and evaluation of the plan. The public will be invited to participate in each stage by attending meetings and provide feedback to the planning team and new Steering Committee. The Steering Committee may include community stakeholders, such as prominent businesses, local action groups, etc.

18.3 INCORPORATION INTO EXISTING PLANNING MECHANISMS

The information on hazard, risk, vulnerability, and mitigation contained in this plan is based on the best science and technology available at the time this plan update was prepared. The existing Smith County regulations, ordinances, and plans (including the Smith County Emergency Operations Plan), and the

jurisdictional comprehensive plans are considered to be integral parts of this plan. The county and planning partners, through adoption of comprehensive plans and zoning ordinances, have planned for the impact of natural hazards.

Many of the small jurisdictions in Smith County do not have standing formal planning mechanisms such as a Comprehensive Plan or Capital Improvements Plan through which formal integration of mitigation actions can be documented. As a result activities that occur in these small communities are developed through annual budget planning, regular City Council Meetings and other community forums rather than a formal planning process. Planning mechanisms that do exist within the participating jurisdictions include:

- Comprehensive Plans;
- Various ordinances of participating jurisdictions, including floodplain management ordinances in NFIP-participating communities;
- Smith County Emergency Operations Plan;
- Capital Improvement Plans

In particular, updated FIS and DFIRMs became effective in April 2014 during the *Smith County Hazard Mitigation Action Plan, 2011-2016* plan cycle. Several affected municipalities, for example the City of Tyler, have adopted updated floodplain prevention ordinances to incorporate this data. Other jurisdictions, for example unincorporated Smith County, has a floodplain prevention ordinance that allows for FIS revisions to be adopted by reference and declared to be a part of their ordinance. Thus no need for a revised ordinance.

For a detailed summary of planning mechanisms and other mitigation-related capabilities, see Chapter 5. Table 18-1 provides additional details on each jurisdiction regarding how the *Smith County Hazard Mitigation Action Plan, 2011-2016* was integrated into existing planning mechanisms as well as the strategy going forward to integrate this plan update into existing planning mechanisms.

In Smith County, the general statue process for integration is initiated via an action request by a county departmental supervisor, elected official or other interested party. Once a request is initiated the item is placed on the Commissioner’s Court agenda, compliant with all County required procedures which includes posting in the Courthouse kiosks in the designated windows as well as the Smith County Commissioner’s website, <http://www.smith-county.com/Commissioners/Admin/Default.aspx>, for public access. The item is discussed as part of the Commissioners normal agenda. Discussion is then open to the public in attendance at the Commissioner’s Court public meeting compliant with the provisions of the Texas Open Meeting Act, Texas Government Code, Chapter 551. The proposal is then voted on by the Commissioner’s Court which may or may not be the same meeting the proposal was first introduced at.

In the participating cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Troup, Tyler, Whitehouse, and Winona, the general statue process for integration is initiated via an action request by a city departmental supervisor, city manager, elected official or other interested party. The City Clerk or City Secretary coordinators action items and completes the City Council’s agenda which is posted for public access per each city’s statue. The item is discussed at the City Council’s public meeting, including receipt of public comment per the provisions of the Texas Open Meeting Act, Texas Government Code, Chapter 551. The proposal is then voted on by the City Council which may or may not be the same meeting the proposal was first introduced at.

Table 18-1. Integration of Previous Plan and Strategies to Integrate Plan Update

Jurisdiction	Type of Plan	Incorporation of 2011 Plan into Existing Planning Mechanisms	Integration Process for Plan Update
Smith County	Annual Budget	Reviewed mitigation action ideas during Commission's Court meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
	1 st Responders Emergency Preparedness	Fire Marshal's Office used plan to improve preparedness and plan for better service delivery during emergency response calls.	Fire Marshal's Office will use plan update to improve preparedness and plan for better service delivery during emergency response calls.
	Smith County Subdivision Ordinance, 2009	No incorporation occurred.	Maintain current data on high risk areas via the mitigation plan and regularly incorporate information on high risk hazard areas into the subdivision requirements, thereby eliminating or reducing potential impacts on current and future development.
	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Smith County Basic Emergency Operations Plan	No incorporation occurred.	Over 10 years old and will be updating and integrating the HMP Risk Assessment into the Basic Emergency Operations Plan. This plan update process will be directed by the EMC, then submitted to TDEM for approval, and then the Smith County Commissioner's Court proposal status process followed.
	Grant Applications	Plan consulted when grant funding opportunities arose, as County officials considered whether to apply for funding.	Training in grant writing for current staff members; hiring a new staff member with grant writing experience, or hiring a contractor to write grant applications for mitigation projects.
Arp	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
Bullard	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
	Bullard 2030 Comprehensive Plan, 2008	No incorporation occurred.	Mitigation will be a key component of the Plan update.
	Capital improvement program	No incorporation occurred.	The recommended mitigation actions will be reviewed with this program annually and funded when possible.
	Stormwater Management	No incorporation occurred.	Working with TCEQ for stormwater permit and then will proceed with new stormwater management program.
Hideaway	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process

Jurisdiction	Type of Plan	Incorporation of 2011 Plan into Existing Planning Mechanisms	Integration Process for Plan Update
	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
Lindale	Adopt IBC and IRC 2015	No building codes were updated during this plan timeframe.	Updated buildings codes will help mitigate against all natural hazards.
	Second Century Comprehensive Plan, 2005	Not applicable. The plan was written in 2005.	Over 13 years old and will be updated with HMP Risk Assessment data.
	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
New Chapel Hill	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
Noonday	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
Troup	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
Tyler	1st Responders Emergency Preparedness	Fire Department used plan to improve preparedness and plan for better service delivery during emergency response calls.	Fire Department will use plan update to improve preparedness and plan for better service delivery during emergency response calls.

Jurisdiction	Type of Plan	Incorporation of 2011 Plan into Existing Planning Mechanisms	Integration Process for Plan Update
	Tyler 1st Comprehensive Plan	No incorporation occurred.	Will be updating with HMP Risk Assessment data and recommended mitigation actions.
	Burn Ban Ordinance	No incorporation occurred.	Adopt Burn Ban Ordinance within the city limits
	Emergency Management Plan	No updates occurred during this plan timeframe.	Will be updating with HMP Risk Assessment data.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014 and revised Flood Damage Prevention Order, 2015.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
Whitehouse	Whitehouse Vision 2020 Comprehensive Plan, 2006	No updates occurred during this plan timeframe.	Will be updating with HMP Risk Assessment data and recommended mitigation actions.
	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process
Winona	Flood Damage Prevention Order	The Plan was consulted for NFIP compliance and flood risk for the FIS Report 2014.	Overlay high risk/flood prone areas from 2014 DFIRMs with future floodplain regulations, thereby minimizing or reducing the impacts of flooding on current and future development.
	Budget planning process	Reviewed mitigation action ideas during City Council meetings as part their annual budget reviews.	Integrate mitigation action ideas into annual budget planning process

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APPENDIX A.
ACRONYMS AND DEFINITIONS

APPENDIX A. ACRONYMS AND DEFINITIONS

ACRONYMS

Note: Acronyms are defined the first time they are used in each part of this plan.

°F	Degrees Fahrenheit
°C	Degrees Celsius
44 CFR	Title 44 Code of Federal Regulations
CWPP	Community Wildfire Protection Plan
DFIRM	Digital Flood Insurance Rate Maps
DMA	Disaster Mitigation Act of 2000
DPS	Department of Public Safety
EAP	Education and Awareness Program
EF	Enhanced Fujita
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
HAZMAT	Hazardous Materials
Hazus	Hazards, United States-Multi Hazard
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
KT	Knot
LPR	Local Plans and Regulations
Mph	Miles per Hour
M _w	Moment Magnitude
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NREL	National Renewable Energy Laboratory
NSP	Natural Systems Protection
NWS	National Weather Service
OEM	Office of Emergency Management
PDI	Palmer Drought Index
PHDI	Palmer Hydrological Drought Index

SIP	Structure and Infrastructure Project
SFHA	Special Flood Hazard Area
SPI	Standardized Precipitation Index
SWCD	Soil and Water Conservation District
TCEQ	Texas Commission on Environmental Quality
TDEM	Texas Division of Emergency Management
TFS	Texas Forest Service
TSSWCB	Texas State Soil and Water Conservation Board
TWDB	Texas Water Development Board
TxWRAP	Texas A&M Forest Service Wildfire Risk Assessment Portal
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WHP	Wildfire Hazard Potential
WUI	Wildland Urban Interface

DEFINITIONS

100-Year Flood: The term “100-year flood” can be misleading. The 100-year flood does not necessarily occur once every 100 years. Rather, it is the flood that has a 1% chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The Federal Emergency Management Agency (FEMA) defines it as the 1% annual-chance-flood, which is now the standard definition used by most federal and state agencies and by the National Flood Insurance Program (NFIP).

Acre-Foot: An acre-foot is the amount of water it takes to cover 1 acre to a depth of 1 foot. This measure is used to describe the quantity of storage in a water reservoir. An acre-foot is a unit of volume. One acre foot equals 7,758 barrels; 325,829 gallons; or 43,560 cubic feet. An average household of four will use approximately 1 acre-foot of water per year.

Asset: An asset is any man-made or natural feature that has value, including, but not limited to, people; buildings; infrastructure, such as bridges, roads, sewers, and water systems; lifelines, such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, wetlands, and landmarks.

Base Flood: The flood having a 1% chance of being equaled or exceeded in any given year, also known as the “100-year” or “1% chance” flood. The base flood is a statistical concept used to ensure that all properties subject to the NFIP are protected to the same degree against flooding.

Basin: A basin is the area within which all surface water, whether from rainfall, snowmelt, springs, or other sources, flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Basins are also referred to as “watersheds” and “drainage basins.”

Benefit: A benefit is a net project outcome and is usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of benefit-cost analysis of proposed mitigation measures,

benefits are limited to specific, measurable risk reduction factors, including reduction in expected property losses (buildings, contents, and functions) and protection of human life.

Benefit/Cost Analysis: A benefit/cost analysis is a systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

Breach: An opening through which floodwaters may pass after part of a levee has given way.

Building: A building is defined as a structure that is walled and roofed, principally aboveground, and permanently fixed to a site. The term includes manufactured homes on permanent foundations on which the wheels and axles carry no weight.

Capability Assessment: A capability assessment provides a description and analysis of a community's current capacity to address threats associated with hazards. The assessment includes two components: an inventory of an agency's mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community's actions to reduce losses are identified, reviewed, and analyzed, and the framework for implementation is identified. The following capabilities were reviewed under this assessment:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability

Conflagration: A fire that grows beyond its original source area to engulf adjoining regions. Wind, extremely dry or hazardous weather conditions, excessive fuel buildup, and explosions are usually the elements behind a wildfire conflagration.

Critical Area: An area defined by state or local regulations as deserving special protection because of unique natural features or its value as habitat for a wide range of species of flora and fauna. A sensitive/critical area is usually subject to more restrictive development regulations.

Critical Facility: Facilities and infrastructure that are critical to the health and welfare of the population. These become especially important after any hazard event occurs.

Dam: A barrier, including one for flood detention, designed to impound liquid volumes and which has a height of dam greater than six feet (Texas Administrative Code, Ch. 299, 1986).

Dam Failure: Dam failure refers to a partial or complete breach in a dam (or levee) that impacts its integrity. Dam failures occur for a number of reasons, such as flash flooding, inadequate spillway size, mechanical failure of valves or other equipment, freezing and thawing cycles, earthquakes, and intentional destruction.

Debris Flow: Dense mixtures of water-saturated debris that move down-valley; looking and behaving much like flowing concrete. They form when loose masses of unconsolidated material are saturated, become unstable, and move down slope. The source of water varies but includes rainfall, melting snow or ice, and glacial outburst floods.

Deposition: Deposition is the placing of eroded material in a new location.

Disaster Mitigation Act of 2000 (DMA): The DMA is Public Law 106-390 and is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program (HMGP) were established.

Drainage Basin: A basin is the area within which all surface water, whether from rainfall, snowmelt, springs or other sources, flows to a single water body or watercourse. The boundary of a river basin is

defined by natural topography, such as hills, mountains and ridges. Drainage basins are also referred to as **watersheds** or **basins**.

Drought: Drought is a period of time without substantial rainfall or snowfall from one year to the next. Drought can also be defined as the cumulative impacts of several dry years or a deficiency of precipitation over an extended period of time, which in turn results in water shortages for some activity, group, or environmental function. A hydrological drought is caused by deficiencies in surface and subsurface water supplies. A socioeconomic drought impacts the health, well-being, and quality of life or starts to have an adverse impact on a region. Drought is a normal, recurrent feature of climate and occurs almost everywhere.

Earthquake: An earthquake is defined as a sudden slip on a fault, volcanic or magmatic activity, and sudden stress changes in the earth that result in ground shaking and radiated seismic energy. Earthquakes can last from a few seconds to over 5 minutes, and have been known to occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties may result from falling objects and debris as shocks shake, damage, or demolish buildings and other structures.

Emergency Action Plan: A document that identifies potential emergency conditions at a dam and specifies actions to be followed to minimize property damage and loss of life. The plan specifies actions the dam owner should take to alleviate problems at a dam. It contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show emergency management authorities the critical areas for action in case of an emergency. (FEMA 64)

Enhanced Fujita Scale (EF-scale): The EF-scale is a set of wind estimates (not measurements) based on damage. It uses 3-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators. These estimates vary with height and exposure. Standard measurements are taken by weather stations in openly exposed area.

Expansive Soil: Expansive soil and rock are characterized by clayey material that shrinks as it dries or swells as it becomes wet.

Exposure: Exposure is defined as the number and dollar value of assets considered to be at risk during the occurrence of a specific hazard.

Extent: The extent is the size of an area affected by a hazard.

Extreme Heat: Summertime weather that is substantially hotter or more humid than average for a location at that time of year.

Fault: A fracture in the earth's crust along which two blocks of the crust have slipped with respect to each other.

Fire Behavior: Fire behavior refers to the physical characteristics of a fire and is a function of the interaction between the fuel characteristics (such as type of vegetation and structures that could burn), topography, and weather. Variables that affect fire behavior include the rate of spread, intensity, fuel consumption, and fire type (such as underbrush versus crown fire).

Fire Frequency: Fire frequency is the broad measure of the rate of fire occurrence in a particular area. An estimate of the areas most likely to burn is based on past fire history or fire rotation in the area, fuel conditions, weather, ignition sources (such as human or lightning), fire suppression response, and other factors.

Flash Flood: A flash flood occurs with little or no warning when water levels rise at an extremely fast rate.

Flood: The inundation of normally dry land resulting from the rising and overflowing of a body of water.

Flood Insurance Rate Map (FIRM): FIRMs are the official maps on which the Federal Emergency Management Agency (FEMA) has delineated the Special Flood Hazard Area (SFHA).

Flood Insurance Study: A report published by the Federal Insurance and Mitigation Administration for a community in conjunction with the community's FIRM. The study contains such background data as the base flood discharges and water surface elevations that were used to prepare the FIRM. In most cases, a community FIRM with detailed mapping will have a corresponding flood insurance study.

Floodplain: Any land area susceptible to being inundated by flood waters from any source. A FIRM identifies most, but not necessarily all, of a community's floodplain as the SFHA.

Floodway: Floodways are areas within a floodplain that are reserved for the purpose of conveying flood discharge without increasing the base flood elevation more than one foot. Generally speaking, no development is allowed in floodways, as any structures located there would block the flow of floodwaters.

Freeboard: Freeboard is the margin of safety added to the base flood elevation.

Freezing Rain: The result of rain occurring when the temperature is below the freezing point. The rain freezes on impact, resulting in a layer of glaze ice up to an inch thick. In a severe ice storm, an evergreen tree 60 feet high and 30 feet wide can be burdened with up to 6 tons of ice, creating a threat to power and telephone lines and transportation routes.

Fujita Scale of Tornado Intensity: Tornado wind speeds are sometimes estimated on the basis of wind speed and damage sustained using the Fujita Scale. The scale rates the intensity or severity of tornado events using numeric values from F0 to F5 based on tornado wind speed and damage. An F0 tornado (wind speed less than 73 miles per hour [mph]) indicates minimal damage (such as broken tree limbs), and an F5 tornado (wind speeds of 261 to 318 mph) indicates severe damage.

Goal: A goal is a general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to achieve. The success of a hazard mitigation plan is measured by the degree to which its goals have been met (that is, by the actual benefits in terms of actual hazard mitigation).

Geographic Information System (GIS): GIS is a computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.

Ground Subsidence: Ground subsidence is the sinking of land over human-caused or natural underground voids and the settlement of native low density soils.

Groundwater Depletion: Groundwater depletion occurs when groundwater is pumped from pore spaces between grains of sand and gravel. If an aquifer has beds of clay or silt within or next to it, the lowered water pressure in the sand and gravel causes slow drainage of water from the clay and silt beds. The reduced water pressure is a loss of support for the clay and silt beds. Because these beds are compressible, they compact (become thinner), and the effects are seen as a lowering of the land surface.

Hazard: A hazard is a source of potential danger or adverse condition that could harm people or cause property damage.

Hazard Mitigation Grant Program (HMGP): Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.

Hazards U.S. Multi-Hazard (Hazus) Loss Estimation Program: Hazus is a GIS-based program used to support the development of risk assessments as required under the DMA. The Hazus software program assesses risk in a quantitative manner to estimate damages and losses associated with natural hazards. Hazus is FEMA's nationally applicable, standardized methodology and software program and contains modules

for estimating potential losses from earthquakes, floods, and wind hazards. Hazus has also been used to assess vulnerability (exposure) for other hazards.

High Hazard Dam — Dams where failure or operational error will probably cause loss of human life. (FEMA 333)

Hurricane: A tropical cyclone with maximum sustained surface winds (using the U.S. 1-minute average) of 64 knot (kt) (74 miles per hour [mph]) or more.

Hydraulics: Hydraulics is the branch of science or engineering that addresses fluids (especially water) in motion in rivers or canals, works and machinery for conducting or raising water, the use of water as a prime mover, and other fluid-related areas.

Hydrology: Hydrology is the analysis of waters of the earth. For example, a flood discharge estimate is developed by conducting a hydrologic study.

Hypocenter: The region underground where an earthquake's energy originates.

Intensity: For the purposes of this plan, intensity refers to the measure of the effects of a hazard.

Interface Area: An area susceptible to wildfires and where wildland vegetation and urban or suburban development occur together. An example would be smaller urban areas and dispersed rural housing in forested areas.

Inventory: The assets identified in a study region comprise an inventory. Inventories include assets that could be lost when a disaster occurs and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

Lightning: Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt," usually within or between clouds and the ground. A bolt of lightning instantaneously reaches temperatures approaching 50,000°F. The rapid heating and cooling of air near lightning causes thunder. Lightning is a major threat during thunderstorms. In the United States, 75 to 100 people are struck and killed by lightning each year (see <http://www.fema.gov/hazard/thunderstorms/thunder.shtm>).

Local Government: Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under state law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Magnitude: Magnitude is the measure of the strength of an earthquake, and is typically measured by the Richter scale. As an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Mitigation: A preventive action that can be taken in advance of an event that will reduce or eliminate the risk to life or property.

Mitigation Actions: Mitigation actions are specific actions to achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and property.

National Flood Insurance Program (NFIP): The NFIP provides federally backed flood insurance in exchange for communities enacting floodplain regulations.

Peak Ground Acceleration: Peak Ground Acceleration is a measure of the highest amplitude of ground shaking that accompanies an earthquake, based on a percentage of the force of gravity.

Preparedness: Preparedness refers to actions that strengthen the capability of government, citizens, and communities to respond to disasters.

Presidential Disaster Declaration: These declarations are typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

Probability of Occurrence: The probability of occurrence is a statistical measure or estimate of the likelihood that a hazard will occur. This probability is generally based on past hazard events in the area and a forecast of events that could occur in the future. A probability factor based on yearly values of occurrence is used to estimate probability of occurrence.

Repetitive Loss Property: Any NFIP-insured property that, since 1978 and regardless of any changes of ownership during that period, has experienced:

- Four or more paid flood losses in excess of \$1,000; or
- Two paid flood losses in excess of \$1,000 within any 10-year period since 1978; or
- Three or more paid losses that equal or exceed the current value of the insured property.

Riparian Zone: The area along the banks of a natural watercourse.

Riverine: Of or produced by a river. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains.

Risk: Risk is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Risk Assessment: Risk assessment is the process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards and focuses on (1) hazard identification; (2) impacts of hazards on physical, social, and economic assets; (3) vulnerability identification; and (4) estimates of the cost of damage or costs that could be avoided through mitigation.

Risk Ranking: This ranking serves two purposes, first to describe the probability that a hazard will occur, and second to describe the impact a hazard will have on people, property, and the economy. Risk estimates for the jurisdiction are based on the methodology that the jurisdiction used to prepare the risk assessment for this plan. The following equation shows the risk ranking calculation:

$$\text{Risk Ranking} = \text{Probability} + \text{Impact (people + property + economy)}$$

Robert T. Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-107, was signed into law on November 23, 1988. This law amended the Disaster Relief Act of 1974, Public Law 93-288. The Stafford Act is the statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs.

Severe Local Storm: Small-scale atmospheric systems, including tornadoes, thunderstorms, windstorms, ice storms, and snowstorms. These storms may cause a great deal of destruction and even death, but their impact is generally confined to a small area. Typical impacts are on transportation infrastructure and utilities.

Significant Hazard Dam: Dams where failure or operational error will result in no probable loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities, or can impact other concerns. Significant hazard dams are often located in rural or agricultural areas but could be located in areas with population and significant infrastructure. (FEMA 333)

Sinkhole: A collapse depression in the ground with no visible outlet. Its drainage is subterranean. It is commonly vertical-sided or funnel-shaped.

Special Flood Hazard Area: The base floodplain delineated on a FIRM. The SFHA is mapped as a Zone A in riverine situations. The SFHA may or may not encompass all of a community's flood problems.

Stakeholder: Business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, developers, special purpose districts, and others whose actions could impact hazard mitigation.

Stream Bank Erosion: Stream bank erosion is common along rivers, streams, and drains where banks have been eroded, sloughed, or undercut. However, it is important to remember that a stream is a dynamic and constantly changing system. It is natural for a stream to want to meander, so not all eroding banks are "bad" and in need of repair. Generally, stream bank erosion becomes a problem where development has limited the meandering nature of streams, where streams have been channelized, or where stream bank structures (like bridges, culverts, etc.) are located in places where they can actually cause damage to downstream areas. Stabilizing these areas can help protect watercourses from continued sedimentation, damage to adjacent land uses, control unwanted meander, and improvement of habitat for fish and wildlife.

Steep Slope: Different communities and agencies define it differently, depending on what it is being applied to, but generally a steep slope is a slope in which the percent slope equals or exceeds 25%. For this study, steep slope is defined as slopes greater than 33%.

Sustainable Hazard Mitigation: This concept includes the sound management of natural resources, local economic and social resiliency, and the recognition that hazards and mitigation must be understood in the largest possible social and economic context.

Thunderstorm: A thunderstorm is a storm with lightning and thunder produced by cumulonimbus clouds. Thunderstorms usually produce gusty winds, heavy rains, and sometimes hail. Thunderstorms are usually short in duration (seldom more than 2 hours). Heavy rains associated with thunderstorms can lead to flash flooding during the wet or dry seasons.

Tornado: A tornado is a violently rotating column of air extending between and in contact with a cloud and the surface of the earth. Tornadoes are often (but not always) visible as funnel clouds. On a local scale, tornadoes are the most intense of all atmospheric circulations, and winds can reach destructive speeds of more than 300 mph. A tornado's vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long.

Tropical Storm: A tropical cyclone with maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 34 kt (39 mph) to 63 kt (73 mph).

Tropical Depression: A tropical cyclone with maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 4 kt (39 mph) to 63 kt (73 mph).

Values Response Index (VRI): The wildfire VRI reflects a rating of the potential impact of a wildfire on values or assets. The VRI is an overall rating that combines the impact ratings for WUI (housing density) and Pine Plantations (pine age) into a single measure. VRI combines the likelihood of a fire occurring (threat) with those areas of most concern that are adversely impacted by fire to derive a single overall measure of wildfire risk.

Vulnerability: Vulnerability describes how exposed or susceptible an asset is to damage. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect

damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power. Flooding of an electric substation would affect not only the substation itself but businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Watershed: A watershed is an area that drains downgradient from areas of higher land to areas of lower land to the lowest point, a common drainage basin.

Wildfire: Wildfire refers to any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is influenced by three factors: the presence of fuel, topography, and air mass. Fuel can include living and dead vegetation on the ground, along the surface as brush and small trees, and in the air such as tree canopies. Topography includes both slope and elevation. Air mass includes temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount, duration, and the stability of the atmosphere at the time of the fire. Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

Wildfire Hazard Potential (WHP): The wildfire threat or WHP is the likelihood of a wildfire occurring or burning into an area. Threat is calculated by combining multiple landscape characteristics including surface and canopy fuels, fire behavior, historical fire occurrences, weather observations, terrain conditions, and other factors.

Windstorm: Windstorms are generally short-duration events involving straight-line winds or gusts exceeding 50 mph. These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in areas with significant tree stands, exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and aboveground utility lines. A windstorm can topple trees and power lines; cause damage to residential, commercial, critical facilities; and leave tons of debris in its wake.

Winter Storm: A storm having significant snowfall, ice, or freezing rain; the quantity of precipitation varies by elevation.

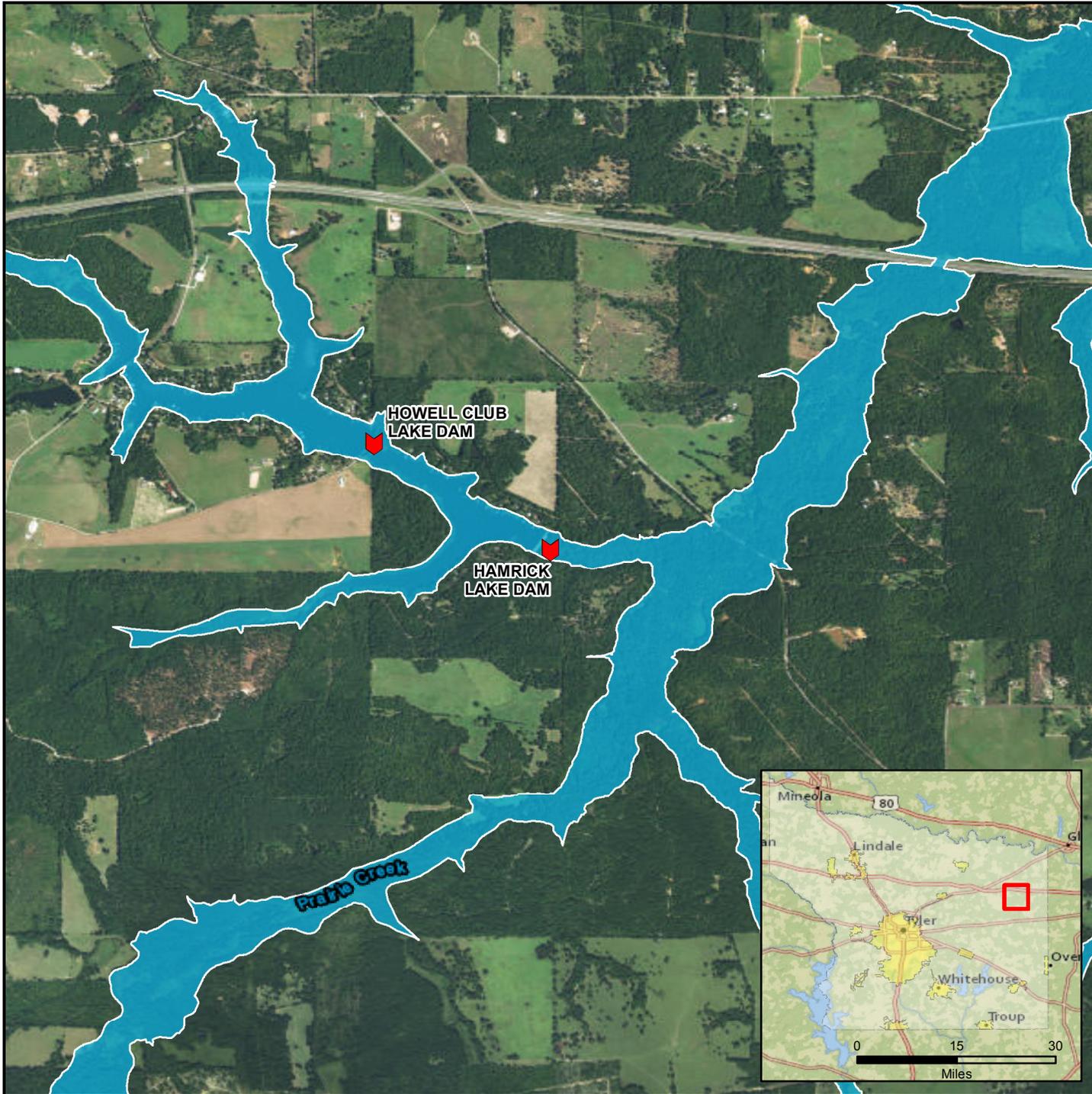
Zoning Ordinance: The zoning ordinance designates allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.

Smith County
Hazard Mitigation Plan Update

APPENDIX B.
DAM LOCATION MAPS

APPENDIX B. DAM LOCATION MAPS

This appendix shows all the location of all the high- and significant-hazard dams in Smith County, Texas.



Hamrick Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI

Hide A Way Lake No 1

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

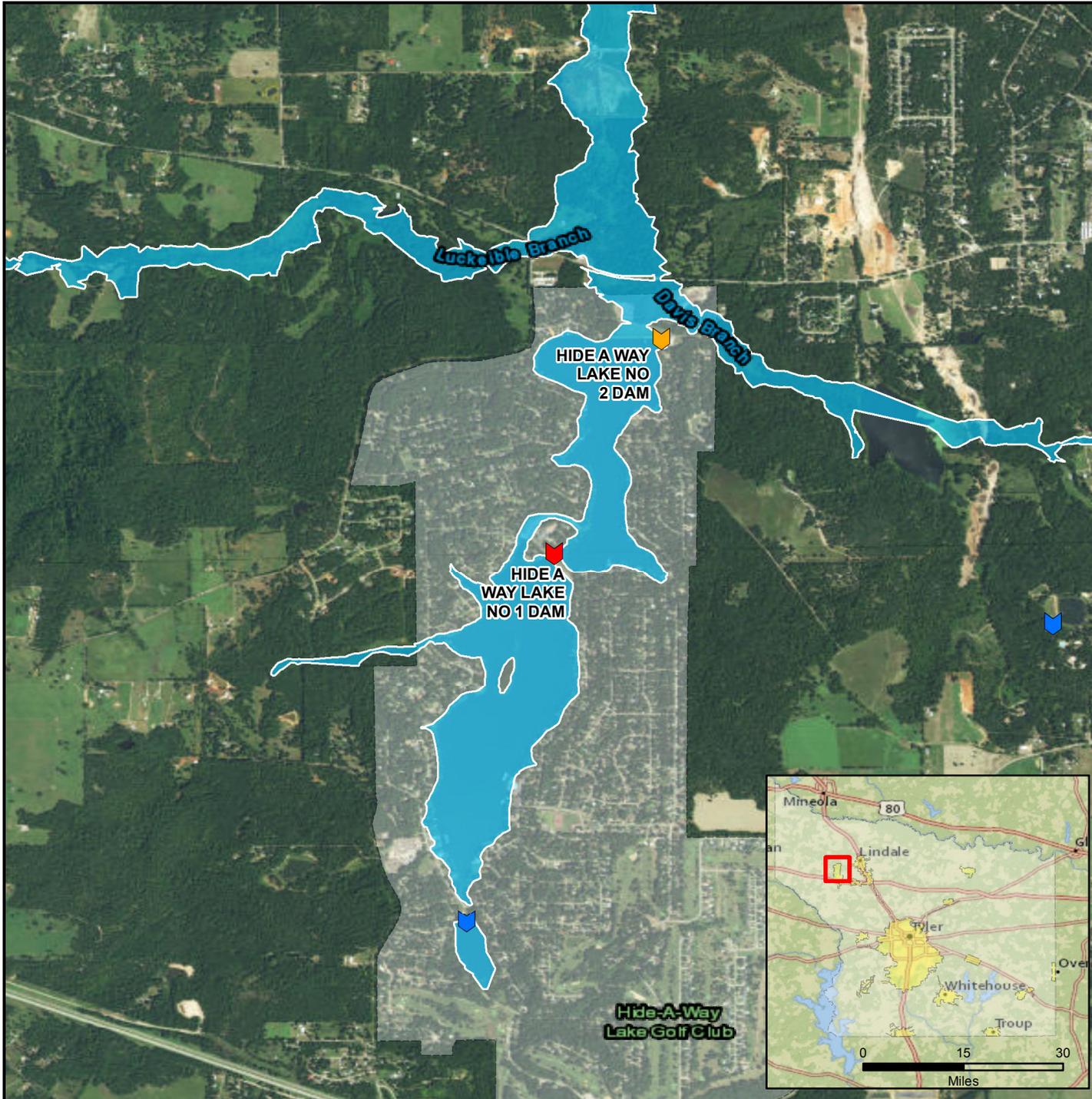
-  High
-  Significant
-  Low

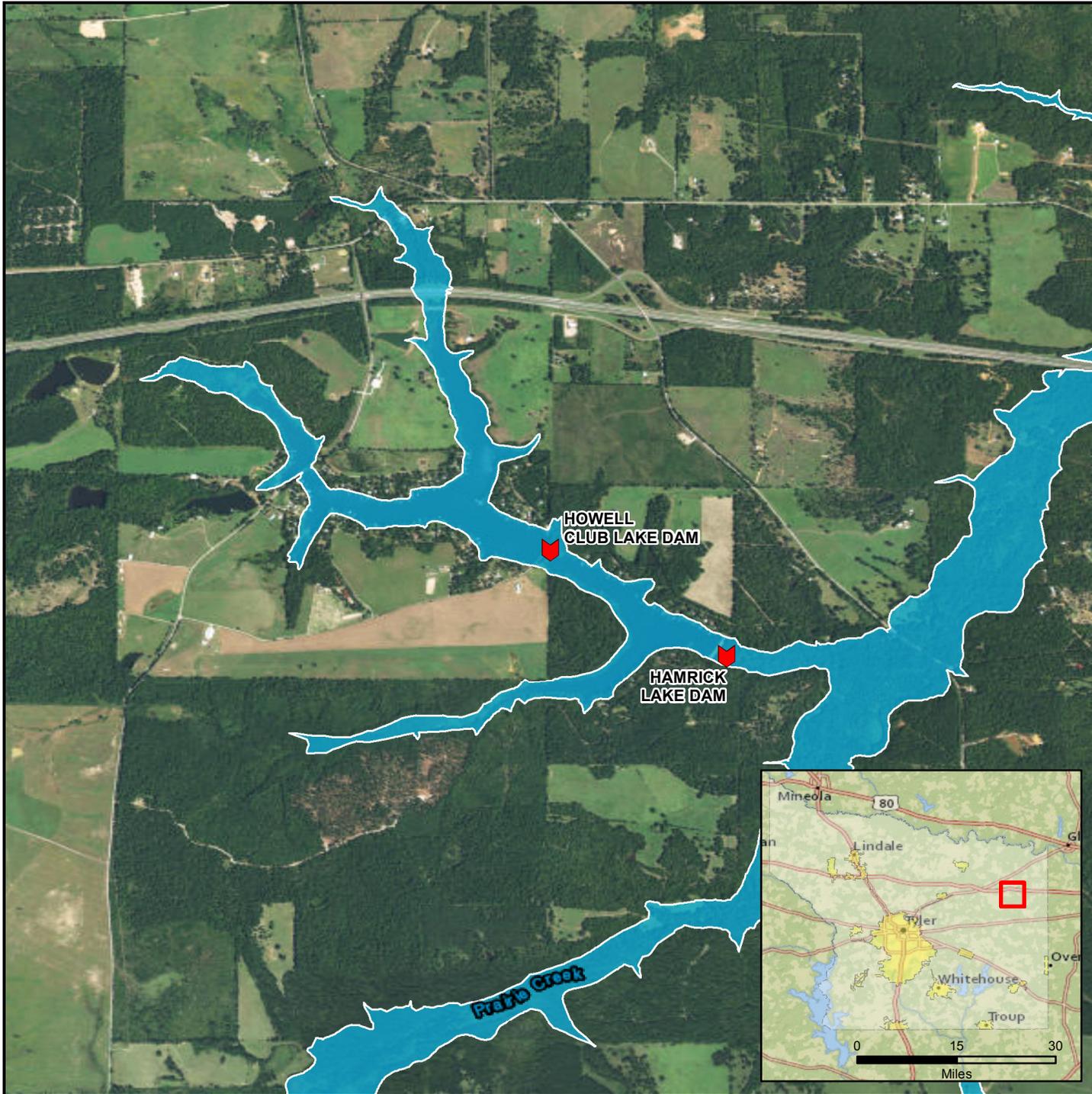
Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI





Howell Club Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Mud Creek Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

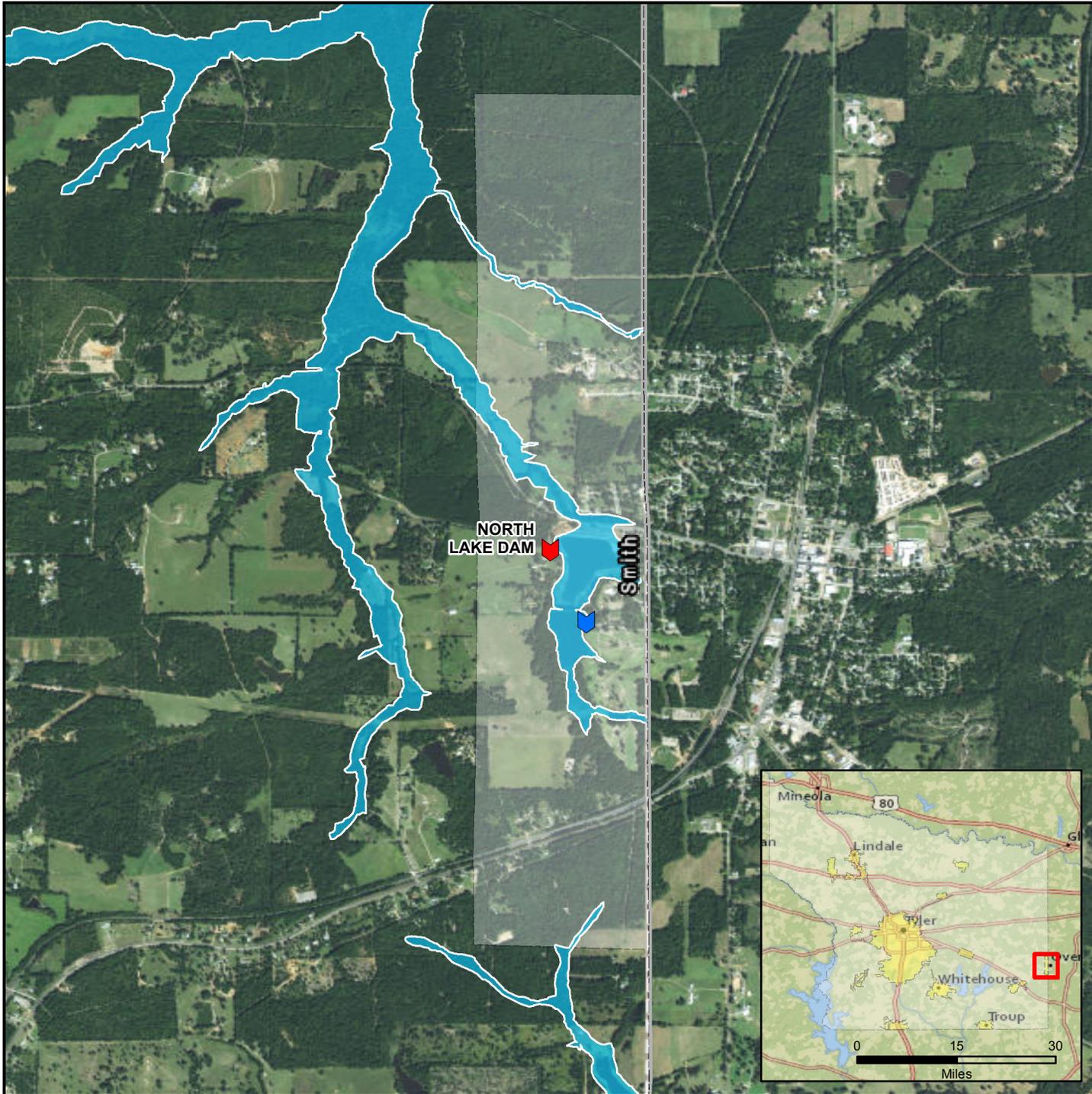
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



North Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

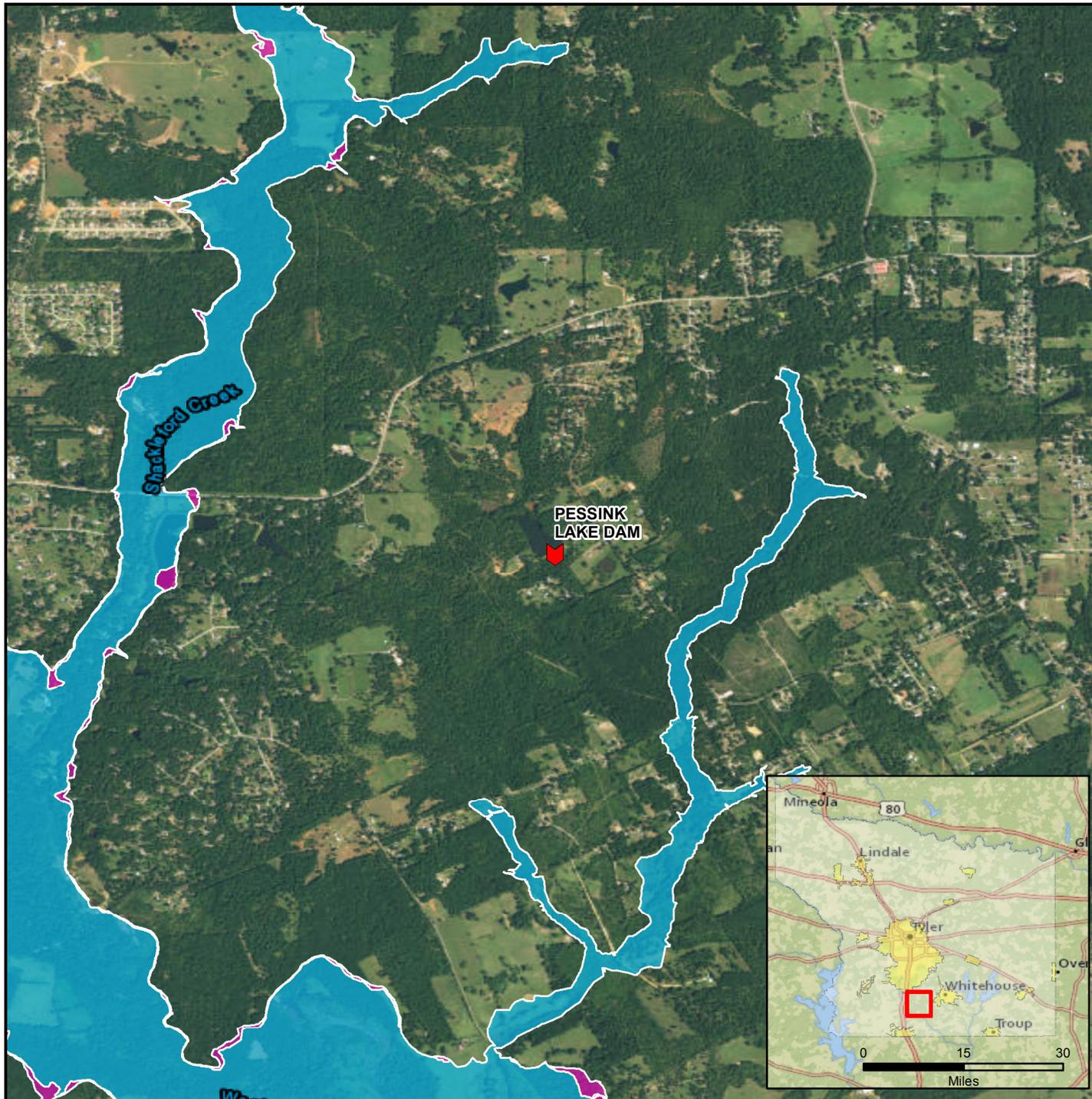
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Pessink Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI

Pleasure Acres Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

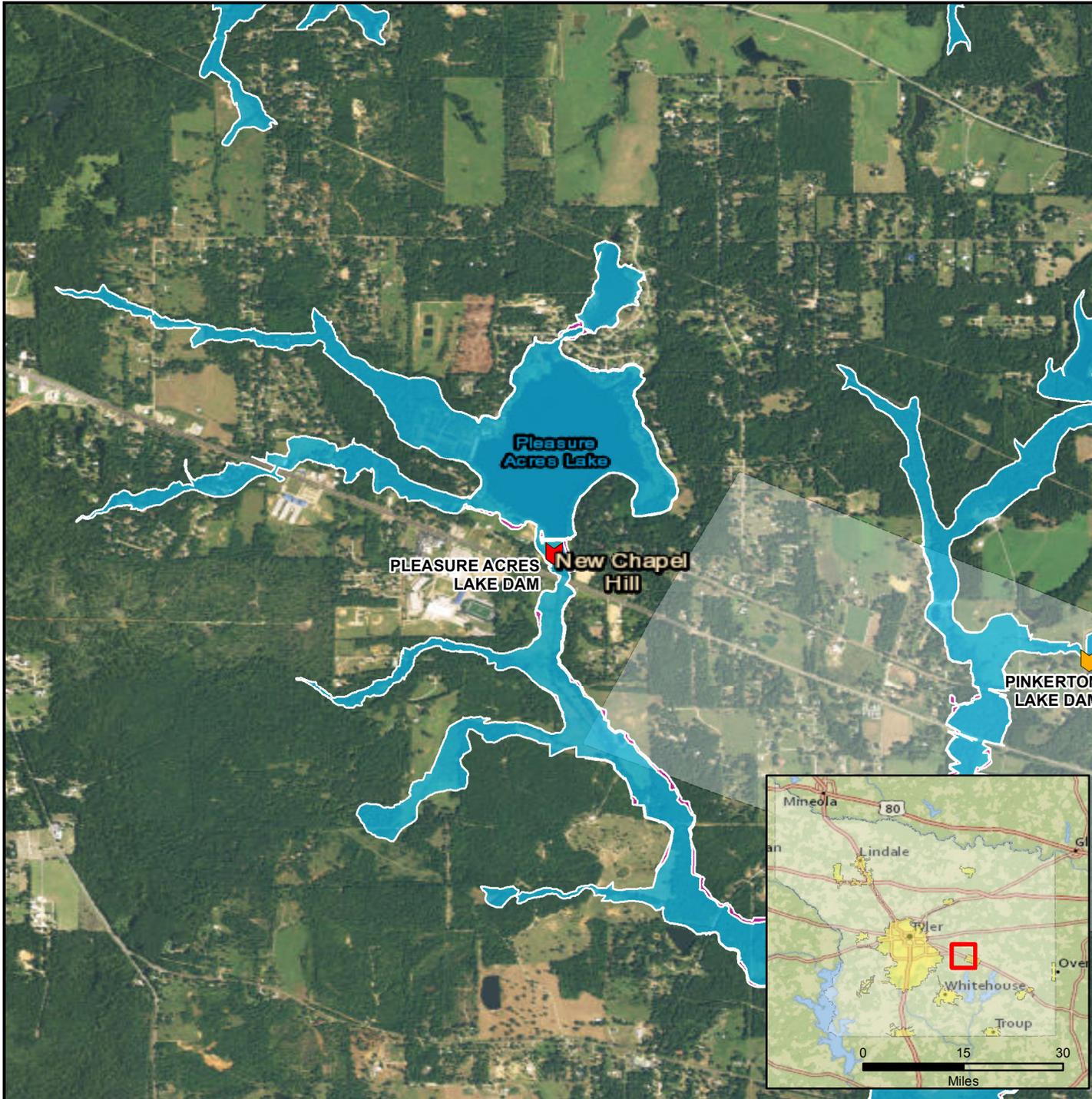
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI





Whitehouse Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Bellwood Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Greenbriar Lake Dam

Dam Locations & Flood Risk Areas

- Smith County Boundary
- City Limits
- 1% Chance Annual Flood (100-Year)
- 0.2% Chance Annual Flood (500-Year)

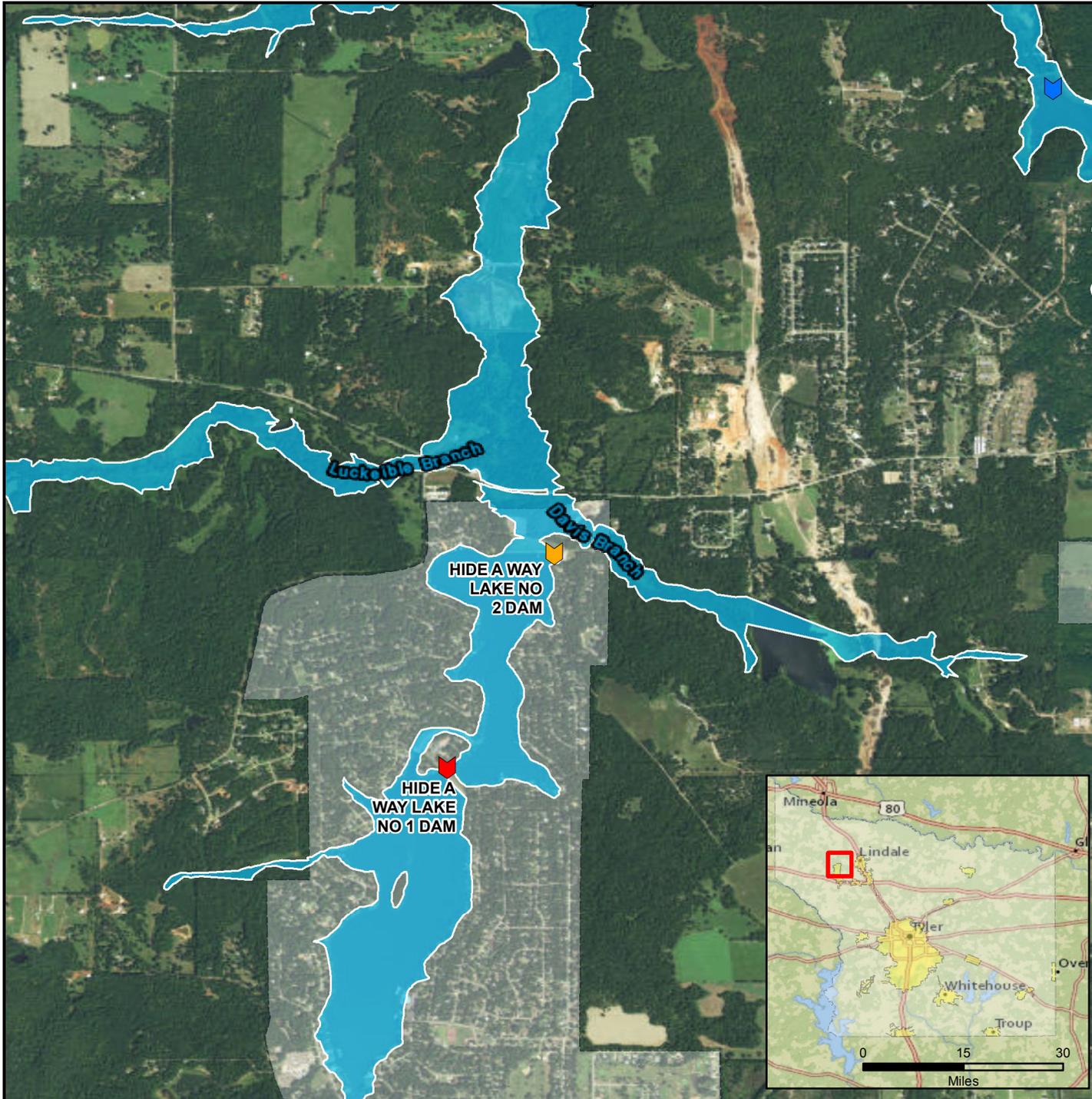
- ### Dams / Hazard Class
- High
 - Significant
 - Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Hide A Way Lake No 2

Dam Locations & Flood Risk Areas

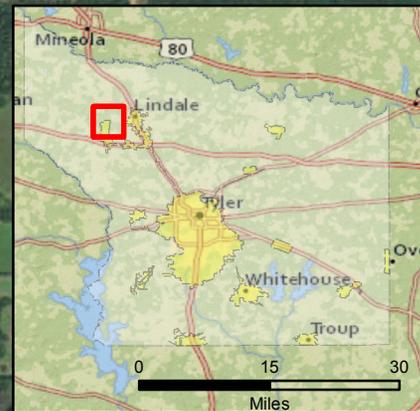
-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

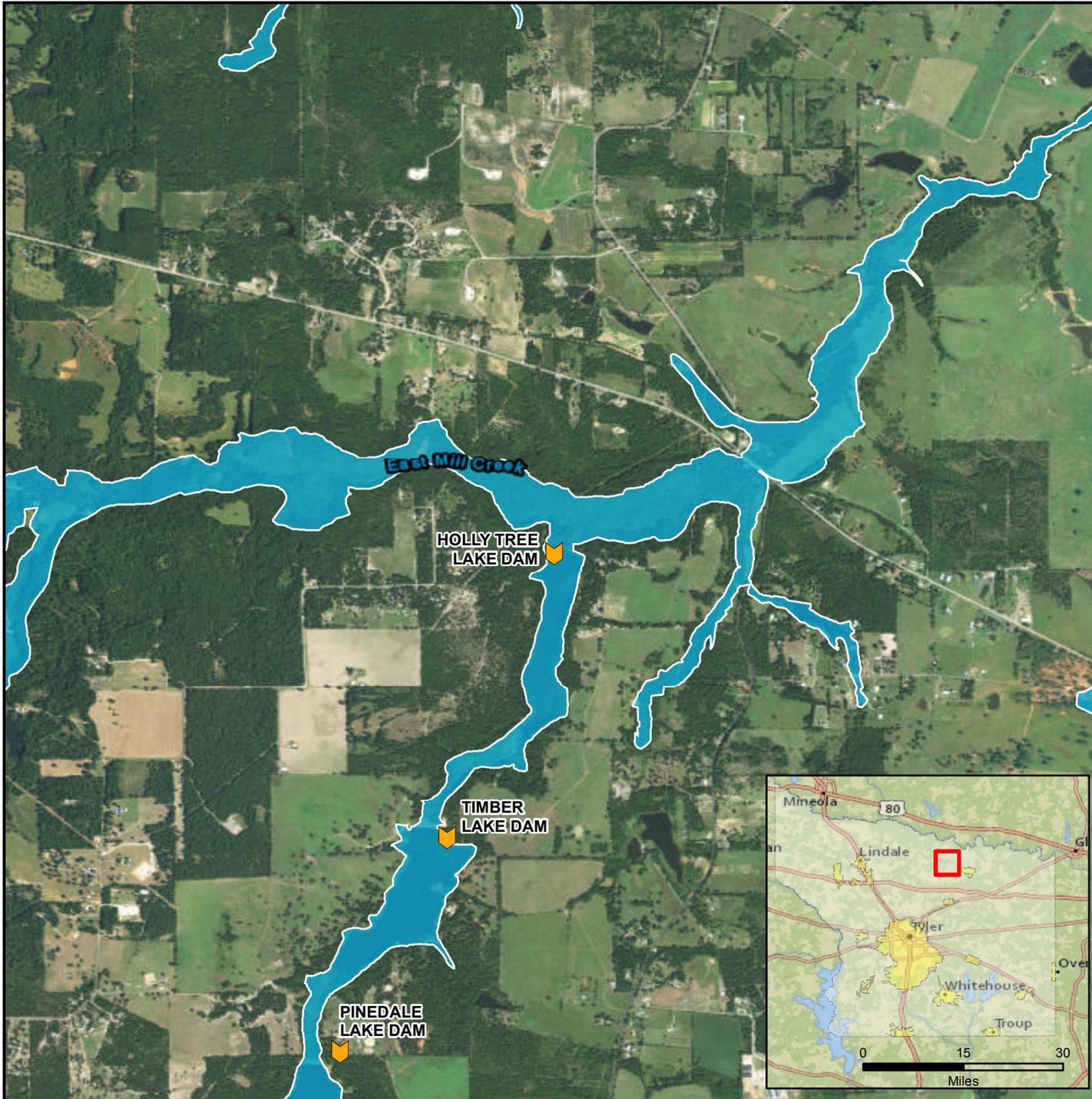
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Holly Tree Lake Dam

Dam Locations & Flood Risk Areas

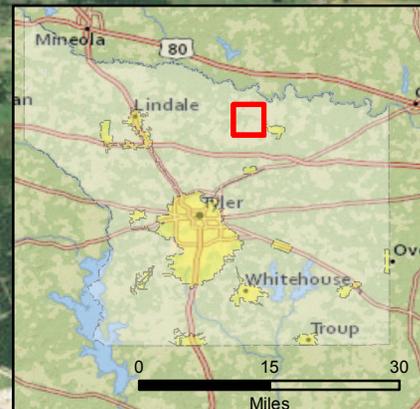
-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

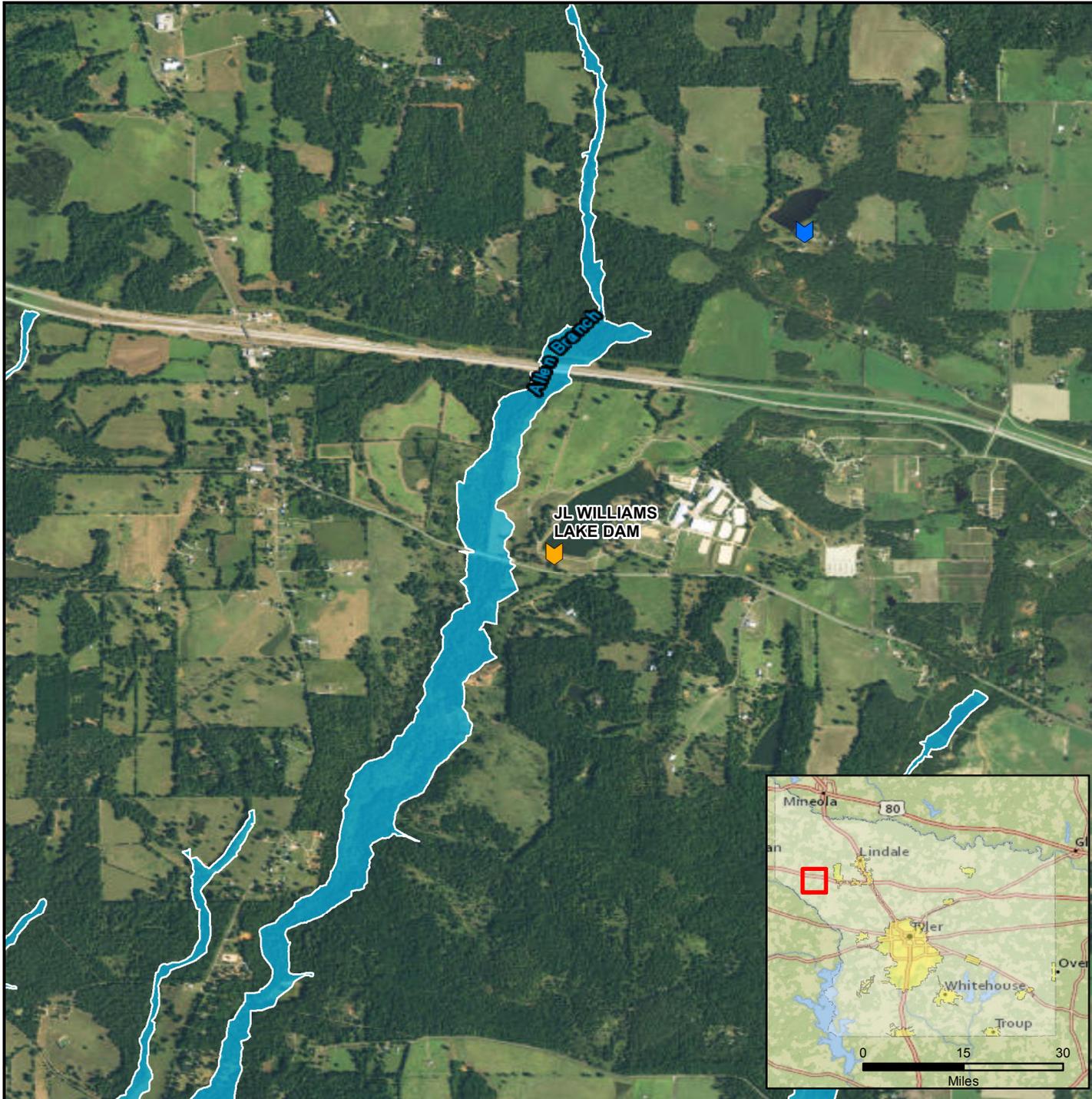
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Jl Williams Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

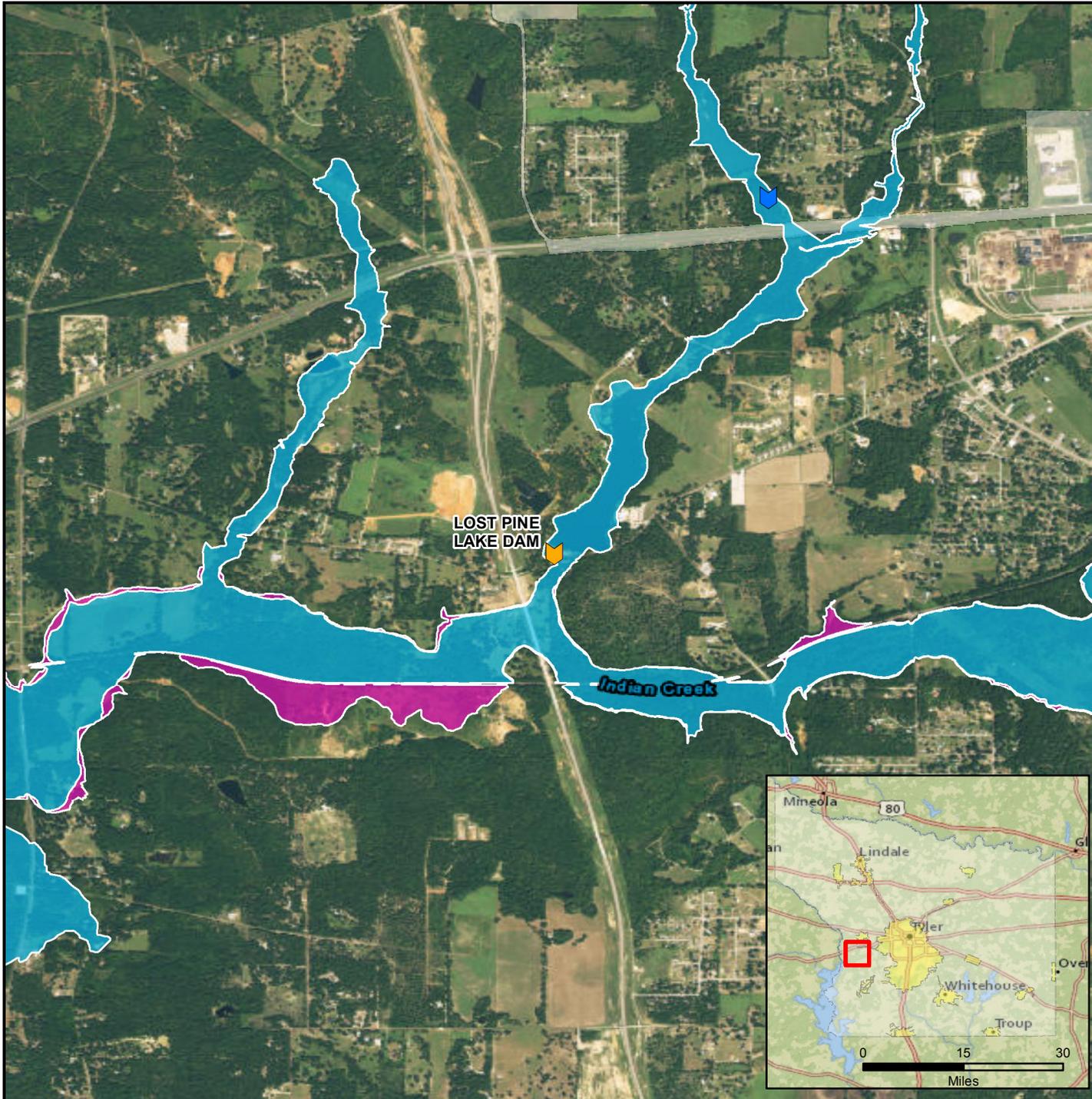
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Lost Pine Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

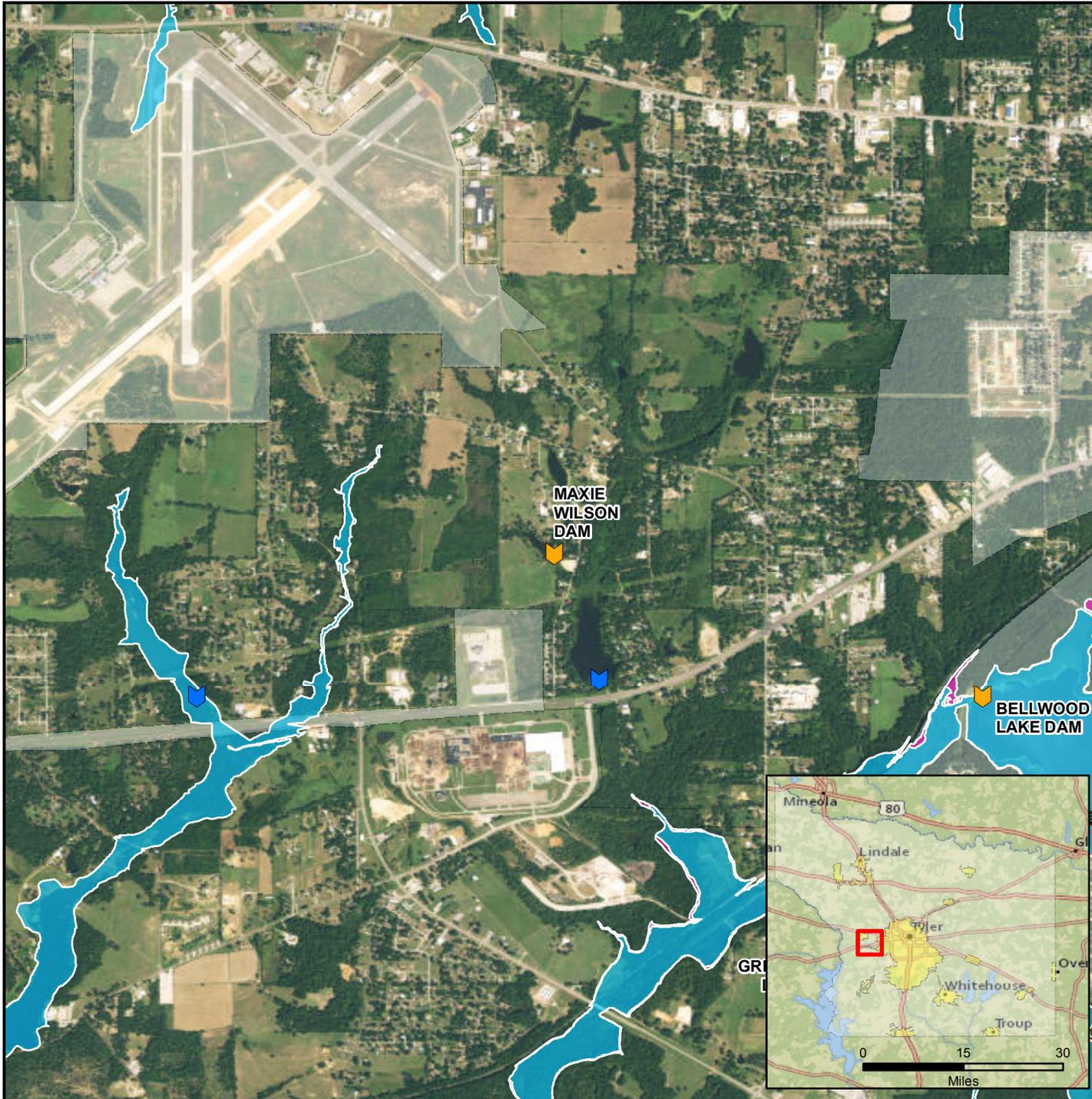
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Maxie Wilson Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

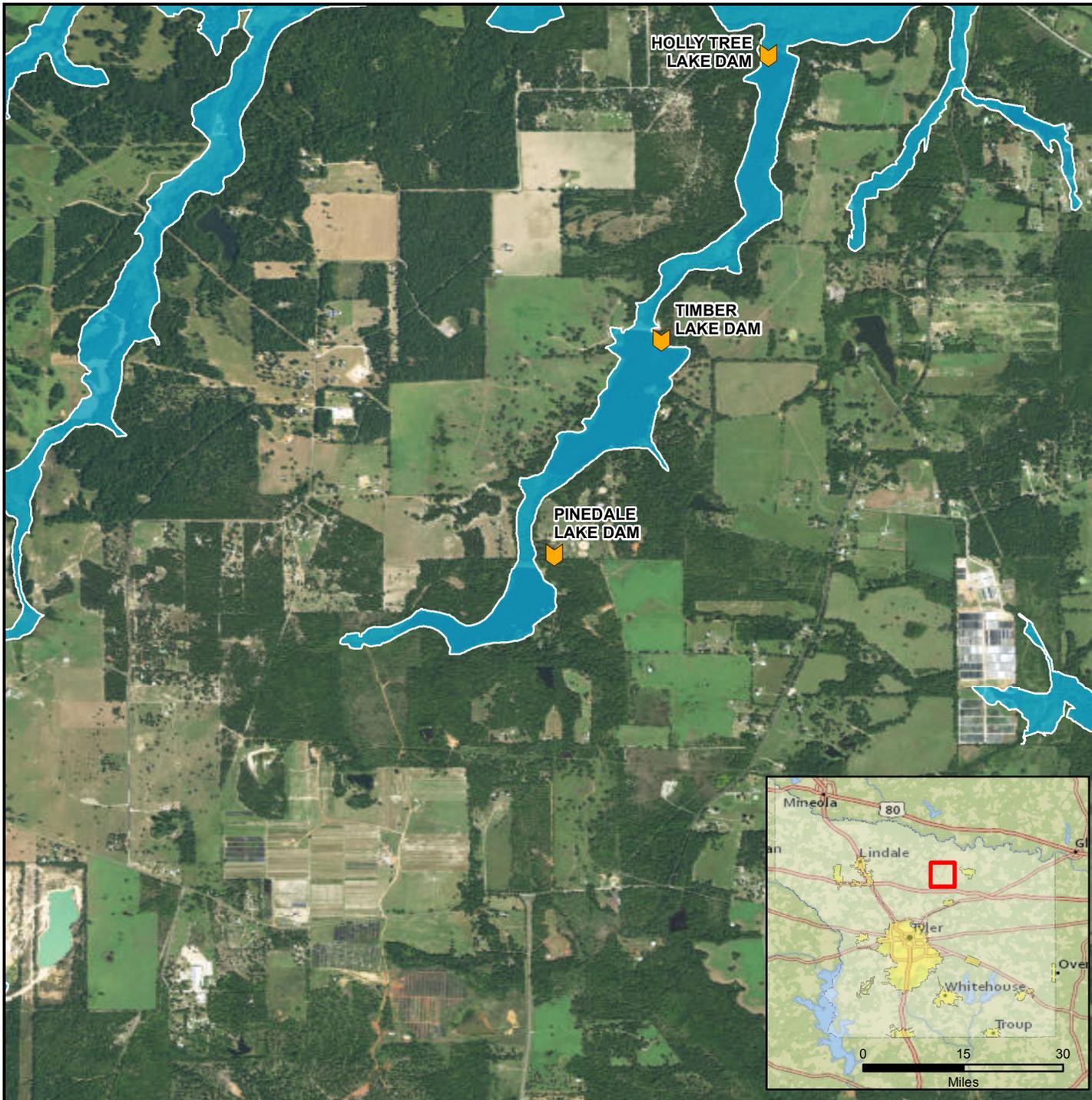
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Pinedale Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI

Pinkerton Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

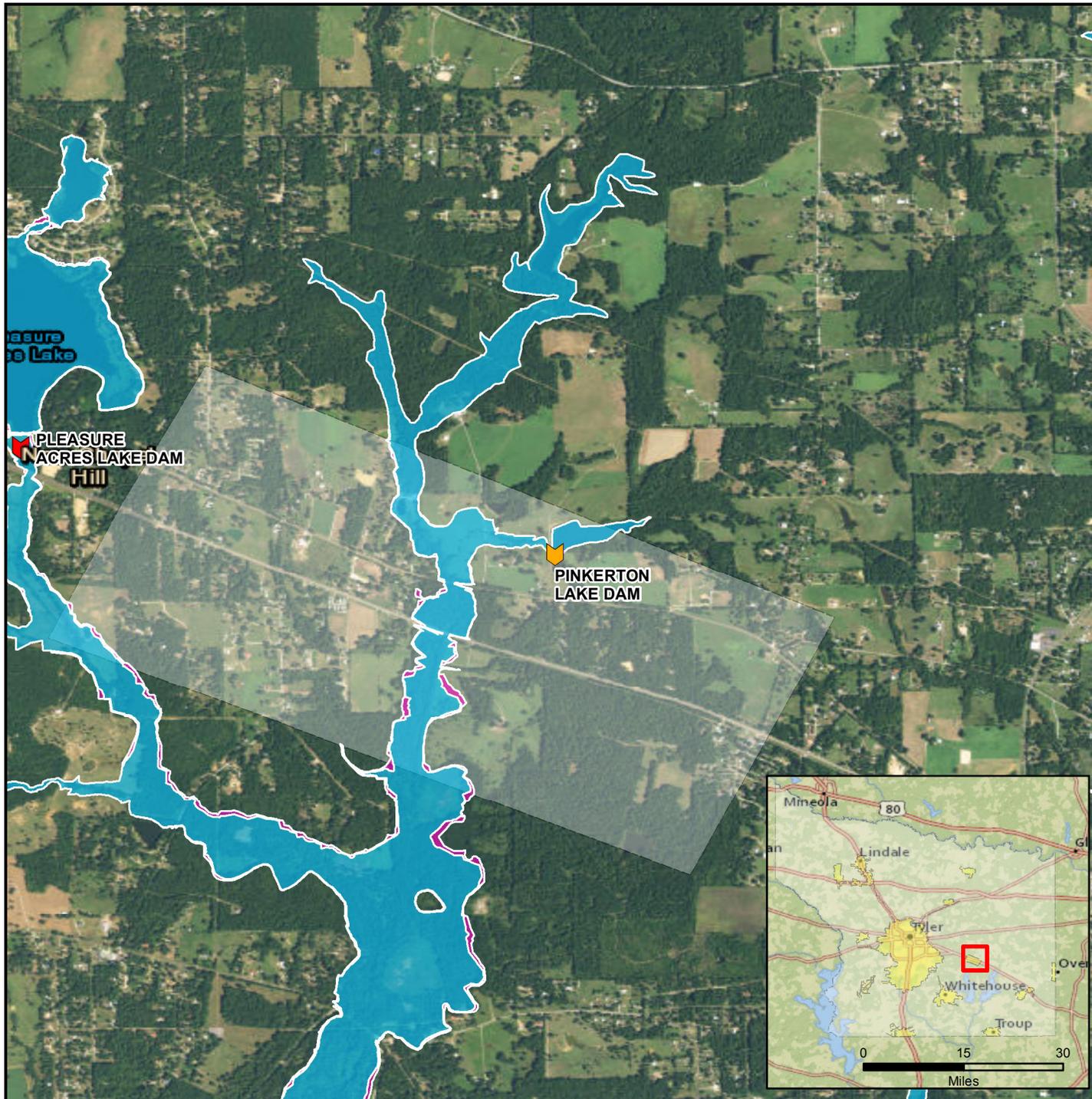
-  High
-  Significant
-  Low

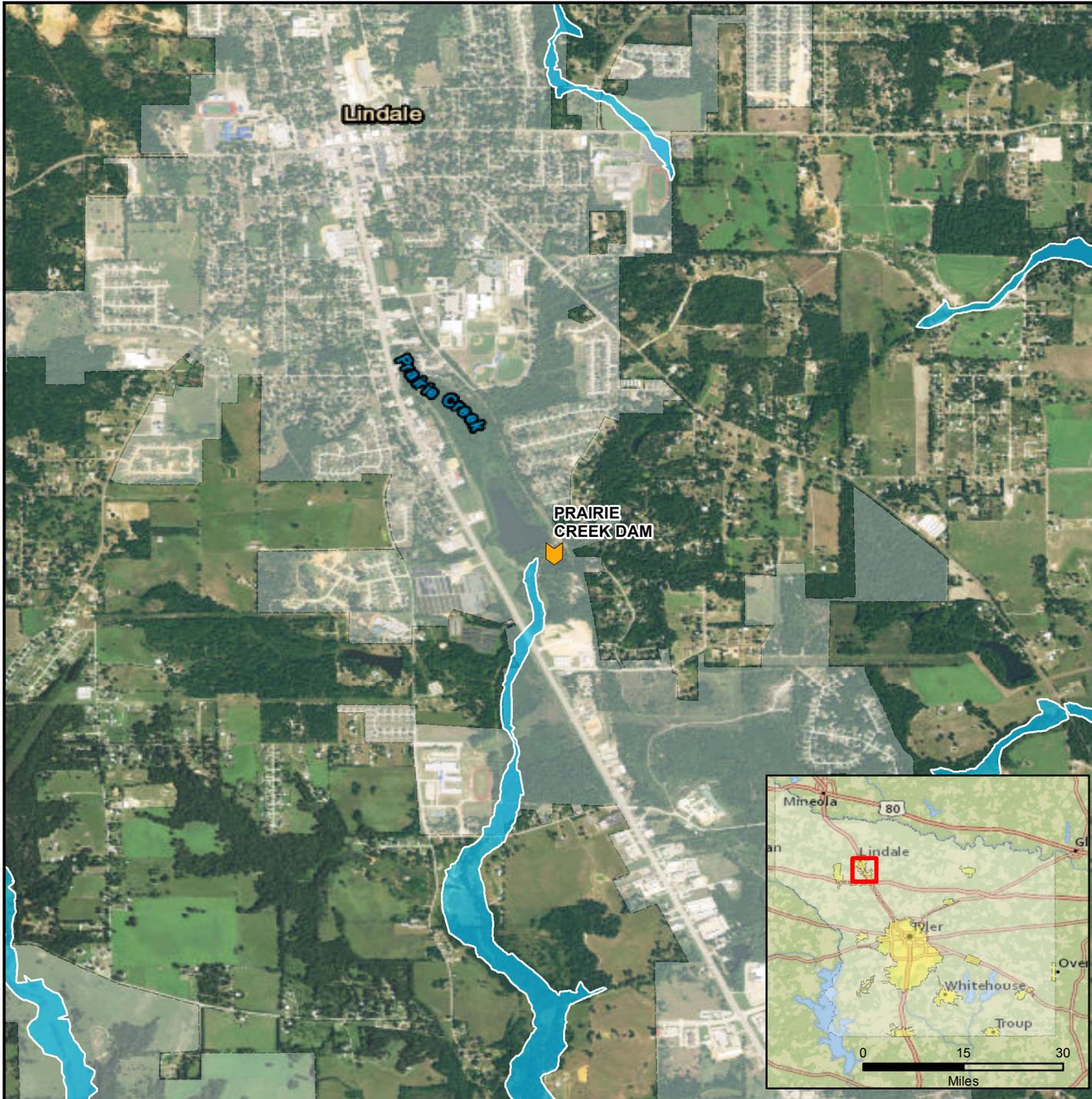
Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI





Prairie Creek Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

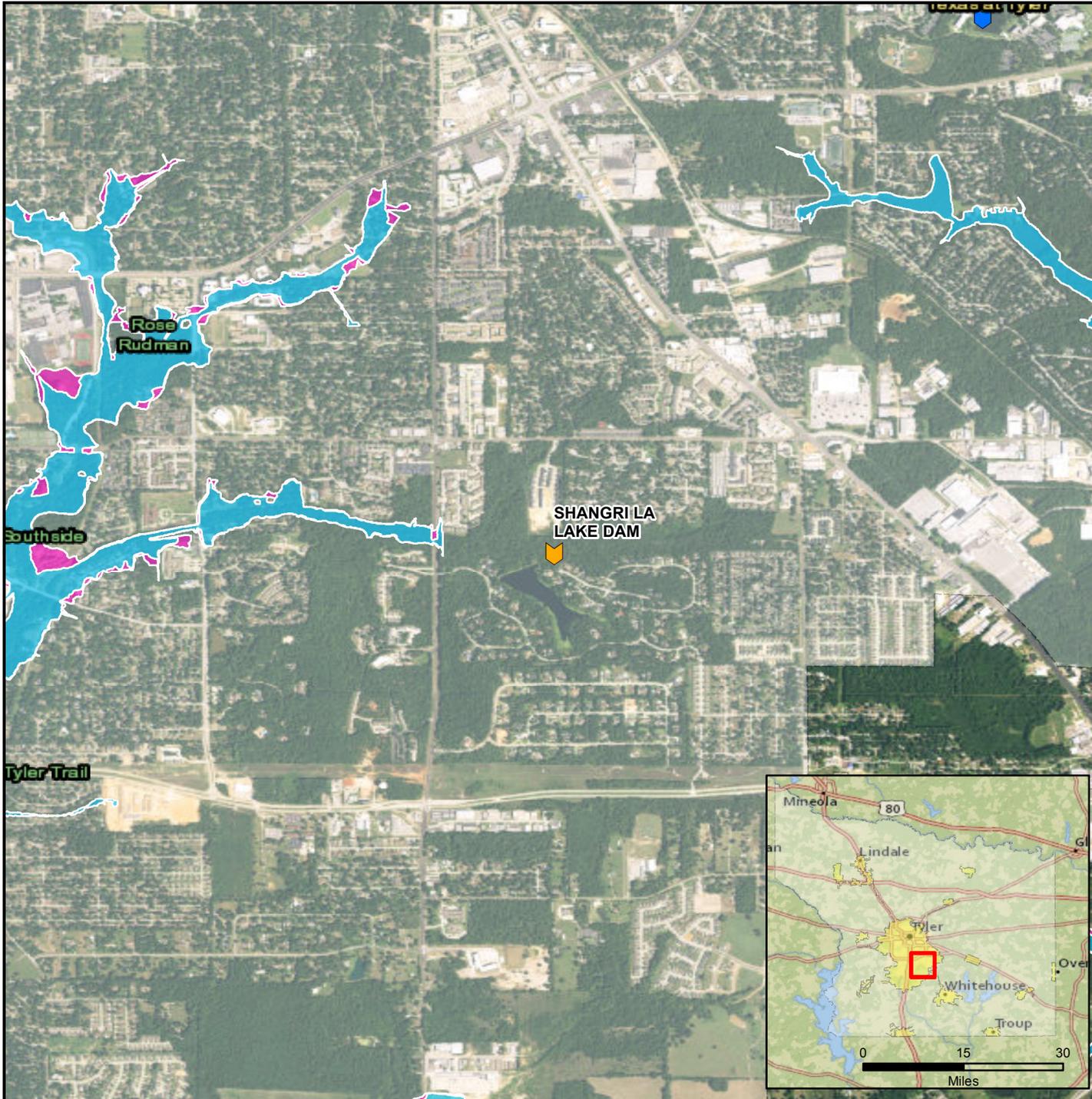
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Shangri La Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Sky Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

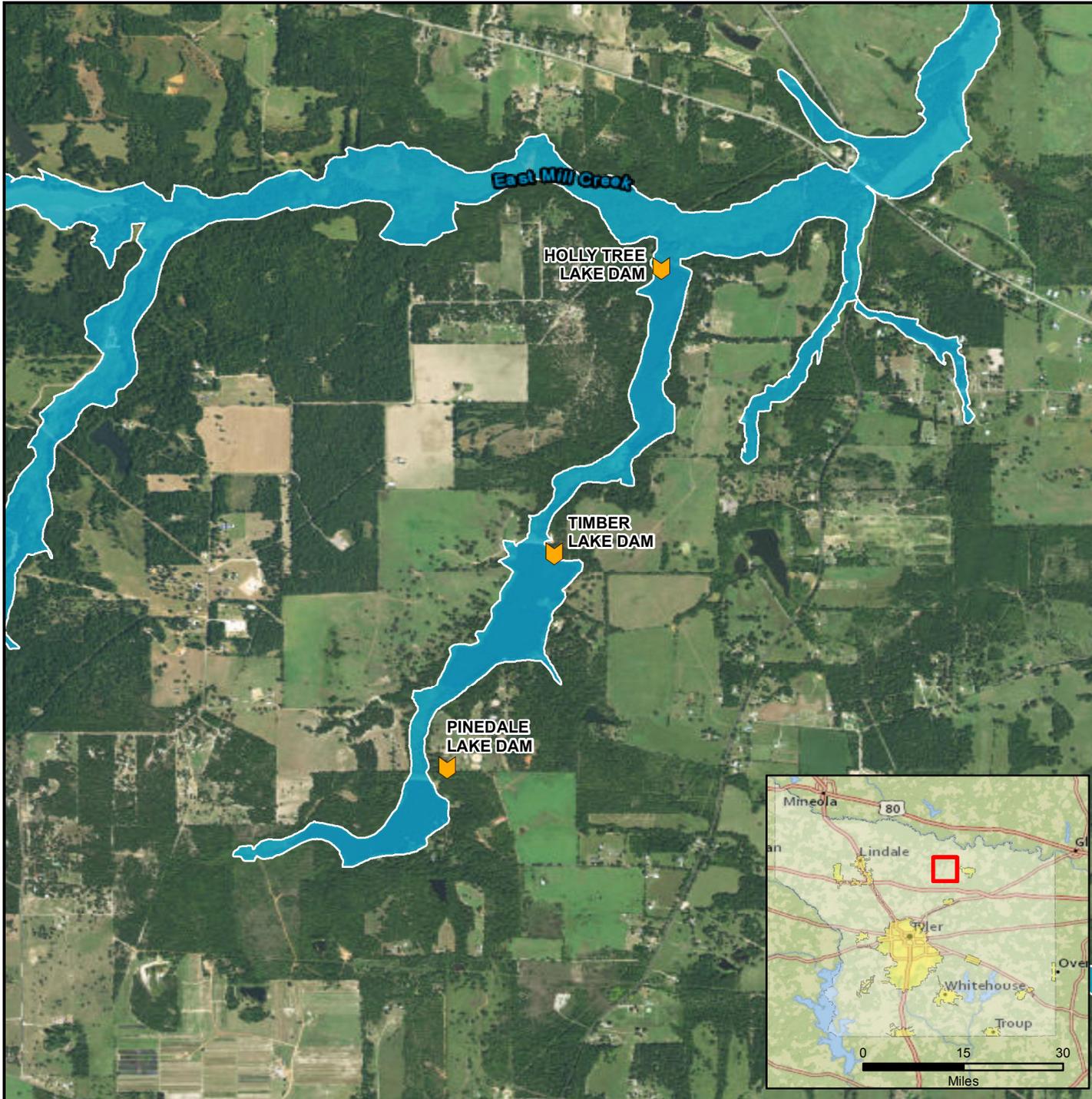
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Timber Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

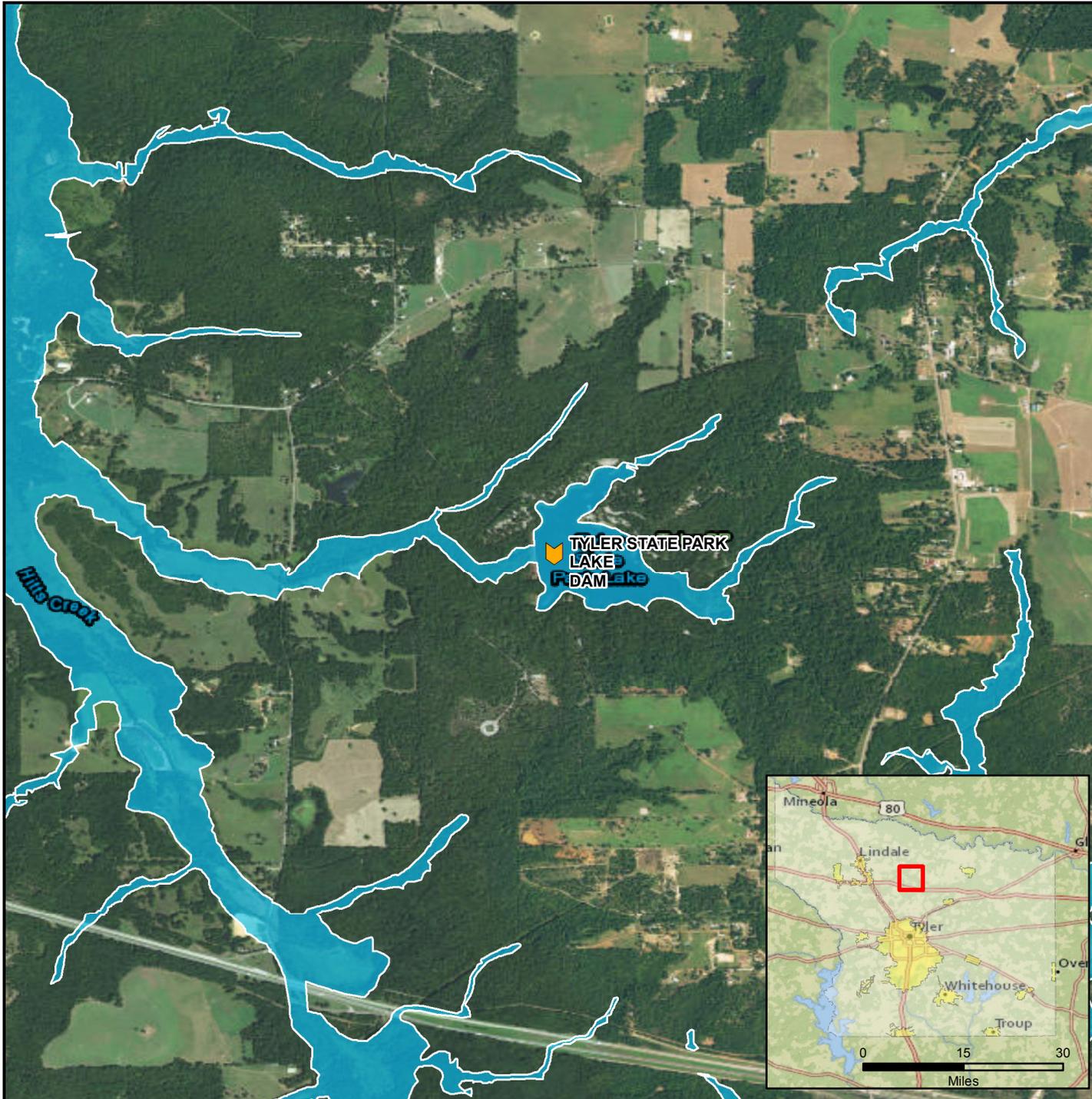
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Tyler State Park Lake Dam

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

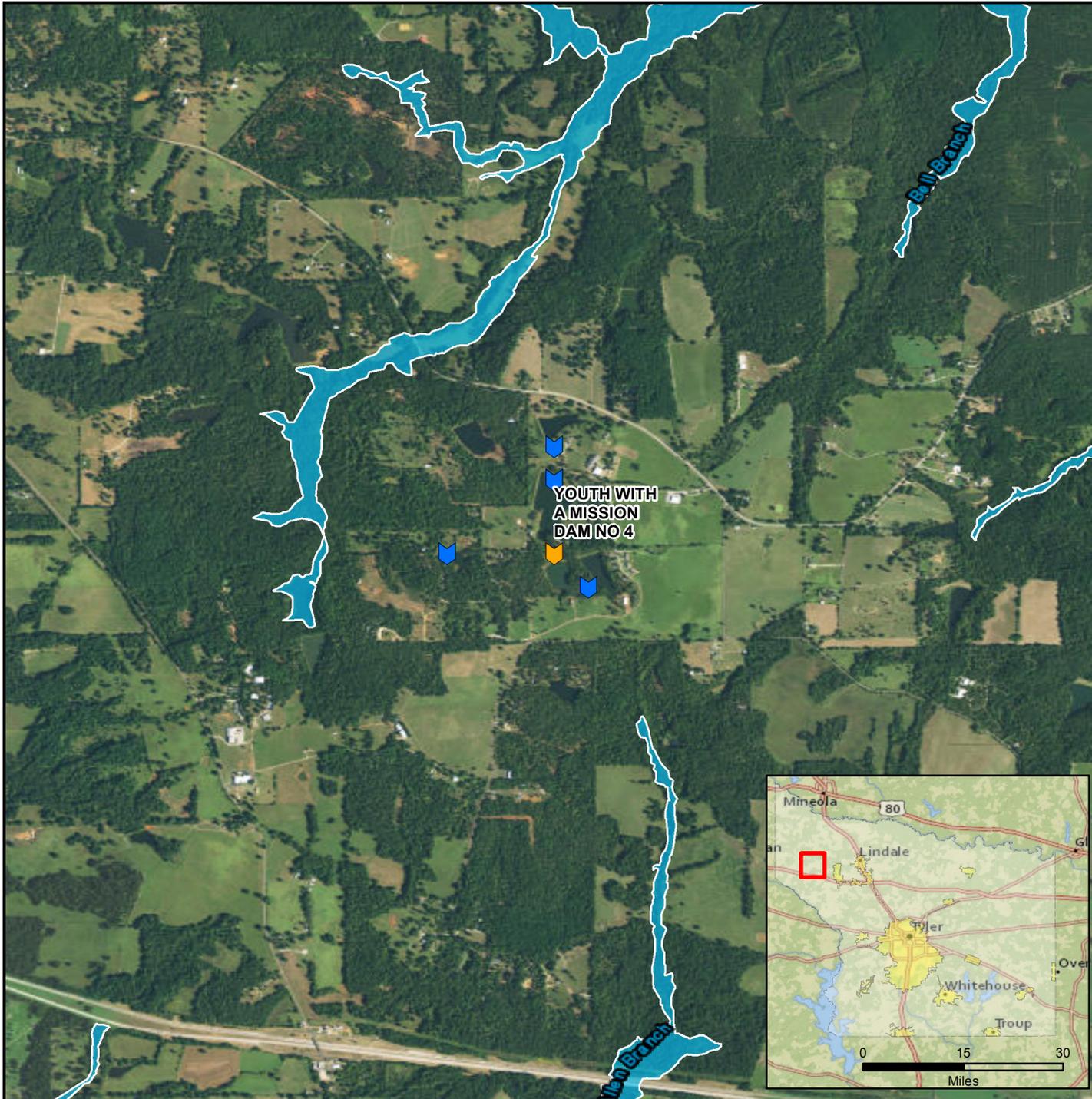
-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI



Youth With A Mission

Dam Locations & Flood Risk Areas

-  Smith County Boundary
-  City Limits
-  1% Chance Annual Flood (100-Year)
-  0.2% Chance Annual Flood (500-Year)

Dams / Hazard Class

-  High
-  Significant
-  Low

Dam Locations from 2017 Stanford National Performance of Dams Program

Flood hazard areas as depicted on Effective FEMA Digital Insurance Rate Maps (DFIRM)



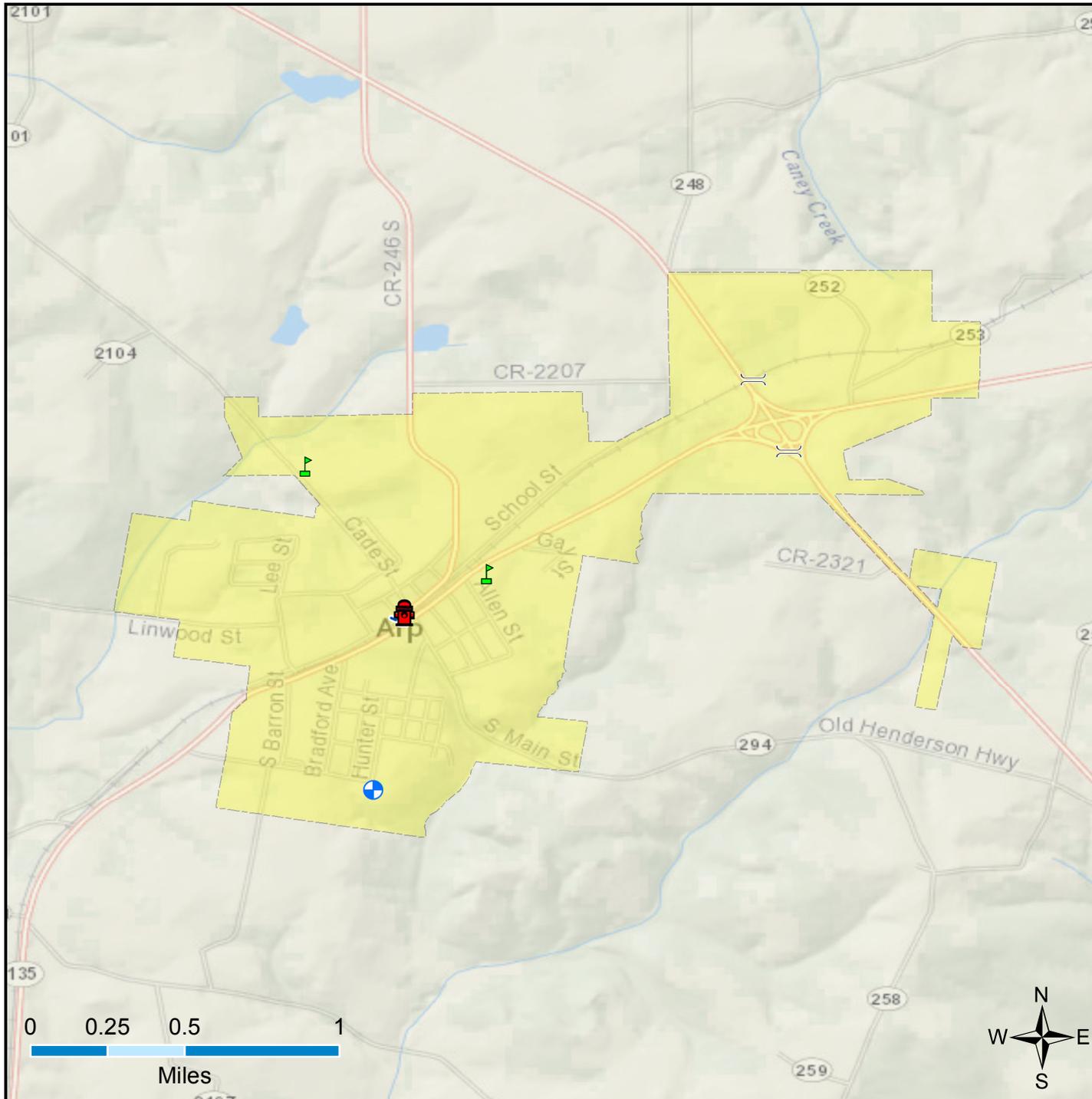
Map Data Sources: Smith County, Hazus 4.0, Stanford National Performance of Dams Program, FEMA, ESRI

Smith County
Hazard Mitigation Plan Update

APPENDIX C.
CRITICAL FACILITIES MAPS

APPENDIX C. CRITICAL FACILITIES MAPS

This appendix includes the jurisdictional maps showing the location of identified critical facilities.



City of Arp

Critical Facilities & Infrastructure

Critical Facilities

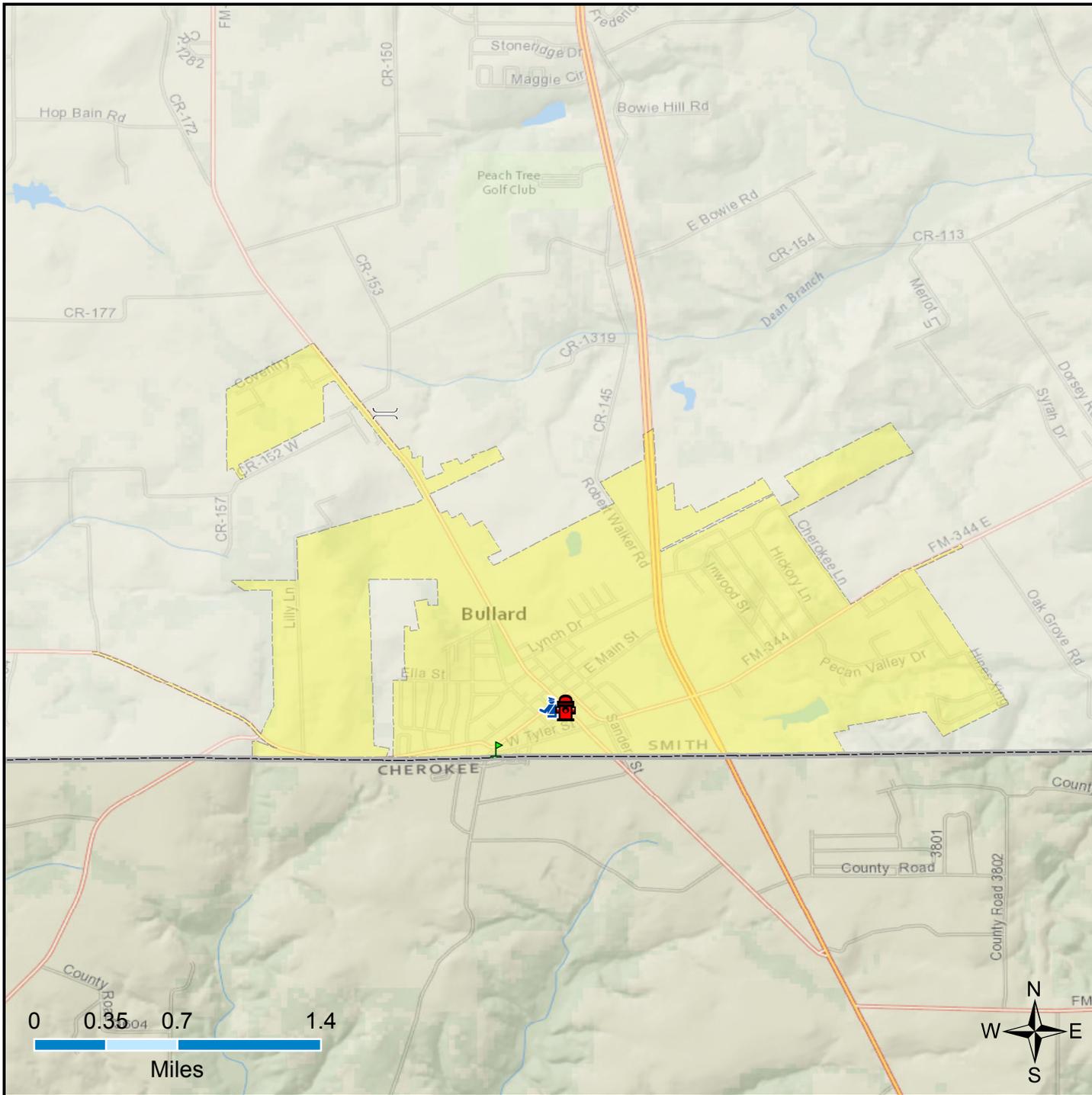
-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic



City of Bullard

Critical Facilities & Infrastructure

Critical Facilities

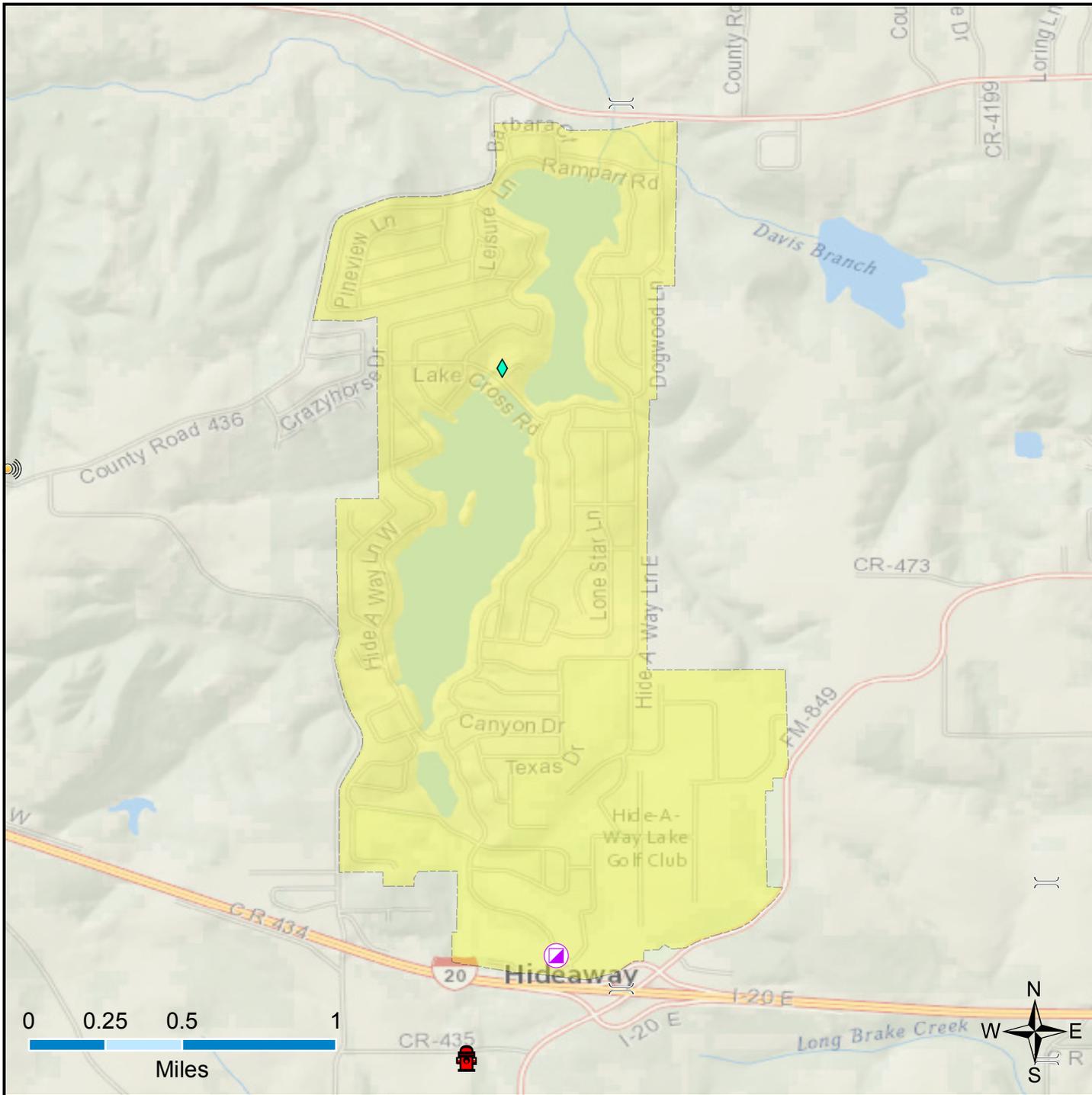
-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic



City of Hideaway

Critical Facilities & Infrastructure

- Critical Facilities**
- Educational Facilities
 - Emergency Operations Centers
 - Fire Stations
 - Medical Care Facilities
 - Other Community Facilities
 - Police Stations
 - Hazardous Materials
- Critical Infrastructure**
- Airport Facilities
 - Bus Facilities
 - Communication Facilities
 - Electric Power Facilities
 - Highway Bridges
 - Oil Facilities
 - Railway Bridges
 - Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic

City of New Chapel Hill

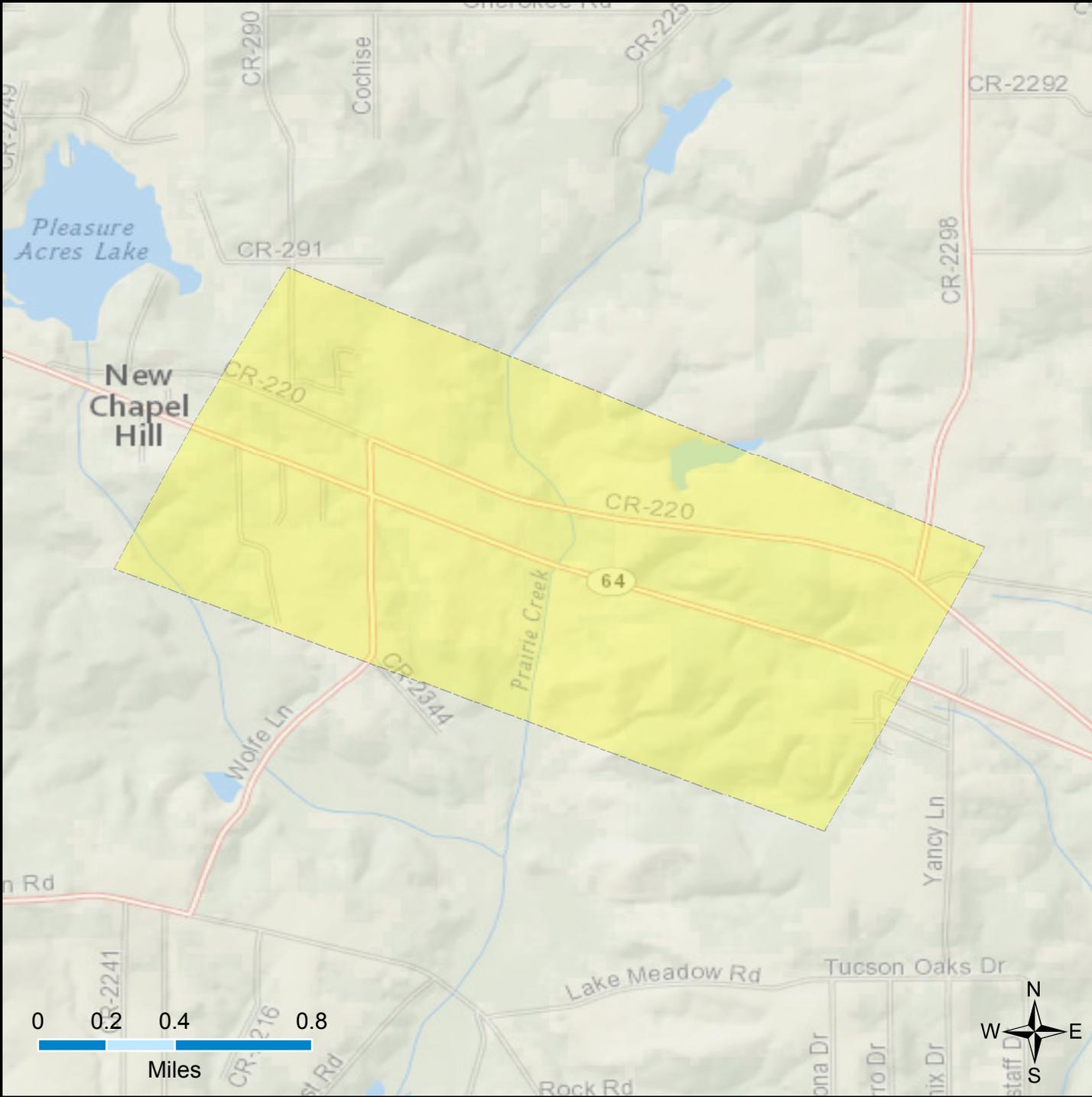
Critical Facilities & Infrastructure

Critical Facilities

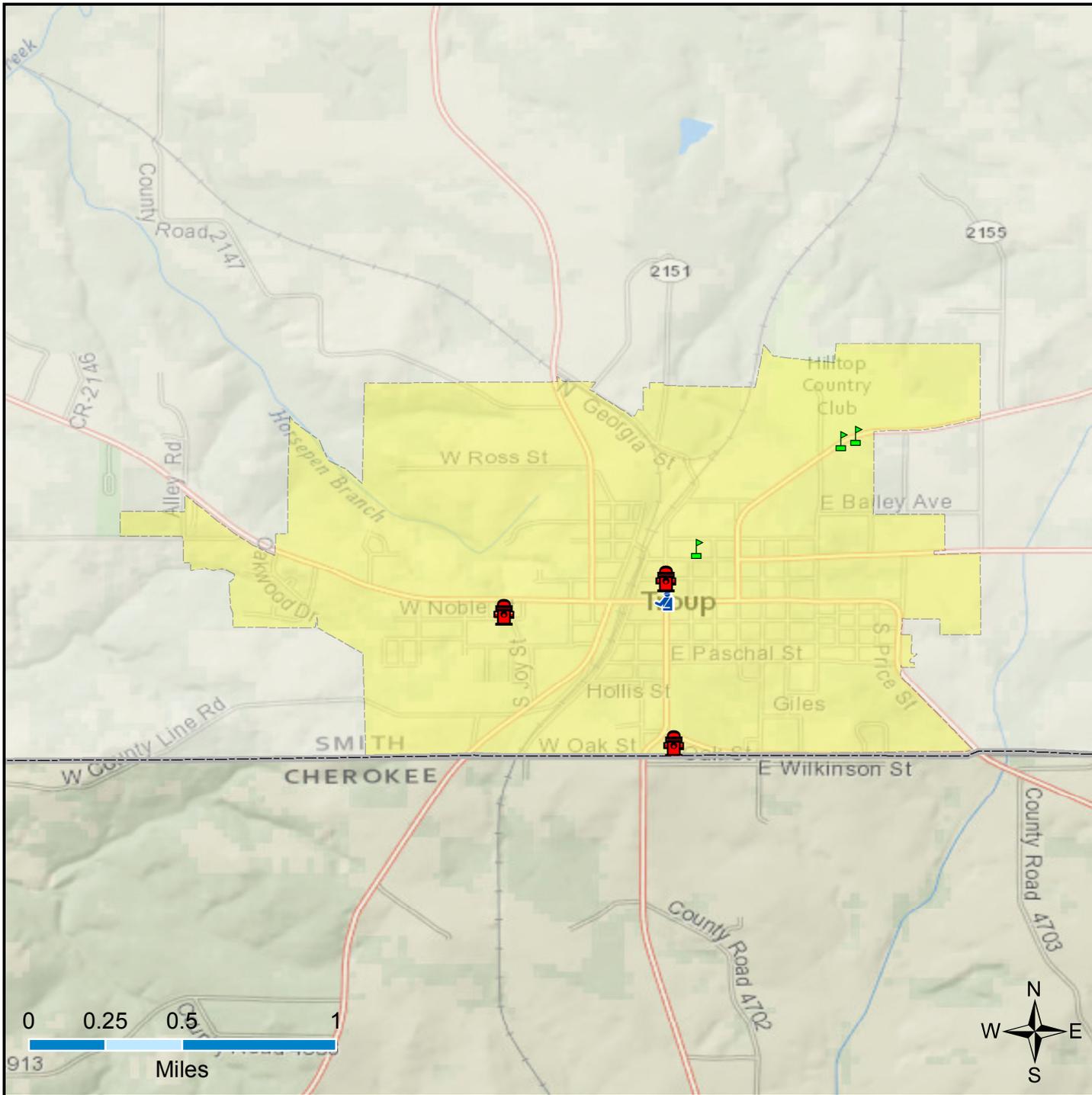
-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic



City of Troup

Critical Facilities & Infrastructure

Critical Facilities

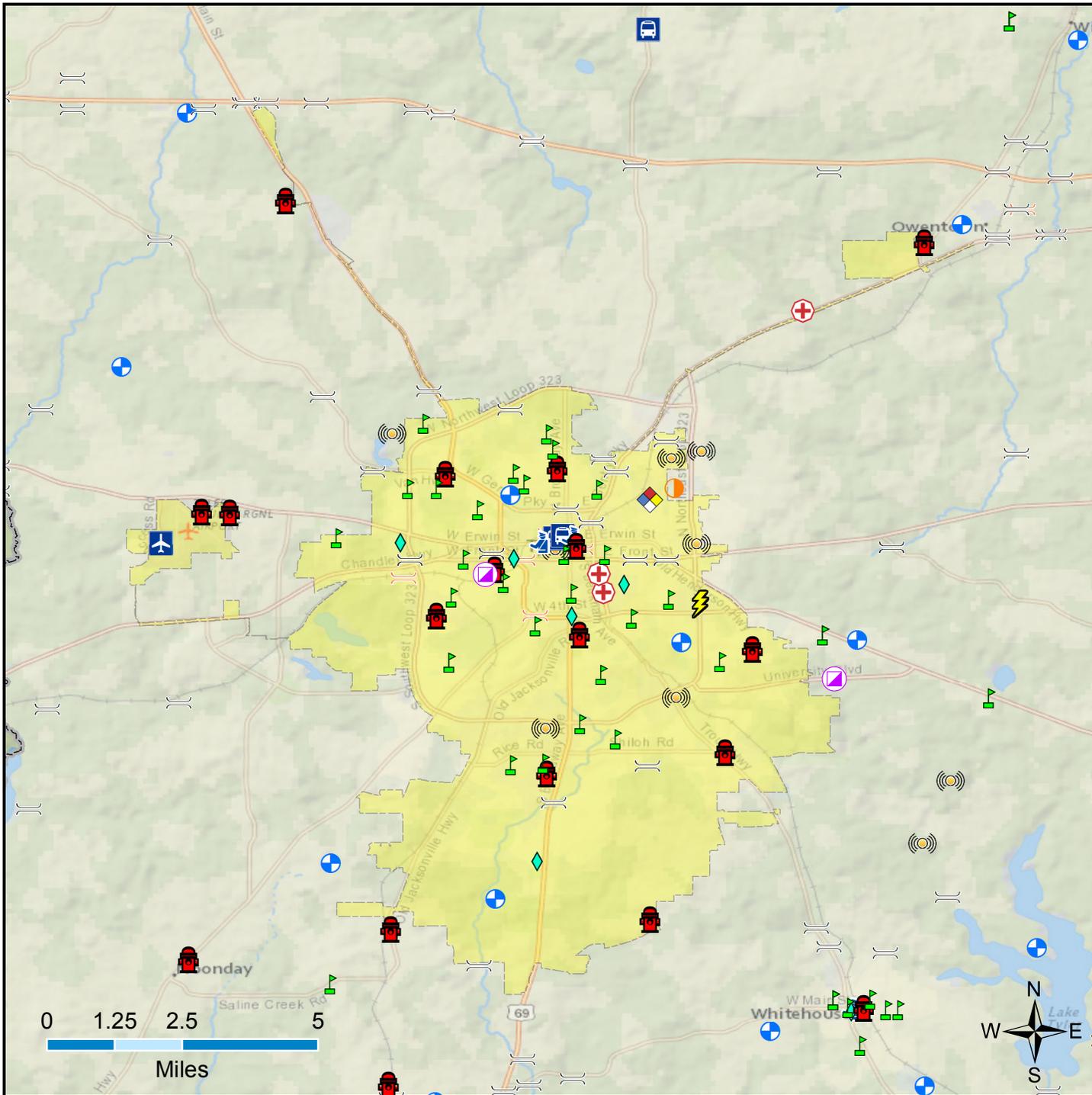
-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic



City of Tyler

Critical Facilities & Infrastructure

Critical Facilities

-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic

City of Whitehouse

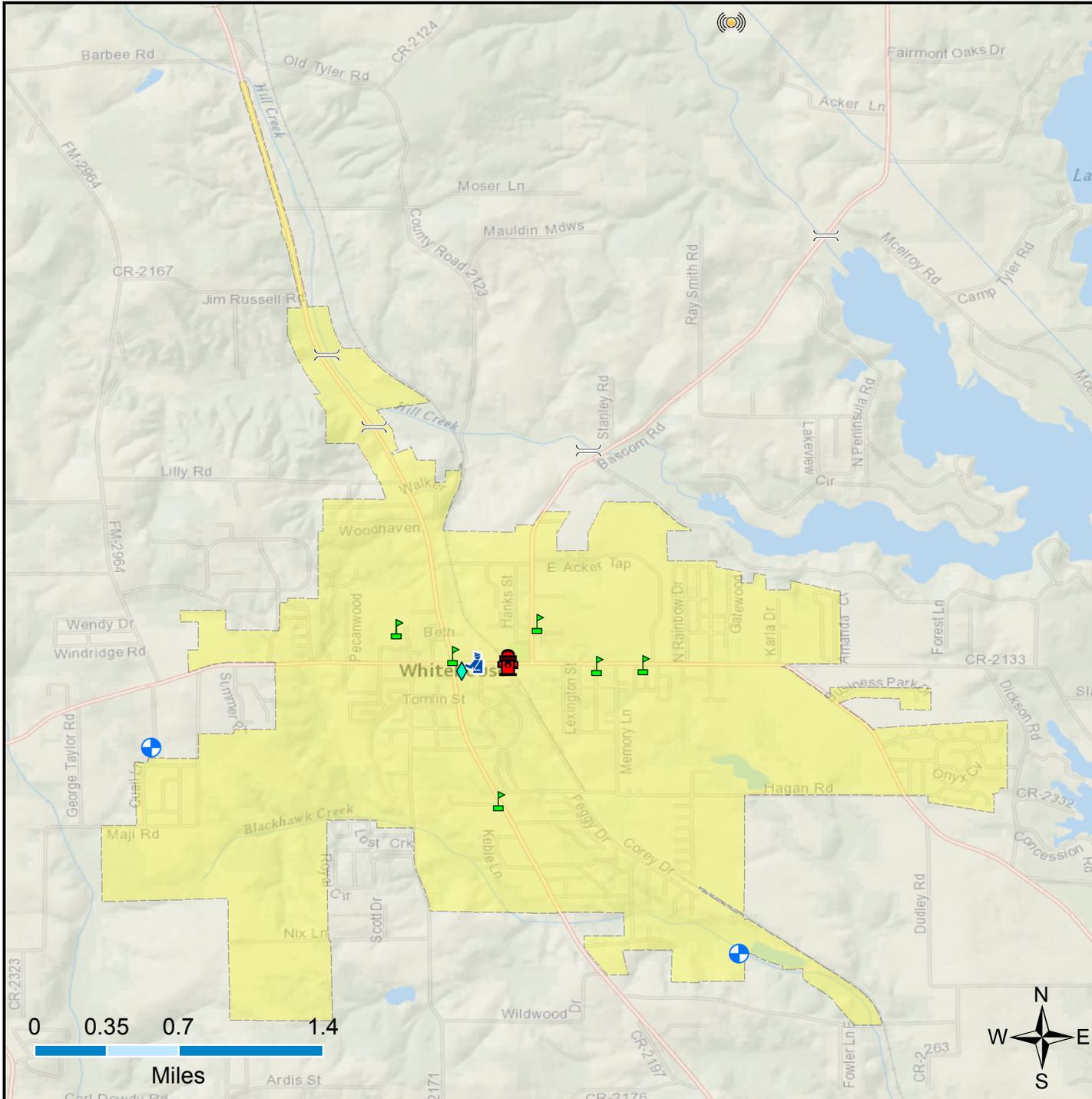
Critical Facilities & Infrastructure

Critical Facilities

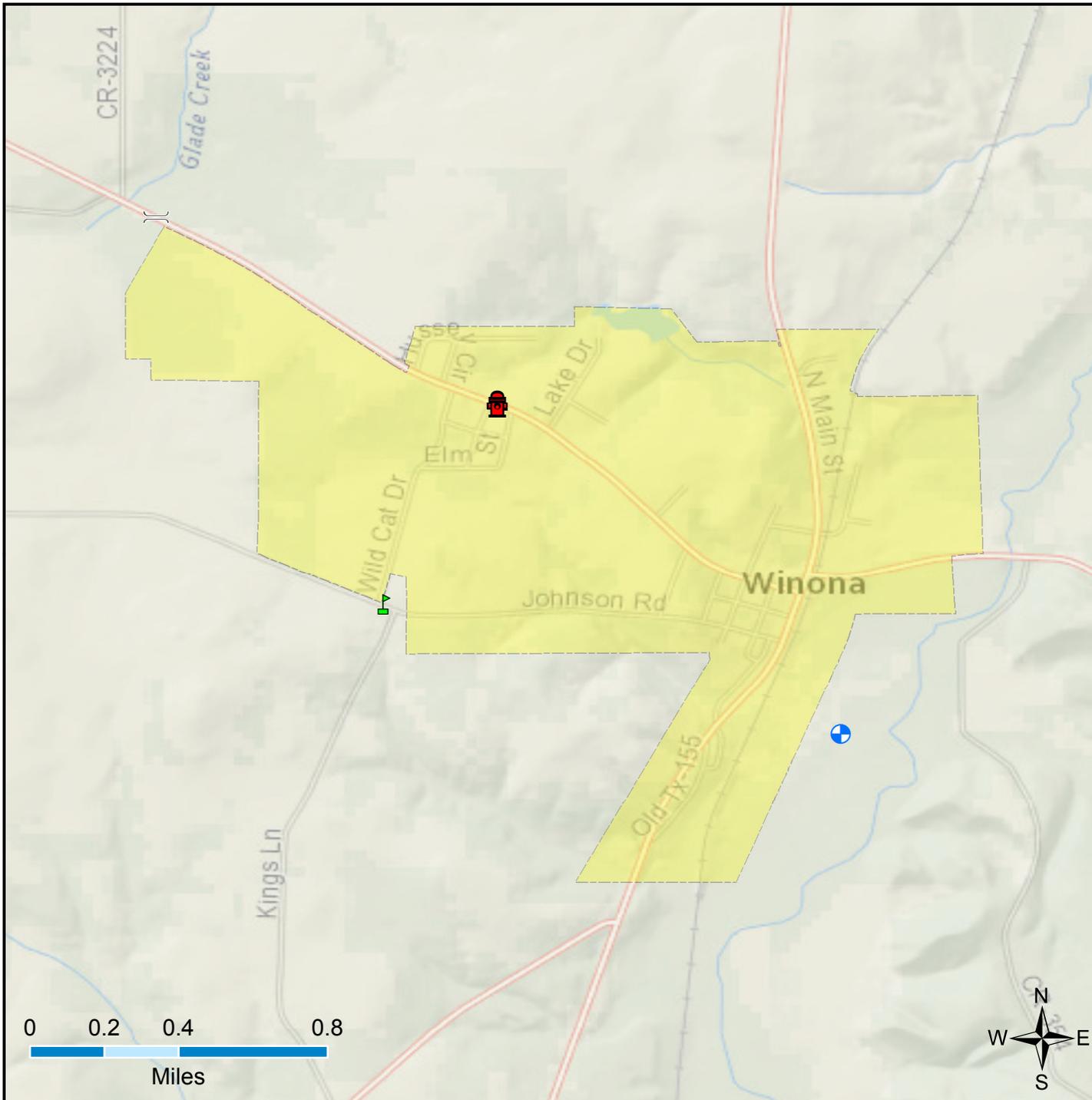
-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic



City of Winona

Critical Facilities & Infrastructure

Critical Facilities

-  Educational Facilities
-  Emergency Operations Centers
-  Fire Stations
-  Medical Care Facilities
-  Other Community Facilities
-  Police Stations
-  Hazardous Materials

Critical Infrastructure

-  Airport Facilities
-  Bus Facilities
-  Communication Facilities
-  Electric Power Facilities
-  Highway Bridges
-  Oil Facilities
-  Railway Bridges
-  Waste Water Facilities



Map Data Sources: Smith County, Hazus 4.0, ESRI, National Geographic

Smith County
Hazard Mitigation Plan Update

**APPENDIX D.
PLANNING PROCESS DCOUMENTATION**

APPENDIX D. PLANNING PROCESS DOCUMENTATION

This appendix includes the agenda, sign-in sheets, and meeting notes from each of the three Steering Committee Meetings. This appendix also include the results of the Smith County Hazard Mitigation Plan questionnaire, as described in Chapter 3.7.2.



**Hazard Mitigation Plan for Smith County
Steering Committee Kick-Off Meeting**

June 26, 2017

2:00 PM

- Welcome and Introductions
- What is Hazard Mitigation Planning
- Steering Committees Purpose and Responsibilities
- Review/Revise/Update (as needed) Plan Goals
- Review of Past Mitigation Actions
- Critical Facilities
- Next Steps
 - Capabilities Assessment
 - Hazard Analysis
 - Community Participation and Survey Handout (in packet)
- Action Items
- Adjournment





**Hazard Mitigation Plan for Smith County
Steering Committee Kick-Off Meeting
2:00 PM, Monday, June 26, 2017
Meeting Notes**

- Welcome and Introductions – Laura Johnston (Tetra Tech) welcomed everyone and Meeting attendees stated their name and the jurisdiction/community they were representing. See sign in sheet for a complete list of attendees.
- Each attendee was provided a folder with handouts, a copy of the presentation slides, and contact information for the consultant team.
- Ms. Johnston provided an overview of the planning process and discussed the purpose and goals of the Hazard Mitigation Plan (HMP) for Smith County. Ms. Johnston stated that the plan will only address natural hazards. The HMP is developed to ensure eligibility of the county and participating jurisdictions for disaster recovery grants from the Federal Emergency Management Agency (FEMA) and to develop mitigation actions to help reduce risk and exposure to the hazards. The HMP will help make Smith County a safer and more resilient community.
- Ms. Johnston stated that this an update to the previous expired HMP developed for Smith County several years ago. The HMP will need to be reviewed annually or after a significant event and updated at least every 5 years to maintain eligibility for disaster recovery grants.
- Ms. Johnston reviewed the purpose and responsibilities of the Planning and Steering Committee. Planning and Steering Committee members:
 - Are leaders involved in the development of the plan
 - Provide guidance on their specific community
 - Carry information from the meetings to their community
 - Represent all community stakeholders (residents and businesses)
 - Attend and actively participate in all three committee meetings (including this one)

Smith County Kick-off Meeting
Meeting Notes

- Ms. Johnston stated that plan participants will sign and adopt the HMP through formal resolutions or other appropriate methods for the jurisdiction. Ms. Johnson discussed the anticipated participants, including Smith County, and the Cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Tyler, Troup, Whitehouse, and Winona. A participating jurisdiction can apply for hazard mitigation grants directly as the applicant of record.
 - Representatives from the institutes of higher education with campuses in Tyler asked for clarification on their participation in the process and plan adoption. Discussion followed and it was concluded that they would actively participate and coordinate with and work through the City of Tyler rather than be standalone signators.
- Ms. Johnston outlined the topics of the second and third steering committee meetings. These meetings are tentatively scheduled for Fall 2017. A target of early January 2018 has been set for TDEM review of the Draft HMP.
- Ms. Johnston explained the difference between overarching goals, the plan goals and objectives, and mitigation actions. Overarching goals state the broad purpose of the HMP. Plan goals are general statements or guidelines that explain the objective of the plan; they are usually broad-based, policy-type statements and represent global visions. Objectives are more short-term aims that, when combined, form a strategy to meet a goal.
- Ms. Johnston referred to the goals located in the expired Smith County HMP and the discussed updates with the Committee. Discussion followed regarding modifications. The Committee drafted and agreed upon a new overarching goal and several specific goals. Ms. Johnston explained that mitigation actions would be developed after the second Steering Committee meeting to identify actions to achieve the goals.
- Ms. Johnston explained that FEMA Region VI requires a minimum of two mitigation actions for each hazard rated medium and high in the plan. Mitigation actions must be supported by at least one goal. However, mitigation actions can fall under multiple goals. Mitigation actions are more likely to be funded if under more than one goal.
- Ms. Johnston reviewed the critical facilities analysis.
 - There was a brief discussion on the definition of “Critical Facilities.” Ms. Johnston shared the definition of Critical. Ms. Johnston has a draft list of critical facilities obtained from FEMA’s HAZUS defaults but this needs to be updated.

- Ms. Johnston gave the draft list of the critical facilities to Mr. Lowry, who will distribute the list to the proper departments and jurisdictions. Mr. Lowry will collect, review, and update the lists before returning to Tetra Tech.
- This updated information is needed to map the critical facilities for the planning area to determine if these facilities are located in high risk areas and how they overlap with hazards. Ms. Johnston emphasized that the list of critical facilities will not be made available to the public nor will the locations of the critical facilities appear in the HMP in sufficient detail for the public to identify their locations.
- Ms. Johnston reviewed the next steps: capabilities assessment, hazard analysis, and community participation and survey.
 - Ms. Johnston provided an overview of capabilities assessment. Tetra Tech initiated online research and completed as much of the document as possible. The draft document was handed out to each community representative to verify the current resources of the jurisdictions. This is used to determine the strengths and opportunities related to the community's ability to implement the future mitigation actions. Comments are due back to Tt representative Kari Valentine in 2 weeks.
 - Tetra Tech will conduct the hazards analysis in the next few months. During the next (second) meeting, the results of the hazards analysis will be presented and the attendees will rank these hazards.
 - When ranking hazards, perception and reality may be different. Perception (especially community perception) can be skewed based on recent event, even if event is not local. When ranking hazards, we need to consider reality on a community-specific basis.
 - Ms. Johnston explained that the hazard assessment will analyze historical information and data, rate of occurrence, and future projected losses, etc. Historic information from Steering Committee members will make the risk assessment more accurate.
 - We will provide hazard-specific information for the members to determine a prioritization ranking of high, medium, or low. Community perception will be uncovered, in part, through the community survey. However, ranking process is still subjective.

Smith County Kick-off Meeting
Meeting Notes

- Ms. Johnston discussed how community participation (including the online survey) is an integral part of this HMP update process. Ms. Johnston discussed the benefits of full community participation in order to produce a true community plan.
 - The online surveys consists of 36 questions. The survey was set up for community input; the links to the surveys were provided in the handout packets.
 - Steering Committee members need to get the word out to the communities they serve. Ms. Johnston suggested putting the survey link on local websites and newsletters, mentioning the survey in meetings, posting the announcement, etc. A handout was provided.
- Ms. Johnston reviewed the action items for the Steering Committee members, including:
 - Publicize community survey link to community through website posting and other media
 - Community Representatives will review and make changes to the Capabilities Assessments due back to Tt by July 11th, 2017.
 - Appropriate points of contact will review and update as necessary the list of critical facilities and return to Tetra Tech by July 14, 2017
- The date for the next meeting of the Steering Committee has not been determined but is anticipated to be in September of 2017. Meeting details will be forthcoming.
- Adjournment

Smith County Hazard Mitigation Plan
Steering Committee Meeting



June 26, 2017 @ 2:00 PM
Smith County HUB
304 E. Furguson St.
Tyler, Texas

Committee Member	Signature	Title and Dept/Agency Representing	Phone Number	Email Address
Eric Lowry		Smith County Fire Marshal's Office	903-590-2655	ELowry@smith-county.com
Jerry Garner		Smith County ESD1	903-882-3443	jgarner@lindalevfd.com
Terry Rozell		Smith County ESD2	903-571-2838	
Terry Lowry		City of Arp	903-859-6131	lowryt@beckvilleisd.net
Pam Frederick		City of Bullard	903-894-7223	pam.frederick@bullardisd.com
Pat Bonds		City of Hideaway	214-384-2053	
J.D. Brown		City of Hideaway EMC	281-732-6561	mcfoof@sbcglobal.net
Jeff Daugherty		City of Lindale	903-882-3422	jdaugherty@lindaletx.gov
Riley Harris		City of New Chapel Hill	903-283-0700	riley@rileyharris.com
Mike Turman		City of Noonday	903-570-0564	conoonday@gmail.com
GENE COTTLE Joe Carlyle		City of Troup	903-842-3128 ext.11	jcarlyle@trouptx.com
Martin Heines		City of Tyler	903-531-1250	mheines@tylertexas.com
David Coble		City of Tyler EMC	903-535-0005	Dcoble@tylertexas.com

Smith County Hazard Mitigation Plan
Steering Committee Meeting



June 26, 2017 @ 2:00 PM
Smith County HUB
304 E. Furguson St.
Tyler, Texas

Committee Member	Signature	Title and Dept/Agency Representing	Phone Number	Email Address
Charles Parker		City of Whitehouse	903-839-4914	cparker@whitehousetx.org
Pat Schlau	<i>Pat Schlau</i>	City of Winona	903-521-5529	pat.schlau@winonatexas.com
Kent Cooper		Delek Refining	903-859-5872	steven.cooper@deleklogistics.com
Danny King		Eastman Chemical	903-237-5356	dking@eastman.com
Neal Franklin		ETMC	903-535-5820	nifranklin@etmc.org
Randy Melton	<i>Randy Melton</i>	Chief TJC EMC	903-510-2310	rmel@tjc.edu
David Adams		Troup ISD EMC	903-842-5108	DAdams@troupsid.org
Randal Duke	<i>R Duke</i>	EMC UT Tyler	903-566-7446	rduke@uttyler.edu
Laura Johnston		Project Manager, Tetra Tech	225-955-2431	laura.johnston@tetrattech.com
Ray Hutcherson	<i>Ray Hutcherson</i>	Mayor Pro Tem Hidaway	903-245-9172	rayhutcherson@att.net
MEGHAN BURGER	<i>Meghan Burger</i>	SMITH COUNTY FIRE MARSHAL ASSISTANT EMC	903-590-2655	mburger@smith-county.com
CONNIE WASSON	<i>Connie Wasson</i>	SMITH COUNTY FIRE MARSHAL EAC	903-590-2650	c.mccay@smith-county.com
Chad Hogue	<i>Chad Hogue</i>	S.C.F.M.	903-590-2655	Phogue@smith-county.com
Dave Atkinson	<i>Dave Atkinson</i>	Eastman Chemical	803-720-7861	dlatkinson@eastman.com
Trey Glover	<i>Trey Glover</i>	S.C.F.M.	903-590-2651	tglover2@smith-county.com

Smith County Hazard Mitigation Plan
Steering Committee Meeting



June 26, 2017 @ 2:00 PM
Smith County HUB
304 E. Furguson St.
Tyler, Texas

Committee Member	Signature	Title and Dept/Agency Representing	Phone Number	Email Address
John Hargis		Smith County ESD 2	903-570-3659	johnhargis@smithcountytexas.org
MADISON JOHNSON		CITY OF WHITEHOUSE FD	903-439-4914	MJOHNSON@WHITEHOUSETX.ORG
Carolyn Caldwell		City of Lindale city manager	903-882-3422	CarolynC@lindaletx.gov
Dan Somes		"Chief Police	"	DANS@LINDALETX.GOV
Becky Mays		"Actin ASST	"	beckym@lindaletx.gov
Amanda Fenwick		Comm. Supervisor	903-714-9019	amandaf@lindaletx.gov



**Hazard Mitigation Plan for Smith County
Steering Committee 2nd Meeting
Wednesday, September 14, 2017
2:30 PM**

- Welcome and Introductions
- Reminder: What is Hazard Mitigation?
- Reminder: Steering Committee Purpose and Responsibilities
- Review of Completed Items
 - Final Goals (in packet)
 - Capabilities Assessment
- Hazard Analysis
 - Community Participation and Survey Results (in packet)
 - Hazard Analysis Review
 - Hazard Ranking Exercise (in packet)
- Mitigation Action Worksheet (in packet)
- Next Meeting Date
- Adjournment





**Hazard Mitigation Plan for Smith County
Steering Committee 2nd Meeting
Wednesday, September 14, 2017 @2:30 PM
Meeting Notes**

- Welcome and Introductions – Ms. Laura Johnston (Tetra Tech) welcomed everyone and requested an introduction of each attending committee member and the organization or municipality they represent. Please see the sign in sheet for a full list of meeting attendees.
- Each member of the Committee was provided with handouts and a copy of the presentation slides.
- Ms. Johnston provided an overview of the mitigation plan process, FEMA requirements, and the benefits to Smith County.
 - What is Hazard Mitigation Planning and Why - The county is completing the HMP to create a safer and more resilient community to the effects of natural disasters. The HMP also makes the county and participating communities eligible for FEMA and other grants for mitigation projects. Some grants require a current HMP in order for the community to receive the funds; other grants, such as community development block grants, rank applications higher if the community has a current HMP. The HMP may also help communities and departments secure local funding because the projects were vetted and ranked through a public process.
 - Communities must have participated and adopted the HMP and it should be updated at least every 5 years.
- Ms. Johnston reviewed the purpose and responsibilities of the Steering Committee. Steering Committee members:
 - Provide guidance on their specific community
 - Carry information from the meetings to their community
 - Attend and actively participate in all committee meetings (3)



- Ms. Johnston reviewed the goals developed by the Steering Committee during and since the first kick-off meeting. The goals were given to the Committee members as handouts. Ms. Johnston reminded the Committee that each mitigation action developed must fall under one of the goals and objectives in the plan.
- Ms. Johnston provided an overview of the completed capabilities assessment for the Smith County and reminded the Committee that there are still capabilities assessment for several communities that are outstanding with the reminder that they need to be completed ASAP and given to either Mr. Eric Lowry, Smith County, or directly sent to Tetra.
- Ms. Johnston presented an overview of the results of the community survey to date, which is still open for new comments. The current results of the survey were provided to the committee members in handouts.
 - 141 community members participated in the survey online.
 - Ms. Johnston encouraged the Steering Committee to review the survey responses and use that information as appropriate when ranking hazards and preparing mitigation actions.
- Ms. Johnston introduced the hazard identification and risk assessment for Smith County. This process involved the identification of hazards, hazard profiles, an inventory of the assets of each community, and loss estimations. Snapshots of community-specific hazard analysis information was included in the handouts provided to the attendees.
 - Ms. Johnston discussed the hazard ranking form. She explained that after analysis of the hazards was presented, each Steering Committee member will fill out the hazard ranking worksheet (provided in handouts). Members will rank each hazard as “high,” “medium,” or “low” for probability of occurrence and impact on people, property, and the economy.
- Ms. Johnston presented a general overview of the results of the risk assessment and hazard profiles for Smith County and participating communities. Noting that much more detailed countywide information as well as detailed information for at the participating community level will be included in the DRAFT plan which will be provided for review to members.
- Ms. Johnston discussed the following hazards:
 - Dam failure
 - Drought
 - Earthquake



- Flood
- Hurricanes and Tropical Storms
- Severe Storms (Hail/ Wind/ Lightning)
- Landslide, Mud/Debris Flow, Rockfall
- Tornado
- Wildfire
- Winter Storm

Discussion followed

- The steering committee was given 10-15 minutes to complete the hazard ranking worksheet, which were then collected from the meeting attendees. Ms. Johnston will score the ranking worksheets and send out the ranking of each hazard.
- Ms. Johnston explained that the county and each participating jurisdiction needs to identify mitigation actions. Ms. Johnston reminded the attendees that two mitigation actions are needed for each hazard. Any mitigation actions carried forward from the current HMP should be included. Ms. Johnston asked the members to use the mitigation action worksheet to develop new mitigation actions and send them to Tetra Tech.
- Ms. Johnston encouraged attendees to use the mitigation action worksheets to support funding efforts for short-, mid-, and long-term projects within their community. She explained that although the HMP is a five-year document, the projects can extend beyond five years. Ms. Johnston stated that mitigation actions cannot be maintenance activities.
- Ms. Johnston encouraged attendees to work with other members of the community to get ideas for mitigation actions. Electronic versions of the mitigation action worksheet will be provided to the department and participating organization in the next few days. Mitigation action worksheets are due back to Tetra Tech by Friday, October 6, 2017. During the next meeting the attendees will rank the mitigation actions.
- The 3rd Steering Committee meeting will be scheduled for December. Meeting details will be forthcoming.
- Adjournment

Smith County Hazard Mitigation Plan
2nd Steering Committee Meeting



September 14, 2017 @ 2:30 PM
Smith County HUB
304 E. Ferguson St.
Tyler, Texas

Committee Member	Signature	Department/Agency	Title	Phone Number	Email Address
Eric Lowry		Smith County Fire Marshal's Office		903-590-2655	ELowry@smith-county.com
Trey Glover		Smith County Fire Marshal's Office		903-590-2651	tglover2@smith-county.com
Meghan Burger		Smith County Fire Marshal's Office	Assistant EMC	903-590-2653	mburger@smith-county.com
Chad Hogue		Smith County Fire Marshal's Office		903-590-2655	Phogue@smith-county.com
Connie Wasson		Smith County Fire Marshal's Office	FIRE MARSHAL EMC	903-590-2650	cmccoy@smith-county.com
Jerry Garner		Smith County ESD1		903-882-3443	jgarner@lindalevfd.com
Terry Rozell		Smith County ESD2	Chief of Operations	903-571-2838	
John Hargis		Smith County ESD2	Battalion Chief	903-540-3659	
Terry Lowry		City of Arp		903-859-6131	lowryt@beckvilleisd.net
Pam Frederick		City of Bullard	Mayor	903-894-7223	pam.frederick@bullardisd.com
Pat Bonds		City of Hideaway		214-384-2053	
J.D. Brown		City of Hideaway EMC		281-732-6561	mcfoof@sbcglobal.net
Ray Hutcheson		City of Hideaway	Mayor Pro Tem	903-245-9172	ray.hutcheson@att.net
Carolyn Caldwell		City of Lindale	City Manager	903-882-3422	carolync@lindaletx.gov
Jeff Daugherty		City of Lindale		903-882-3422	jdaugherty@lindaletx.gov

Smith County Hazard Mitigation Plan
2nd Steering Committee Meeting



September 14, 2017 @ 2:30 PM
Smith County HUB
304 E. Ferguson St.
Tyler, Texas

Committee Member	Signature	Department/Agency	Title	Phone Number	Email Address
Dan Somes		City of Lindale	Police Chief	903-882-3422	dans@lindaletx.gov
Amanda Fenwick		City of Lindale	Comm. Supervisor	903-714-9019	amandafe@lindaletx.gov
Becky Mays		City of Lindale	Admin Assist	903-882-3422	beckym@lindaletx.gov
Riley Harris		City of New Chapel Hill	MAYOR	903-283-0700	riley@rileyharris.com
Mike Turman		City of Noonday		903-570-0564	conoonday@gmail.com
Gene Cottle		City of Troup	City Manager	903-842-4109	troupadmin@trouptx.com
Martin Heines		City of Tyler		903-531-1250	mheines@tylertexas.com
David Coble		City of Tyler EMC		903-535-0005	Dcoble@tylertexas.com
Madison Johnson		City of Whitehouse	FC / EMC	903-839-4914	mjohnson@whitehousetx.org
Charles Parker		City of Whitehouse		903-839-4914	cparker@whitehousetx.org
Pat Schlau		City of Winona	Mayor	903-521-5529	pat.schlau@winonatexas.com
Kent Cooper		Delek Refining		903-859-5872	steven.cooper@deleklogistics.com
Danny King		Eastman Chemical		903-237-5356	dking@eastman.com
David Atkinson		Eastman Chemical	Fire Chief	903-720-7861	datkinson@eastman.com
Neal Franklin		ETMC		903-535-5820	nifranklin@etmc.org

Smith County Hazard Mitigation Plan
2nd Steering Committee Meeting



September 14, 2017 @ 2:30 PM
Smith County HUB
304 E. Ferguson St.
Tyler, Texas

Committee Member	Signature	Department/Agency	Title	Phone Number	Email Address
Randy Melton		TJC EMC	Chief	903-510-2310	rmel@tjc.edu
David Adams		Troup ISD EMC		903-842-5108	DAdams@troupsid.org
Randal Duke		EMC		903-566-7446	rduke@uttyler.edu
Laura Johnston		Project Manager, Tetra Tech		225-955-2431	laura.johnston@tetrattech.com
Joe Carlisle		City of Troup			
STEVEN LLOYD		City of LINDALE	DIRECTOR Community Development	903 780 8044	stevenl@lindaletx.gov
Marty Lawrence		Tyler Fire Dept Dev. Services	Admin. Captain Proj. Engineer	903-535-0005 903-531-1039	mlawrence@tylertexas.com
Karl Seydler		City of Tyler	Int. Floodplain Admin.		ksydler@tylertexas.com
Caitlin Roberson		SMITH COUNTY Fire Marshal's Office	Deputy Fire Marshal / Asst. EMC	903-590-2653	croberson@smith-county.com
Carey Lewis		Smith County Fire Marshal's Office	Asst EMC	903-590-2652	clewis@smith-county.com
Doug Nichols		Smith County Road / Flood Plain	Admin's Trustee	903-590-4806	D.Nicholson " " "
Johnny Vargas		App PD	Asst Chief	903-859-2465	J.Vargas@CITYOFFAIRTX.NET



**Hazard Mitigation Plan for Smith County
Steering Committee 3rd Meeting
Monday, December 18, 2017
2:00 PM**

- Welcome and Introductions
- Review and Reminders
 - What is Hazard Mitigation?
 - Steering Committee Purpose and Responsibilities
 - Mitigation Goals and Objectives
 - Final Hazard Ranking
- Review of Survey Results
 - Question #23 Results
- Mitigation Actions
 - General Guidelines and Requirements
 - Summary Table
 - Presentation / Review of Mitigation Actions
- Ranking of Mitigation Actions (In Packet)
- Plan Maintenance
- Hazard Mitigation Assistance Grants (In Packet)
- Plan submittal to TDEM and FEMA Region VI
- Adjournment



**Hazard Mitigation Plan for Smith County
Steering Committee 3rd Meeting
Monday, December 18, 2017 @2:00 PM
Meeting Notes**

- Welcome and Introductions – Mr. Eric Lowry, Smith County Hazard Mitigation Officer welcomed everyone and introduced Laura Johnston, Project Manager from Tetra Tech. Ms. Johnston greeted the committee and requested an introduction of each attending committee member and the organization or municipality they represent. Ms. Johnston reminded each attendee to please see the sign in sheet for a full list of Steering Committee attendees.
- Each member of the Committee was provided with handouts and a copy of the presentation slides.
- Ms. Johnston went over items covered to date:
 1. She reminded each Committee member what hazard mitigation is and why we are going thru this process.
 2. She provided a reminder /review of the purpose and responsibilities of the Steering Committee. Steering Committee members:
 - Provide guidance on their specific community
 - Carry information from the meetings to their community
 - Attend and actively participate in all committee meetings (3).
- Ms. Johnston further provided an overview /reviewer of the goals as developed and agreed upon by the Steering Committee previously. The goals were also given to the Committee members in their Powerpoint presentation. The committee was reminded that each of the proposed mitigation actions that the members developed must fall under one of the goals and objectives in the plan.
- The Final Hazard Ranking for the Committee noting that there are separate rankings for each of the participating communities as well as the County. There was a brief discussion on the rankings.
- A review of the survey results advised the committee of 39 total respondents. The following questions were some of the questions reported on and discussed:
 1. Q3: Which of the following hazard events have you or has anyone in your household experienced in the last 20 years within Smith County. The predominant responses were: Thunderstorms, Lightning, Hail, Extreme heat, Drought



2. Q19: Would the disclosure of this type natural hazard risk information influence your decision to buy or rent a home? Responses were: Yes – 72%, No – 18% and Not sure – 10%
 3. Q8 asked: Which of the following methods do you think are most effective for providing hazard and disaster information? Predominant responses were: TV News, Internet, Radio News, Social Media, Law Enforcement
- Mitigation Actions ranking process:
 1. Ms. Johnston reminded the Committee that FEMA requires a minimum of 2 unique actions for each “low”, “medium” and “high” ranked hazard. Additionally she stated that at least one mitigation action for each mitigation goal.
 2. A discussion followed on the ranking of the proposed mitigation actions to be included in the plan. Committee members were given time to rank their proposed mitigation actions. Each jurisdiction representative was asked to and submitted a ranking of the proposed actions for their jurisdiction. The rankings will be included in the Plan document.
 - Committee members were given the requirements for annual (minimum) Plan Maintenance and the 5-year plan update cycle. A brief question and answer discussion followed. The next steps in the plan development process were overviewed as well. An overview of Hazard Mitigation Assistance Grants was presented and additional information was in the committee member’s packets.
 - Ms. Johnston also provided the Committee with information regarding funding opportunities for all communities within the State of Texas’s from DR 4332 – Hurricane Harvey. She outlined some of the States criteria for ranking projects for funding as provided by Mr. Patrick Kelly at TDEM.
 - Adjournment

Smith County Hazard Mitigation Plan
3rd Steering Committee Meeting



December 18, 2017 @ 2:00 PM
Smith County HUB
304 E. Furguson St.
Tyler, Texas

Committee Member	Signature	Department/Agency	Title	Phone Number	Email Address
Eric Lowry		Smith County Fire Marshal's Office		903-590-2655	ELowry@smith-county.com
Trey Glover		Smith County Fire Marshal's Office		903-590-2651	tglover2@smith-county.com
Meghan Burger		Smith County Fire Marshal's Office	Assistant EMC	903-590-2653	mburger@smith-county.com
Chad Hogue		Smith County Fire Marshal's Office		903-590-2655	Phogue@smith-county.com
Carey Lewis		Smith County Fire Marshal's Office	Assits EMC	903-590-2652	clewis@smith-county.com
Connie Wasson		Smith County Fire Marshal's Office	Fire Marshal EMC	903-590-2650	cmccoy@smith-county.com
Caitlin Roberson		Smith County Fire Marshal's Office	Deputy Fire Marshal/Assist EMC	903-590-2653	croberson@smith-county.com
Jerry Garner		Smith County ESD1		903-882-3443	jgarner@lindalevfd.com
Terry Rozell		Smith County ESD2	Chief of Operations	903-571-2838	
John Hargis		Smith County ESD2	Battalion Chief	903-540-3659	
Doug Nicholson		Smith County Roads	Floodplain Administrator	903-590-4806	dnicholson@smith-county.com
Terry Lowry		City of Arp		903-859-6131	lowryt@beckvilleisd.net
Johnny Vargas		City of Arp P.D	Assist Chief	903-859-2465	j.vargas@cityofarptx.com
Pam Frederick		City of Bullard	Mayor	903-894-7223	pam.frederick@bullardisd.com
Pat Bonds		City of Hideaway		214-384-2053	

Smith County Hazard Mitigation Plan
3rd Steering Committee Meeting



December 18, 2017 @ 2:00 PM
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304 E. Furguson St.
Tyler, Texas

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J.D. Brown		City of Hideaway EMC		281-732-6561	mcfoof@sbcglobal.net
Ray Hutcheson		City of Hideaway	Mayor Pro Tem	903-245-9172	ray.hutcheson@att.net
Carolyn Caldwell		City of Lindale	City Manager	903-882-3422	carolync@lindaletx.gov
Jeff Daugherty		City of Lindale		903-882-3422	jdaugherty@lindaletx.gov
Dan Somes		City of Lindale	Police Chief	903-882-3422	dans@lindaletx.gov
Steve Lloyd		City of Lindale	Director Community Development	903-780-8044	stevenl@lindaletx.gov
Amanda Fenwick		City of Lindale	Comm. Supervisor	903-714-9019	amandafe@lindaletx.gov
Becky Mays		City of Lindale	Admin Assist	903-882-3422	beckym@lindaletx.gov
Riley Harris		City of New Chapel Hill	Mayor <i>KMC</i>	903-283-0700	riley@rileyharris.com
Mike Turman		City of Noonday		903-570-0564	conoonday@gmail.com
Joe Carlyle		City of Troup			
Gene Cottle		City of Troup	City Manager	903-842-4109	troupadmin@trouptx.com
Martin Heines		City of Tyler		903-531-1250	mheines@tylertexas.com
Marty Lawrence		City of Tyler FD	Admin Captain	903-595-0005	mlawrence@tylertexas.com
David Coble		City of Tyler EMC		903-535-0005	Dcoble@tylertexas.com

Smith County Hazard Mitigation Plan
3rd Steering Committee Meeting



December 18, 2017 @ 2:00 PM
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304 E. Furguson St.
Tyler, Texas

Committee Member	Signature	Department/Agency	Title	Phone Number	Email Address
Karl Seydler		City of Tyler Dev. Services	Engineer/Floodplain Admin	903-531-1039	kseydler@tylertexas.com
Madison Johnson		City of Whitehouse	Fire Chief/EMC	903-839-4914	mjohnson@whitehousetx.org
Charles Parker		City of Whitehouse		903-839-4914	cparker@whitehousetx.org
Pat Schlau		City of Winona	Mayor	903-521-5529	pat.schlau@winonatexas.com
Kent Cooper		Delek Refining		903-859-5872	steven.cooper@deleklogistics.com
Danny King		Eastman Chemical		903-237-5356	dking@eastman.com
David Atkinson		Eastman Chemical	Fire Chief	903-720-7861	datkinson@eastman.com
Neal Franklin		ETMC		903-535-5820	njfranklin@etmc.org
Randy Melton		TJC EMC	Chief	903-510-2310	rmel@tjc.edu
David Adams		Troup ISD EMC		903-842-5108	DAdams@troupid.org
Randal Duke		EMC		903-566-7446	rduke@uttyler.edu
Laura Johnston		Project Manager, Tetra Tech		225-955-2431	laura.johnston@tetrattech.com
Committee Member	Signature	Department/Agency	Title	Phone Number	Email Address

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Smith County

July 3 at 10:07am ·

Like Page

Contact Us

Smith County officials are working with cities and communities within its boundaries to update the Smith County Hazard Mitigation Plan. Community input and involvement is instrumental in the development of this plan, which will reflect the needs and perceptions of Smith County residents.

Please take a few minutes to fill out this survey so that your ideas may become a part of the plan to make Smith County a safer and more resilient community!

<https://www.surveymonkey.com/r/SmithHMPCCommunitySurvey>

[Smith County Fire Marshal's Office](#)

[Smith County ESD2](#)

[City of Tyler, Texas Government](#)

[City of Troup](#)

[Whitehouse, Texas](#)

[Noonday, Texas](#)

[City of Bullard](#)

[City of Lindale](#)

[Hideaway, Texas](#)

[Winona, Texas](#)

[New Chapel Hill, Texas](#)



Smith County Hazard Mitigation Plan Update

Public Involvement/Participation

A partnership of the county government and cities and communities in Smith County are working together to create the Update of the Smith County Hazard Mitigation Plan. Community input and involvement is instrumental in the development of a mitigation plan that truly reflects the perceptions and needs of Smith County residents.

We have developed a community survey and would like as much input from Smith County residents, businesses, and interested citizens as possible. Please take a few minutes to fill out this survey so that your ideas may become a part of the plan to make Smith County a safer and more resilient county!

Community Survey Link:

<https://www.surveymonkey.com/r/SmithHMPCCommunitySurvey>

If you have any questions, please don't hesitate to contact:

Kari Valentine at kari.valentine@tetratech.com



5 Likes 1 Comment 12 Shares

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5

Chronological

12 shares



Tonya Baker The link won't work

Like · Reply · July 3 at 10:24am

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Chat (3)

SHORTCUTS

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Smith County TX HMP Update Survey

Web survey powered by SurveyMonkey.com...
SURVEYMONKEY.COM

Like · Reply · 1 · July 3 at 1:19pm



Tonya Baker Smith County Thank You!!

Like · Reply · July 3 at 1:58pm



Write a reply...



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Smith County updated their cover photo.

July 7 at 3:48pm ·



3



Smith County

July 7 at 3:08pm ·

Smith County Road and Bridge crews will begin work on Monday, July 10, to replace a culvert on...[See more](#)



2

1 Share



Smith County

July 7 at 9:57am ·

Smith County Commissioner Jo Ann Hampton was featured in the latest County Progress...[See more](#)



5

1 Comment



Smith County with Keith Buckner.

July 6 at 11:44am ·

Keith Buckner was recently honored for five years of service to Smith County. Buckner works in...[See more](#)



25

2 Comments



Smith County with Mandy Zehren.

July 6 at 11:36am ·

Diana Morales was recently recognized for 10 years of service to Smith County. She started working...[See more](#)

Chat (3)



CITY OF TYLER FIRE DEPARTMENT

Paul Findley, Fire Marshal/Public Information Officer

Office (903) 535-0005 or cell (903) 360-0553, pfindley@tylertexas.com

**Press Release
For Immediate Release
Jul. 11, 2017**

Tyler Fire Department urges public to participate in Smith County Hazard Mitigation Plan Update

A partnership of local governments and other stakeholders in Smith County are working together to create an update of the Smith County Hazard Mitigation Plan addressing natural hazards. The original Natural Hazards Mitigation Plan was prepared in 2008 - 2010. This updated plan will focus only on natural hazards identified within Smith County. The plan is developed in response to Federal programs that enable the partnership to use pre- and post-disaster financial assistance to reduce the exposure of County residents to risks associated with hazards. Community input and involvement is instrumental in the development of a mitigation plan that truly reflects the perceptions and needs of Smith County residents.

In order to identify and plan for future natural disasters, we need your assistance. We have developed a community survey and would like as much input from Smith County residents, businesses, and interested citizens as possible. This questionnaire is designed to help us gauge the level of knowledge local citizens already have about disaster issues and to identify areas vulnerable to various types of disasters. The information you provide will help us coordinate activities to reduce the risk of injury or property damage in the future. Please take a few minutes to fill out this survey so that your ideas may become a part of the plan to make Smith County a safer and more resilient community. A link to the survey can be found on the Tyler Fire Department's webpage (www.tylerfiredept.com) or by clicking the link below.

The survey consists of 36 questions plus an opportunity for any additional comments at the end. The survey should take less than 10 minutes to complete and is anonymous. When you have finished the survey, please click "Done" on the final page.

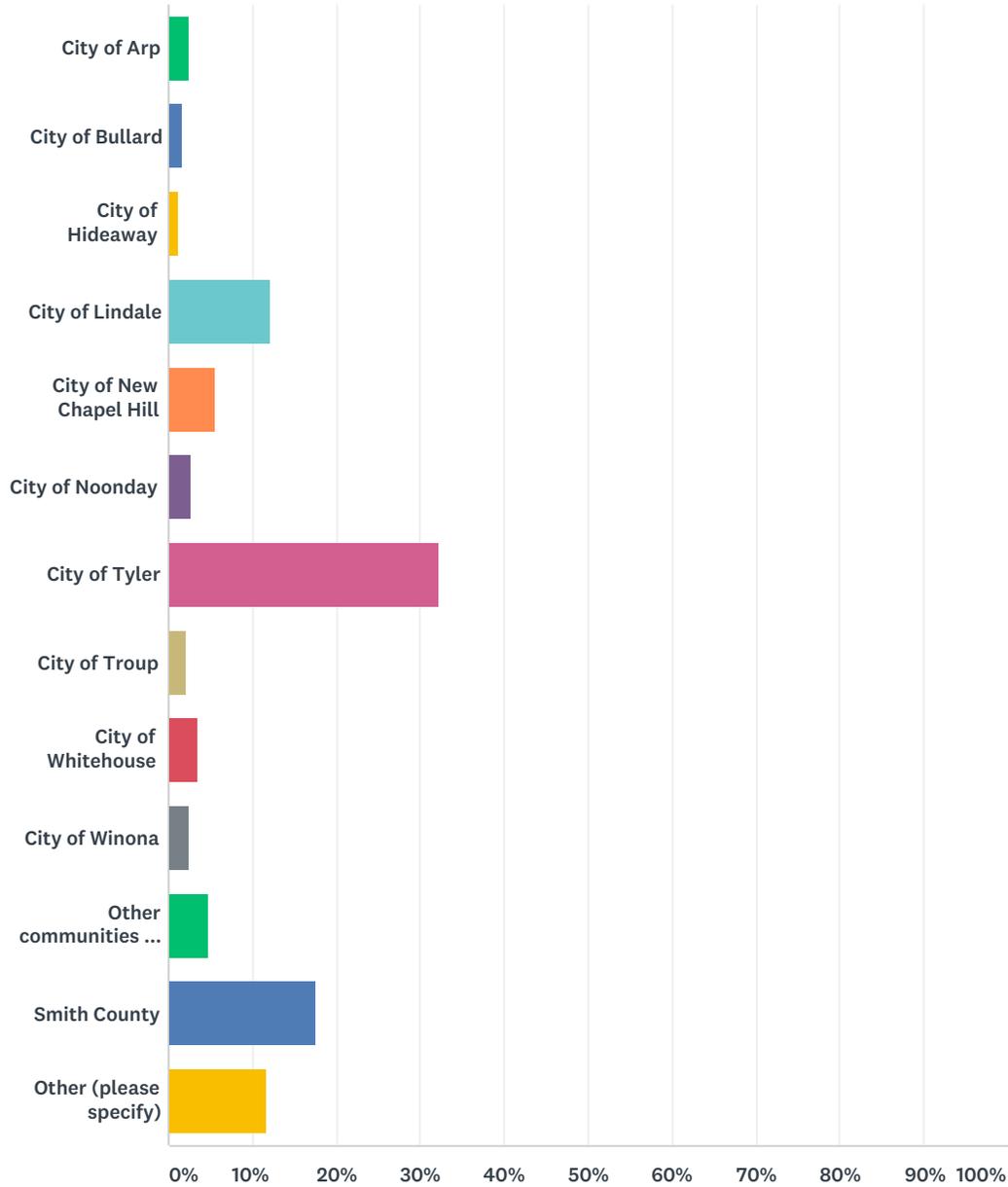
The Smith County Hazard Mitigation Steering Committee thanks you for taking the time to participate in this information-gathering process.

Community Survey Link:

<https://www.surveymonkey.com/r/SmithHMPCCommunitySurvey>

Q1 Where in Smith County do you live?

Answered: 249 Skipped: 0



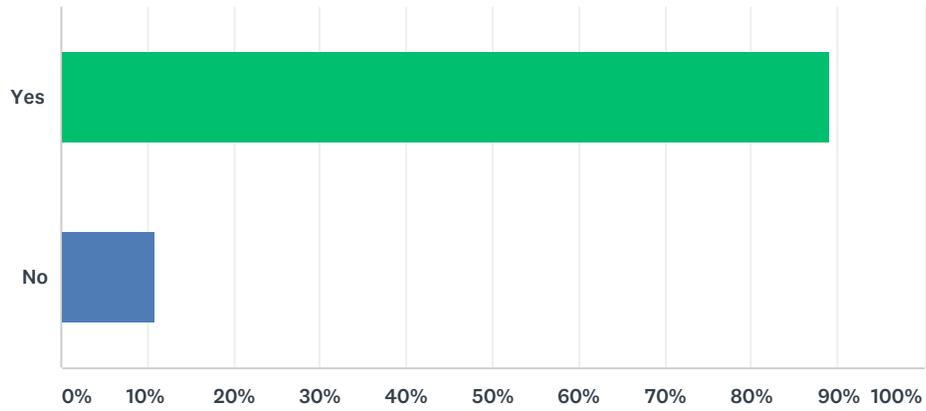
ANSWER CHOICES	RESPONSES
City of Arp	2.41% 6
City of Bullard	1.61% 4
City of Hideaway	1.20% 3
City of Lindale	12.05% 30
City of New Chapel Hill	5.62% 14
City of Noonday	2.81% 7

Smith County TX HMP Update Survey

City of Tyler	32.13%	80
City of Troup	2.01%	5
City of Whitehouse	3.61%	9
City of Winona	2.41%	6
Other communities not identified	4.82%	12
Smith County	17.67%	44
Other (please specify)	11.65%	29
TOTAL		249

Q2 Do you work in Smith County?

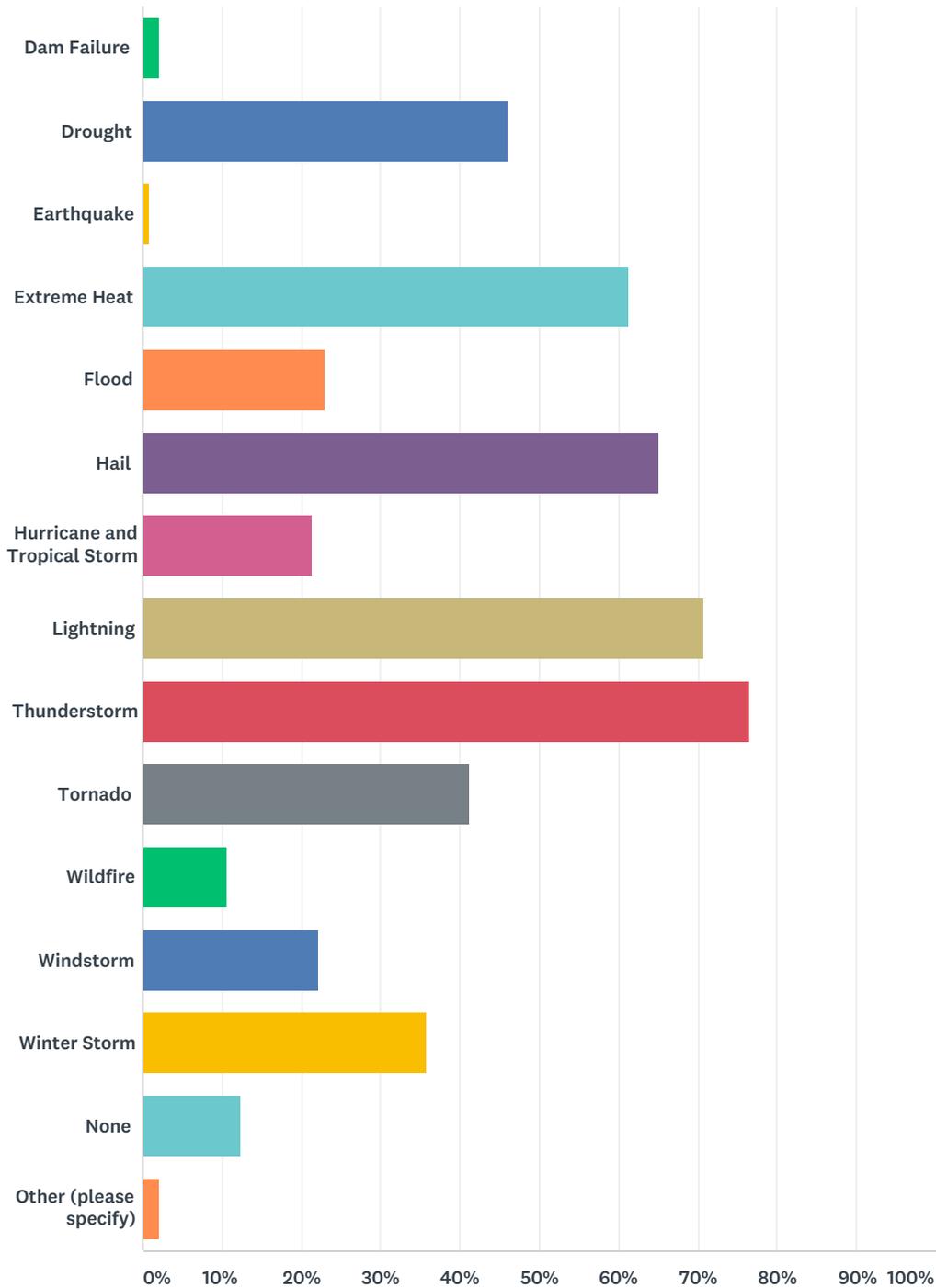
Answered: 247 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	89.07%	220
No	10.93%	27
TOTAL		247

Q3 Which of the following hazard events have you or has anyone in your household experienced in the past 20 years within Smith County? (Check all that apply)

Answered: 243 Skipped: 6



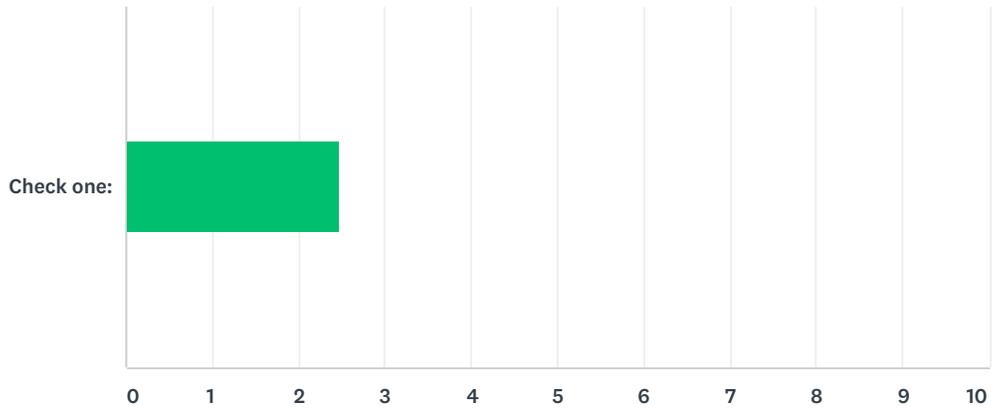
ANSWER CHOICES	RESPONSES
Dam Failure	2.06% 5

Smith County TX HMP Update Survey

Drought	46.09%	112
Earthquake	0.82%	2
Extreme Heat	61.32%	149
Flood	23.05%	56
Hail	65.02%	158
Hurricane and Tropical Storm	21.40%	52
Lightning	70.78%	172
Thunderstorm	76.54%	186
Tornado	41.15%	100
Wildfire	10.70%	26
Windstorm	22.22%	54
Winter Storm	35.80%	87
None	12.35%	30
Other (please specify)	2.06%	5
Total Respondents: 243		

Q4 How prepared is your household to deal with a natural hazard event?

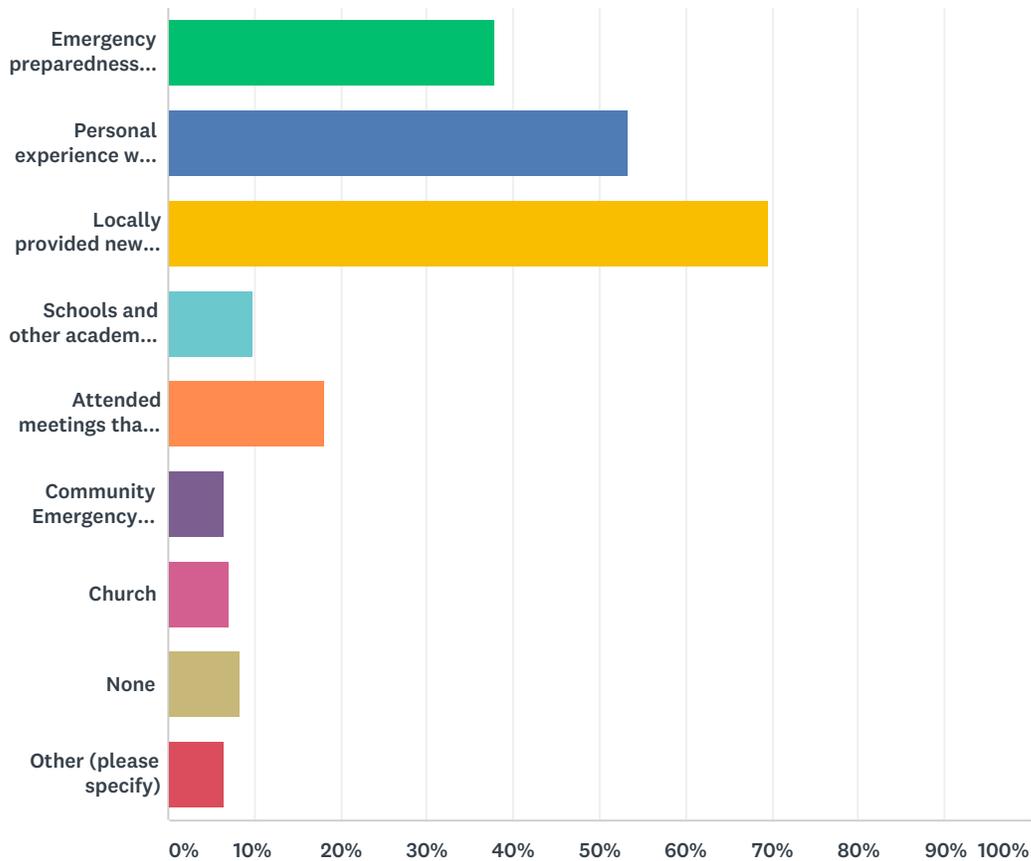
Answered: 216 Skipped: 33



	NOT AT ALL PREPARED	SOMEWHAT PREPARED	ADEQUATELY PREPARED	WELL PREPARED	VERY WELL PREPARED	TOTAL	WEIGHTED AVERAGE
Check one:	8.80% 19	50.93% 110	27.78% 60	10.65% 23	1.85% 4	216	2.46

Q5 Which of the following have provided you with useful information to help you be prepared for a natural hazard event? (Check all that apply)

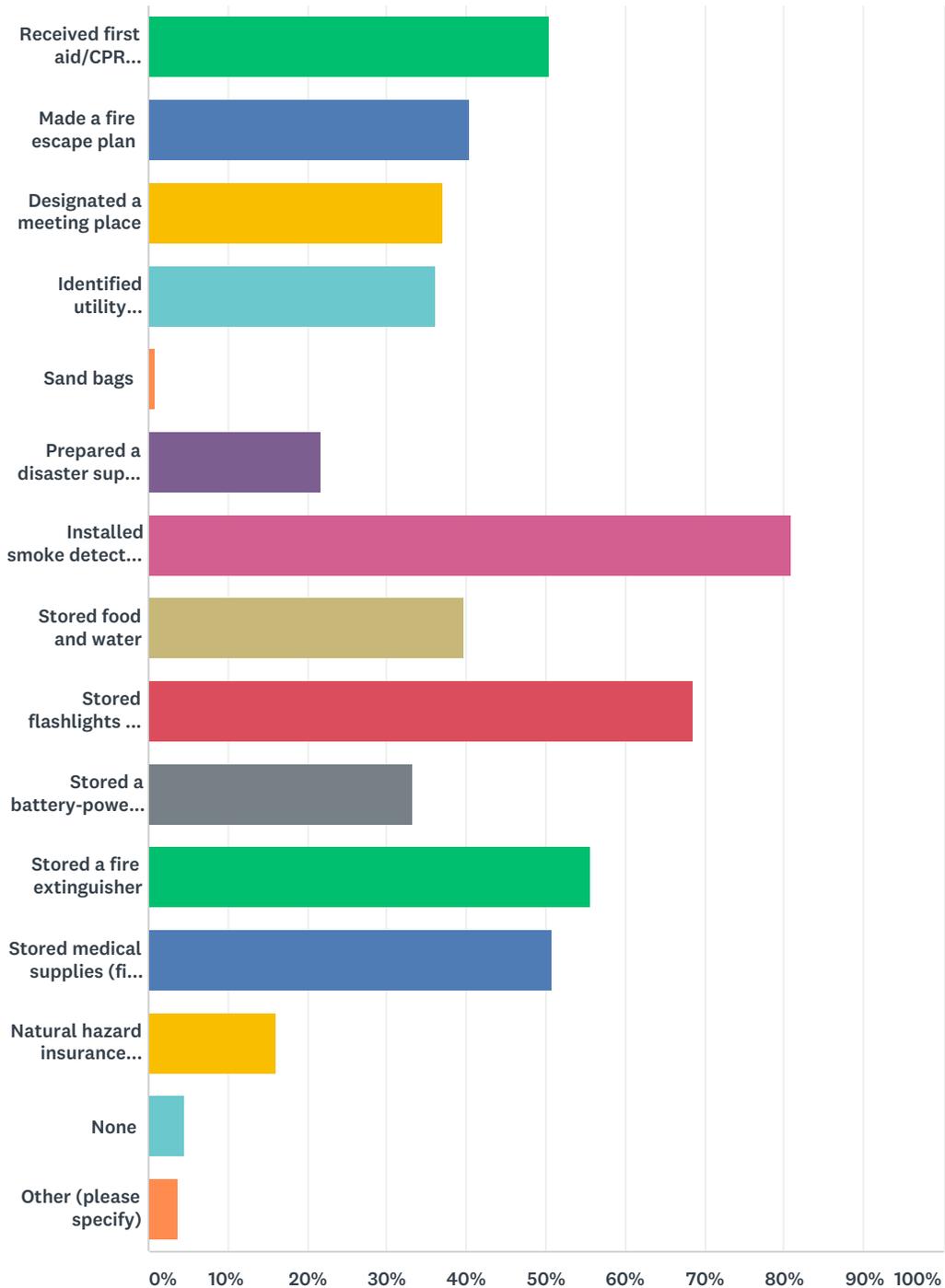
Answered: 214 Skipped: 35



ANSWER CHOICES	RESPONSES	
Emergency preparedness information from a government source (e.g., federal, state, or local emergency management)	37.85%	81
Personal experience with one or more natural hazards/disasters	53.27%	114
Locally provided news or other media information	69.63%	149
Schools and other academic institutions	9.81%	21
Attended meetings that have dealt with disaster preparedness	18.22%	39
Community Emergency Response Training (CERT)	6.54%	14
Church	7.01%	15
None	8.41%	18
Other (please specify)	6.54%	14
Total Respondents: 214		

Q6 Which of the following steps has your household taken to prepare for a natural hazard event? (Check all that apply)

Answered: 216 Skipped: 33



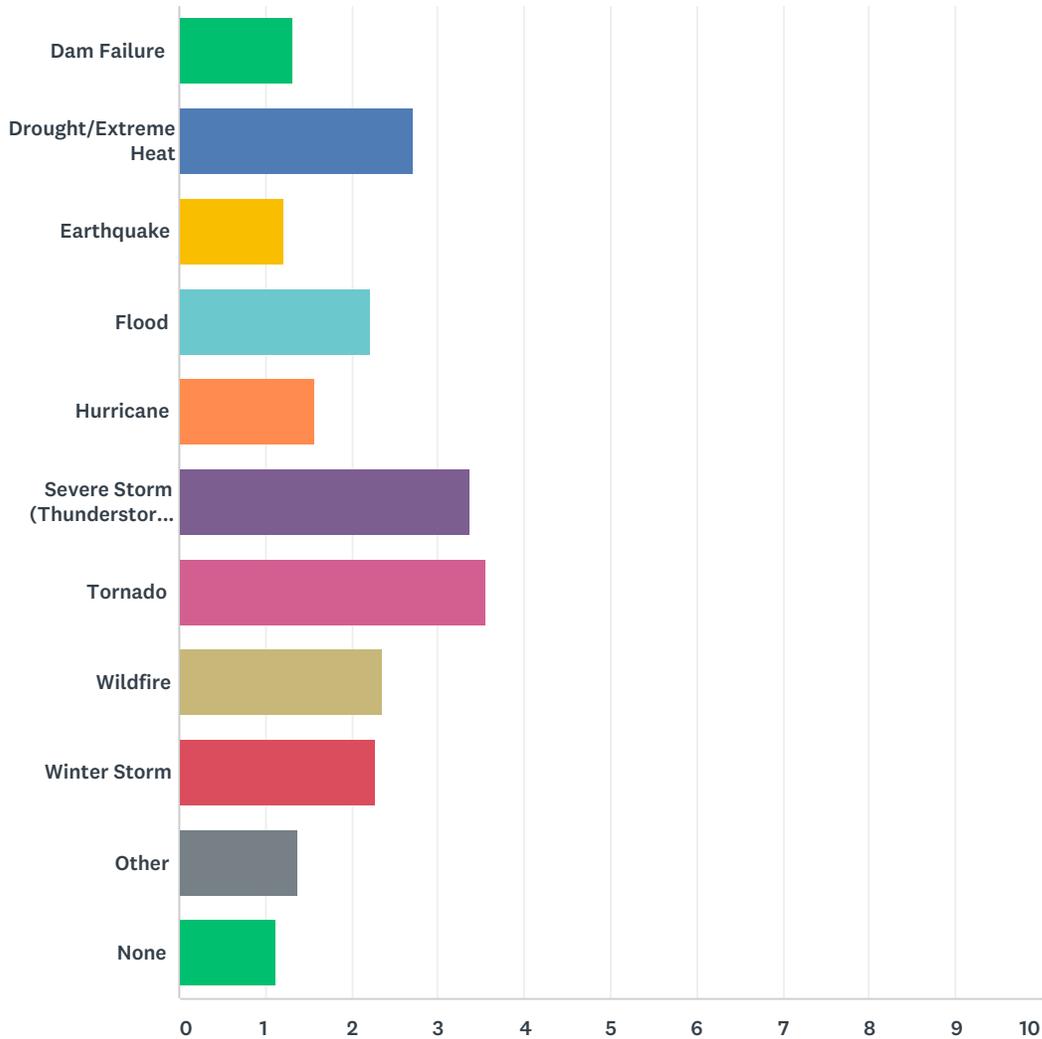
ANSWER CHOICES	RESPONSES	
Received first aid/CPR training	50.46%	109
Made a fire escape plan	40.28%	87

Smith County TX HMP Update Survey

Designated a meeting place	37.04%	80
Identified utility shutoffs	36.11%	78
Sand bags	0.93%	2
Prepared a disaster supply kit	21.76%	47
Installed smoke detectors on each level of the house	81.02%	175
Stored food and water	39.81%	86
Stored flashlights and batteries	68.52%	148
Stored a battery-powered radio	33.33%	72
Stored a fire extinguisher	55.56%	120
Stored medical supplies (first aid kit, medications)	50.93%	110
Natural hazard insurance (Flood, Earthquake, Wildfire)	16.20%	35
None	4.63%	10
Other (please specify)	3.70%	8
Total Respondents: 216		

Q7 How concerned are you about the following natural hazards in Smith County? (Check one response for each hazard)

Answered: 216 Skipped: 33



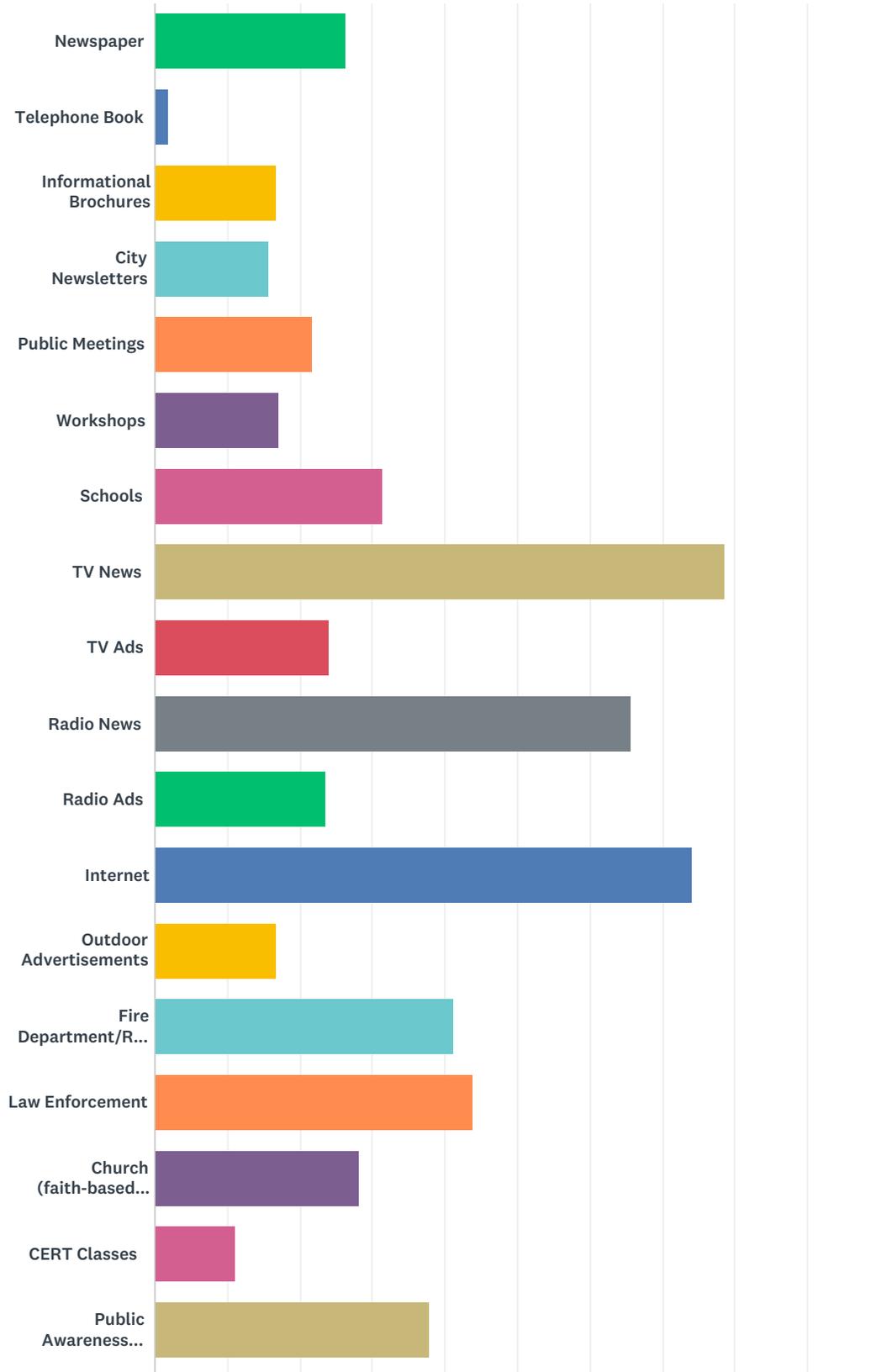
	NOT CONCERNED	SOMEWHAT CONCERNED	CONCERNED	VERY CONCERNED	EXTREMELY CONCERNED	TOTAL	WEIGHTED AVERAGE
Dam Failure	75.61% 155	18.05% 37	6.34% 13	0.00% 0	0.00% 0	205	1.31
Drought/Extreme Heat	10.90% 23	36.02% 76	33.18% 70	11.37% 24	8.53% 18	211	2.71
Earthquake	82.27% 167	14.78% 30	2.96% 6	0.00% 0	0.00% 0	203	1.21
Flood	26.57% 55	39.61% 82	23.19% 48	7.25% 15	3.38% 7	207	2.21
Hurricane	57.14% 116	30.54% 62	10.84% 22	1.48% 3	0.00% 0	203	1.57

Smith County TX HMP Update Survey

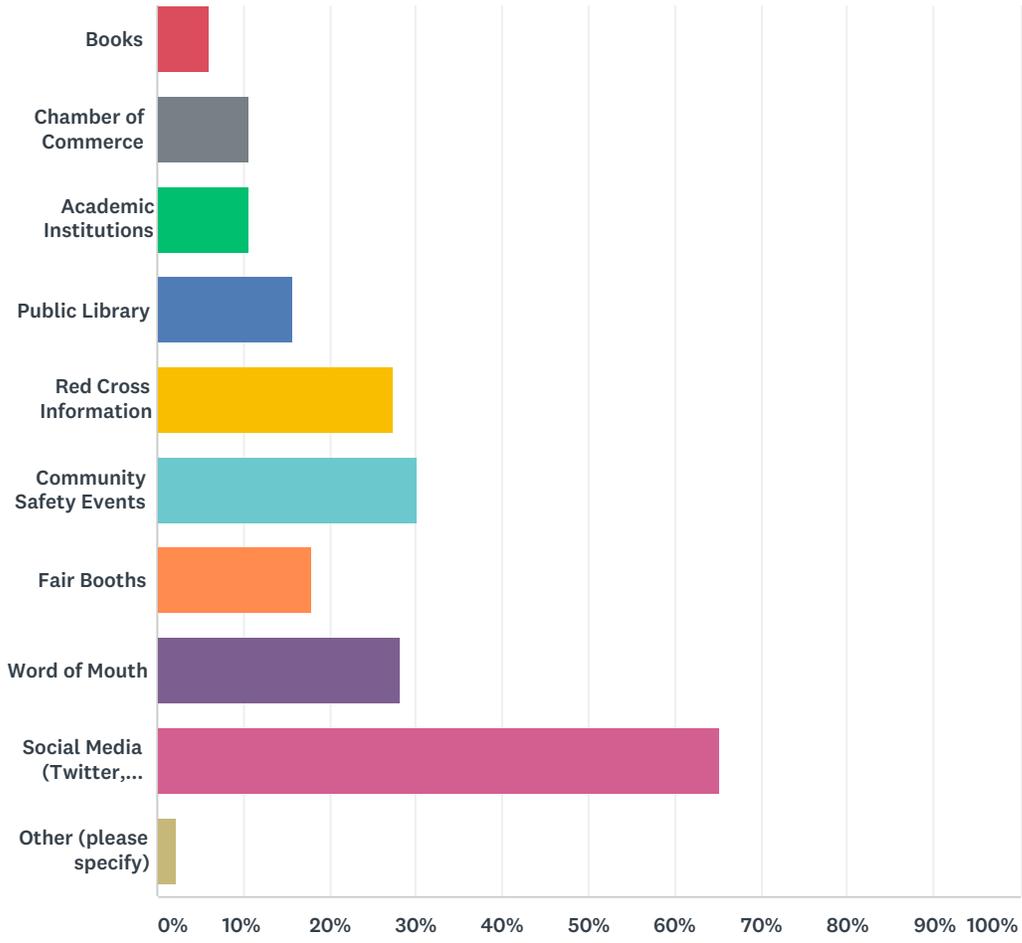
Severe Storm (Thunderstorms, Lightning, Hail and/or High Winds)	1.86% 4	16.74% 36	36.74% 79	33.02% 71	11.63% 25	215	3.36
Tornado	1.40% 3	14.42% 31	30.70% 66	33.49% 72	20.00% 43	215	3.56
Wildfire	27.32% 56	30.24% 62	27.32% 56	9.76% 20	5.37% 11	205	2.36
Winter Storm	26.96% 55	33.33% 68	27.45% 56	9.31% 19	2.94% 6	204	2.28
Other	81.94% 59	5.56% 4	8.33% 6	1.39% 1	2.78% 2	72	1.38
None	92.16% 47	3.92% 2	1.96% 1	1.96% 1	0.00% 0	51	1.14

Q8 Which of the following methods do you think are most effective for providing hazard and disaster information? (Check all that apply)

Answered: 216 Skipped: 33



Smith County TX HMP Update Survey



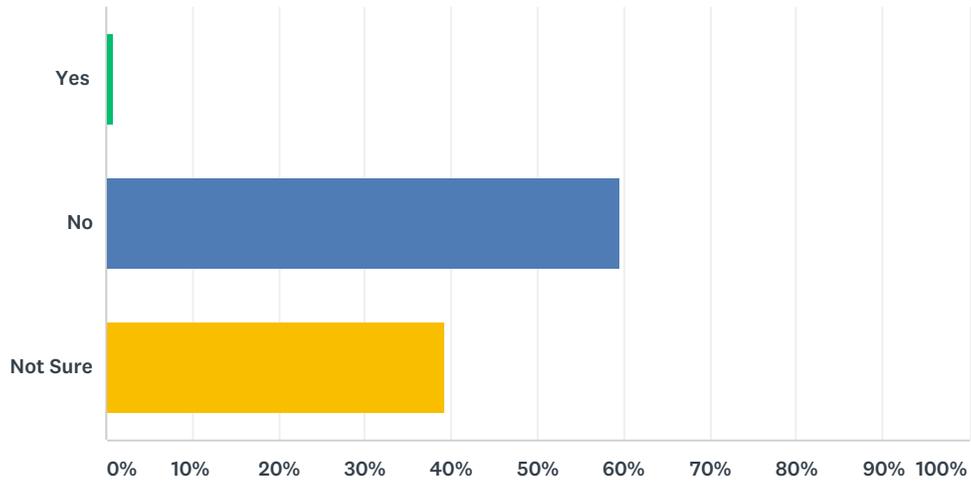
ANSWER CHOICES	RESPONSES	
Newspaper	26.39%	57
Telephone Book	1.85%	4
Informational Brochures	16.67%	36
City Newsletters	15.74%	34
Public Meetings	21.76%	47
Workshops	17.13%	37
Schools	31.48%	68
TV News	78.70%	170
TV Ads	24.07%	52
Radio News	65.74%	142
Radio Ads	23.61%	51
Internet	74.07%	160
Outdoor Advertisements	16.67%	36
Fire Department/Rescue	41.20%	89
Law Enforcement	43.98%	95

Smith County TX HMP Update Survey

Church (faith-based institutions)	28.24%	61
CERT Classes	11.11%	24
Public Awareness Campaign (e.g., Flood Awareness Week, Winter Storm Preparedness Month)	37.96%	82
Books	6.02%	13
Chamber of Commerce	10.65%	23
Academic Institutions	10.65%	23
Public Library	15.74%	34
Red Cross Information	27.31%	59
Community Safety Events	30.09%	65
Fair Booths	18.06%	39
Word of Mouth	28.24%	61
Social Media (Twitter, Facebook, Linkdin)	65.28%	141
Other (please specify)	2.31%	5
Total Respondents: 216		

Q9 Is your property located in or near a FEMA designated floodplain?

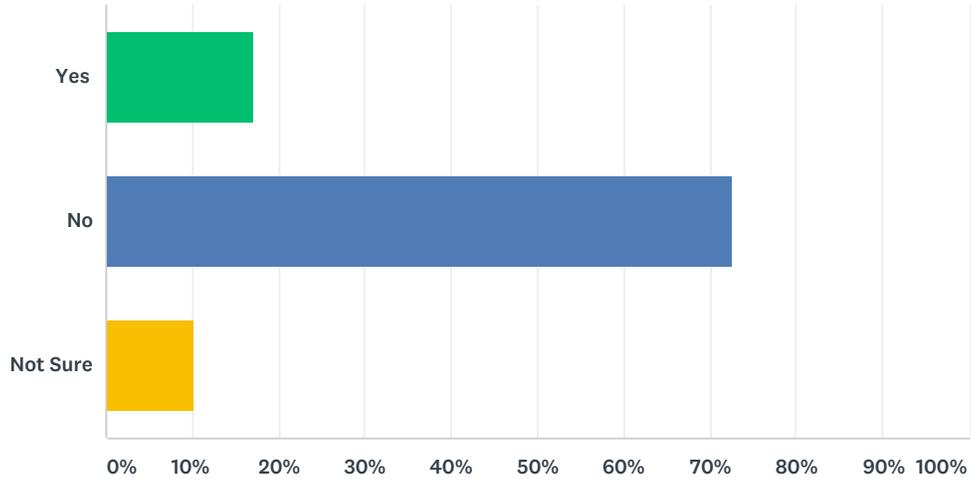
Answered: 216 Skipped: 33



ANSWER CHOICES	RESPONSES
Yes	0.93% 2
No	59.72% 129
Not Sure	39.35% 85
TOTAL	216

Q10 Do you have flood insurance?

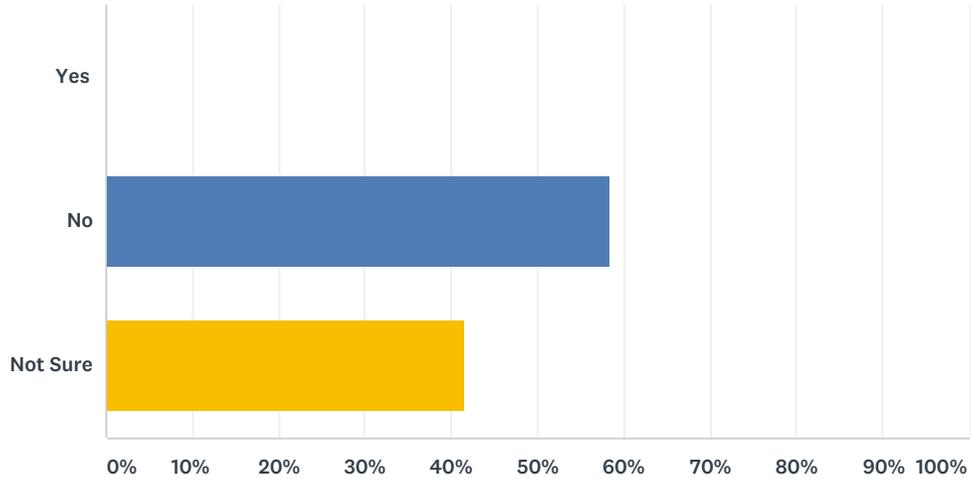
Answered: 216 Skipped: 33



ANSWER CHOICES	RESPONSES	
Yes	17.13%	37
No	72.69%	157
Not Sure	10.19%	22
TOTAL		216

Q11 Is your property located near an earthquake fault?

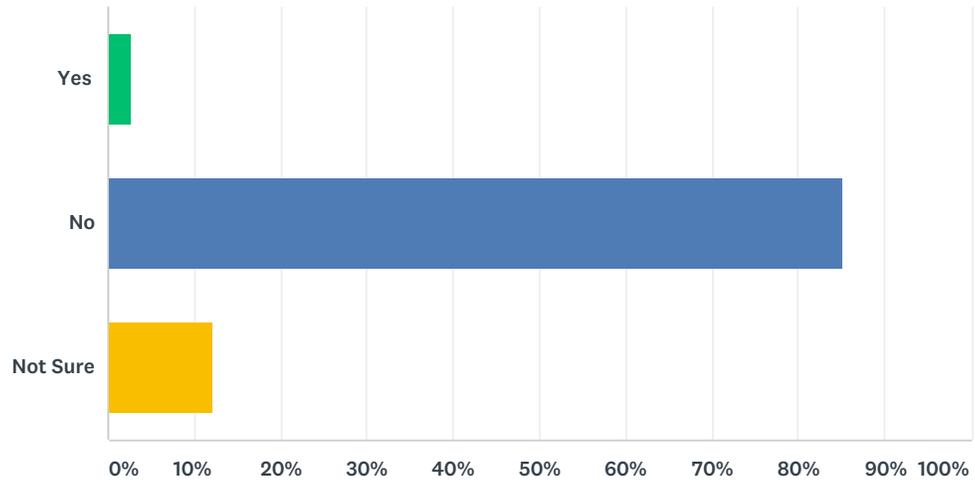
Answered: 216 Skipped: 33



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	58.33%	126
Not Sure	41.67%	90
TOTAL		216

Q12 Do you have earthquake insurance?

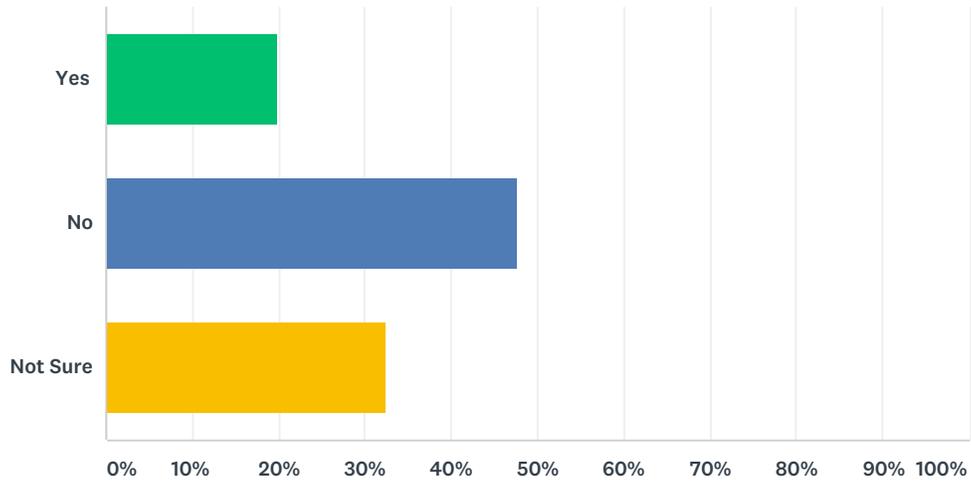
Answered: 216 Skipped: 33



ANSWER CHOICES	RESPONSES	
Yes	2.78%	6
No	85.19%	184
Not Sure	12.04%	26
TOTAL		216

Q13 Is your property located in an area at risk for wildfires?

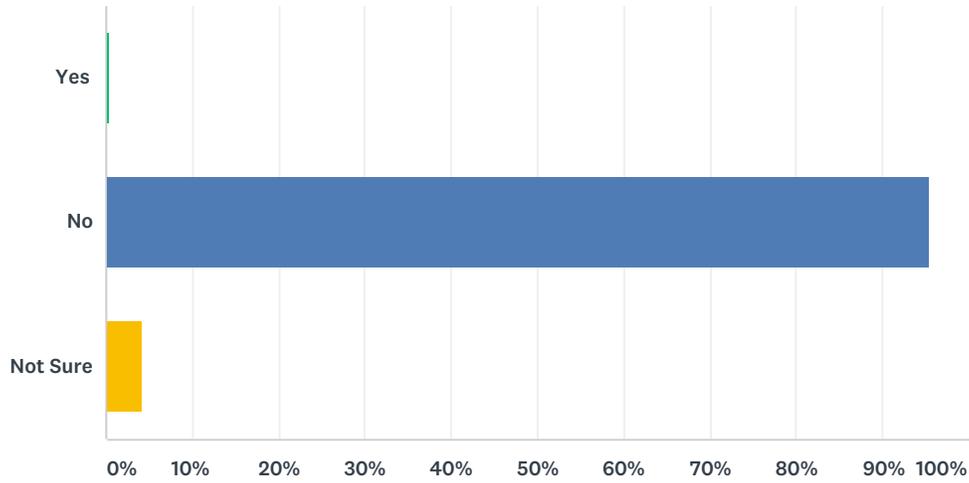
Answered: 216 Skipped: 33



ANSWER CHOICES	RESPONSES	
Yes	19.91%	43
No	47.69%	103
Not Sure	32.41%	70
TOTAL		216

Q14 Have you ever had problems getting homeowners or renters insurance due to risks from natural hazards?

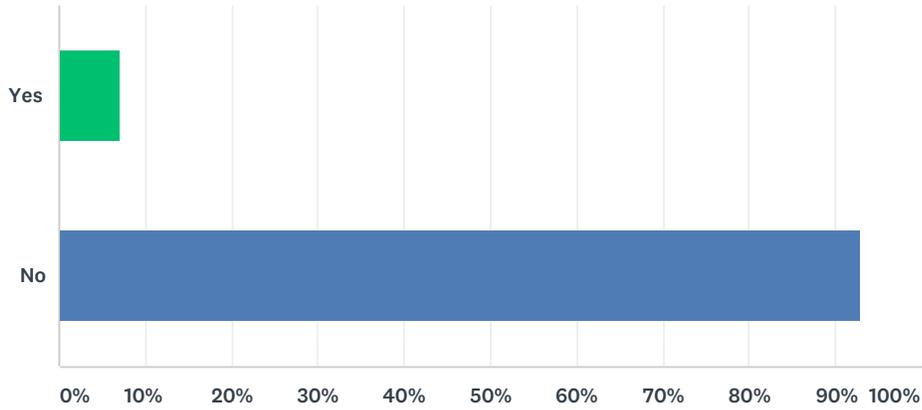
Answered: 215 Skipped: 34



ANSWER CHOICES	RESPONSES	
Yes	0.47%	1
No	95.35%	205
Not Sure	4.19%	9
TOTAL		215

Q15 Do you have any special access or functional needs within your household that would require early warning or specialized response during disasters?

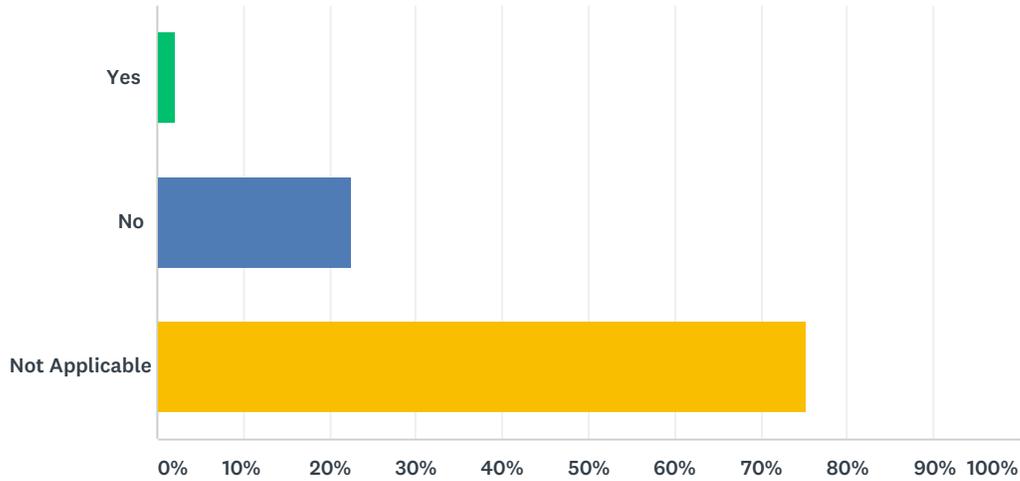
Answered: 214 Skipped: 35



ANSWER CHOICES	RESPONSES	
Yes	7.01%	15
No	92.99%	199
TOTAL		214

Q16 If the answer to question # 15 was yes, would you like County Emergency Management personnel to contact you regarding your access and functional needs? If yes, please enter your contact information in the following text box.

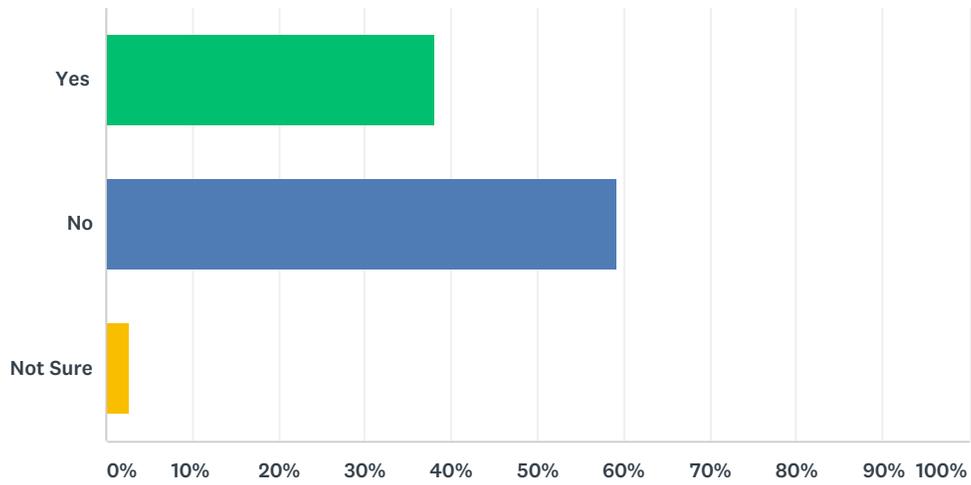
Answered: 146 Skipped: 103



ANSWER CHOICES	RESPONSES	
Yes	2.05%	3
No	22.60%	33
Not Applicable	75.34%	110
TOTAL		146

Q17 When you moved into your home, did you consider the impact a natural disaster could have on your home?

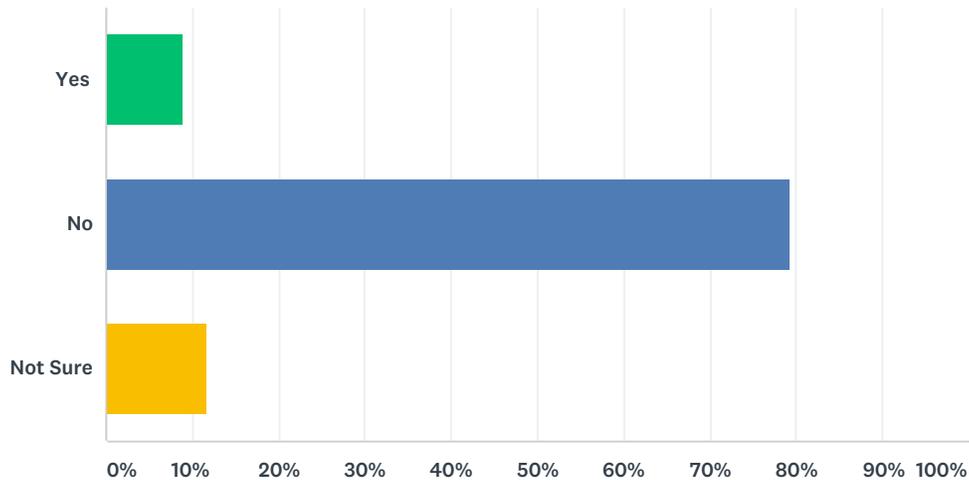
Answered: 189 Skipped: 60



ANSWER CHOICES	RESPONSES	
Yes	38.10%	72
No	59.26%	112
Not Sure	2.65%	5
TOTAL		189

Q18 Was the presence of a natural hazard risk zone (e.g., dam failure zone, flood zone, landslide hazard area, high fire risk area) disclosed to you by a real estate agent, seller, or landlord before you purchased or moved into your home?

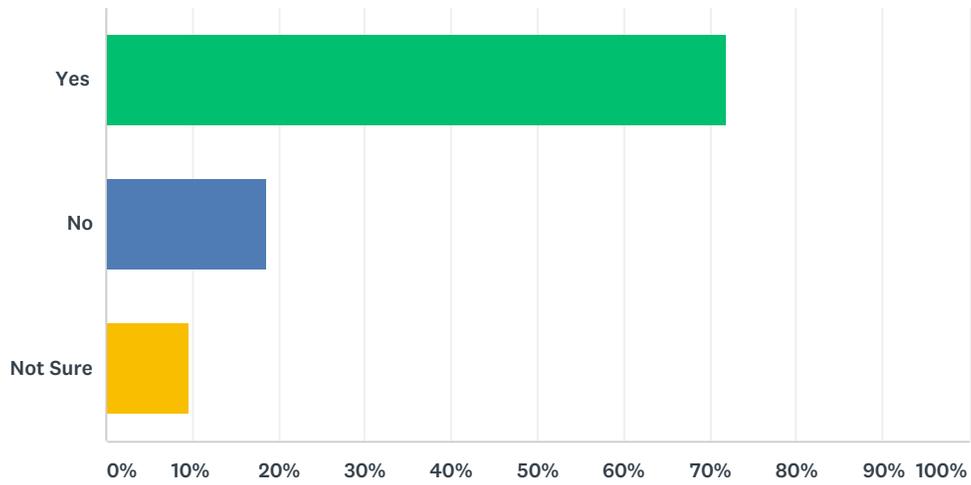
Answered: 189 Skipped: 60



ANSWER CHOICES	RESPONSES	
Yes	8.99%	17
No	79.37%	150
Not Sure	11.64%	22
TOTAL		189

Q19 Would the disclosure of this type of natural hazard risk information influence your decision to buy or rent a home?

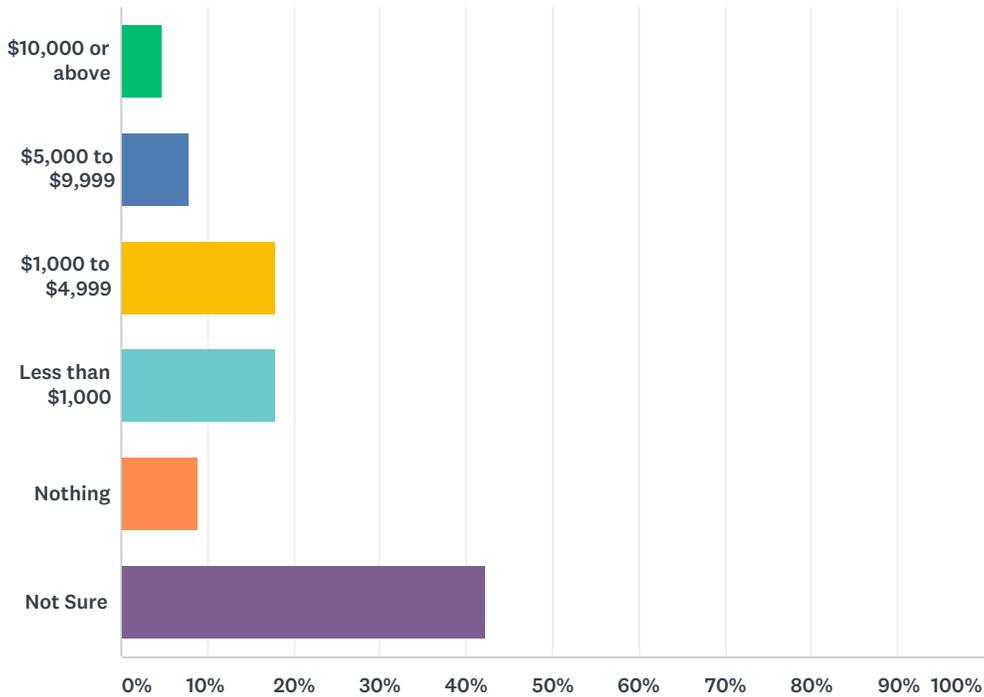
Answered: 189 Skipped: 60



ANSWER CHOICES	RESPONSES	
Yes	71.96%	136
No	18.52%	35
Not Sure	9.52%	18
TOTAL		189

Q20 How much money would you be willing to spend to retrofit your home to reduce risks associated with natural disasters? (for example, by clearing brush and plant materials from around your home to create a "defensible space" for wildfire, performing seismic upgrades, or replacing a combustible roof with non-combustible roofing)

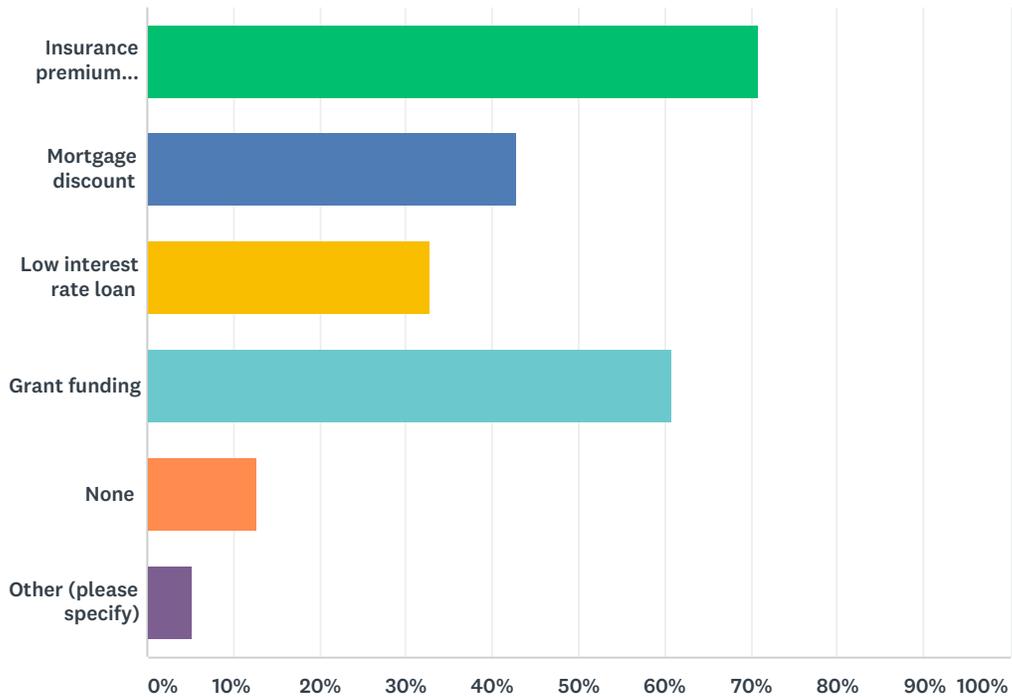
Answered: 189 Skipped: 60



ANSWER CHOICES	RESPONSES
\$10,000 or above	4.76% 9
\$5,000 to \$9,999	7.94% 15
\$1,000 to \$4,999	17.99% 34
Less than \$1,000	17.99% 34
Nothing	8.99% 17
Not Sure	42.33% 80
TOTAL	189

Q21 Which of the following incentives would encourage you to spend money to retrofit your home to protect against natural disasters? (Check all that apply)

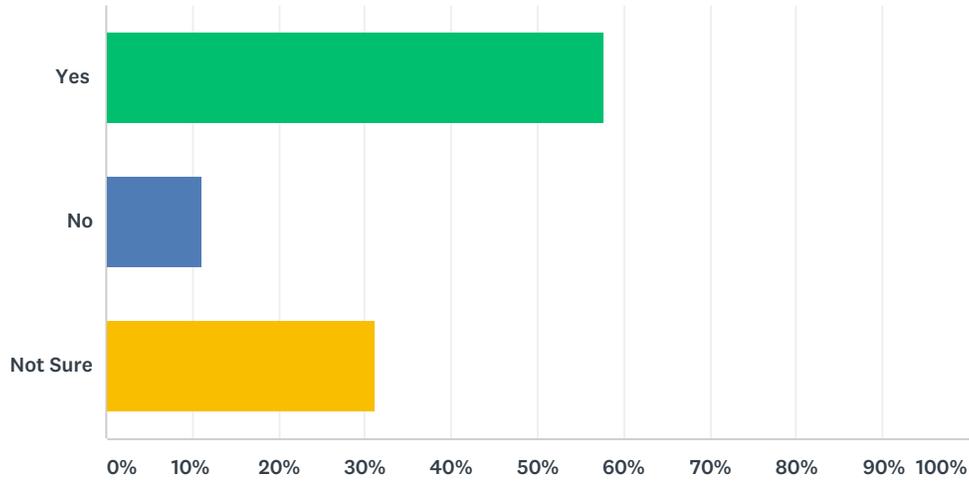
Answered: 189 Skipped: 60



ANSWER CHOICES	RESPONSES	
Insurance premium discount	70.90%	134
Mortgage discount	42.86%	81
Low interest rate loan	32.80%	62
Grant funding	60.85%	115
None	12.70%	24
Other (please specify)	5.29%	10
Total Respondents: 189		

Q22 If your property were located in a designated “high hazard” area or had received repetitive damages from a natural hazard event, would you consider a “buyout” offered by a public agency?

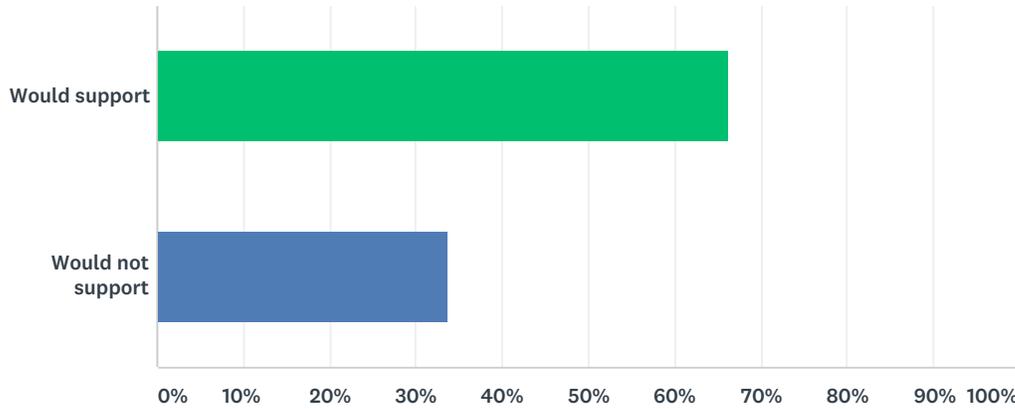
Answered: 189 Skipped: 60



ANSWER CHOICES	RESPONSES	
Yes	57.67%	109
No	11.11%	21
Not Sure	31.22%	59
TOTAL		189

Q23 Would you support the regulation (restriction) of land uses within known high hazard areas?

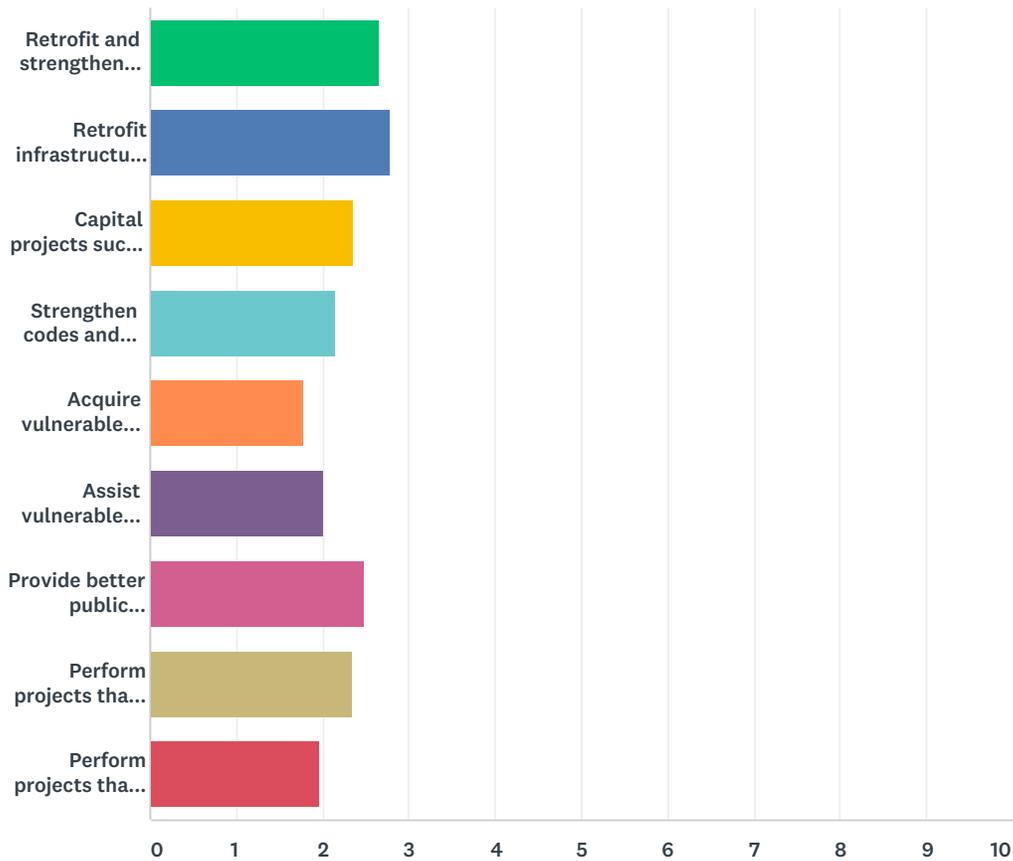
Answered: 187 Skipped: 62



ANSWER CHOICES	RESPONSES	
Would support	66.31%	124
Would not support	33.69%	63
TOTAL		187

Q24 What types of projects do you believe the County, State or Federal government agencies should be doing in order to reduce damage and disruption from hazard events within Smith County? Please rank each option as a high, medium or low priority.

Answered: 185 Skipped: 64



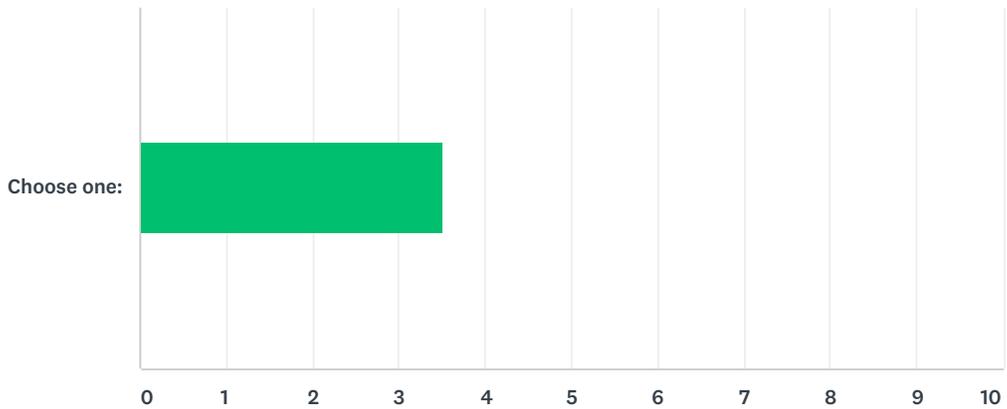
	HIGH	MEDIUM	LOW	TOTAL	WEIGHTED AVERAGE
Retrofit and strengthen essential facilities such as police, fire, schools and hospitals.	72.43% 134	20.00% 37	7.57% 14	185	2.65
Retrofit infrastructure such as roads, bridges, drainage facilities, water supply, waste water and power supply facilities.	78.92% 146	20.00% 37	1.08% 2	185	2.78
Capital projects such as dams, flood walls, drainage improvements and bank stabilization projects.	46.49% 86	42.70% 79	10.81% 20	185	2.36
Strengthen codes and regulations to include higher regulatory standards in hazard areas.	37.02% 67	40.88% 74	22.10% 40	181	2.15
Acquire vulnerable properties and maintain as open space.	21.47% 38	33.90% 60	44.63% 79	177	1.77
Assist vulnerable property owners with securing funding for mitigation.	31.32% 57	38.46% 70	30.22% 55	182	2.01
Provide better public information about risk, and the exposure to hazards within the operational area.	58.79% 107	32.42% 59	8.79% 16	182	2.50

Smith County TX HMP Update Survey

Perform projects that restore the natural environments capacity to absorb the impacts from natural hazards.	45.36% 83	43.72% 80	10.93% 20	183	2.34
Perform projects that mitigate the potential impacts from climate change.	31.32% 57	34.07% 62	34.62% 63	182	1.97

Q25 Please indicate how you feel about the following statement:It is the responsibility of government (local, state and federal) to provide education and programs that promote citizen actions that will reduce exposure to the risks associated with natural hazards.

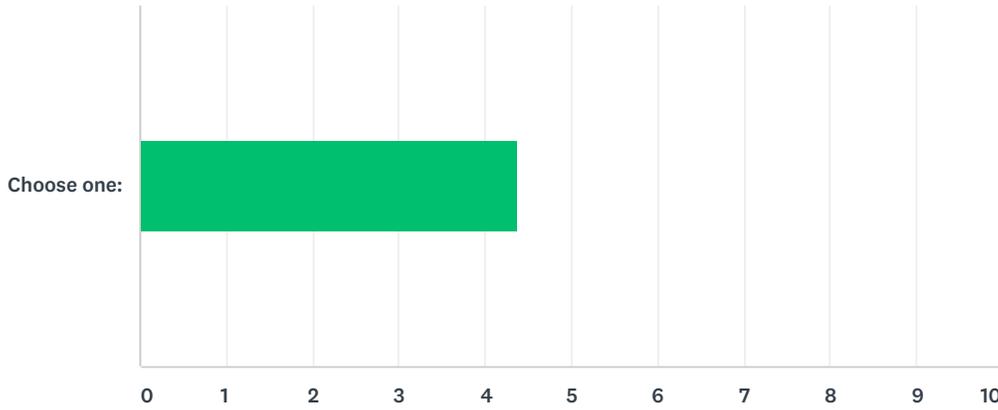
Answered: 186 Skipped: 63



	STRONGLY DISAGREE	SOMEWHAT DISAGREE	NEITHER AGREE NOR DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
Choose one:	9.68% 18	11.83% 22	17.74% 33	39.25% 73	21.51% 40	186	3.51

Q26 Please indicate how you feel about the following statement:It is my responsibility to educate myself and take actions that will reduce my exposure to the risks associated with natural hazards.

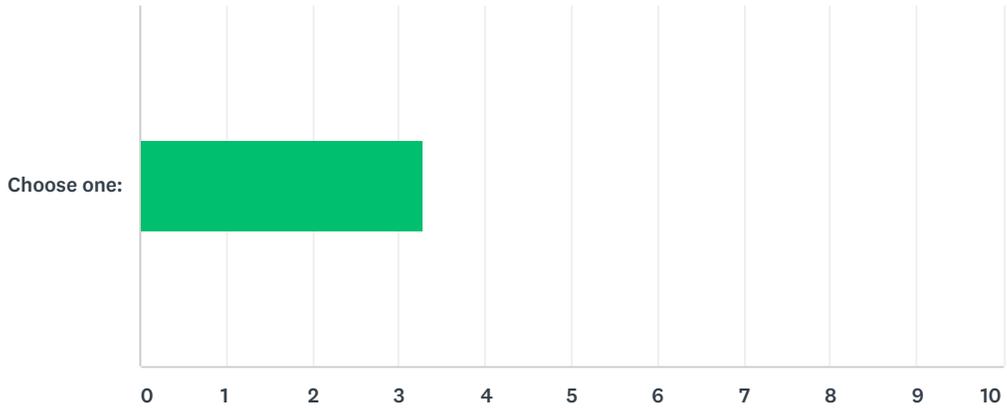
Answered: 186 Skipped: 63



	STRONGLY DISAGREE	SOMEWHAT DISAGREE	NEITHER AGREE NOR DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
Choose one:	3.76% 7	1.61% 3	4.84% 9	32.26% 60	57.53% 107	186	4.38

Q27 Please indicate how you feel about the following statement: Information about the risks associated with natural hazards is readily available and easy to locate.

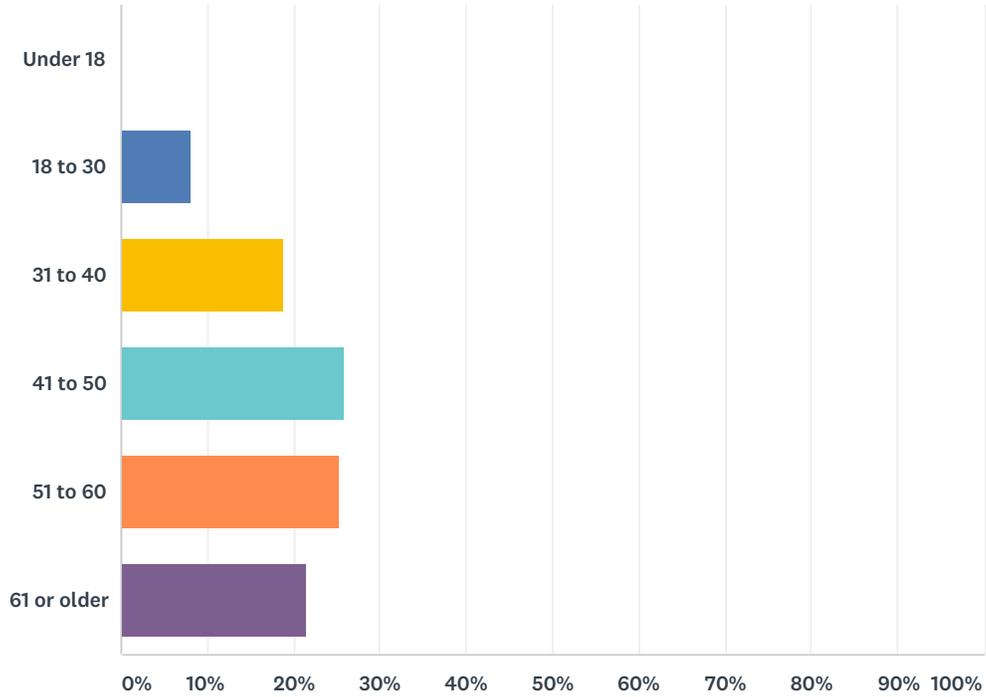
Answered: 187 Skipped: 62



	STRONGLY DISAGREE	SOMEWHAT DISAGREE	NEITHER AGREE NOR DISAGREE	SOMEWHAT AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
Choose one:	8.02% 15	17.65% 33	24.60% 46	37.97% 71	11.76% 22	187	3.28

Q28 Please indicate your age range:

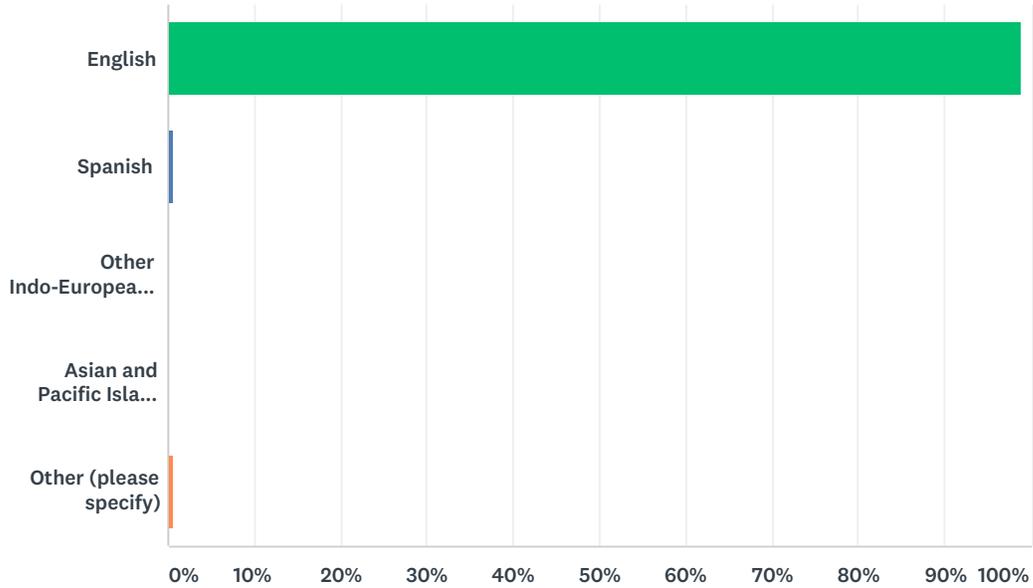
Answered: 185 Skipped: 64



ANSWER CHOICES	RESPONSES	
Under 18	0.00%	0
18 to 30	8.11%	15
31 to 40	18.92%	35
41 to 50	25.95%	48
51 to 60	25.41%	47
61 or older	21.62%	40
TOTAL		185

Q29 Please indicate the primary language spoken in your household.

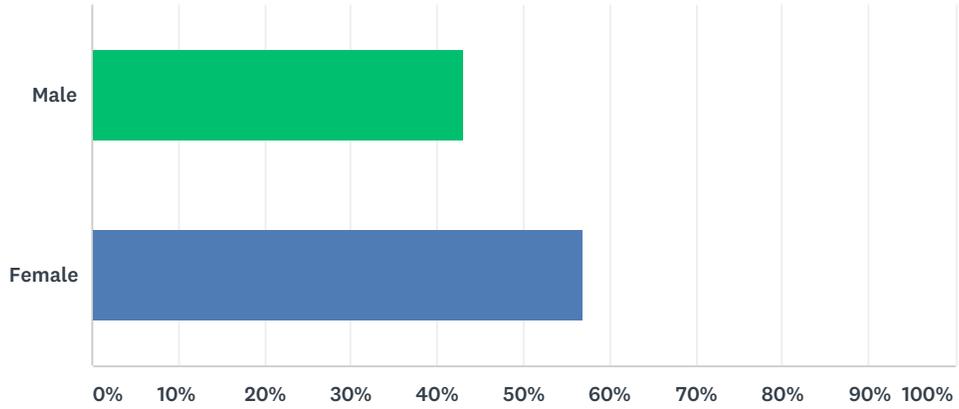
Answered: 185 Skipped: 64



ANSWER CHOICES	RESPONSES	
English	98.92%	183
Spanish	0.54%	1
Other Indo-European Languages	0.00%	0
Asian and Pacific Island Languages	0.00%	0
Other (please specify)	0.54%	1
TOTAL		185

Q30 Please indicate your gender:

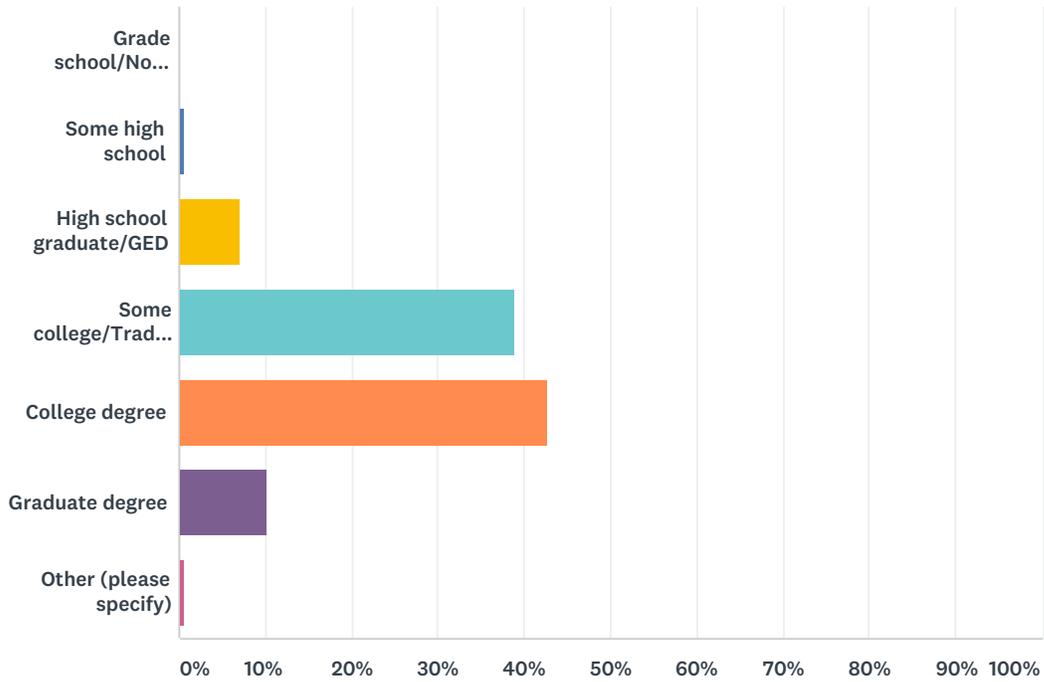
Answered: 183 Skipped: 66



ANSWER CHOICES	RESPONSES	
Male	43.17%	79
Female	56.83%	104
TOTAL		183

Q31 Please indicate your highest level of education.

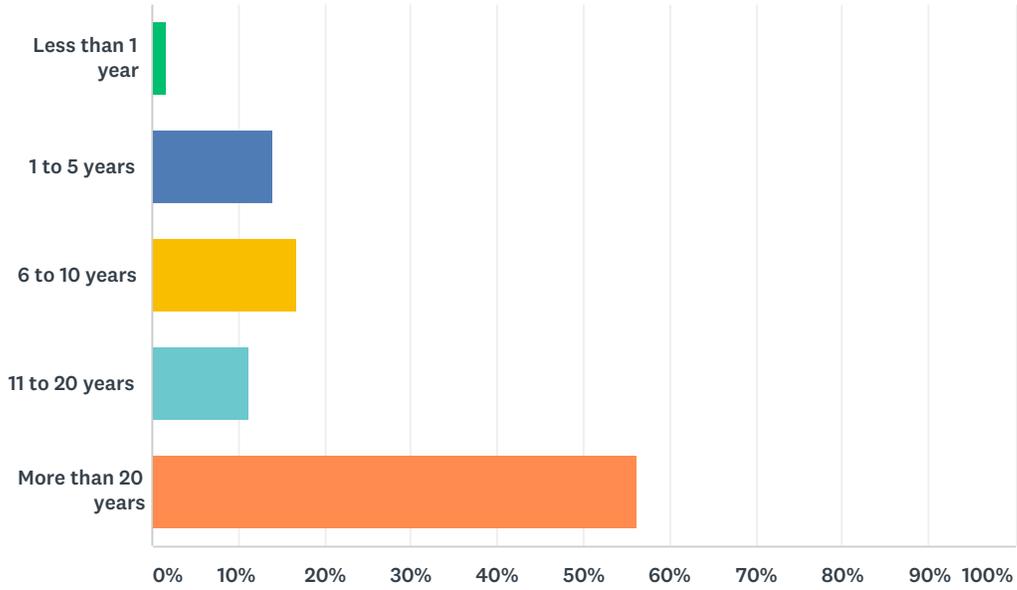
Answered: 185 Skipped: 64



ANSWER CHOICES	RESPONSES
Grade school/No schooling	0.00% 0
Some high school	0.54% 1
High school graduate/GED	7.03% 13
Some college/Trade school	38.92% 72
College degree	42.70% 79
Graduate degree	10.27% 19
Other (please specify)	0.54% 1
TOTAL	185

Q32 How long have you lived in Smith County?

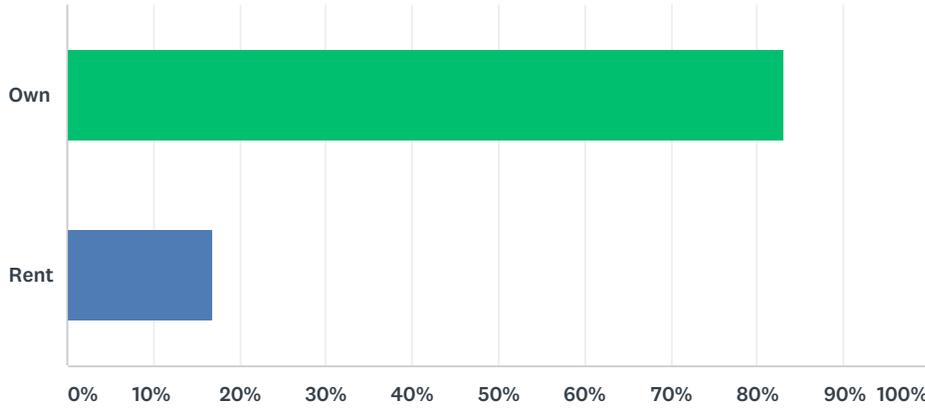
Answered: 185 Skipped: 64



ANSWER CHOICES	RESPONSES	
Less than 1 year	1.62%	3
1 to 5 years	14.05%	26
6 to 10 years	16.76%	31
11 to 20 years	11.35%	21
More than 20 years	56.22%	104
TOTAL		185

Q33 Do you own or rent your place of residence?

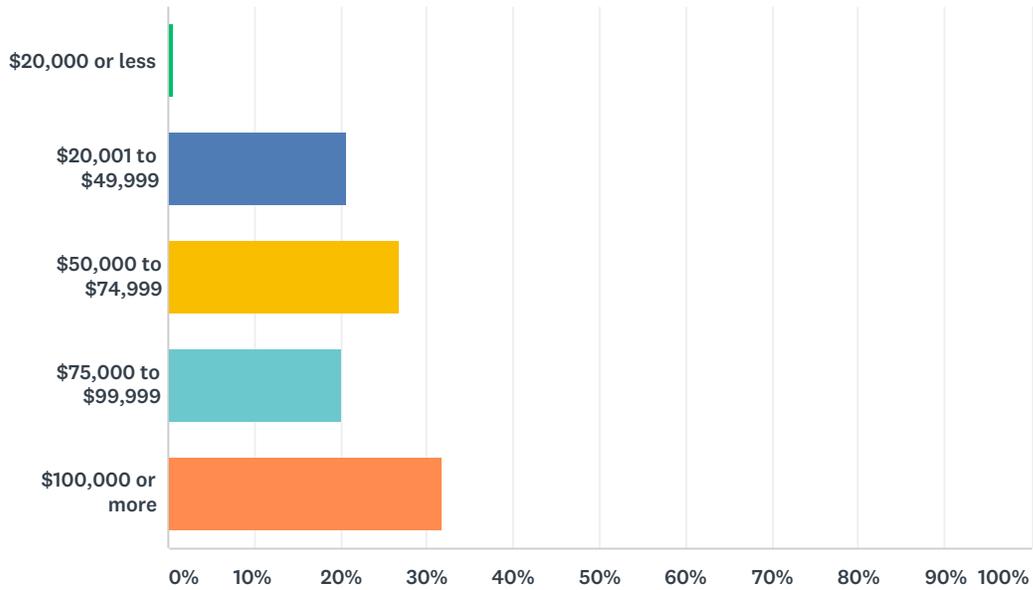
Answered: 184 Skipped: 65



ANSWER CHOICES	RESPONSES	
Own	83.15%	153
Rent	16.85%	31
TOTAL		184

Q34 How much is your gross household income?

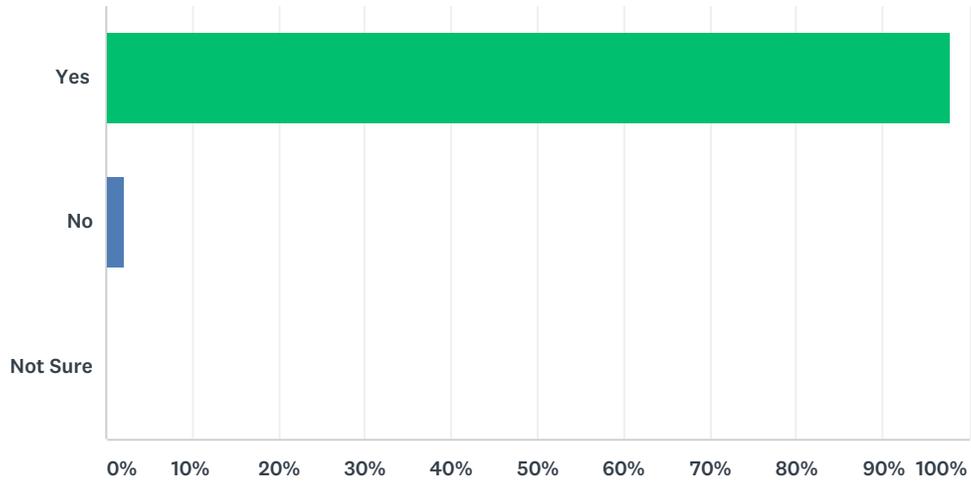
Answered: 179 Skipped: 70



ANSWER CHOICES	RESPONSES	
\$20,000 or less	0.56%	1
\$20,001 to \$49,999	20.67%	37
\$50,000 to \$74,999	26.82%	48
\$75,000 to \$99,999	20.11%	36
\$100,000 or more	31.84%	57
TOTAL		179

Q35 Do you have regular access to the Internet either in your home, work or elsewhere?

Answered: 186 Skipped: 63



ANSWER CHOICES	RESPONSES	
Yes	97.85%	182
No	2.15%	4
Not Sure	0.00%	0
TOTAL		186

**APPENDIX E.
PREVIOUS ACTIONS**

APPENDIX E. PREVIOUS ACTIONS

This appendix presents the previous mitigation action identified in the 2011-2016 Hazard Mitigation Plan and their status.

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments	
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received		Target Completion
Smith County Specific Actions as listed 2011 HMP										
Dam Failure1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam Failure2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam Failure3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam Failure4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam Failure5	Update the inundation maps at least every 10 years.(Long Term)			x						
Disease1	Increase ability to vaccinate and spay/neuter animals. (Long Term)				X					
Disease2	Create a County Emergency Action Plan for mass public vaccination. (Long Term)				X					
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)		x							Continue as Action #2
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Smith County Specific Actions as listed 2011 HMP									
Flood1	Continue efforts to develop or enhance data and mapping for floodplain information within the County as needed. (Long Term)			x					
Flood2	Take action to flood-proof public buildings, where appropriate. (Long Term)			x					
Hail1	Educate the public on strengthening roofs through the use of specific building materials, such as concrete tiles, this can lessen the long-term damage from hailstorms and protect private property utilizing informational pamphlets. (Short Term)			x					
Hail2	Stress the importance of purchasing NOAA Weather Radios for homes and businesses which automatically alerts the public when a watch or warning is issued for an area. (Short Term)			x					
HazardousMaterials1	As development occurs, evaluate and implement more logical alternative hazardous material (HAZMAT) routes, especially for areas, in which hazardous materials are passing by high or critical populations. (Long Term)				X				
HazardousMaterials2	Develop a plan to handle evacuated residents from surrounding areas. (Short Term)				X				
Lightning1	Stress the importance of NOAA Weather Radios that automatically alert the public when a watch or warning is issued for an area as well as train people to serve as weather spotters. Public Service Announcements could be used for this type of information dissemination. (Short Term)			x					
Smith County Specific Actions as listed 2011 HMP									

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Lightning2	Encourage cities within the County to pass ordinances requiring buried power lines. This offer the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Long Term)				x				
Thunderstorm1	Enhance strategies for debris management by establishing specific locations throughout the county which can house debris until it can be disposed of properly. (Short Term)				x				
Thunderstorm2	Map and publicize locations around the County that have the highest incidence of extreme thunderstorm and windstorm events. (Long Term)				X				
Tornado1	Incorporate the design of shelters in the construction of new critical facilities. (Long Term)				X				
Tornado2	Retrofit or add shelters to existing facilities that offer adequate protection. (Long Term)				X				
Wildfire1	Increase training opportunities, dispatching capabilities, communication capabilities, and necessary equipment in order to reduce damage that could occur as a result of inadequate resources. (Short Term)			x					
Wildfire2	Enhance response capabilities in the County by working with local fire departments by assisting with funding to increase training and upgrade equipment. (Evaluate whether additional resources are needed for particular types of fires, structural, forestry, grass fires, petroleum, etc.). (Long Term)			x					
Winter Storm1	Enhance strategies for debris management after storms. (Short Term)			x					
Winter Storm2	Enhance weather monitoring to attain earlier severe storm warning. (Short Term)			x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Arp Specific Actions as listed 2011 HMP										
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x						
Thunderstorm2	Evaluate the need for early storm warning notification systems for those communities that currently have none or need upgrades. (Short Term)			x						
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)				x					
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)		x							Continue as Action #2
Hail1	Reduce the adverse impacts by preparing individuals and buildings with materials that will withstand hail storms. Encourage citizens to purchase storm windows and doors to protect private property and provide adequate shelter within the home or business. (Short Term)			x						
Hail2	Produce pamphlets describing to the general public the actions necessary to protect life and property <i>prior</i> to a hail storm. These actions would include bringing property such as cars and pets into a sheltered area, seeking adequate shelter if humans are outside, when a hailstorm is imminent. (Short Term)				x					
Tornado1	Ensure that all public building have a designated "safe haven." (Long Term)				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Arp Specific Actions as listed 2011 HMP										
Tornado2	Require critical facilities, such as schools and daycare centers, to determine the best location for occupants during a storm, and provide directions to the designated "safe haven." (Long Term)			x						
Wildfire1	Identify alternative methods of water supply to fight fires. (Long Term)			x						
Wildfire2	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)		x							Continue as Action #7
Drought3	Continuous campaigns to support water conservation practices.(Long Term)				x					
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)				x					
Flood1	Develop and/or obtain data necessary to develop floodplain regulations. (Long Term)			x						
Flood2	Adopt measures to control runoff from developing areas outside the floodplain (Long Term) a. Incorporate "No Adverse Impact" methods to community activities, where appropriate. b. Recommend revisions to requirements for development within the floodplain, where appropriate.				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Arp Specific Actions as listed 2011 HMP										
WinterStorm1	Enhance weather monitoring to attain earlier severe storm warning. (Short Term)			x						
WinterStorm2	Enhance strategies for debris management. (Short Term)			x						
Hazmat1	Develop a plan to handle evacuated residents from surrounding areas. (Long Term)				X					
Hazmat2	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Long Term)				X					
Disease1	Encourage clinics to increase oxygen stock in order to have an adequate quantity to refill tanks for citizens that are dependent on power to run breathing machines. (tank capacity -- four hour limit). (Short Term)				X					
Disease2	Designate a climate-controlled area for Disease-related supplies. (Short Term)				X					
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Bullard Specific Actions as listed 2011 HMP									
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x					
Thunderstorm2	Evaluate the need for early storm warning notification systems. (Long Term)			x					
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)				x				
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)				x				
Hail1	Stress the importance of purchasing NOAA Weather Radios for homes and businesses which automatically alerts the public when a watch or warning is issued for an area. These notices will be distributed in water bills. (Short Term)			x					
Hail2	Educate the public on strengthening roofs through the use of specific building materials, such as concrete tiles, this can lessen the long-term damage from hailstorms and protect private property. (Long Term)			x					
Tornado1	Adopt the most current edition of a model building codes and engineering standards that provide greater protection against high winds. (Long Term)			x					
Tornado2	Obtain a current inventory of all buildings and their wind ratings, and recommend any necessary modifications. (Long Term)				x				

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Bullard Specific Actions as listed 2011 HMP										
Wildfire1	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Wildfire2	Enhance response capabilities by the fire department by increasing training and upgrading equipment. (Evaluate whether additional resources are needed for particular types of fires, structural, forestry, grass fires, petroleum, etc.). (Long Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how to go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts from drought. (Long Term)				x					
Flood1	Encourage development of acquisition and management strategies to preserve open space for flood mitigation and water quality in the floodplain. (Long Term)				x					
Flood2	Improve maintenance of storm gutters and storm sewers. (Short Term)		x							Ongoing. The City has a new Street Department in 2018.
WinterStorm1	Enhance strategies for debris management. (Short Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Bullard Specific Actions as listed 2011 HMP										
WinterStorm2	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure. (Long Term)			x						
HazMat1	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Short Term)				X					
HazMat2	As development occurs, evaluate and implement more logical alternative hazardous material (HAZMAT) routes, especially for areas, in which hazardous materials are passing by high or critical populations. (Short Term)				X					
Disease1	Increase ability to vaccinate and spay/neuter animals. (Long Term)				X					
Disease2	Take measures to reduce fear associated with bio-terrorist threats by distributing accurate, non-biased information. (Short Term)				X					
DamFailure1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
DamFailure2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
DamFailure3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
DamFailure4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
DamFailure5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Hideaway Specific Actions as listed 2011 HMP										
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x						
Thunderstorm2	Evaluate the need for early storm warning notification systems for those communities that currently have none or need upgrades. (Short Term)			x						
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)			x						
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)				x					
Hail1	Stress the importance of purchasing NOAA Weather Radios for homes and businesses which automatically alerts the public when a watch or warning is issued for an area. These notices will be distributed in water bills. (Short Term)			x						
Hail2	Educate the public on strengthening roofs through the use of specific building materials, such as concrete tiles, this can lessen the long-term damage from hailstorms and protect private property. (Long Term)			x						
Tornado1	engineering standards that provide greater protection against high winds. (Long Term)			x						
Tornado2	Obtain a current inventory of all buildings and their wind ratings, and recommend any necessary modifications. (Long Term)				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Hideaway Specific Actions as listed 2011 HMP										
Wildfire1	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Wildfire2	Enhance response capabilities by the fire department by increasing training and upgrading equipment. (Evaluate whether additional resources are needed for particular types of fires, structural, forestry, grass fires, petroleum, etc.). (Long Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)				x					
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how to go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts from drought. (Long Term)				x					
Flood1	Encourage development of acquisition and management strategies to preserve open space for flood mitigation and water quality in the floodplain. (Long Term)				x					
Flood2	Improve maintenance of storm gutters and storm sewers. (Short Term)				x					
WinterStorm1	Enhance strategies for debris management. (Short Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Hideaway Specific Actions as listed 2011 HMP										
WinterStorm2	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure. (Long Term)			x						
HazMat1	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Short Term)				X					
HazMat2	As development occurs, evaluate and implement more logical alternative hazardous material (HAZMAT) routes, especially for areas, in which hazardous materials are passing by high or critical populations. (Short Term)				X					
Disease1	Increase ability to vaccinate and spay/neuter animals. (Long Term)				X					
Disease2	Take measures to reduce fear associated with bio-terrorist threats by distributing accurate, non-biased information. (Short Term)				X					
DamFailure1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
DamFailure2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
DamFailure3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
DamFailure4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
DamFailure5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Lindale Specific Actions as listed 2011 HMP										
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x						
Thunderstorm2	Evaluate the need for early storm warning notification systems for those communities that currently have none or need upgrades. (Short Term)			x						
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)				x					
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)		x							Continue as Action #2
Hail1	Reduce the adverse impacts by preparing individuals and buildings with materials that will withstand hail storms. Encourage citizens to purchase storm windows and doors to protect private property and provide adequate shelter within the home or business. (Short Term)			x						
Hail2	Produce pamphlets describing to the general public the actions necessary to protect life and property prior to a hail storm. These actions would include bringing property such as cars and pets into a sheltered area, seeking adequate shelter if humans are outside, when a hailstorm is imminent. (Short Term)		x							Continue as Action #1
Tornado1	Ensure that all public building have a designated "safe haven." (Long Term)		x							Continue as Action #2
Tornado2	Require critical facilities, such as schools and daycare centers, to determine the best location for occupants during a storm, and provide directions to the designated "safe haven." (Long Term)			x						
Wildfire1	Identify alternative methods of water supply to fight fires. (Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Lindale Specific Actions as listed 2011 HMP										
Wildfire2	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)			x						
Flood1	Develop and/or obtain data necessary to develop floodplain regulations. (Long Term)			x						
Flood2	Adopt measures to control runoff from developing areas outside the floodplain (Long Term) a. Incorporate "No Adverse Impact" methods to community activities, where appropriate. b. Recommend revisions to requirements for development within the floodplain, where appropriate.		x							Continue as Action #3 and #4
WinterStorm1	Enhance weather monitoring to attain earlier severe storm warning. (Short Term)			x						
WinterStorm2	Enhance strategies for debris management. (Short Term)			x						
Hazmat1	Develop a plan to handle evacuated residents from surrounding areas. (Long Term)				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Lindale Specific Actions as listed 2011 HMP										
Hazmat2	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Long Term)				X					
Disease1	Encourage clinics to increase oxygen stock in order to have an adequate quantity to refill tanks for citizens that are dependent on power to run breathing machines. (tank capacity -- four hour limit). (Short Term)				X					
Disease2	Designate a climate-controlled area for Disease-related supplies. (Short Term)				X					
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
New Chapel Hill Specific Actions as listed 2011 HMP										
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x						
Thunderstorm2	Evaluate the need for early storm warning notification systems for those communities that currently have none or need upgrades. (Short Term)			x						
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)				x					
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)			x						
Hail1	Reduce the adverse impacts by preparing individuals and buildings with materials that will withstand hail storms. Encourage citizens to purchase storm windows and doors to protect private property and provide adequate shelter within the home or business. (Short Term)			x						
Hail2	Produce pamphlets describing to the general public the actions necessary to protect life and property prior to a hail storm. These actions would include bringing property such as cars and pets into a sheltered area, seeking adequate shelter if humans are outside, when a hailstorm is imminent. (Short Term)		x							Continue Action #1
Tornado1	Ensure that all public building have a designated "safe haven." (Long Term)			x						
Tornado2	Require critical facilities, such as schools and daycare centers, to determine the best location for occupants during a storm, and provide directions to the designated "safe haven." (Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
New Chapel Hill Specific Actions as listed 2011 HMP										
Wildfire1	Identify alternative methods of water supply to fight fires. (Long Term)			x						
Wildfire2	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how to go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts from drought. (Long Term)				x					
Flood1	Develop and/or obtain data necessary to develop floodplain regulations. (Long Term)			x						
Flood2	Adopt measures to control runoff from developing areas outside the floodplain (Long Term) a. Incorporate "No Adverse Impact" methods to community activities, where appropriate. b. Recommend revisions to requirements for development within the floodplain, where appropriate.				x					
WinterStorm1	Enhance weather monitoring to attain earlier severe storm warning. (Short Term)			x						
WinterStorm2	Enhance strategies for debris management. (Short Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
New Chapel Hill Specific Actions as listed 2011 HMP										
Hazmat1	Develop a plan to handle evacuated residents from surrounding areas. (Long Term)				X					
Hazmat2	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Long Term)				X					
Disease1	Encourage clinics to increase oxygen stock in order to have an adequate quantity to refill tanks for citizens that are dependent on power to run breathing machines. (tank capacity -- four hour limit). (Short Term)				X					
Disease2	Designate a climate-controlled area for Disease-related supplies. (Short Term)				X					
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Noonday Specific Actions as listed 2011 HMP									
Thunderstorm1	Encourage electrical utilities to use underground construction methods where possible to reduce power outages from thunderstorms and windstorms. (Long Term)				x				
Thunderstorm2	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x					
Lightning1	Pass ordinance requiring buried power lines. This offer the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Long Term)				x				
Lightning2	Require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)				x				
Hail1	Reduce the adverse impacts by preparing individuals and buildings with materials that will withstand hail storms. Encourage citizens to purchase storm windows and doors to protect private property and provide adequate shelter within the home or business. (Short Term)			x					
Hail2	Produce pamphlets describing to the general public the actions necessary to protect life and property prior to a hail storm. These actions would include bringing property such as cars and pets into a sheltered area, seeking adequate shelter if humans are outside, when a hailstorm is imminent. (Short Term)		x						Continued as Action #1
Tornado1	Ensure that all public building have a designated "safe haven." (Long Term)				x				

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Noonday Specific Actions as listed 2011 HMP										
Tornado2	Require critical facilities, such as schools and daycare centers, to determine the best location for occupants during a storm, and provide directions to the designated "safe haven." (Long Term)			x						
Wildfire1	Identify alternative methods of water supply to fight fires. (Long Term)			x						
Wildfire2	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)				x					
Flood1	Develop and/or obtain data necessary to develop floodplain regulations. (Long Term)			x						
Flood2	Adopt measures to control runoff from developing areas outside the floodplain (Long Term) a. Incorporate "No Adverse Impact" methods to community activities, where appropriate. b. Recommend revisions to requirements for development within the floodplain, where appropriate.				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Noonday Specific Actions as listed 2011 HMP										
WinterStorm1	Enhance weather monitoring to attain earlier severe storm warning. (Short Term)			x						
WinterStorm2	Enhance strategies for debris management. (Short Term)			x						
Hazmat1	Develop a plan to handle evacuated residents from surrounding areas. (Long Term)				X					
Hazmat2	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Long Term)				X					
Disease1	Encourage clinics to increase oxygen stock in order to have an adequate quantity to refill tanks for citizens that are dependent on power to run breathing machines. (tank capacity -- four hour limit). (Short Term)				X					
Disease2	Designate a climate-controlled area for Disease-related supplies. (Short Term)				X					
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Troup Specific Actions as listed 2011 HMP										
Thunderstorm1	Pass Ordinance requiring utilities to use underground construction methods where possible to reduce power outages from thunderstorms and windstorms. (Long Term)				x					
Thunderstorm2	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x						
Lightning1	Pass ordinance requiring buried power lines. This offer the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Long Term)				x					
Lightning2	Require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)				x					
Hail1	Reduce the adverse impacts by preparing individuals and buildings with materials that will withstand hail storms. Encourage citizens to purchase storm windows and doors to protect private property and provide adequate shelter within the home or business. (Short Term)			x						
Hail2	Produce pamphlets describing to the general public the actions necessary to protect life and property prior to a hail storm. These actions would include bringing property such as cars and pets into a sheltered area, seeking adequate shelter if humans are outside, when a hailstorm is imminent. (Short Term)				x					
Tornado1	Ensure that all public building have a designated "safe haven." (Long Term)				x					
Tornado2	Require critical facilities, such as schools and daycare centers, to determine the best location for occupants during a storm, and provide directions to the designated "safe haven." (Long Term)				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Troup Specific Actions as listed 2011 HMP										
Wildfire1	Identify alternative methods of water supply to fight fires. (Long Term)			x						
Wildfire2	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)			X						
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long			X						
Flood1	Develop and/or obtain data necessary to develop floodplain regulations. (Long Term)			x						
Flood2	Adopt measures to control runoff from developing areas outside the floodplain (Long Term) a. Incorporate "No Adverse Impact" methods to community activities, where appropriate. b. Recommend revisions to requirements for development within the floodplain, where appropriate.		X							Continued as Mitigation Action 1
WinterStorm1	Enhance weather monitoring to attain earlier severe storm warning. (Short Term)			x						
WinterStorm2	Enhance strategies for debris management. (Short Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Troup Specific Actions as listed 2011 HMP										
Hazmat1	Develop a plan to handle evacuated residents from surrounding areas. (Long Term)				X					
Hazmat2	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Long Term)				X					
Disease1	Encourage clinics to increase oxygen stock in order to have an adequate quantity to refill tanks for citizens that are dependent on power to run breathing machines. (tank capacity -- four hour limit). (Short Term)				X					
Disease2	Designate a climate-controlled area for Disease-related supplies. (Short Term)				X					
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Tyler Specific Actions as listed 2011 HMP									
Thunderstorm1	Enhance strategies for debris management by establishing specific locations throughout the city which can house debris until it can be disposed of properly. (Short Term)			X		X			
Thunderstorm2	Map and publicize locations around the area that have the highest incidence of extreme thunderstorm and windstorm events. (Long Term)				X				
Lightning1	Public and private buildings should be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Short Term)			X					
Lightning2	Stress the importance of NOAA Weather Radios that automatically alert the public when a watch or warning is issued for an area as well as train people to serve as weather spotters. (Short Term)								
Hail1	Stress the importance of purchasing NOAA Weather Radios for homes and businesses which automatically alerts the public when a watch or warning is issued for an area. (Short Term)								
Hail2	Educate the public on strengthening roofs through the use of specific building materials, such as concrete tiles, this can lessen the long-term damage from hailstorms and protect private property. (Short Term)	X							Continue as Action #1
Tornado1	Encourage critical facilities, such as schools and daycare centers, to determine the best location for occupants during a storm, and provide directions to the designated "safe haven." (Short Term)			X					
Tornado2	Continue efforts to keep up-to-date list of addresses of shelters, to assist non-local emergency response agencies in checking after a tornado to see if people are trapped inside. (Long Term)			X					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Tyler Specific Actions as listed 2011 HMP									
Wildfire1	Utilize resources of the Texas Forest Service for fire prevention and suppression. (Short Term)			X					
Wildfire2	Utilize GIS department to develop maps to assist emergency services during response. (Long Term)				X				
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)	X							Continue as Action #1
Drought2	Adopt water conservation techniques. (Short Term)								
Drought3	Continuous campaigns to support water conservation practices.(Long Term)	X							Continue as Action #8
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)				X				
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)			X					
Flood1	Conduct hydrology studies and surveys of flood-prone areas and identify feasible mitigation options. (Long Term)			X					
Flood2	Take action to flood-proof public buildings, where appropriate. (Long Term)								
WinterStorm1	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure. (Long Term)				X				
WinterStorm2	Increase public awareness of severe winter storm mitigation activities. (Short Term)	X							Continue as Action #1

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Tyler Specific Actions as listed 2011 HMP									
Hazmat1	As development occurs, evaluate and implement more logical alternative hazardous material (HAZMAT) routes, especially for areas, in which hazardous materials are passing by high or critical populations. (Short Term)				X				
Hazmat2	Increase response capabilities by review HAZMAT evacuation plans and develop				X				
Disease1	Continue to pursue state and federal funding for health department to treat citizens of the community who may not have the opportunity to seek healthcare in a hospital due to insurance restrictions. (Short Term)				X				
Disease2	Continue to identify individuals with special needs and publicize existing programs to improve the County's inventory of any medical needs that might need to be addressed prior to, during, or after a hazard event, especially in the event of a power outage. (Long Term)				X				
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)				X				
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)				X				
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)				X				
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			X					
Dam5	Update the inundation maps at least every 10 years.(Long Term)				X				

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Whitehouse Specific Actions as listed 2011 HMP									
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x					
Thunderstorm2	Evaluate the need for early storm warning notification systems for those communities that currently have none or need upgrades. (Short Term)			x					
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)				x				
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)				x				
Hail1	Stress the importance of purchasing NOAA Weather Radios for homes and businesses which automatically alerts the public when a watch or warning is issued for an area. These notices will be distributed in water bills. (Short Term)			x					
Hail2	Educate the public on strengthening roofs through the use of specific building materials, such as concrete tiles, this can lessen the long-term damage from hailstorms and protect private property. (Long Term)			x					
Tornado1	Encourage the adoption of the most current edition of a model building codes and engineering standards that provide greater protection against high winds. (Long Term)			x					
Tornado2	Obtain a current inventory of all buildings and their wind ratings, and recommend any necessary modifications. (Long Term)				x				

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Whitehouse Specific Actions as listed 2011 HMP									
Wildfire1	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x					
Wildfire2	Enhance response capabilities by the volunteer fire department by increasing training and upgrading equipment. (Evaluate whether additional resources			x					
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x					
Drought2	Adopt water conservation techniques. (Short Term)			x					
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x					
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)				x				
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)				x				
Flood1	Encourage development of acquisition and management strategies to preserve open space for flood mitigation and water quality in the floodplain. (Long Term)				x				
Flood2	Improve maintenance of storm gutters and storm sewers. (Short Term)			x					
WinterStorm1	Enhance strategies for debris management. (Short Term)			x					
WinterStorm2	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure. (Long Term)			x					
HazMat1	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Short Term)				x				

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding			Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	
Whitehouse Specific Actions as listed 2011 HMP									
HazMat2	As development occurs, evaluate and implement more logical alternative hazardous material (HAZMAT) routes, especially for areas, in which hazardous materials are passing by high or critical populations. (Short Term)				X				
Disease1	Increase ability to vaccinate and spay/neuter animals. (Long Term)				X				
Disease2	Take measures to reduce fear associated with bio-terrorist threats by distributing accurate, non-biased information. (Short Term)				X				
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x					
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x					
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x					
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x					
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Winona Specific Actions as listed 2011 HMP										
Thunderstorm1	Increase public awareness of thunderstorm and windstorm mitigation activities, such as to secure loose objects, trimming tree limbs near power lines, etc. (Short Term)			x						
Thunderstorm2	Evaluate the need for early storm warning notification systems for those communities that currently have none or need upgrades. (Short Term)			x						
Lightning1	Pass ordinance requiring buried power lines. This offers the security of uninterrupted power during and after storms. Utility companies should be encouraged to bury lines where appropriate. (Short Term)				x					
Lightning2	Pass ordinances to require public and private buildings to be designed with lightning rods, structural bracing, shutters, laminated glass in window panes, and hail resistant roof shingles or flashing to minimize damage. (Long Term)				x					
Hail1	Stress the importance of purchasing NOAA Weather Radios for homes and businesses which automatically alerts the public when a watch or warning is issued for an area. These notices will be distributed in water bills. (Short Term)			x						
Hail2	Educate the public on strengthening roofs through the use of specific building materials, such as concrete tiles, this can lessen the long-term damage from hailstorms and protect private property. (Long Term)			x						
Tornado1	Encourage the adoption of the most current edition of a model building codes and engineering standards that provide greater protection against high winds. (Long Term)			x						
Tornado2	Obtain a current inventory of all buildings and their wind ratings, and recommend any necessary modifications. (Long Term)				x					

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Winona Specific Actions as listed 2011 HMP										
Wildfire1	Continue efforts to reduce fire fuel load on developed and undeveloped lots by removing debris. (Short Term)			x						
Wildfire2	Enhance response capabilities by the volunteer fire department by increasing training and upgrading equipment. (Evaluate whether additional resources are needed for particular types of fires, structural, forestry, grass fires, petroleum, etc.). (Long Term)			x						
Drought1	Distribute public awareness information regarding droughts to encourage citizens to lower their water use during drought periods. (Short Term)			x						
Drought2	Adopt water conservation techniques. (Short Term)			x						
Drought3	Continuous campaigns to support water conservation practices.(Long Term)			x						
Drought4	Distribute public awareness information regarding crop insurance which includes importance of insurance and how t go about purchasing insurance. (Long Term)				x					
Drought5	Make known drought assistance can be obtained through both State and Federal agencies to lessen the strain of financial impacts form drought. (Long Term)				x					
Flood1	Encourage development of acquisition and management strategies to preserve open space for flood mitigation and water quality in the floodplain. (Long Term)				x					
Flood2	Improve maintenance of storm gutters and storm sewers. (Short Term)				x					
WinterStorm1	Enhance strategies for debris management. (Short Term)			x						
WinterStorm2	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure. (Long Term)			x						

SMITH COUNTY PROJECT IMPLEMENTATION WORKSHEET (Update of 2011 HM Plan Projects)

Action No.	Action	Project Status				Funding				Comments
		In Progress	Delayed	Completed	No Longer Required	Budgeted	Apply for Grant	Grant Received	Target Completion	
Winona Specific Actions as listed 2011 HMP										
HazMat1	Continue efforts to collect information regarding the location of hazardous materials and distribute information to emergency response crews. (Short Term)				X					
HazMat2	As development occurs, evaluate and implement more logical alternative hazardous material (HAZMAT) routes, especially for areas, in which hazardous materials are passing by high or critical populations. (Short Term)				X					
Disease1	Increase ability to vaccinate and spay/neuter animals. (Long Term)				X					
Disease2	Take measures to reduce fear associated with bio-terrorist threats by distributing accurate, non-biased information. (Short Term)				X					
Dam1	Create a county wide mapping system that includes: Locate all dams on a map. Survey areas located below these dams that contain homes or business that would be impacted by a dam breach. Establish an inventory of these structures. (Long Term)			x						
Dam2	Work with land/property owners that would be impacted by a dam breach to inform them of the risk of the hazard and options for prevention. (Short Term)			x						
Dam3	Promote low intensity, non-residential land uses in dam inundation zones for future development.(Long Term)			x						
Dam4	Identify inundation areas and produce or update evacuation plans for those areas. (Short Term)			x						
Dam5	Update the inundation maps at least every 10 years.(Long Term)			x						

APPENDIX F.
LOCAL MITIGATION PLAN REVIEW TOOL

APPENDIX F. LOCAL MITIGATION PLAN REVIEW TOOL

This appendix presents the local mitigation action review tool for the Smith County Hazard Mitigation Plan. The review tool demonstrates how the plan meets federal regulations and offers state and FEMA planners

APPENDIX G.
PLAN ADOPTION RESOLUTIONS FROM PLANNING PARTNERS

APPENDIX G.
PLAN ADOPTION RESOLUTIONS FROM PLANNING PARTNERS

This appendix presents the signed resolutions from the planning partners.

RESOLUTION NO. 2018-006

HAZARD MITIGATION ACTION PLAN

WHEREAS, Smith County and the City of Arp have experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health and safety concerns; and

WHEREAS, the community at large affecting Smith County and the City of Arp has prepared a *Hazard Mitigation Plan* that outlines the communities' options to reduce overall damage and impact from hazards; and

WHEREAS, the *Hazard Mitigation Action Plan* has been reviewed by the community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, be it resolved that:

1. The *Hazard Mitigation Action Plan* is hereby adopted as an official plan of Smith County and the City of Arp.
2. A hazard mitigation planning group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Arp shall be a member of the Committee. Members of the Smith County/City of Arp Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be as designated in the *Hazard Mitigation Plan*.
3. The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the community governing body or other sources.
4. The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the *Hazard Mitigation Plan*.
 - a. Establish a formal Hazard Mitigation Committee to develop a process to implement & monitor mitigation activities and to update the Hazard Mitigation Plan.
 - b. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.
 - c. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - d. Prioritize the remaining mitigation measures according to funding

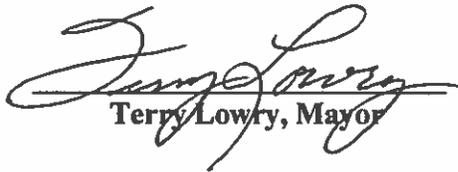
availability and cost-benefits analysis.

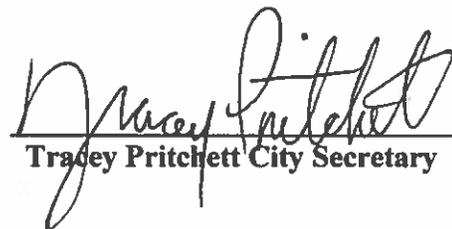
- e. Identify and pursue funding opportunities to develop and implement local mitigation activities.

5. The County Hazard Mitigation Officer shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners Court and the City of Arp in accordance with the following format:

- a. An annual review and/or update of the original plan.
- b. A review of any disaster or emergencies that occurred during the previous calendar year.
- c. A review of the actions taken, including what was accomplished during the year.
- d. A discussion of any implementation problems.
- e. Recommendations for new projects or revised action items. Such recommendations of the City of Arp shall be subject to approval by the City of Arp.
- f. Submit a copy of the review to be forwarded to The Governor's division of emergency Management and to the Federal Emergency Management Agency.

Duly PASSED and APPROVED by the City Council of the City of Arp, Texas this 20th day of August, 2018.


Terry Lowry, Mayor


Tracey Pritchett City Secretary

RESOLUTION 2018-0814
HAZARD MITIGATION PLAN ADOPTION

At a regular meeting of the City of Bullard City Council held August 14, 2018, at which a quorum was present, the following Resolution was adopted:

Whereas, Section 322 of the Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5165 requires local governments to develop a hazardous mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects; and

Whereas the Code of Federal Regulations (CFR) at Title 44, chapter 1, part 201, requires the County to prepare and adopt a local mitigation plan every five years; and

Whereas, a Steering Committee comprised of members of the county, and participating incorporated areas within, selected and deemed appropriate by the Commissioners' Court in his authority to do so as granted by the people, as well as the local participating governments' leadership was convened in order to assess the risks of hazards facing the County and the Communities, and to make recommendations on actions to be taken to mitigate these hazards; and

Whereas, a request for proposals was issued through the Smith County Purchasing Department to hire an experienced consulting firm to work with the County to update a Comprehensive Hazard Mitigation Plan for the County and the participating jurisdictions;

Whereas, the plan incorporates the comments, ideas and concerns of the community and of the public in general, which this plan is designed to protect, ascertained through a series of public meetings, publication of the draft plan, press releases, and other outreach activities; and

Whereas Smith County Commissioners Court approved and adopted the 2018 Smith County, Texas Hazard Mitigation Plan on the 19th day of July, 2018.

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Bullard, Texas, that the 2018 Smith County, Texas Hazard Mitigation Plan is hereby approved and adopted by the City Council of the City of Bullard, Texas, and resolves to execute the actions in the plan.

This Resolution shall take effect immediately without reconsideration.

A copy of the plan is available upon request from the Smith County Office of Emergency Management.

Passed and adopted by the City Council of the City of Bullard, Texas, this 14th day of August,

2018.



Pam Frederick, Mayor

ATTEST:



Doris Crockett, City Secretary

RESOLUTION NO. #####

HAZARD MITIGATION ACTION PLAN

WHEREAS, the City of Chapel Hill, Texas is a Type A General Law Municipality organized and existing under the laws of the State of Texas;

WHEREAS, Smith County and the City of Chapel Hill have experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health and safety concerns; and

WHEREAS, the community at large affecting Smith County and the City of Chapel Hill has prepared a *Hazard Mitigation Plan* that outlines the communities' options to reduce overall damage and impact from hazards; and

WHEREAS, the *Hazard Mitigation Action Plan* has been reviewed by the community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, be it resolved that:

1. The *Hazard Mitigation Action Plan* is hereby adopted as an official plan of Smith County and the City of Chapel Hill.
2. A hazard mitigation planning group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Chapel Hill shall be a member of the Committee. Members of the Smith County/City of Chapel Hill Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be as designated in the *Hazard Mitigation Plan*.
3. The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the community governing body or other sources.
4. The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the *Hazard Mitigation Plan*.
 - a. Establish a formal Hazard Mitigation Committee to develop a process to implement & monitor mitigation activities and to update the Hazard Mitigation Plan.
 - b. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.
 - c. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - d. Prioritize the remaining mitigation measures according to funding

availability and cost-benefits analysis.

- e. Identify and pursue funding opportunities to develop and implement local mitigation activities.

5. The County Hazard Mitigation Officer shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners Court and the City of Chapel Hill in accordance with the following format:

- a. An annual review and/or update of the original plan.
- b. A review of any disaster or emergencies that occurred during the previous calendar year.
- c. A review of the actions taken, including what was accomplished during the year.
- d. A discussion of any implementation problems.
- e. Recommendations for new projects or revised action items. Such recommendations of the City of Chapel Hill shall be subject to approval by the City of Chapel Hill.
- f. Submit a copy of the review to be forwarded to The Governor's division of emergency Management and to the Federal Emergency Management Agency.

Duly PASSED and APPROVED by the City Council of the City of Chapel Hill, Texas
this ~~22nd~~ day of September, 2018.

11th day of October 2018



Riley Harris

City of Hideaway Resolution

HAZARD MITIGATION PLAN ADOPTION

RESOLUTION #2018-1

At a regular meeting of the Board of Aldermen of the City of Hideaway held on July 17th, 2018 at the Member Services Building, at which a quorum was present, the following resolution was adopted:

Whereas, Smith County and the City of Hideaway have experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health and safety concerns; and

Whereas, the community at large affecting Smith County and the City of Hideaway has prepared a Hazard Mitigation Plan that outlines the communities' options to reduce overall damage and impact from hazards; and

Whereas, the Hazard Mitigation Action Plan has been reviewed by the community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns; Now, therefore, be it resolved that:

1. The Hazard Mitigation Action Plan is hereby adopted as an official plan of Smith County and the City of Hideaway.
2. A Hazard Mitigation Planning Group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Hideaway shall be a Member of the committee. Members of the Smith County/City of Hideaway Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be as in the Hazard Mitigation Plan.
3. The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the community governing body or other sources.
4. The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the Hazard Mitigation Plan.

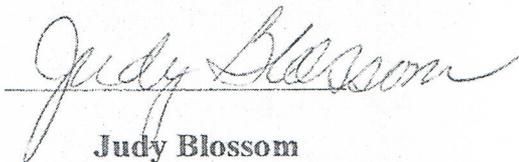
- A. Establish a formal Hazard Mitigation Committee to implement and monitor mitigation activities and to update the Hazard Mitigation Plan.
 - B. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.
 - C. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - D. Prioritize the remaining mitigation measures according to funding availability and cost-benefits analysis.
 - E. Identify and pursue funding opportunities to develop and implement local mitigation activities.
5. The County Hazard Mitigation Officer or the Mayor shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners' Court and the City of Hideaway in accordance with the following format:

- A. An annual review and/or update of the original plan.
- B. A review of any disaster or emergencies that occurred the previous calendar year.
- C. A review of the actions taken, including what was accomplished during the year.
- D. A discussion of any implementation problems.
- E. Recommendations for new projects or revised action items. Such recommendations of the City of Hideaway shall be subject to approval by the City of Hideaway.
- F. Submit a copy of the review to be forwarded to the Governor's division of emergency management and to the Federal Emergency Management Agency.

WITNESS OUR HANDS THIS 17th day of July, 2018



Patrick Bonds
Mayor



Judy Blossom
City Secretary

Resolution R07-2018

At a regular meeting of the City of Lindale City Council held at the City Council Chambers Lindale, Texas, at which a quorum was present, the following resolution was adopted:

WHEREAS, Section 322 of the Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5165) requires local governments to develop a hazardous mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects; and,

WHEREAS, the Code of Federal Regulations (CFR) at Title 44, Chapter 1, part 201, requires the County to prepare and adopt a local mitigation plan every five years; and,

WHEREAS, a steering committee comprised of members of the County, and participating incorporated areas within, selected and deemed appropriate by the Commissioners Court in his authority to do so as granted by the people, as well as the local participating governments' leadership was convened in order to assess the risks of hazards facing the County and the Communities, and to make recommendations on actions to be taken to mitigate these hazards; and,

WHEREAS, a request for proposals was issued through the Smith County Purchasing Department to hire an experienced consulting firm to work with the County to update a comprehensive hazard mitigation plan for the County and the participating jurisdictions; and,

WHEREAS, the plan incorporates the comments, ideas and concerns of the community and of the public in general, which this plan is designed to protect, ascertained through a series of public meetings, publication of the draft plan, press releases, and other outreach activities; and

NOW THEREFORE, BE IT RESOLVED by the City Council of City of Lindale that the 2018 Smith County, Texas Hazard Mitigation Plan, is hereby approved and adopted by the City of Lindale and resolves to execute the actions in the plan.

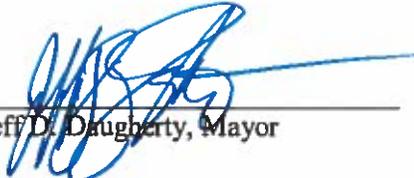
This Resolution shall take effect immediately without reconsideration.

A copy of the plan is available upon request from the Smith County Office of Emergency Management.

Adopted this 17th day of July, 2018



Michelle Phillips, City Secretary



Jeff D. Daugherty, Mayor

RESOLUTION 24

At a regular meeting of the City of Noonday, City Council held a meeting at the City Council chambers in Noonday, Texas, at which a quorum was present, the following Resolution was adopted:

Whereas, Smith County and the City of Noonday have experienced repetitive disasters that have damaged commercial, residential, and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health safety concerns; and

Whereas, the community at large affecting Smith County and the City of Noonday has prepared a Hazard Mitigation Action Plan that outlines the communities' options to reduce overall damage and impact from hazards; and

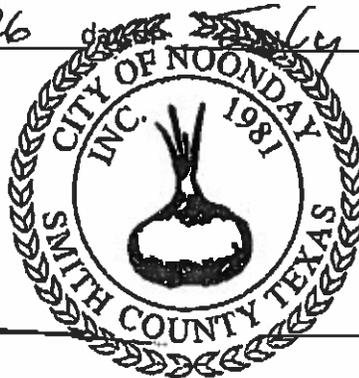
Whereas, the *Hazard Mitigation Action Plan* has been reviewed by the community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

Now, therefore, be it resolved that:

1. **The *Hazard Mitigation Action Plan* is hereby adopted as an official plan of Smith County and the City of Noonday.**
2. **A hazard mitigation planning group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Noonday shall be a member of the Committee. Members of the Smith County/City of Noonday Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be designated in the *Hazard Mitigation Action Plan*.**
3. **The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the community governing body or other sources.**
4. **The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the *Hazard Mitigation Action Plan*.**
 - a. **Establish a formal Hazard Mitigation Committee to develop a process to implement and monitor mitigation activities and to update the Hazard Mitigation Plan.**

- b. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.
 - c. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - d. Prioritize the remaining mitigation measures according to funding availability and cost-benefits analysis.
 - e. Identify and pursue funding opportunities to develop and implement local mitigation activities.
5. The County hazard Mitigation Officer shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners Court and the City of Noonday in accordance with following format:
- a. An annual review and/or update of the original plan.
 - b. A review of any disaster or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for new projects or revised action items. Such recommendations of the City of Noonday shall be subject to approval by the City of Noonday.
 - f. Submit a copy of the review to be forwarded to the Governor's division of Emergency Management and to the Federal Emergency Management Agency.

WITNESS OUR HANDS THIS 26 day of July, 2018.



Mike Turman

Mike Turman, Mayor

Tina Adams

Tina Adams, City Secretary



STATE OF TEXAS

§
§
§

IN THE COMMISSIONERS COURT

COUNTY OF SMITH

SMITH COUNTY HAZARD MITIGATION PLAN RESOLUTION

At a regular meeting of the Smith County Commissioners Court held at the Smith County Courthouse Annex, Tyler, Texas, at which a quorum was present, the following Resolution was adopted:

WHEREAS, Section 322 of the Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5165) requires local governments to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects; and,

WHEREAS, the Code of Federal Regulations (CFR) at Title 44, Chapter 1, part 201, requires the County to prepare and adopt a local mitigation plan every five years; and,

WHEREAS, a steering committee comprised of members of the County, and participating incorporated areas within, selected and deemed appropriate by the Commissioners Court in its authority to do so as granted by the people, as well as the local participating governments' leadership was convened in order to assess the risks of hazards facing the County and the Communities, and to make recommendations on actions to be taken to mitigate these hazards; and,

WHEREAS, RFP-08-17 was issued through the Smith County Purchasing Department to hire an experienced consulting firm to work with the County to update a comprehensive hazard mitigation plan for the County and the participating jurisdictions; and,

WHEREAS, on May 9, 2017 the Smith County Commissioners Court awarded a contract for RFP-08-17 to Tetra Tech, Inc. to update the Smith County Hazard Mitigation Plan; and

WHEREAS, the plan has been completed and incorporates the comments, ideas and concerns of the community and of the public in general, which this plan is designed to protect, ascertained through a series of public meetings, publication of the draft plan, press releases, and other outreach activities; and

NOW THEREFORE, BE IT RESOLVED by the **Smith County Commissioners Court** that the 2018 Smith County, Texas Hazard Mitigation Plan, is hereby approved and adopted by the Commissions Court of Smith County and resolves to execute the actions in the plan.

This Resolution shall take effect immediately without reconsideration.

A copy of the plan is available upon request from the Smith County Office of Emergency Management.

APPROVED AND ADOPTED THIS 17th DAY OF JULY, 2018.

Nathaniel Moran
NATHANIEL MORAN
COUNTY JUDGE

Jeff Warr
JEFF WARR,
COMMISSIONER, PRECINCT 1

Cary Nix
CARY NIX,
COMMISSIONER, PRECINCT 2

Terry Phillips
TERRY PHILLIPS,
COMMISSIONER, PRECINCT 3

Joann Hampton
JOANN HAMPTON,
COMMISSIONER, PRECINCT 4

ATTEST: Karen Phillips
KAREN PHILLIPS, COUNTY CLERK



RESOLUTION NO. 20180723-01

HAZARD MITIGATION ACTION PLAN

WHEREAS, the City of Troup, Texas is a Type A General Law Municipality organized and existing under the laws of the State of Texas;

WHEREAS, Smith County and the City of Troup have experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health and safety concerns; and

WHEREAS, the community at large affecting Smith County and the City of Troup has prepared a *Hazard Mitigation Plan* that outlines the communities' options to reduce overall damage and impact from hazards; and

WHEREAS, the *Hazard Mitigation Action Plan* has been reviewed by the community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

NOW, THEREFORE, be it resolved that:

1. The *Hazard Mitigation Action Plan* is hereby adopted as an official plan of Smith County and the City of Troup.
2. A hazard mitigation planning group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Troup shall be a member of the Committee. Members of the Smith County/City of Troup Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be as designated in the *Hazard Mitigation Plan*.
3. The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the community governing body or other sources.
4. The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the *Hazard Mitigation Plan*.
 - a. Establish a formal Hazard Mitigation Committee to develop a process to implement & monitor mitigation activities and to update the Hazard Mitigation Plan.
 - b. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.
 - c. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - d. Prioritize the remaining mitigation measures according to funding

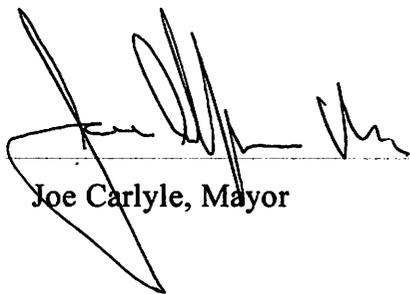
availability and cost-benefits analysis.

- e. Identify and pursue funding opportunities to develop and implement local mitigation activities.

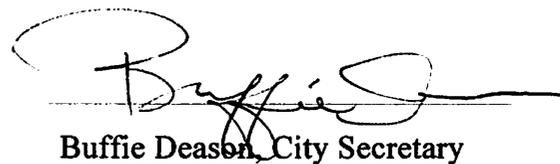
5. The County Hazard Mitigation Officer shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners Court and the City of Troup in accordance with the following format:

- a. An annual review and/or update of the original plan.
- b. A review of any disaster or emergencies that occurred during the previous calendar year.
- c. A review of the actions taken, including what was accomplished during the year.
- d. A discussion of any implementation problems.
- e. Recommendations for new projects or revised action items. Such recommendations of the City of Troup shall be subject to approval by the City of Troup.
- f. Submit a copy of the review to be forwarded to The Governor's division of emergency Management and to the Federal Emergency Management Agency.

Duly PASSED and APPROVED by the City Council of the City of Troup, Texas this 23rd day of July, 2018.



Joe Carlyle, Mayor



Buffie Deason, City Secretary

RESOLUTION NO. R-2018-19

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF TYLER, TEXAS, SUPPORTING AND APPROVING THE REVISED HAZARD MITIGATION ACTION PLAN; AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, it is the intent of the City Council to protect the public health, safety and welfare; and

WHEREAS, the Smith County community has prepared a Hazard Mitigation Action Plan that outlines the communities' options to reduce overall damage and impact from hazards; and

WHEREAS, the Hazard Mitigation Action Plan has been reviewed by the Smith County community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns; and

WHEREAS, the City Council supports the goal of the Hazard Mitigation Action Plan to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF TYLER, TEXAS:

PART 1: That the Hazard Mitigation Action Plan referenced herein is hereby adopted as an official plan of the City of Tyler. A copy of the updated Hazard Mitigation Action Plan shall be kept on file at the Tyler Fire Department.

PART 2: A Hazard Mitigation Action Committee has been established as a permanent community advisory body, with the Smith County Fire Marshal serving as the County Hazard Mitigation Officer. The Fire Chief of the City of Tyler and/or designee(s) is hereby designated as the Emergency Management Coordinator of the City of Tyler, and shall serve on the Committee. The group's terms and duties are designated in the Hazard Mitigation Action Plan.

PART 3: The County Hazard Mitigation Officer is charged with overall supervision and the implementation of the Plan's recommendations within the funding limitations as provided by the governing bodies or other sources. The City's Emergency Management Coordinator is charged with supervision and implementation of the Plan's recommendations as it relates to the City of Tyler within the funding limitations and pursuant to the directives of the Tyler City Council.

PART 4: The Hazard Mitigation Officer shall give priority attention to the following action items recommended by the Hazard Mitigation Action Plan.

- a. Establish a formal Hazard Mitigation Action Committee to develop a process to implement and monitor mitigation activities and to update the Hazard Mitigation Action Plan.
- b. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.

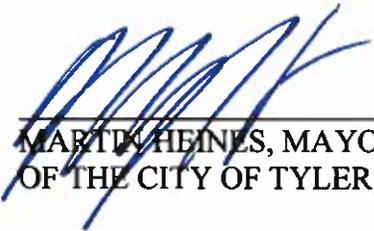
- c. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
- d. Prioritize the remaining mitigation measures according to funding availability and cost-benefit analysis.
- e. Identify and pursue funding opportunities to develop and implement local mitigation activities.

PART 5: The Hazard Mitigation Officer shall convene the Hazard Mitigation Action Committee quarterly. The Committee shall monitor implementation of the plan and shall submit a written progress report to the Tyler City Council in accordance with the following format:

- a. An annual review and/or update of the original plan.
- b. A review of any disaster or emergencies that occurred during the previous calendar year.
- c. A review of the actions taken, including what was accomplished during the year.
- d. A discussion of any implementation problems.
- e. Recommendation for new projects or revised action items. Any recommendations specifically affecting the City of Tyler shall be subject to approval by the Tyler City Council.
- f. Submit a copy of the review to be forwarded to the Governor's Division of Emergency Management and Federal Emergency Management Group.

PART 6: That this Resolution shall be effective immediately upon its adoption.

PASSED AND APPROVED on this the 8th day of August, 2018.



MARTIN HEINES, MAYOR
OF THE CITY OF TYLER, TEXAS

ATTEST:

APPROVED:



CASSANDRA BRAGER, CITY CLERK





DEBORAH G. PULLUM,
CITY ATTORNEY



RESOLUTION R18-0828-01

WHEREAS, Smith County and the City of Whitehouse have experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health and safety concerns; and

WHEREAS, the Smith County community and the City of Whitehouse have prepared a Hazard Mitigation Plan that outline the communities' options to reduce overall damage and impact from hazards; and

WHEREAS, the Hazard Mitigation Action Plan has been reviewed by the community residents, business owners, and federal state and local agencies, and has been revised to reflect their concerns;

NOW THEREFORE, BE IT RESOLVED that:

1. The Hazard Mitigation Action Plan is hereby adopted as an official plan of Smith County and the City of Whitehouse.
2. A hazard mitigation planning group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Whitehouse shall be a member of the Committee. Members of the Smith County/City of Whitehouse Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be as designated in the Hazard Mitigation Plan.
3. The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitation as provided by Smith County or other sources.
4. The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the Hazard Mitigation Plan.
 - A. Establish a formal Hazard mitigation Committee to develop a process to implement and monitor mitigation activities and to update the Hazard Mitigation Plan.
 - B. Seek funding to continue efforts to collect data of historical damage reports and to develop estimated costs of potential projects.
 - C. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - D. Prioritize the remaining mitigation measures according to funding availability and cost-benefits analysis.
 - E. Identify and pursue funding opportunities to develop and implement local mitigation activities.

5. The County Hazard Mitigation Officer shall convene the hazard mitigation group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners' Court and the City of Whitehouse in accordance with the following format:
 - A. An annual review and/or update of the original plan.
 - B. A review of any disaster or emergencies that occurred during the previous calendar year.
 - C. A review of the actions taken including what was accomplished during the year.
 - D. A discussion of any implementation problems.
 - E. Recommendations for new projects or revised action items. Such recommendations of the City of Whitehouse shall be subject to approval by the City of Whitehouse.
 - F. Submit a copy of the review to be forwarded to The Governor's Division of Emergency Management and the Federal Emergency Management Agency.

PASSED AND APPROVED this 28th day of August 2018.



Charles Parker – Mayor

Attested by:



Susan Hargis – City Secretary

RESOLUTION 2018-01

HAZARD MITIGATION PLAN ADOPTION

At a special call meeting of the City of Winona City Council held September 11, 2018, at which a quorum was present, the following Resolution was adopted:

Whereas, Smith County and the City of Winona have experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, closed streets and bridges dividing the community both physically and emotionally, and presented general public health and safety concerns; and

Whereas the community at large affecting Smith County and the City of Winona has prepared a *Hazard Mitigation Action Plan* that outlines the communities' options to reduce overall damage and impact from hazards; and

Whereas the *Hazard Mitigation Action Plan* has been reviewed by the community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

Now, therefore, be it resolved that:

1. The *Hazard Mitigation Action Plan* is hereby adopted as an official plan of Smith County and the City of Winona.
2. A Hazard Mitigation Planning Group is hereby established as a permanent community advisory body. The Emergency Management Coordinator of the City of Winona shall be a member of the Committee. Members of the Smith County/City of Winona Hazard Mitigation Committee shall serve one-year terms. The group's duties shall be as designated in the *Hazard Mitigation Plan*.
3. The County Hazard Mitigation Officer is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the community governing body or other sources.
4. The County Hazard Mitigation Officer shall give priority attention to the following action items recommended by the Hazard Mitigation Plan.
 - a. Establish a formal Hazard Mitigation Committee to develop a process to implement and monitor mitigation activities and to update the Hazard Mitigation Plan.
 - b. Seek Funding to continue efforts to collect data of historical damage reports and to develop estimates cost of potential projects.

- c. Develop cost estimates for each potential project, especially projects that could be funded through grant programs.
 - d. Prioritize the remaining mitigation measures according to funding availability and cost-benefits analysis.
 - e. Identify and pursue funding opportunities to develop and implement local mitigation activities.
5. The County Hazard Mitigation Officer shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the Commissioners Court and the City of Winona in accordance with the following format:
- a. An annual review and/or update of the original plan.
 - b. A review of any disaster or emergencies that occurred during the previous calendar year.
 - c. A review of the actions taken, including what was accomplished during the year.
 - d. A discussion of any implementation problems.
 - e. Recommendations for a new projects or revised action items. Such recommendations shall be subject to approval by this the City of Winona.
 - f. Submit a copy of the review to be forwarded to The Governor's Division of Emergency Management and the Federal Emergency Management Agency.

Passed and adopted by the City Council of the City of Winona, Texas, this 11th day of September, 2018.


Pat Schlau, Mayor

ATTEST:


Deana Powell, City Secretary

APPENDIX H.
EXAMPLE PROGRESS REPORT

APPENDIX H. EXAMPLE PROGRESS REPORT

Smith County Hazard Mitigation Plan Update Annual Progress Report

Reporting Period: 2018-2022

Background: Smith County and the cities of Arp, Bullard, Hideaway, Lindale, New Chapel Hill, Noonday, Troup, Tyler, Whitehouse, and Winona developed a hazard mitigation plan to reduce risk from all hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act of 2000 requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. To prepare the plan, the participating partners organized resources, assessed risks from natural hazards within the planning area, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from natural hazards. By completing this process, these jurisdictions maintained compliance with the Disaster Mitigation Act, achieving eligibility for mitigation grant funding opportunities afforded under FEMA's Hazard Mitigation Assistance grants.

Summary Overview of the Plan's Progress: The performance period for the Hazard Mitigation Plan became effective on ____, 2018, with the final approval of the plan by FEMA. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before ____, 2022. As of this reporting period, the performance period for this plan is considered to be __% complete. The Hazard Mitigation Plan has targeted 70 hazard mitigation actions to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

__ out of __ actions (__%) reported ongoing action toward completion

__ out of __ actions (__%) were reported as being complete

__ out of __ actions (__%) reported no action taken

Purpose: The purpose of this report is to provide an annual update on the implementation of the action plan identified in the Smith County Hazard Mitigation Plan Update. The objective is to ensure that there is a continuing and responsive planning process that will keep the Hazard Mitigation Plan dynamic and responsive to the needs and capabilities of the partner jurisdictions. This report discusses the following:

- Natural hazard events that have occurred within the last year
- Changes in risk exposure within the planning area (all of Smith County)
- Mitigation success stories
- Review of the action plan
- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement
- Monitor the incorporation of the Mitigation Plan into planning mechanisms.

The Hazard Mitigation Plan Steering Committee: The Hazard Mitigation Plan Steering Committee, made up of planning partners and stakeholders within the planning area, reviewed and approved this progress report at its annual meeting held on ____, 201_. It was determined through the plan's

development process that a Steering Committee would remain in service to oversee maintenance of the plan. At a minimum, the Steering Committee will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, the Steering Committee membership (sign-in sheet attached).

Natural Hazard Events within the Planning Area: During the reporting period, there were natural hazard events in the planning area that had a measurable impact on people or property. A summary of these events is as follows:

Changes in Risk Exposure in the Planning Area: *(Insert brief overview of any natural hazard event in the planning area that changed the probability of occurrence or ranking of risk for the hazards addressed in the hazard mitigation plan)*

Mitigation Success Stories: *(Insert brief overview of mitigation accomplishments during the reporting period)*

Review of the Action Plan: The following sample table reviews the recommended mitigation actions for Smith County. When reporting, the status will need to include all the planning partners' mitigation actions. Reviewers of this report should refer to the Hazard Mitigation Plan for more detailed descriptions of each action and the prioritization process.

Address the following in the "status" column of the following table:

Was any element of the action carried out during the reporting period?

If no action was completed, why?

Is the timeline for implementation for the action still appropriate?

If the action was completed, does it need to be changed or removed from the action plan?

Table H-1. Mitigation Action Plan Matrix

Action No.	Title	Action Taken? (yes or No)	Timeline	Priority	Status	Status (√, O, X)
SMITH COUNTY						
1	Purchase and install an electric back-up generator					
2 (Previous Drought4)	Distribute public awareness information on crop insurance.					
3	Take action to complete EAP for all high and significant hazard dams					
4	Take action to evaluate earthquake risk due to the drilling and fracking in the area.					
5	Upgrade Drainage Capacity					
6	Purchase All-Hazard NOAA Weather Radios					
7	Xeriscape around County Buildings					

Changes That May Impact Implementation of the Plan: *(Insert brief overview of any significant changes in the planning area that would have a profound impact on the implementation of the plan. Specify any changes in technical, regulatory and financial capabilities identified during the plan's development)*

Recommendations for Changes or Enhancements: Based on the review of this report by the Hazard Mitigation Plan Steering Committee, the following recommendations will be noted for future updates or revisions to the plan:

Public review notice: *The contents of this report are considered to be public knowledge and have been prepared for total public disclosure. Copies of the report have been provided to the governing boards of all planning partners and to local media outlets and the report is posted on the Smith County Hazard Mitigation Plan website. Any questions or comments regarding the contents of this report should be directed to:*

Insert Contact Info Here

www.smith-county.com