Special Topics

Mayes County Disaster Resiliency Assessment

The purpose of this section is to assess at the county level key components of disaster resiliency. Housing location and quality as well as planning activities can help reduce impacts from disaster events and allow for faster recovery. Disasters can include tornadoes, extreme weather, high winds, as well as man-made events. These events may largely be inevitable, but the ability to reduce damage and casualties as well as recovery can be improved with good planning.

C.0 Comprehensive Plans & Hazard Mitigation Plans

There are 13 cities and towns within the county. The City of Pryor Creek is the county seat. Towns include Adair, Chouteau, Disney, Grand Lake Towne, Hoot Owl, Langley, Locust Grove, Pensacola, Salina, Spavinaw, Sportsmen Acres and Strang. MidAmerica Industrial Park (MAIP) is also included in the Mayes County Hazard Mitigation Plan.

Comprehensive plans are the guiding documents for cities of various sizes to address key aspects of their community from land use, transportation, environment, housing, and economic development.

City of Pryor Creek has a Comprehensive Land Use Plan that is in the process of being updated. Specific objectives and policies are not outlined in the plan; however, within the discussion on transportation, the engineering consultant noted that some arterial roadways flood when Pryor Creek overflows, thus, the roadway elevation should be raised so that arterials are passable during flooding events.

Langley has a comprehensive plan. The towns of Adair, Choteau, Disney, Grand Lake Towne, Locust Grove, Pensacola, Salina, Sportsmen Acres, and Strang do not have a comprehensive plan. MAIP is considered an unincorporated territory in Mayes County.

Emergency Operation Plan

According to Mayes County Emergency Management, Mayes County, as a whole, along with several communities in the county, is National Incident Management System (NIMS) compliant and has incorporated MIMS/ICS (Incident Command System) into its Emergency Operations Plan and other protocols.

- **Emergency Operations Center** – During major emergencies, Mayes County's government will be moved to the Emergency Operations Center (EOC) located at 700 E. Graham in Pryor. The backup location is the Mayes County Courthouse at 1 Court Place. .
- **9-1-1** – Mayes Emergency Services Trust Authority (MESTA) has a 911 system and dispatch center located at MidAmerica Industrial Park.
- **Mass Telephone Notification** – Mayes County has in place a county-wide mass telephone notification system that allows emergency managers to call every telephone number in the database during emergencies.
- **Warning Siren** – The warning siren coverage for the Mayes County includes 26 sirens strategically located in incorporated areas inside the county.

Emergency Operation Center

During major emergencies, Mayes County's government will be moved to the Emergency Operation Center (EOC). The backup EOC is at the Mayes County Courthouse. The Mobile EOC van is equipped with a backup generator and includes communications equipment, radio, television and internet capabilities. The community of Locust Grove built a school gymnasium that is a monolithic dome structure that also serves as a storm shelter. The dome structure deflects wind and can sustain winds up to 250 mph. A new elementary school in Locust Grove is also built as a series of dome structures.

The other key plan for a city to manage, mitigate and plan for recovery related to disasters are county or city **Hazard Mitigation Plans and/or Emergency Management Plans**.

Mayes County has a Hazard Mitigation Plan (HMP) that provides guidance related to major risks that impact the area and methods to address and mitigate those risks. The existing HMP was completed with coordination towns and school districts within the county.

City of Pryor Creek also has a Hazard Mitigation Plan.

C.2.1.1. Historical Data on Natural Disasters and Other Hazards

The Mayes County Multi-Jurisdictional Multi-Hazard Mitigation 2013 Plan Update has several Goals and Objectives. The following specifically addresses storm shelters and safe rooms.

Tornados

GOAL: To reduce injuries and loss of life; trauma; damage to property, equipment and infrastructure; community disruption; and economic, environmental and other losses caused by tornadoes.

Objective: Structural Projects**.** Provide safe tornado shelters, Safe Rooms, and fortified buildings for vulnerable populations, including children; offer training and incentives to encourage people to include shelters and Safe Rooms in new and retrofit building projects.

The following are high priority mitigation measures within the Mayes County HMP:

Prioritized Mitigation Measures		
Rank	**Lead/Responsible Department**	**Mitigation Strategy**
1	County, Local and Schools Emergency Management	Develop an All-Hazard Public Information, Education, and Awareness Program.
2	City Manager, County Emergency Management	Educate the public on the importance of a Family Disaster Plan and Supply Kit.
3	City Manager, County Emergency Management	Develop and Distribute a Family Emergency Preparedness Guide to all families.

4	County Emergency Management	Develop distribution centers in local libraries, government facilities, and other public buildings where information and safety guidance on natural and manmade hazards can be provided to citizens.
5	Community, OK DHS, County Health Department	Develop an inventory, registry and database of Special Needs Populations (elderly, poor, deaf, blind, etc.) that may require special assistance, that tie in with 9-1-1, GIS Systems, etc., so that vulnerable populations within the community can be checked on, notified, or evacuated effectively in the event of disasters.
6	Emergency Management	Evaluate, upgrade and maintain community-wide outdoor omni-directional voice/siren warning systems.
7	Emergency Management	Acquire and distribute NOAA Weather Radios to all Critical Facilities and the public.
8	City Manager/ Emergency Manager	Develop a public information program designed to communicate the potential severity of a drought, and the appropriate responses by the local population, including voluntary water conservation measures the public can take.
9	Parks Department/ County Emergency Management	Provide lightning warning systems for Community public outdoor sports areas, pools, golf courses, and parks.
10	Public Schools/ Emergency Management	Provide lightning warning systems for Public Schools outdoor sports areas and play grounds.
11	City Manager	Provide surge and lightning protection for computer-reliant critical facilities (e.g. City Hall, 911 Center, EOC, Police and Fire stations, water/wastewater treatment plant and public works buildings).
12	City Manager	Educate the Public, and encourage the Utility Companies to provide information to their clients on Whole House Surge and Lightning Protection.
13	City Manager	When replaced, install Break/Shatter Resistant Glass in Government Offices, and critical facilities.
14	Superintendent, Public Schools	When replaced, install Break/Shatter Resistant Glass in Schools.
15	City Manager/ County Emergency Management/ City Engineer	Provide employee shelters/safe-rooms at critical facilities, such as 911 Center, fire stations and police stations to protect first responders.
16	Public Schools	Perform tornado and high wind and earthquake evaluations of schools and retrofit or remodel buildings to make them more disaster resistant.
17	Superintendent, Public Schools	Install Safe-Rooms in Schools and retrofit/construct safe rooms at existing Schools.
18	City Manager/ County	Develop an Individual Safe Room Program for vulnerable populations that will withstand hazards, including Home owners,

	Emergency Management	Special Needs Populations, elderly, mobile home residents, etc.
19	City Manager/ Emergency Management	Adopt an ordinance requiring registration of Safe Rooms, and create a data base and GIS (lat/long) map to locate Safe Rooms in the event of a disaster.
20	Emergency Manager	Obtain grants for storm shelters/safe rooms in mobile home parks.
21	City Manager	Adopt an Ordinance requiring new Mobile Home Parks to provide storm shelters/safe rooms for their residents.
22	City Manager/ Code Enforcement	Educate residents, building professionals and safe room vendors on the International Codes Council/National Storm Shelter Association's "Standard for the Design and Construction of Storm Shelters" and incorporate this Standard into current regulatory ordinances.
23	Community Development Departments/ Code Enforcement	Identify and develop public information and education programs and provide materials and mitigation measures that protect a building's roof, all outside openings, and the building envelope. Also research ways to improve quality of construction related to wind resistance. Top priority should be given to protection of the roof system, typically the most vulnerable and most expensive component to replace.
24	County Emergency Management	Develop an Emergency Back-up Generator Hazard Mitigation Plan Annex to the Multi-Hazard Mitigation Plan for the community, assessing and prioritizing generator needs for critical facilities, both public and private. Assessment should include emergency generator needs, costs of installation for pads/ transfer panels only, or for complete generator assembly installation.
25	Department of Public Works/ School Superintendent	Obtain emergency generators for continuity of government/use during disaster power outages for critical facilities including Emergency Operations Centers, City Hall, Dispatch, Police, Fire, Community Centers used for emergency housing during disasters, critical facilities, lift stations, water treatment plants, and community medical facilities, as identified in the Emergency Back-up Generator Hazard Mitigation Plan Annex.
26	City Manager	Identify and encourage Private Critical Facilities (Financial Institutions, Elder Care Facilities, Designated/Potential Community Emergency Shelters, etc.) to have generator pad, wiring/transfer switches and Emergency Back-Up Generators, or Reliable Contracts to provide Back-Up Generators.
27	Community Manager	Adopt an Ordinance requiring generator pad and wiring/transfer switches for Elder Care Facilities and Nursing Homes, to accommodate Emergency Back-Up Generators in the event of prolonged power outages.
28	Community Manager	Identify and/or encourage key important private service facilities (gas stations, convenience stores, etc.) to have wiring/transfer

		switches and emergency backup generators installed, or reliable contracts for the provision of back-up generators, in the event of disasters or power outages.
29	Community Manager	Develop Memorandums of Understanding (MOUs) with private sector gasoline service facilities to provide priority fuel to emergency/critical vehicles (government, Police, Fire, ambulance, etc.) in times of emergency or power outage.
30	Community Manager	Provide covered shelters for City First Response/government vehicles to protect against hail damage.
31	Community Manager/ Public Works Director/ Electric Utility	Provide routine trimming of trees to reduce power outages during storms.
32	Fire Chief/ Emergency Manager/ Police Chief	Develop a contingency plan for evacuating population endangered by a wildfire.
33	Emergency Management	Develop a Heat Emergency Action Plan/Heat Emergency Annex to the Emergency Operations Plan for the jurisdiction.
34	Emergency Management/ Fire/ Police	Provide new/retrofit facilities for the 911 Center and the Emergency Operations Center.
35	City Manager/ Code Enforcement	Train/Educate builders, developers, architects and engineers in techniques of disaster-resistant homebuilding, such as the Fortified Home standards developed by the Institute for Business & Home Safety (IBHS), the Blueprint for Safety guidelines developed by the Federal Alliance for Safe Homes (FLASH).
36	City Manager/ Code Enforcement/ School Superintendent	Educate builders on appropriate foundation types for soils with different degrees of shrink-swell potential. For example, using "post-tensioned slab-ongrade" or "drilled pier" vs. standard "slab-on-grade" or "wall-on-grade" foundations.
37	City Manager/ Public Works Director/ School Superintendent	Implement/enforce an administrative procedure/ordinance to require permits for foundation repair.
38	City Manager/ Code Enforcement	Establish an administrative procedure or change in City codes that require builders to check for expansive soils when applying for new residential construction permits, and to consider the use of foundations that mitigate expansive soil damages when in a moderate to high-risk area.
39	Department of Public Works/ Superintendent, Public Schools	Provide and maintain defensible space around structures vulnerable to wildfires.
40	OSU Extension, Mayes County/ NRCS/ Public Schools	Implement red cedar eradication program (NRCS to assist) to reduce red cedar trees and wild fire potential.
41	Community Manager/ Floodplain Manager	Continue Compliance with, and Participation in the National Flood Insurance Program (NFIP) and the Community Rating System (CRS).

42	Department of Public Works	Prepare a comprehensive basin-wide Flood and Drainage Annex to the Multi-Hazard Mitigation Plan for all watersheds within the jurisdiction. The Annex should identify all flooding problems within the jurisdiction, and recommend the most cost-effective and politically acceptable solutions.
43	Public Works	Continue to acquire and remove floodplain and (future) repetitive loss properties where the community's Flood and Drainage Annex to the Multi-Hazard Mitigation Plans identify acquisition as the most cost-effective and desirable mitigation measure.
44	Community Manager/ Public works	Develop / Review / Update the Debris Management Plan.
45	Emergency Management	Create and maintain habitat for flora and fauna in flood control projects. Maintaining or developing wetlands may be an effective area to receive or reduce floodwaters.
46	Emergency Management	Control erosion during development with vegetation or sediment capture, reducing sedimentation which may fill in channels and lakes, reducing their ability to carry or store floodwaters.
47	Emergency Management	Maintain natural and beneficial functions of streams and floodplains.

City of Pryor Mitigation Measures

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
1	Floods	Acquire and remove floodplain properties where repetitive loss and master drainage plans identify acquisition is the most cost-effective and desirable mitigation measure.	Ongoing
2	Winter Storms	Reduce the number of overhead power lines through consolidating existing lines and burying new lines underground.	Dropped
3	Winter Storms	Develop a contingency plan and acquire equipment for responding to a massive power outage due to severe winter storm, ice and snow.	ongoing
4	Tornadoes & High Winds	Relocate one or more of the existing water towers away from substations where primary electrical functions for the City are located.	Ongoing
5	General	Provide Certified Disaster Training for City employees, and coordinate efforts with local CERT Teams.	Dropped
6	Tornadoes & High Winds	Install community safe-rooms / storm shelters.	Not yet begun
7	Tornadoes & High Winds	Install safe-rooms in schools.	Not yet begun
8	Lightning	Provide surge protection and backup power generators for computer-reliant critical facilities (e.g. 911 Center, EOC, police sub-stations, fire stations, etc.).	Completed for the 911 Center, EOC, and Police. Still working on Fire Dept.
9	Winter Storms	Provide public awareness on effective ways to monitor and avoid ice damage, frozen pipes, and snow loads on roof systems.	Ongoing
10	Winter Storms	Provide for routine trimming of trees to reduce power outages during storms. Update City of Pryor arborist crew with equipment as needed or for major storm events.	Ongoing
11	Extreme Heat	Install window air conditioners for elderly shut-ins (for whom extreme heat can be a life-threatening hazard).	Dropped
12	Expansive Soils	Investigate codes/incentives for the construction of new foundations to mitigate expansive soil damage.	Dropped
13	Urban Fires	Make sure fire extinguishers are strategically placed and properly maintained in all community facilities.	Completed

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
14	General	Establish working partnerships involving local government leaders, civic, business, and volunteer groups to create a safer community.	Ongoing
15	General	Develop a "Helping Your Neighbors" program through the school system to encourage children to think of people who require special assistance (e.g., elders, infants, and persons with disabilities) during severe weather conditions (e.g., winter storms and extreme heat.)	Ongoing
16	General	Investigate making educational materials for all hazards standardized, readily available off-the-shelf, and economical.	Ongoing
17	General	Evaluate and upgrade warning systems.	Not yet begun
18	General	Provide backup facilities for the 911 Center and the Emergency Operations Center.	Completed
19	General	Develop a community debris management plan.	Completed
20	General	Identify citizens who can serve as translators.	Completed
21	Floods	Acquire accurate or verify accuracy of existing flood plain maps.	Completed
22	Floods	Develop land-use ordinances to prevent construction in flood-prone locations.	Completed
23	Floods	Construct regional detention ponds to offset impact of future urban development.	Ongoing
24	Floods	Educate the public on the different hazards that multi-sound warning sirens signify (e.g., tornado warning vs. flash-flood warning).	Ongoing
25	Tornadoes & High Winds	Inspect community schools for tornado and high wind vulnerability.	Ongoing
26	Tornadoes & High Winds	Investigate adopting building codes / incentives leading to construction that is more resistant to tornadoes and high winds.	Completed
27	Lightning	Provide educational demonstrations and information on whole-house surge protection technology.	Ongoing
28	Hail Storms	Provide hail-resistant roofing for community buildings.	Dropped
29	Extreme Heat	Educate community employees on the symptoms of heat disorders and how to administer first aid.	Ongoing
30	Extreme Heat	Identify the vulnerable population and individuals at risk from extreme heat.	Completed
31	Drought	Provide public awareness designed to communicate the potential severity of a drought and the appropriate public response.	Completed
32	Drought	Develop secondary water supply system.	Dropped
33	Urban Fires	Continue education and get funding to inform people on proper evacuation plans for city buildings, offices, and homes.	Ongoing

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
34	Urban Fires	Replace inadequately sized water lines with lines of sufficient size to provide adequate fire protection.	Ongoing
35	Urban Fires	Implement a fire suppression system for City Hall.	Completed
36	General	Develop public information and education plans for responding to natural hazards and hazardous material events.	Completed
37	Tornadoes & High Winds	Develop public awareness programs and provide materials (e.g., hurricane clips) and mitigation measures that protect a building's roof, all outside openings, and the building envelope.	Completed
38	Tornadoes & High Winds	When replaced, install break-resistant glass in county offices and critical facilities.	Dropped
39	Tornadoes & High Winds	Investigate a voluntary pilot program for mobile home communities to provide a storm shelter / safe-room for residents.	Dropped
40	Tornadoes & High Winds	Install safe-rooms in fire and police stations to protect first responders.	Not yet begun
41	Tornadoes & High Winds	Install safe-rooms in daycare centers.	Not yet begun
42	Tornadoes & High Winds	Investigate community tornado shelter programs implemented in other cities or states.	Dropped
43	Tornadoes & High Winds	Consider painting street names and house numbers on curbs for identifying addresses when landmarks are absent.	Not yet begun
44	Lightning	Educate the community about proper lightning safety through public service announcements and other media outlets.	Dropped
45	Lightning	Designate individuals at city recreation facilities who are educated in storm spotting and who have the authority to take proper action.	Completed
46	Lightning	Provide lightning prevention information materials and programs through local power utility.	Not yet begun
47	Hail Storms	Institute public information program for residents informing them of the advantages and costs of hail-resistant roofing.	Not yet begun
48	Urban Fires	Develop a public education program to explain the advantages of individual fire suppression in homes, including fire extinguishers.	Ongoing
49	Wild Fires	Investigate and raise public awareness of fire-resistant materials for buildings.	Ongoing
50	Wild Fires	Provide public education on controlled burns and use of fire-retardant vegetation.	Ongoing
51	Wild Fires	Develop a countywide fire response plan to facilitate the provisioning of water to fire departments during large fires.	Completed

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
52	Hazardous Materials Events	Provide public awareness about the most-common household pollutants, their danger, and disposal information through media, schools, public offices, police, and fire stations.	Not yet begun
53	Hazardous Materials Events	Develop a plan for responding to hazardous materials incidents on major transportation routes through the community.	Ongoing
54	Dam Failure	Develop warning and evacuation plans for areas at risk from dam failure or large release flooding.	Ongoing
55	General	Install an emergency communications network for fire, police, 911, EMT and other emergency operations.	Completed
56	General	Develop daytime population maps for the community.	Completed
58	General	Provide emergency equipment for City Emergency Teams.	Ongoing
58	General	Provide security and surveillance equipment for police and fire stations.	Completed
59	General	Contact agencies that distribute information to at-risk communities (e.g., elderly, infirm, impoverished, outside workers).	Dropped
60	General	Record GPS locations of private water wells and underground storm shelters (to rescue potentially trapped storm victims).	Completed
61	Floods	Inventory inadequate bridges.	Completed
62	Floods	Continually update basin-wide master drainage plans where changed conditions warrant.	Not yet begun
63	Tornadoes & High Winds	Research construction methods for mitigating wind damage, specifically giving top priority to protecting the roof system.	Not yet begun
64	Tornadoes & High Winds	Educate the public about construction methods designed for overall structural resistance to tornadoes and high winds.	Not yet begun
65	Tornadoes & High Winds	Review and update the debris management plan.	Completed
66	Tornadoes & High Winds	Provide safe-room rebates for especially-vulnerable populations (e.g., elderly, infirm, impoverished).	Not yet begun
67	Tornadoes & High Winds	Supply NOAA Weather Radio to all local government buildings, schools, hospitals, and critical facilities.	Completed
68	Lightning	Study other communities that have lightning warning systems intact.	Completed
69	Hail Storms	Provide hail-resistant measures/materials to protect existing public infrastructure improvements.	Dropped
70	Winter Storms	Update the debris management plan.	Completed
71	Extreme Heat	Obtain funding for providing public awareness materials to vulnerable populations through participating community agencies.	Ongoing

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
72	Extreme Heat	Develop a Heat Emergency Action Plan for the community.	Ongoing
73	Expansive Soils	Develop and implement a public and builder awareness plan of the dangers and impact to buildings from expansive soils.	Dropped
74	Wild Fires	Train and coordinate community fire, police, and public works on how to respond to a wildfire emergency.	Completed
75	Dam Failure	Install flood level monitoring equipment (e.g., stream gauges) in local steams and rivers.	Dropped
76	General	Update GIS database to include public utility infrastructure.	Completed
77	General	Translate public information to other languages.	Not yet begun
78	Floods	Obtain elevation certificates for homes located in the floodplain.	Not yet begun
79	Floods	Evaluate appropriate mitigation measures for homes located in the floodplain.	Not yet begun
80	Floods	Construct adequate bridges to survive 100-year regulatory flood without overtopping.	Ongoing
81	Floods	Compensate for the impacts of new bridges and channel improvements.	Ongoing
82	Floods	Identify ways of securing and elevating important equipment inside a building.	Ongoing
83	Floods	Install an automatic monitoring and warning system for spot flooding.	Completed
84	Tornadoes & High Winds	Prepare weather-warning systems for interstate travelers, such as traveler message boards and proper education for travelers.	Dropped
85	Tornadoes & High Winds	Insure that community building code requires proper shingle installation.	Completed
86	Lightning	Install lightning rods for protection of Critical Facilities.	Completed on 911, Police and Fire. Working on the EOC
87	Winter Storms	Upgrade communities' equipment and vehicles for combating ice storm damage/adverse impact to public infrastructure.	Ongoing
88	Extreme Heat	Conserve electricity to ensure adequate energy for air-conditioners during extreme heat periods.	Dropped
89	Drought	Develop and implement plans to identify when a drought begins and ends.	Completed
90	Expansive Soils	Identify and repair Critical Facilities that show, or indicate damage from expansive soils.	Ongoing
91	Expansive Soils	Require foundation piers as part of the building code.	Dropped
92	Wild Fires	Develop a contingency plan for evacuating population endangered by a wildfire.	Completed

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
93	Wild Fires	Consider creating fire breaks along fence rows to thwart "road jumping."	Dropped
94	Hazardous Materials Events	Distribute information identifying hazardous materials to at-risk citizens (e.g., elderly, infirm, poor, and outside workers).	Ongoing
95	Hazardous Materials Events	Develop and reinforce hazardous materials event equipment and response teams.	Ongoing
96	Hazardous Materials Events	Initiate/continue a city-wide household pollutant collection program, and build a year-round collection site.	Dropped
97	Hazardous Materials Events	Coordinate efforts with agencies that distribute information to at-risk populations (e.g., elderly, infirm, poor, and outside workers.	Not yet begun
98	Hazardous Materials Events	Provide public awareness programs relative to dumping household chemicals and automotive fluids into the sanitary sewer drain.	Not yet begun
99	Hazardous Materials Events	Label sanitary sewer drains to warn citizens against dumping chemicals and automotive fluids into the sanitary sewer drain.	Not yet begun
100	Floods	Implement structural and non-structural flood mitigation measures for flood-prone properties.	Not yet begun
101	Tornadoes & High Winds	Begin a revolving fund for families to build safe rooms.	Dropped
102	Lightning	Add lightning warning to the current warning siren system.	Not yet begun
103	Winter Storms	Investigate winterizing exposed elements of residential and commercial structures.	Dropped
104	Urban Fires	Apply for mitigation funding for fire hydrant meter backflow preventers.	Not yet begun
105	Urban Fires	Use City / County money for a fire suppression demonstration project.	Dropped
106	Urban Fires	Review and evaluate the community fire alarm system.	Ongoing
107	Wild Fires	Develop a fire emergency plan that assures access by fire vehicles to all areas included in the rural/urban interface fire danger area.	Ongoing
108	Wild Fires	Develop a warning plan based on drought conditions and moisture measurements to alert officials of increased risk of wildfire.	Completed
109	Earthquakes	Provide public and builder awareness that construction techniques for mitigating tornado damage also mitigate earthquake damage.	Dropped
110	Earthquakes	Provide public information on earthquake insurance.	Not yet begun
111	Earthquakes	Consider more stringent building codes that require all steel construction for public buildings and critical facilities.	Dropped

Priority	Category	Measure	Current Status (Complete, Ongoing, In Progress, Not yet begun, Modified, Dropped)
112	Earthquakes	Consider adopting residential building codes that require earthquake-resistant construction, such as using foundation piers.	Dropped
113	Hazardous Materials Events	Update the study for routing of hazardous materials through the community.	Completed
114	Dam Failure	Develop computerized GIS modeling program for mapping appropriate cubic feet per second (CFS) dam release rates.	Ongoing
115	General	Teach community employees the symptoms of common, life-threatening emergencies and how to administer CPR and first aid	Ongoing

Historical natural disasters in Mayes County are documented in the Mayes County Multi-Jurisdictional Multi-Hazard Mitigation 2013 Plan Update (HMP). Typical hazard disasters in the region include flooding, severe storms, wildfires, severe winter storms, and tornadoes.

Dam Failure Risks

Historical Context: There has not been a historical dam breach in Mayes County.

Table 4-51: Mayes County Area High Hazard Dams

Nat Id	Dam Name	Owner	River	Near City	Year Built	Dam Length (ft)	Dam Height (ft)	Max Discharge	Max Storage
OK00136	Chimney Rock P.S.	GRDA	Salina Creek(also known as Neosho River)	Salina	1968	0	190	0	22,500
OK83002	Forebay	GRDA	Salina Creek (also known as Neosho River)	Salina	1968	356	60	0	22,500
OK00135	Pensacola Dam	GRDA	Neosho River)	Pensacola	1940	6,565	150	525,000	1,537,000
OK00134	Robert S. Kerr Dam	GRDA	Neosho River	Pryor	1964	3,900	80	736,000	200,300
OK83001	Salina Levee	GRDA	Grand River	Salina	1964	6,200	40	0	200,300
OK11025	Spavinaw Lake Dam	City of Tulsa	Spavinaw Creek	Spavinaw	1922	3,680	75	275,000	38,000

Mitigation Strategy / Recommendations from HMP:
No information available.

Drought

Historical Context: Mayes County has experienced **13 drought** events since 2005. No loss of crops or property damage are reported.

Mitigation Strategy / Recommendations from HMP:
No information available.

Earthquake

Historical Context**:** According to the Oklahoma Geological Survey, Mayes County has **1 earthquake** from 1995 through 2010. No deaths, injuries or property damage was reported.

Mitigation Strategy / Recommendations from HMP: Mayes County does not consider earthquakes to be a significant threat.

Expansive Soils

Historical Context**:** Damage to structures due to expansive soils can be expected following periods of extended drought. Damage from expansive soils is difficult to track. No damage information is available.

Mitigation Strategy / Recommendations from HMP:

- Implement/enforce an administrative procedure/ordinance to require permits for foundation repair.
- Establish an administrative procedure or change in City codes that require builders to check for expansive soils when applying for new residential construction permits, and to consider the use of foundations that mitigate expansive soil damages when in a moderate to high-risk area.
- Educate builders on appropriate foundation types for soils with different degrees of shrink-swell potential. For example, using "post-tensioned slab-ongrade" or "drilled pier" vs. standard "slab-on-grade" or "wall-on-grade" foundations.

Extreme Heat

Historical Context: According to the NCDC, Mayes County experienced **10 extreme heat** events from 1995 through 2010 resulting in **4 deaths.**

Mitigation Strategy / Recommendations from HMP:

- Develop a Heat Emergency Action Plan/Heat Emergency Annex to the Emergency Operations Plan for the jurisdiction.

Flood

Historical Context: Mayes County experienced **29 flood** events between 1995 and 2010 that resulted in **1 death, 2 injuries, and $1,018,000 in property damage.**

Date	Location	General Description of Incident
November 6, 1996	Choteau to Pryor	Severe thunderstorms caused flash flooding.

May 11, 1999	Choteau	A slow moving system of severe thunderstorms caused flash flooding.
June 20, 1999	Adair	4-8 inches of rain in Mayes County caused major flash flooding and forced the closing of US Highway 69, 2 mile north of Adair and OK Highway 28 near Adair. A 53-year-old man drowned when his car was washed away by eight-foot-deep flood waters flowing over OK 28 west of Adair.
June 23, 2007	Adair	Flash flooding caused road closures on OK 28 and secondary roads.
May 1-2, 2009	Choteau	Flash flooding caused damage to school facilities.
March 18, 2008	Adair	Heavy rains resulted in flash flooding and a water rescue.
May 1, 2009	Pryor	7 inches of rain caused flooding from Adair east to Langley closing 75% of county roadways and OK 28.
September 9, 2009	Salina	Heavy rain caused creeks to flow out of their banks creating flash flooding. Part of OK 28 was closed. Multiple water rescues performed. No injuries or fatalities were associated with this event.
March 25, 2010	Adair	Heavy rains flooded several roads in and around Adair including US 69.
July 8, 2010	Pensacola	Flood event, no injuries or property damage.

Mitigation Strategy / Recommendations from HMP:

- Continue Compliance with, and Participation in the National Flood Insurance Program (NFIP) and the Community Rating System (CRS).
- Prepare a comprehensive basin-wide Flood and Drainage Annex to the Multi-Hazard Mitigation Plan for all watersheds within the jurisdiction. The Annex should identify all flooding problems within the jurisdiction, and recommend the most cost-effective and politically acceptable solutions.
- Continue to acquire and remove floodplain and (future) repetitive loss properties where the community's Flood and Drainage Annex to the Multi-Hazard Mitigation Plans identify acquisition as the most cost-effective and desirable mitigation measure.
- Create and maintain habitat for flora and fauna in flood control projects. Maintaining or developing wetlands may be an effective area to receive or reduce floodwaters.
- Maintain natural and beneficial functions of streams and floodplains.

Hail

Historical Context**:** Mayes County has reported **174 hail** events from 1995 through 2010, with $100,000 in reported damage.

Date	Description of Event
July 26, 1995	Two hail events occurred, one with H4 and one with H5.
August 19, 1995	4-inch hail fell in Mayes County.
July 6, 1996	H2 hail occurred in Pensacola. There were no reported damages.
July 29, 1996	Hail of H2 size fell on the Town. There were no damages reported.
May 6, 2000	Hail event at Mid America Industrial Park. No damage reported.
March 11, 2006	H3 hail event in Pensacola. No damage reported.
March 12, 2006	H5 hail caused $25,000 in damage. No injuries reported.
April 7 - 8, 2008	H5-H6 diameter hail (2-inch) generated by a series of severe thunderstorms. Damage to structures and automobiles estimated at $50,000
May 7, 2008	H5 hail fell in Strang. No damage or injuries reported.
May 10,2008	H5 hail (1.75-inch) fell in Locust Grove. No injuries reported. Damage estimate at $25,000.

Mitigation Strategy / Recommendations from HMP:

- Provide covered shelters for City First Response/government vehicles to protect against hail damage.

Hazardous Materials, Fixed Site (and Transportation Incidents)

Historical Context: There were **32 fixed-site hazardous materials** events in Mayes County between 1995 and 2010, most all of them involving petroleum industry products such as oil, Butadiene, and natural gas. 1 injury was reported when unloading a tanker truck on December 22, 2007, the valve failed causing the release to the ground of 25,020 pounds of Maleic Anhydride at the Mid America Industrial Park (MAIP). Remediation of the incident was successful.

Table 4–63: Mayes County Fixed Site Hazardous Materials Events

Incident Date	Nearest City	Suspected Responsible Company	Type Of Incident	Incident Cause	Medium Affected	Material Name
3/23/1995	Salina	Philips 82 Auto	Fixed	Dumping	Subsurface	Other Oil
1/29/1998	Pryor	Interplastic Incorp.	Fixed	Unknown	Land	Unknown Acid
3/27/2001	Chouteau	Chouteau High School	Fixed	Other	Land	Raw Sewage
2/11/2004	Locust Grove	Grand River Dam Authority	Fixed	Equipment Failure	Water	Turbin Oil
2/2/2005	Locust Grove	Grand River Dam Authority	Fixed	Equipment Failure	Water	Hydraulic Oil
7/2/2009	Pryor	Pryor Chemical Co.	Fixed	Over Pressuring	Air	Anhydrous Ammonia
2/6/2010	Pryor	Pryor Chemical Co.	Fixed	Other	Air	Anhydrous Ammonia

Source: National Response Center

Mayes County also experienced **23 transportation** incidents from 1995 through 2010. 4 of 6 mobile events involved the release of hazardous materials; 6 of 10 railroad incidents were non-release railroad incidents; there was one minor aircraft incident and no pipeline incidents.

Date	Description of Incident	Location	Suspected Responsible Party	Material
	water.			
10/22/2009	A tanker truck was struck in the rear by a pick up truck, resulting in a leak from the Tanker. It was stated a small amount of Dinbutyl Ether had leaked onto the road.	4.5 Miles South of Pryor, Hwy 69 Southbound	Quality Carriers	Di-N-Butyl Ether
Railroad Release				
07/06/2000	Material released from a tank hose due to equipment failure	Highway 412B MidAmerican Industrial Park	Protein Technologies	Hydrochloric Acid
08/09/2000	Tank car leaked a vapor cloud (no other details were available)	Pryor Rail Yard	Union Pacific	Hydrochloric Acid
04/24/2001	Due to an unknown cause, five rail cars derailed in a rail yard	Union Pacific Rail Yard Mile Post	Union Pacific	unknown
12/20/2007	Train derailment due to one train running into the other. The track was misaligned which caused the one set of cars that was moving to collide with the cars that were stationary. There were no reported release materials.	Mile marker 468 Rail Yard		Non-release

Source: National Response Center

Mitigation Strategy / Recommendations from HMP:
No information available.

High winds

Historical Context: According to the NCDC data, Mayes County experienced **138 wind** events between that resulted in **$295,000 in damage**. These events included winds that ranged from 51 mph to 65 mph.

Mitigation Strategy / Recommendations from HMP:

- Identify and develop public information and education programs and provide materials and mitigation measures that protect a building's roof, all outside openings, and the building envelope. Also research ways to improve quality of construction related to wind resistance. Top priority should be given to protection of the roof system, typically the most vulnerable and most expensive component to replace.
- Train/Educate builders, developers, architects and engineers in techniques of disaster-resistant homebuilding, such as the Fortified Home standards developed by the Institute for Business & Home Safety (IBHS), the Blueprint for Safety guidelines developed by the Federal Alliance for Safe Homes (FLASH).

Lightning

Historical Context**:** According to the NCDC, Mayes County experienced 6 lightning events between 1995 and 2010 that resulted in property damages totaling $190,000.

Date	General Description of Event
September 19, 1993	Lightning struck near Locust Grove causing $50,000 in damages. No further detail was reported.
October 5, 1998	Lightning hit a bank building in Pryor, leaving a hole the size of a softball in it outside wall. The force of the lightning strike sent bricks flying, one of which sailed through the bank's sign. Most of the computer terminals at the bank were lost. The event caused $40,000 in damages.
May 4, 1999	Lightning lit fire to and destroyed a new home in the Grand Prairie Estates west of Pryor. Damages were estimated at $50,000.
May 22, 1999	A lightning strike near Locust Grove started a fire that completely gutted a small church on OK Hwy 82 causing $60,000 in damages.
July 4, 2004	Lightning struck a house in Salina. A person in the house was injured due to the lightning strike. $5,000 in damage was reported.
June 4, 2005	Lightning struck and caused a house fire in Pryor. The event caused $10,000 in damages.
September 21, 2009	Lightning struck a home in Strang. The home caught on fire and ensued $25,000 in damages.

Mitigation Strategy / Recommendations from HMP:

- Provide lightning warning systems for Community public outdoor sports areas, pools, golf courses, and parks.
- Provide lightning warning systems for Public Schools outdoor sports areas and play grounds.
- Provide surge and lightning protection for computer-reliant critical facilities (e.g. City Hall, 911 Center, EOC, Police and Fire stations, water/wastewater treatment plant and public works buildings).
- Educate the Public, and encourage the Utility Companies to provide information to their clients on Whole House Surge and Lightning Protection.

Tornado

Historical Context**:** Mayes County has had **54 tornado** occurrences between 1995 and 2010 caused nearly **$26,100,000 in damage**.

Date	General Description of Event
June 12, 1957	An F1 tornado formed on the east side of Adair and dissipated near Pensacola. One person was injured and damage was estimated at $25,000.
May 9, 1959	And F3 tornado touched down southeast of Pensacola and was on the ground for 7.3 miles. The tornado path paralleled Pensacola Dam and went directly through Disney. There were three injuries and $250,000 in damage.
May 26, 1973	An F1 tornado passed through the southern edge of Town of Choteau. There were no injuries or damages.
May 26, 1973	An F1 tornado created a 10.5 mile path from southeast of Chouteau that moved through the southern portion of MAIP before dissipating north of Locust Grove. There was one fatality associated with this event and damage was $25,000. The location of the fatality and the damage is not reported.
June 8, 1974	A F3 tornado cut through the middle of the Town of Chouteau. There were seven injuries and $25 million in damages.
April 7, 1986	A tornado recorded as an F2 north of the Town of Adair. Damage totaled $250,000. There were no reported injuries.
May 13, 2010	An EF2 tornado was on the ground for four miles beginning four miles west of Town and dissipating one mile northwest of Town of Choteau. The tornado resulted in two injuries and caused $300,000 in damage.
May 15, 1990	An F2 tornado cut an eight mile path from seven miles west of Adair into the Town Limits. There were no injuries, but $250,000 in damage was caused.

Mitigation Strategy / Recommendations from HMP:

- Provide employee shelters/safe-rooms at critical facilities, such as 911 Center, fire stations and police stations to protect first responders.
- Perform tornado and high wind and earthquake evaluations of schools and retrofit or remodel buildings to make them more disaster resistant.
- Install Safe-Rooms in Schools and retrofit/construct safe rooms at existing Schools.
- Develop an Individual Safe Room Program for vulnerable populations that will withstand hazards, including Home owners, Special Needs Populations, elderly, mobile home residents, etc
- Adopt an ordinance requiring registration of Safe Rooms, and create a data base and GIS (lat/long) map to locate Safe Rooms in the event of a disaster.
- Obtain grants for storm shelters/safe rooms in mobile home parks.
- Adopt an Ordinance requiring new Mobile Home Parks to provide storm shelters/safe rooms for their residents. Educate residents, building professionals and safe room vendors

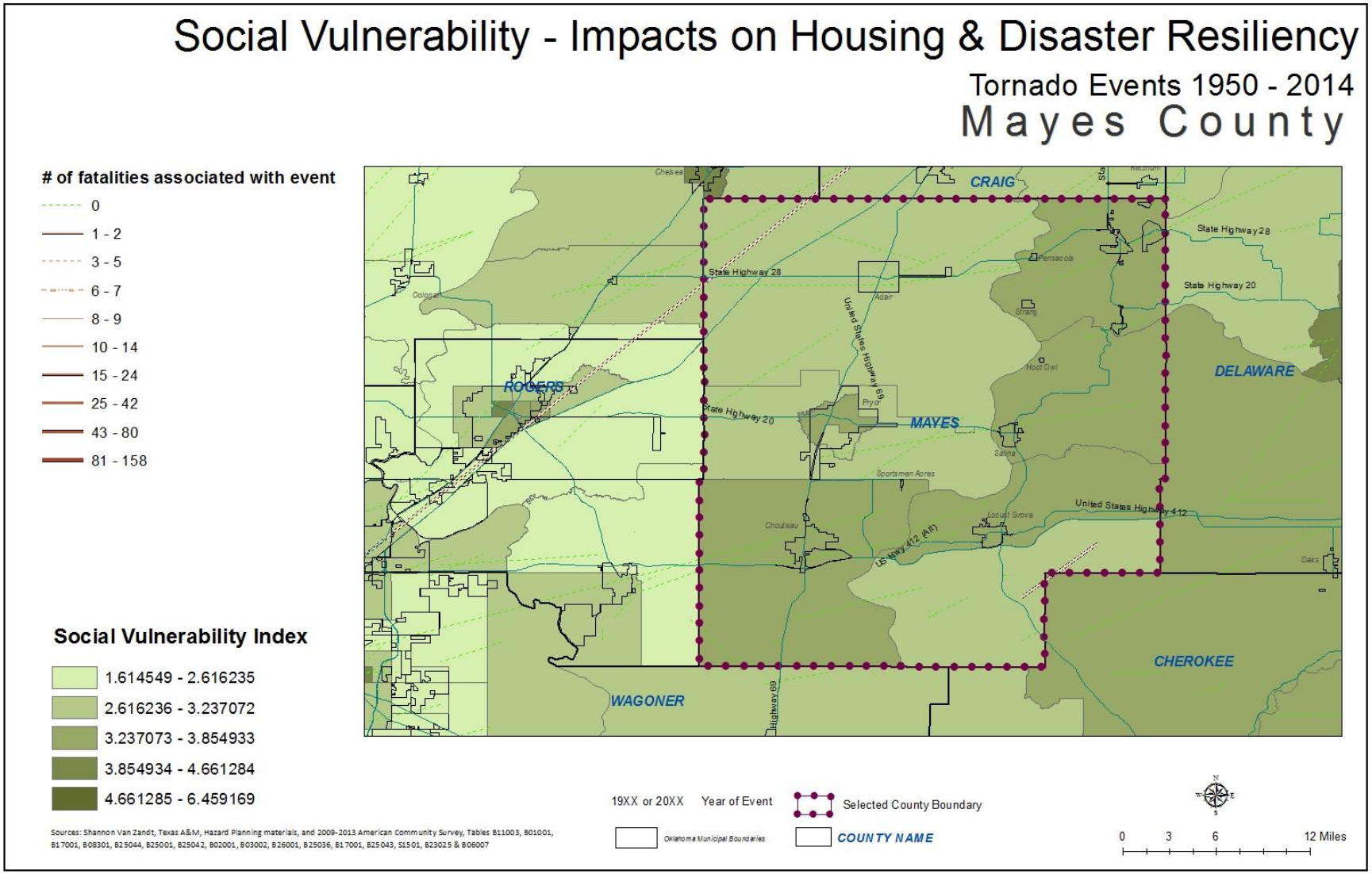
on the International Codes Council/National Storm Shelter Association's "Standard for the Design and Construction of Storm Shelters" and incorporate this Standard into current regulatory ordinances.

For all the county profiles for this study we are providing maps of the historic tornados mapped over the developed social vulnerability index. This is in addition to the data prepared and summarized from the HMP in this section.

Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014

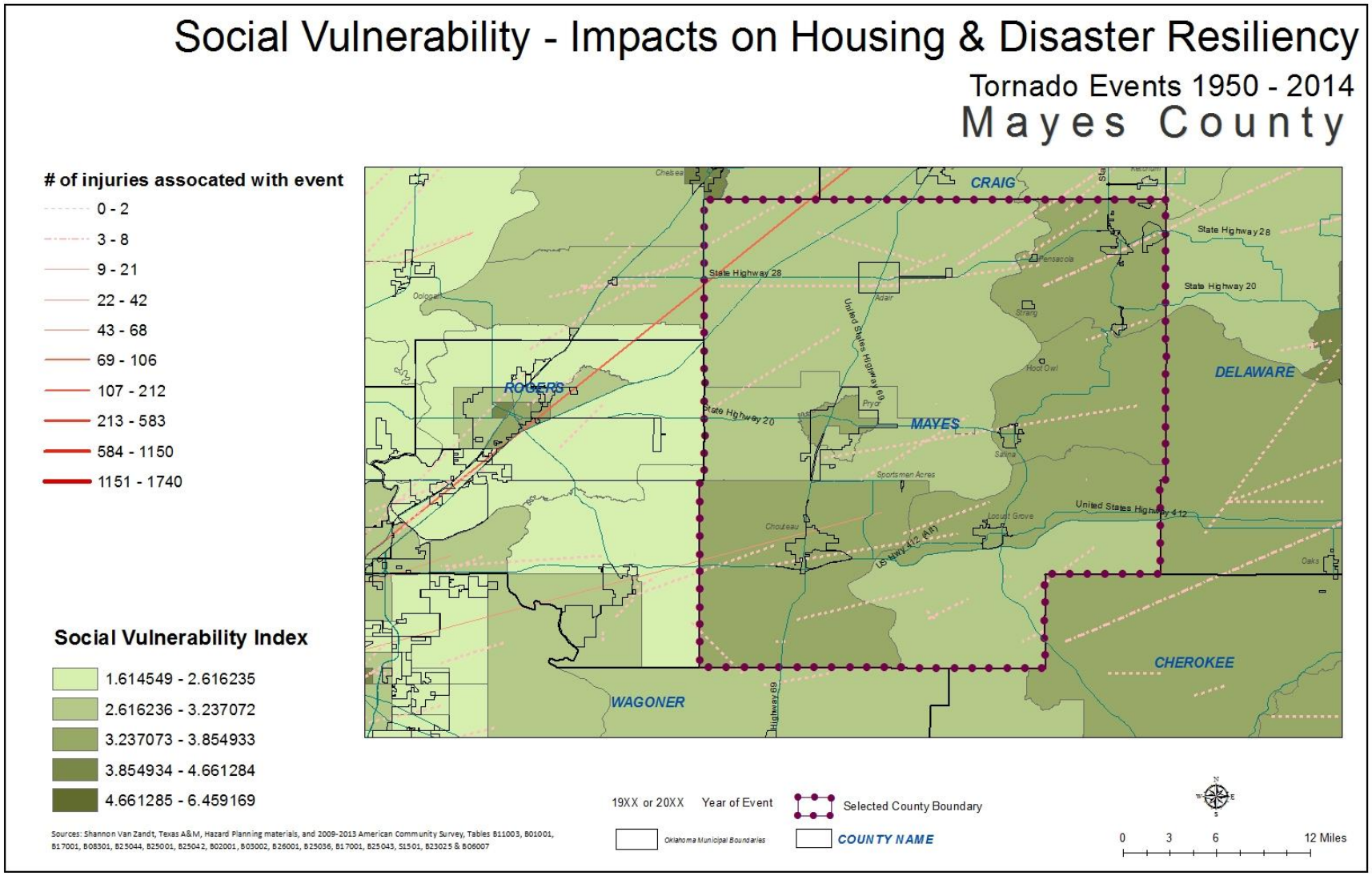
Mayes County



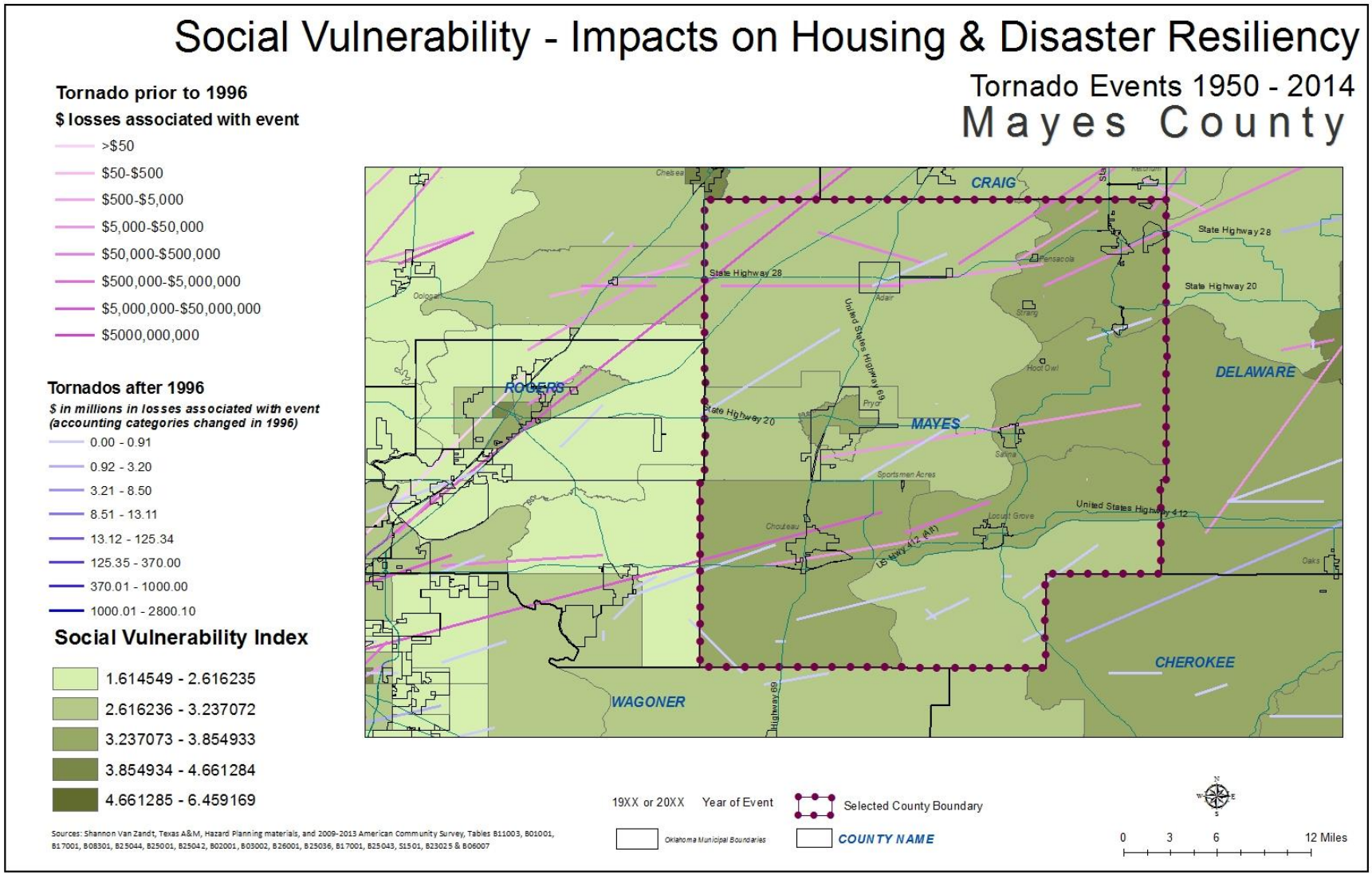
Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014

Mayes County



Sources: Shannon Van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08301, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007


Social Vulnerability - Impacts on Housing & Disaster Resiliency
Tornado Events 1950 - 2014
Mayes County
Tornado prior to 1996
$ losses associated with event
>$50
$50-$500
$500-$5,000
$5,000-$50,000
$50,000-$500,000
$500,000-$5,000,000
$5,000,000-$50,000,000
$5000,000,000
Tornados after 1996
$ in millions in losses associated with event (accounting categories changed in 1996)
0.00 - 0.91
0.92 - 3.20
3.21 - 8.50
8.51 - 13.11
13.12 - 125.34
125.35 - 370.00
370.01 - 1000.00
1000.01 - 2800.10
Social Vulnerability Index
1.614549 - 2.616235
2.616236 - 3.237072
3.237073 - 3.854933
3.854934 - 4.661284
4.661285 - 6.459169
CRAIG
ROGERS
MAYES
DELAWARE
WAGONER
CHEROKEE
State Highway 28
State Highway 20
United States Highway 69
United States Highway 412
Highway 69
19XX or 20XX Year of Event
Selected County Boundary
Oklahoma Municipal Boundaries
COUNTY NAME
0 3 6 12 Miles
Sources: Shannon Van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08301, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007

Urban (Structure) Fires

Historical Context**:** Mayes County experienced **35 fires** in critical facilities from 2000 to 2010 that resulted in the loss of **$234,980 in damage** and **13 civilian injuries, 15 civilian deaths, and 13 firefighter injuries**. Losses in other structures are outline below.

Location	Description of Event
Adair	21 structure resulted in **5** civilian injuries and 4 civilian deaths. No firefighters suffered injury or death. The property damage amounted to $2,208,101.
Choteau	116 structure fires that resulted in 3 civilian injuries and one firefighter death. Property damage was reported at 10,207,863.
Disney	There have been 33 structure fires that resulted in no civilians injured or killed and one firefighter injury. Property damage was reported at $374,000.
Langley	37 structure fires that resulted in 1 civilian death, and no firefighters were injured or killed. Property damage was reported at $1,979,121.
Locust Grove	81 structure fires that resulted in 4 civilian injuries and 4 civilian deaths. 1 firefighter was injured. Property damages amounted to $787,300.
Pensacola	21 structure fires that resulted in $388,400 in property damage.
Salina	125 structure fires that resulted in $3,338,873 in property damage.
Spavinaw	55 structure fires that resulted in $740,200 in property damage.
Strang	27 structure fires that resulted in $1,374,700 in property damage.

Mitigation Strategy / Recommendations from HMP:

- Provide and maintain defensible space around structures vulnerable to wildfires.

Wildfires

Historical Context**:** Based on the Oklahoma State Fire Marshall, from 2000 to 2010, Mayes County fire departments made a total of **42,327 wildfire runs** that burned 11,930 square miles and caused **$507,373 in damage**.

Mitigation Strategy / Recommendations from HMP:

- Develop a contingency plan for evacuating population endangered by a wildfire.
- Provide and maintain defensible space around structures vulnerable to wildfires.
- Implement red cedar eradication program (NRCS to assist) to reduce red cedar trees and wild fire potential.

Winter Storms

Historical Context**:** There have been **28 winter storm** events in Mayes County from 1995 to 2010. The Town of Salina reported a winter storm on February 12, 2011 that left roads virtually impassable. The Town of Spavinaw received 27 inches of snow in a 24-hour period during the same winter storm in 2011. No injuries or deaths resulted. Property damage is estimated at $50,021,500.

Mitigation Strategy / Recommendations from HMP:

No information available.

C.2.1.2; C.2.1.6; C.2.1.7;C.2.1.8 Shelters from Disaster Event

Most jurisdictions have elected to not have public shelters in order to discourage people from leaving safe places and ultimately be caught on the road trying to reach a public shelter. However, Locust Grove built a public school facility that also serves as a community shelter. The 24,000-square-foot dome-shaped structure is built to withstand winds up to 250 mph and can hold more than 1,500 people.

Mayes County has a storm shelter program whereby residents can register locations of private shelters. Mayes County also received FEMA funding for 55 private storm shelters.

http://www.emergencymgmt.com/disaster/FEMA-funding-55-storm-shelters.html

The City of Pryor HMP includes mitigation measures that support implementing a community storm shelter program like other communities have.

C.2.1.3 Public Policy and Governance to Build Disaster Resiliency

Mayes County does not enforce a building code. There are no planning or zoning restrictions in the unincorporated areas of the county except for floodplain regulations adopted in December 1999.

Mayes County Hazard Mitigation Planning Team includes representation by all towns and school districts within the county. City of Pryor has its own Hazard Mitigation Plan.

C.2.1.4 Local Emergency Response Agency Structure

Mayes County Emergency Operation Plan clearly identifies that local resilience to risks starts with prepared individuals. The EOP for Mayes County has a detailed list of task assignments and responsibilities.

C.2.1.5 Threat & Hazard Warning Systems

Warning systems may be activated from any level of government by agencies having responsibility to notify the public of imminent danger. At the local level, these warnings are channeled through the Emergency Management Director in order to assign responsibility and ensure control of the warning process.

Mayes County Emergency Notification and Warning Systems

NOAA Weather Radios

The Mayes County HMP states that the community should consider a NOAA weather radio program.

Warning Systems

Mayes County outdoor warning system includes 26 sirens.

Social Vulnerability

Based on the research work done by the Texas A&M University

Hazard Reduction and Recovery Center, an added component is being included in this section. Social vulnerability can place households at a further disadvantage during and after a disaster. This analysis is assessing for the county the levels of social vulnerability based on demographic indicators to highlight 'hotspots' or counties that have higher social vulnerability. That combined with Hazard Mitigation Plans – or lack thereof – can highlight places where additional work is needed to reduce impacts on households.

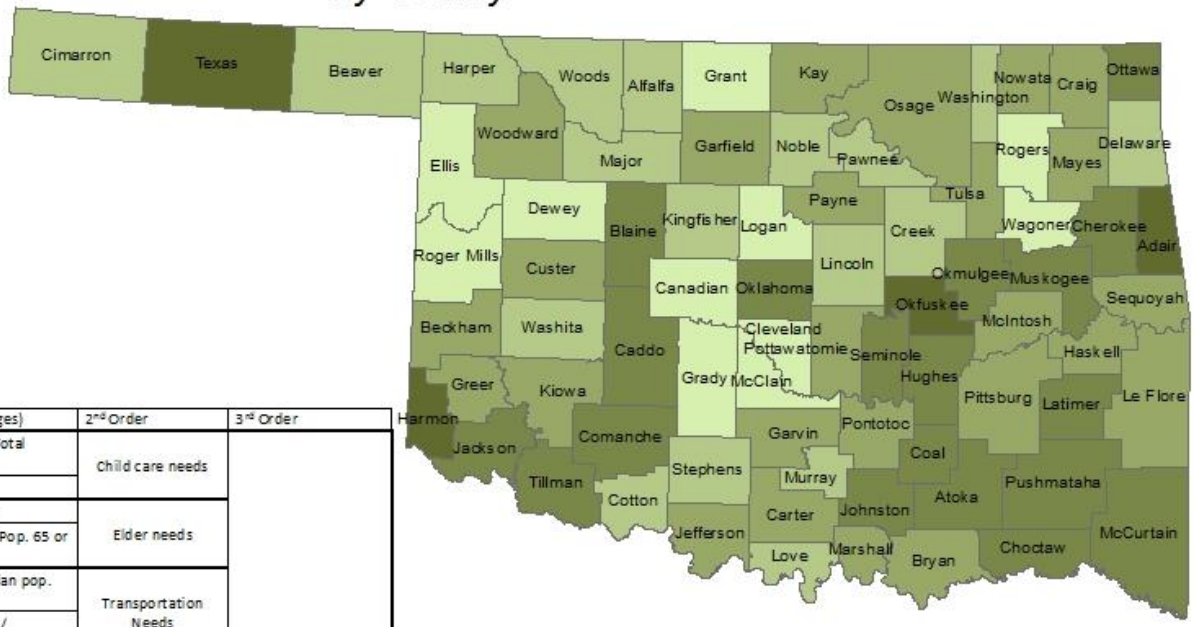
Social Vulnerability Analysis - Mayes County

Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	11.64%	0.184 (Child Care Needs)	**3.327 Social Vulnerability 'Hotspot' or Area of Concern**
2.) Population Under 5	6.76%		
3.) Population 65 or Above	15.88%	0.265 (Elder Needs)	
4.) Population 65 or Above & Below Poverty Rate	10.66%		
5.) Workers Using Public Transportation	0.18%	0.059 (Transportation Needs)	
6.) Occupied Housing Units w/o Vehicle	5.76%		
7.) Housing Unit Occupancy Rate	82.90%	2.526 (Temporary Shelter and Housing Recovery Needs)	
8.) Rental Occupancy Rate	24.76%		
9.) Non-White Population	33.52%		
10.) Population in Group Quarters	1.45%		
11.) Housing Units Built Prior to 1990	70.40%		
12.) Mobile Homes, RVs, Vans, etc.	19.83%		
13.) Poverty Rate	19.72%		
14.) Housing Units Lacking Telephones	3.81%	0.292 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	15.70%		
16.) Unemployment Rate	8.74%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	0.95%		

Sources: Shannon Van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08301, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007

Social Vulnerability Index

By County



Levels of Social Vulnerability Analysis

Base Social Vulnerability Indicators (Percentages)	2nd Order	3rd Order
1. Single parent households with children/ Total Households	Child care needs	Social vulnerability "Hotspot" or area of concern
2. Population 5 or below/Total Population		
3. Population 65 or above/Total Population	Elder needs	
4. Population 65 or above & below poverty/Pop. 65 or above		
5. Workers using public transportation/Civilian pop. 16+ and employed	Transportation Needs	
6. Occupied housing units without a vehicle / Occupied housing units (Hus)		
7. Occupied housing units / Total housing units	Temporary Shelter and housing Recovery needs	
8. Persons in renter occupied housing units/ Total housing units		
9. Non-white population/Total population		
10. Population in group quarters / Total population		
11. Housing units built 20 years ago / Total housing units		
12. Mobile Homes/ Total housing units		
13. Persons in poverty / Total population		
14. Occupied housing units without a telephone/ Total occupied HU	Civic Capacity needs	
15. Population above 25 with less than high school/ Total pop above 25		
16. Population 16+ in labor force an unemployed/ Pop in Labor force 16+		
17. Population above 5 that speak English not well or not at all / Pop >5		

Source: Shannon VanZandt, Texas A&M, Hazard Planning materials; 2009-2013 American Community Survey, Tables B11003, B01001, B17001,

Legend

Social Vulnerabiity "Hot Spots"

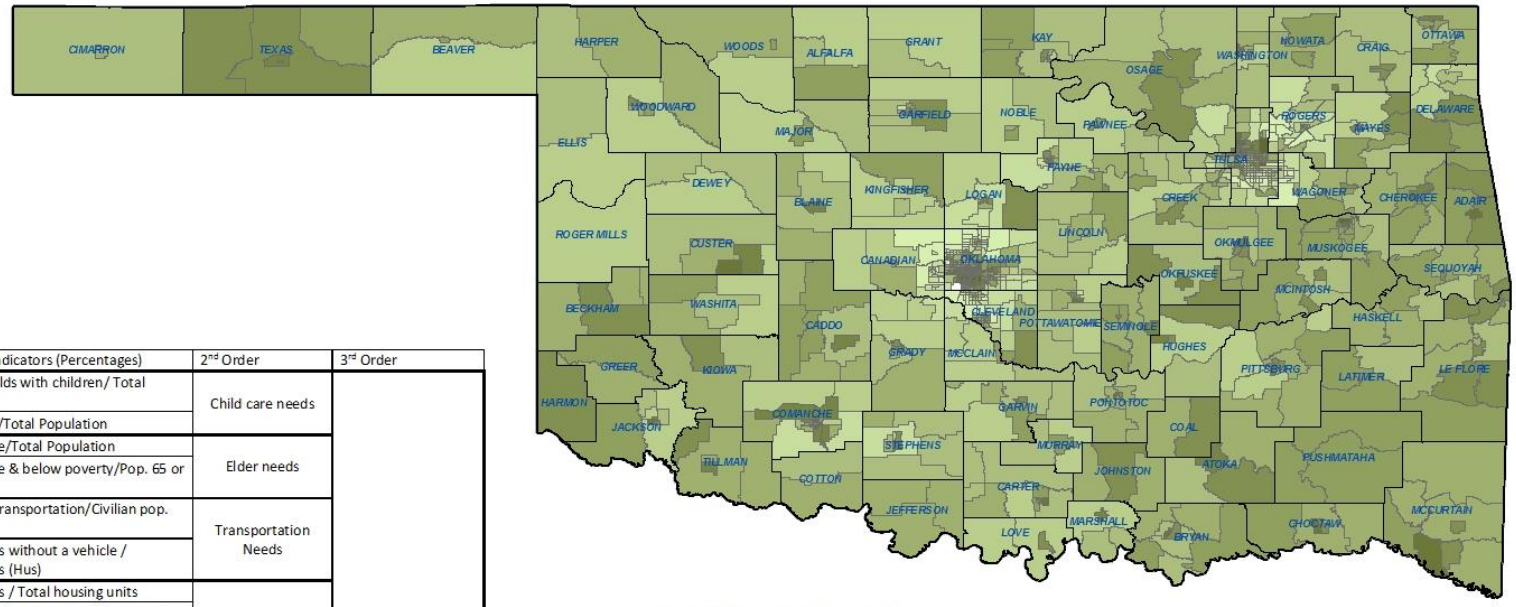
- 2.6340 - 2.9760
- 2.9761 - 3.2170
- 3.2171 - 3.4180
- 3.4181 - 3.6370
- 3.6371 - 3.9500

0 25 50 100 Miles

Social Vulnerability - Impacts on Housing & Disaster Resiliency

Base Social Vulnerability Indicators (Percentages)	2nd Order	3rd Order
1. Single parent households with children/ Total Households	Child care needs	Social vulnerability "Hotspot" or area of concern
2. Population 5 or below/Total Population		
3. Population 65 or above/Total Population	Elder needs	
4. Population 65 or above & below poverty/Pop. 65 or above		
5. Workers using public transportation/Civilian pop. 16+ and employed	Transportation Needs	
6. Occupied housing units without a vehicle / Occupied housing units (Hus)		
7. Occupied housing units / Total housing units	Temporary Shelter and housing Recovery needs	
8. Persons in renter occupied housing units/ Total housing units		
9. Non-white population/Total population		
10. Population in group quarters / Total population		
11. Housing units built 20 years ago / Total housing units		
12. Mobile Homes/ Total housing units		
13. Persons in poverty / Total population		
14. Occupied housing units without a telephone/ Total occupied HU	Civic Capacity needs	
15. Population above 25 with less than high school/ Total pop above 25		
16. Population 16+ in labor force an unemployed/ Pop in Labor force 16+		
17. Population above 5 that speak English not well or not at all / Pop >5		

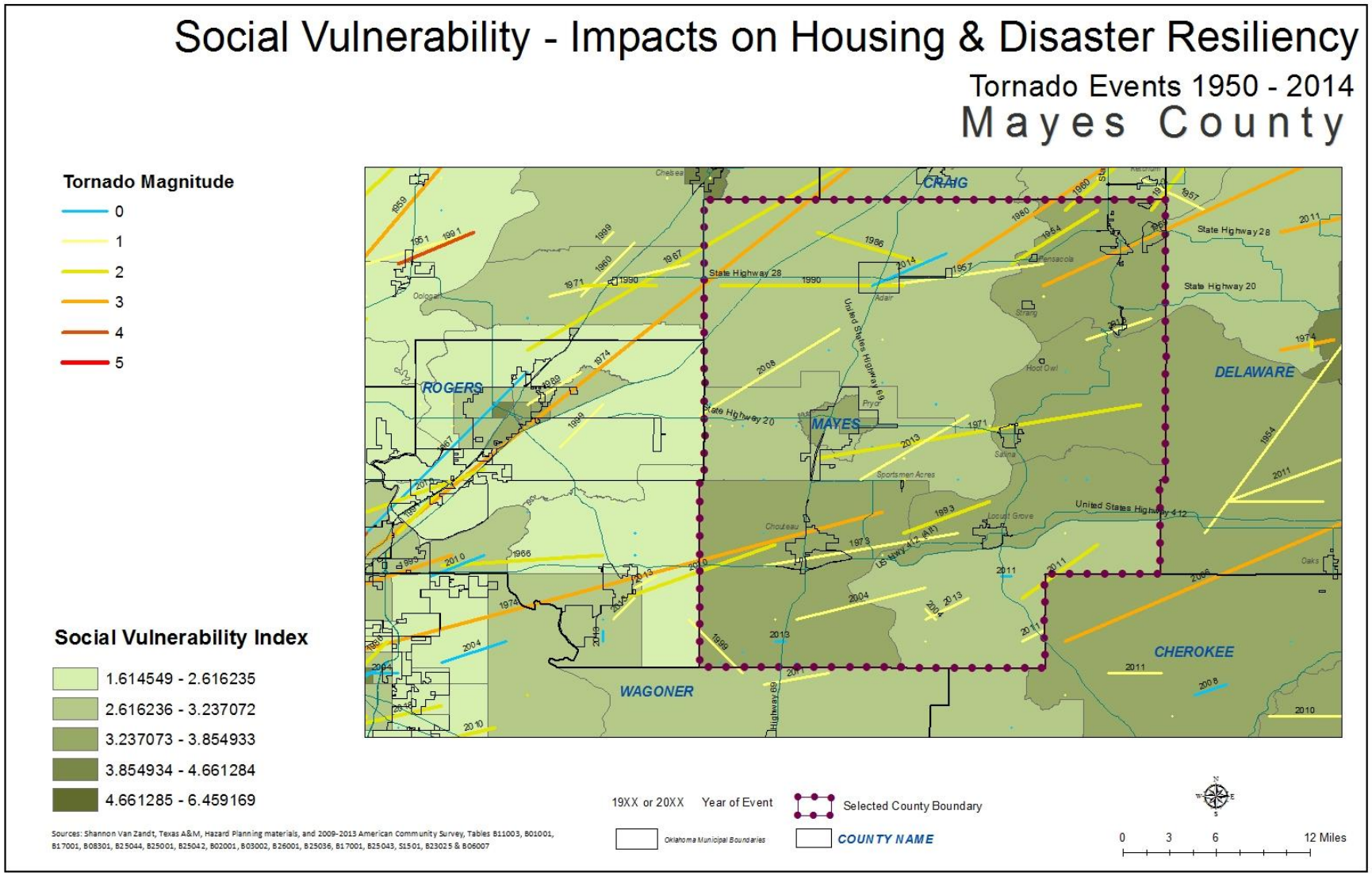
Sources: Shannon Van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08301, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007



Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014

Mayes County



Social vulnerability combined with the devastating impacts of a natural or man-made disaster can compound a household's ability to recover and in fact can place those individuals at an even great gap or disadvantage prior to the event (Shannon Van Zandt, Texas A&M, Hazard Planning).

This county has an above average score per this index for social vulnerability when comparing as a county to other counties in the state. Looking at the census tract level, the Pryor area and a corridor running from southwest to northeast portion of the county have elevated scores for social vulnerability. Combine that with the tornados, as one physical hazard or event that occurs, people in these areas may have additional difficulties during an event due to transportation and family needs. Additionally recovery for socially vulnerable populations can be slow and may require additional outside assistance.

Recommendations for this county:

- Continue to update and maintain the county HMP and include attention to areas within the county that in addition to physical vulnerability may have compounding social vulnerability factors.
- Efforts to strengthen building codes related to tornadoes and natural disasters should be considered.
- Planning for shelters from disaster events for multifamily, HUD and LIHTC units, in addition to all housing in the community should be incorporated with any effort to increase housing.