

Special Topics

Muskogee 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 recovery can be improved with good planning.

C.0 Comprehensive Plans & Hazard Mitigation Plans

There are 5 key cities within the county (Muskogee, Fort Gibson, Webbers Falls, Oktaha, Porum).

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.

Muskogee has a comprehensive plan. The plan includes text on flooding issues and avoiding development in critical flood-prone areas (p.63 and p. 88)

The other key plan for a city to manage, mitigate and plan for recovery related to disasters is a **Hazard Mitigation Plan** (or Emergency Management Plan). Often low density counties, the Hazard Mitigation Plan is done at the county level, though some cities may augment the county plan with a city plan.

Muskogee County does not have a current Hazard Mitigation Plan. Their adopted plan is expired. They began work on an update plan in 2011.

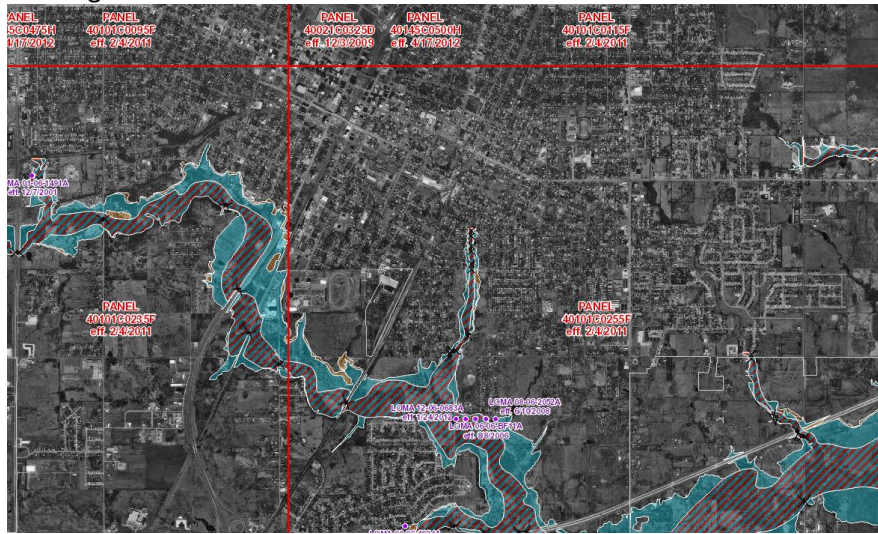
C.2.1.1. Historical Data on Natural Disasters and Other Hazards

Data on historical damages and casualties is typically collected as part of a **Hazard Mitigation Plan** preparation to determine the appropriate planning measures and actions to take before and after an event.

Flooding

All parts of the county may be subject to flash flooding, freeze-thaw flooding and extreme precipitation that can cause flooding, unrelated to the streams and rivers. Development in the floodplain, however, increases risk of damages and property loss potentially repeatedly.

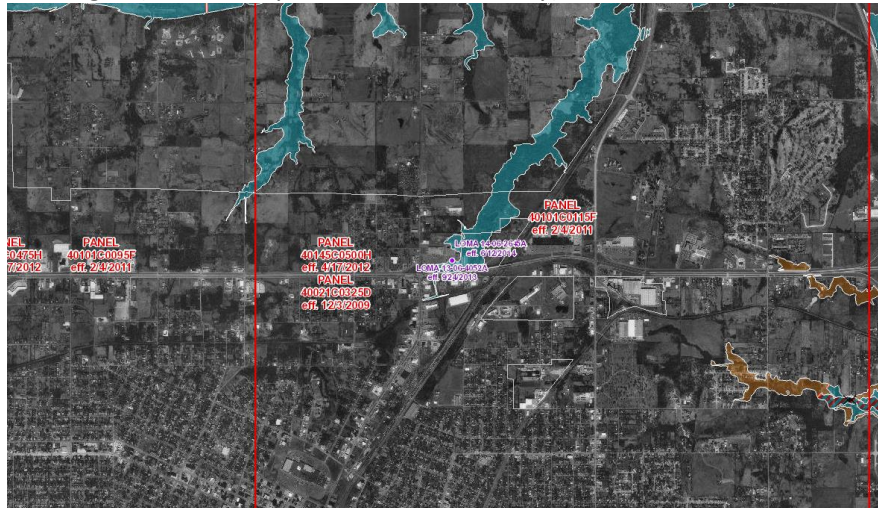
Muskogee



- Flood Hazard Zones
 - 1% Annual Chance Flood Hazard
 - Regulatory Floodway
 - Special Floodway
 - Area of Undetermined Flood Hazard
 - 0.2% Annual Chance Flood Hazard
 - Future Conditions 1% Annual Chance Flood Hazard
 - Area with Reduced Risk Due to Levee

FEMA's National Flood Hazard Layer <http://fema.maps.arcgis.com/>

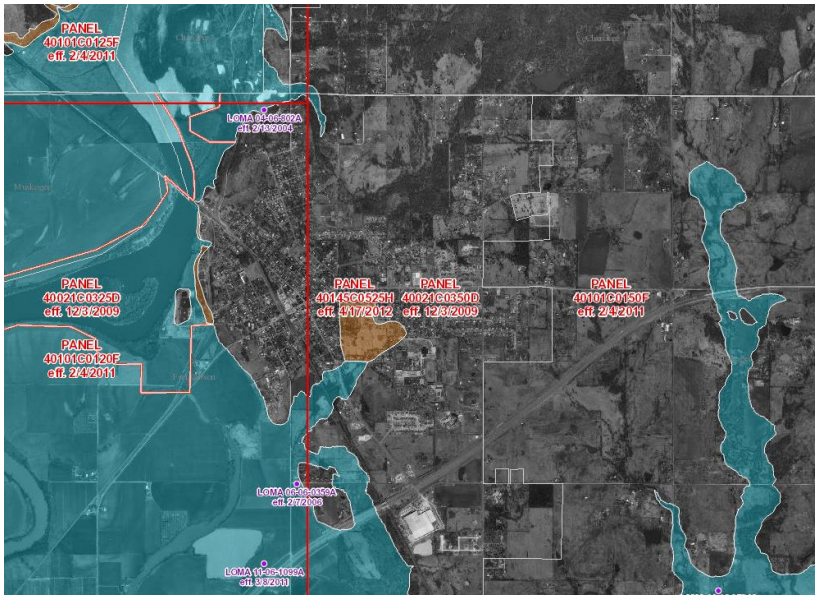
Muskogee (second map; northern area of city)



- Flood Hazard Zones
 - 1% Annual Chance Flood Hazard
 - Regulatory Floodway
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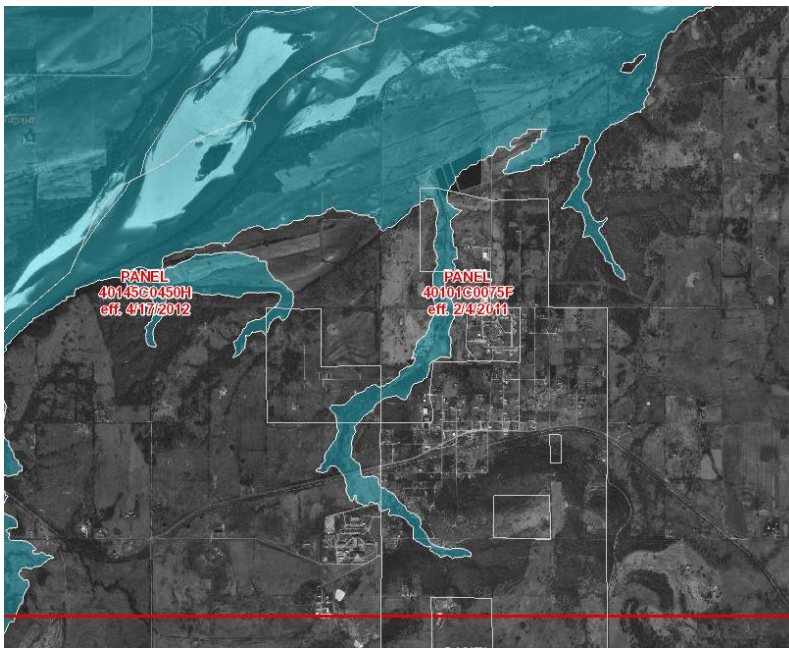
Fort Gibson



- Flood Hazard Zones
 - 1% Annual Chance Flood Hazard
 - Regulatory Floodway
 - Special Floodway
 - Area of Undetermined Flood Hazard
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 - Future Conditions 1% Annual Chance Flood Hazard
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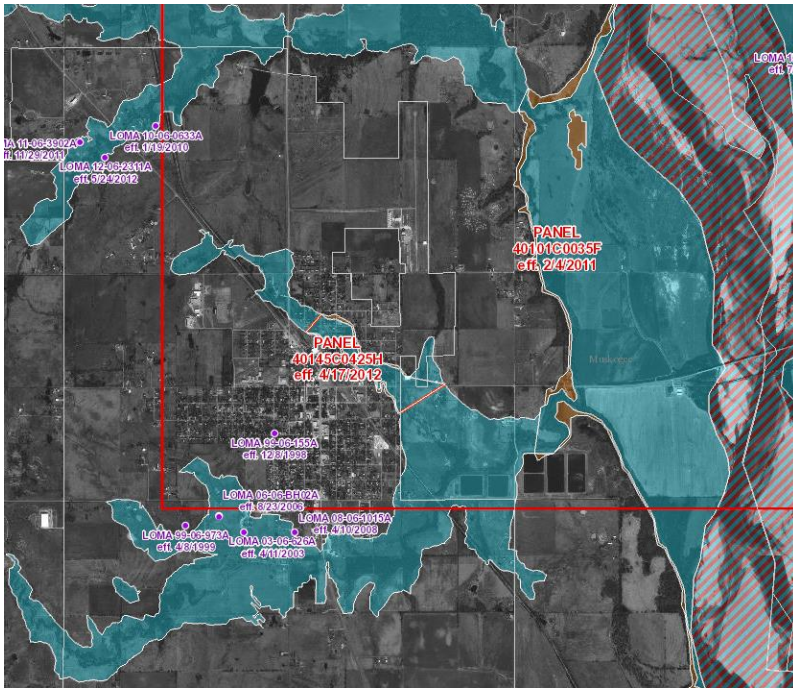
Taft



- Flood Hazard Zones
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 - Special Floodway
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FEMA's National Flood Hazard Layer <http://fema.maps.arcgis.com/>

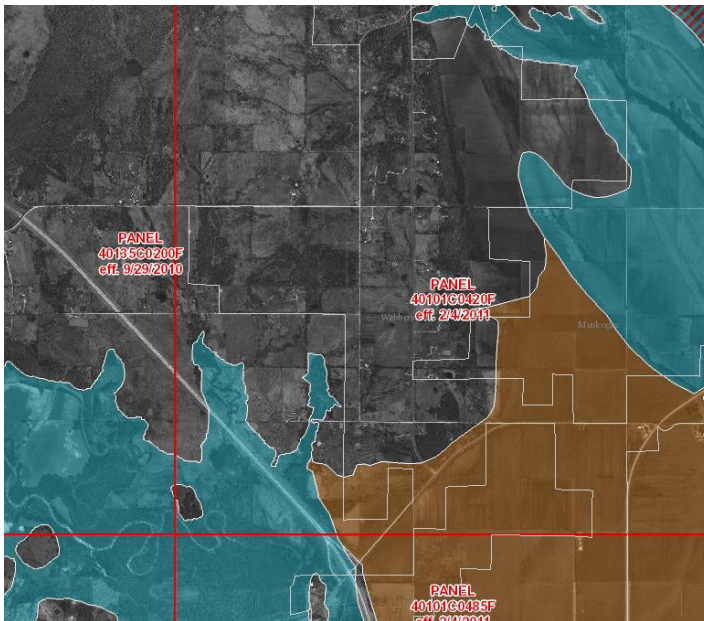
Haskell



- Flood Hazard Zones
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

FEMA's National Flood Hazard Layer <http://fema.maps.arcgis.com/>

Webber Falls



- Flood Hazard Zones
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

FEMA's National Flood Hazard Layer <http://fema.maps.arcgis.com/>

Porum



FEMA's National Flood Hazard Layer <http://fema.maps.arcgis.com/>

NOAA data shows the following historic data on disaster events for the county:

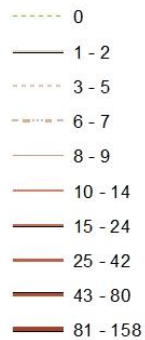
Historic data on tornados between 1950-2014 there are 45 tornados documented. There were 37 injuries that occurred connected to these tornados, with 3 of those injuries happening in the 2010 tornado and 8 occurred in the 1992 tornado. There were 5 fatalities connected to tornadoes during this time period, all of which occurred in 1973. Property losses between 1950-1996 ranged from \$223,605.00 to \$2,236,250.00. (The accounting methods used for losses changed in 1996.) The losses estimated between 1996-2014 was \$670,000.00.

Social Vulnerability - Impacts on Housing & Disaster Resiliency

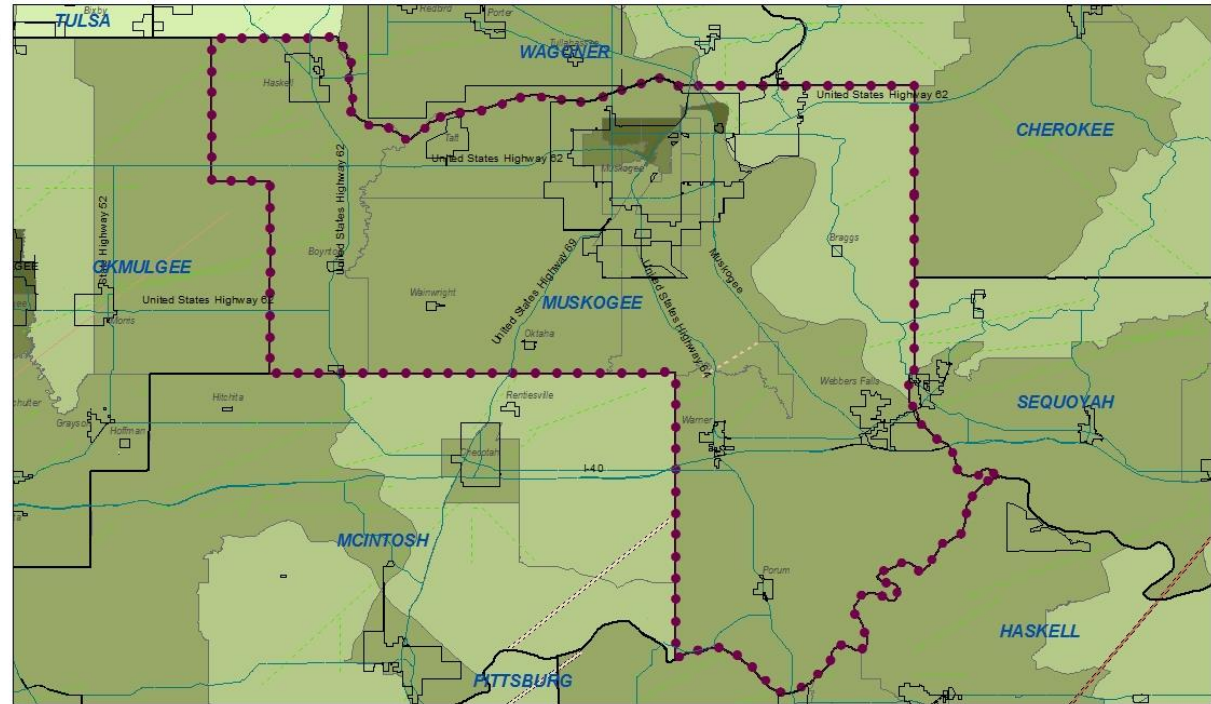
Tornado Events 1950 - 2014

Muskogee County

of fatalities associated with event



Social Vulnerability Index

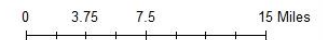


19XX or 20XX Year of Event

Selected County Boundary

Oklahoma Municipal Boundaries

COUNTY NAME



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

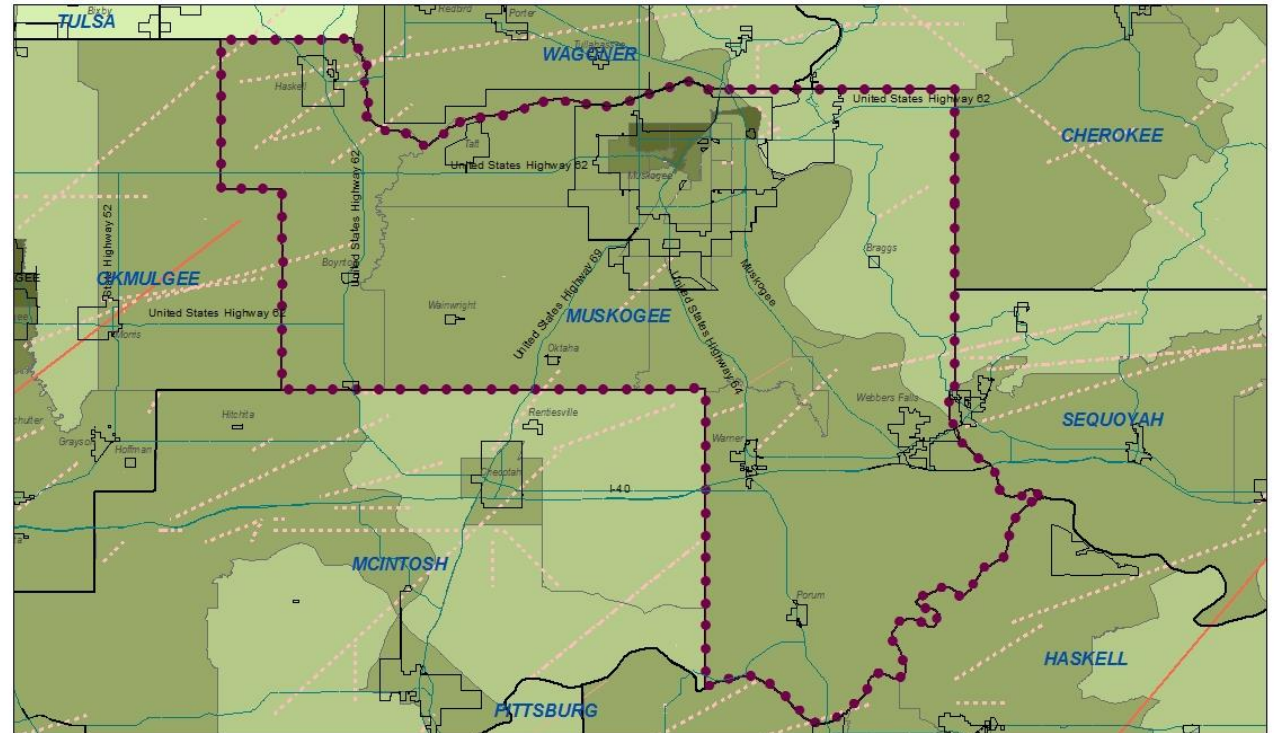
Muskogee County

of injuries associated with event

- 0 - 2
- 3 - 8
- 9 - 21
- 22 - 42
- 43 - 68
- 69 - 106
- 107 - 212
- 213 - 583
- 584 - 1150
- 1151 - 1740

Social Vulnerability Index

- 1.614549 - 2.616235
- 2.616236 - 3.237072
- 3.237073 - 3.854933
- 3.854934 - 4.661284
- 4.661285 - 6.459169



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

19XX or 20XX Year of Event

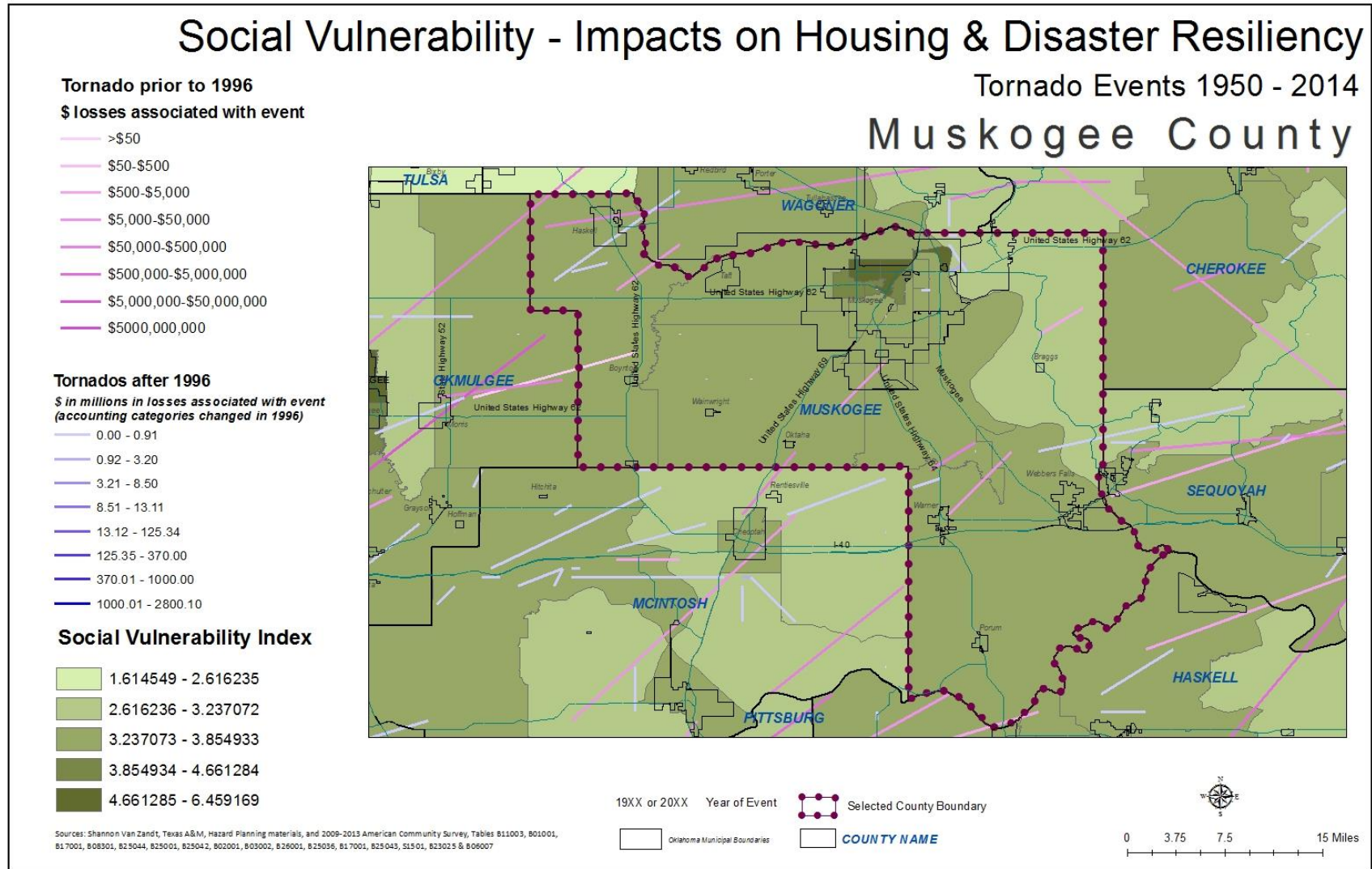
Oklahoma Municipal Boundaries

Selected County Boundary

COUNTY NAME



0 3.75 7.5 15 Miles



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

City of Muskogee Emergency Management Director Jimmy Moore listed three public tornado shelters or safe rooms in Muskogee:

- Tony Goetz Elementary School, 2412 Haskell Blvd.
- Hilldale Elementary School, 315 E. Peak Blvd.
- Basement of Masonic Temple, 121 S. Sixth St.

Two churches also have opened as safe rooms, but are not official shelters.

- First Baptist Church, 111 S. Seventh St., opened its Boston Avenue entrance. No animals are allowed.
- First United Methodist Church, 600 E. Broadway. (http://www.muskogee phoenix.com/archives/breaking-news-area-shelters-open/article_d44e1368-3797-5d93-a3b8-b856cd868876.html)

Muskogee Storm Shelter registration:

http://readymuskogee.com/storms_and_hazards/register_your_storm_shelter

C.2.1.3 Public Policy and Governance to Build Disaster Resiliency

No information available.

C.2.1.4 Local Emergency Response Agency Structure

No information available.

C.2.1.5 Threat & Hazard Warning Systems

The identified Threat & Hazard Warning Systems for Muskogee County include:

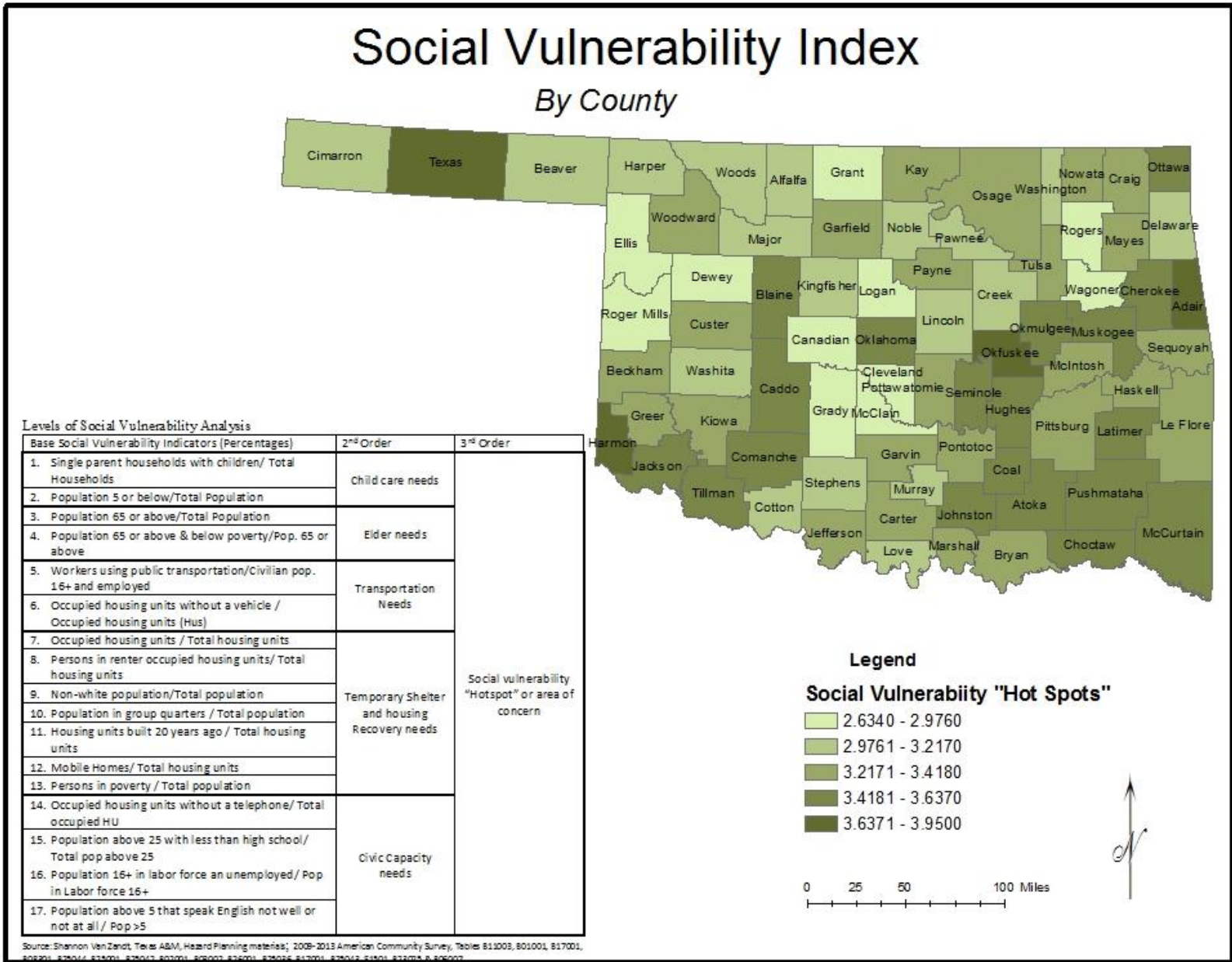
- Sirens (19 sirens across the City of Muskogee)
- Emergency Broadcast System
- Facebook notifications

Social Vulnerability

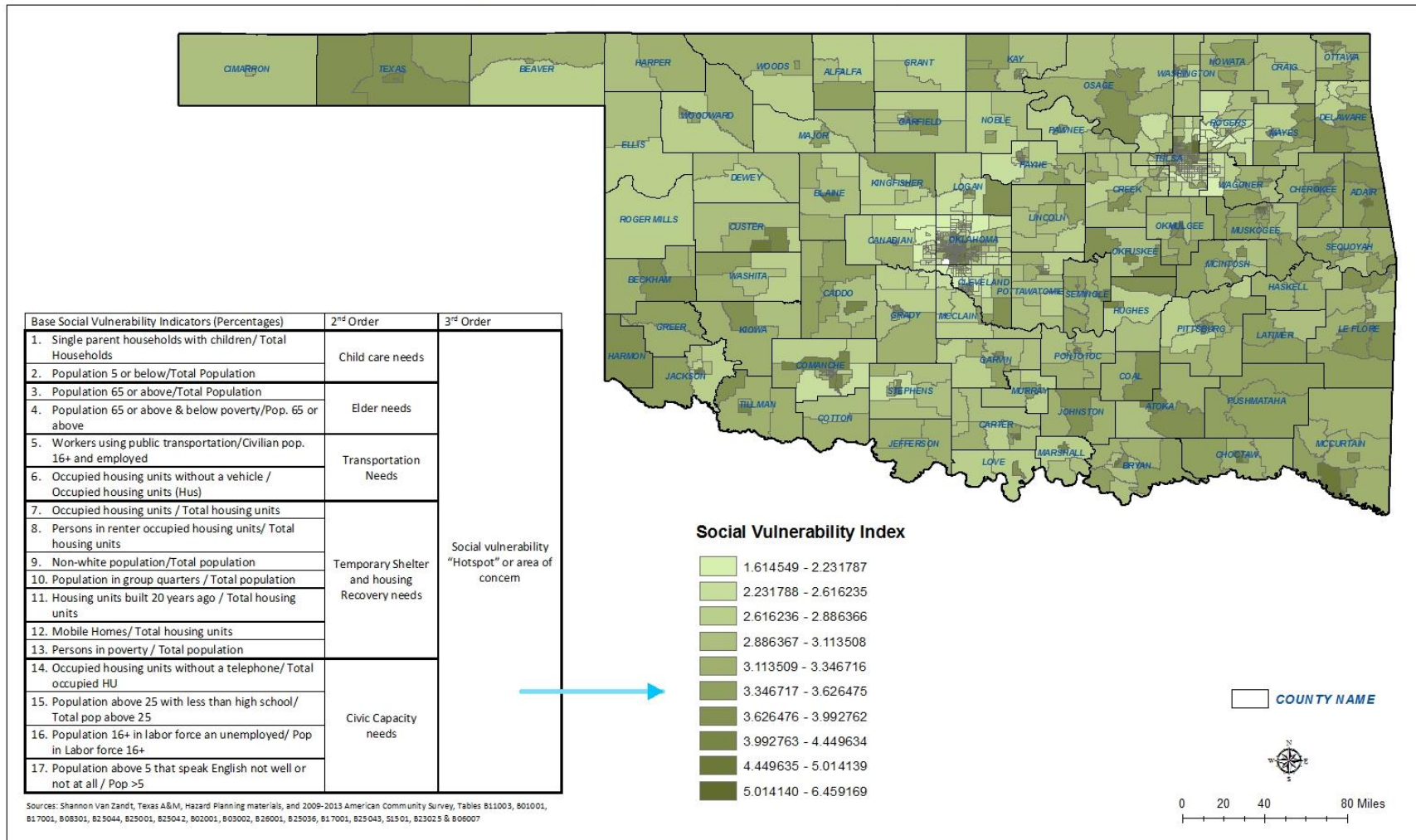
Based on the research work done by the Texas A&M University Hazard Reduction and Recovery Center, an added component is being included in this section. Social vulnerability can place households at a further disadvantage during and after a disaster. This analysis is assessing for the county the levels 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 - Muskogee County			
Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	17.81%	0.249	3.637 Social Vulnerability 'Hotspot' or Area of Concern
2.) Population Under 5	7.06%	(Child Care Needs)	
3.) Population 65 or Above	14.94%	0.25	
4.) Population 65 or Above & Below Poverty Rate	10.03%	(Elder Needs)	
5.) Workers Using Public Transportation	0.22%	0.083	
6.) Occupied Housing Units w/o Vehicle	8.12%	(Transportation Needs)	
7.) Housing Unit Occupancy Rate	86.85%	2.767 (Temporary Shelter and Housing Recovery Needs)	
8.) Rental Occupancy Rate	32.58%		
9.) Non-White Population	42.00%		
10.) Population in Group Quarters	4.96%		
11.) Housing Units Built Prior to 1990	76.51%		
12.) Mobile Homes, RVs, Vans, etc.	10.96%		
13.) Poverty Rate	22.87%		
14.) Housing Units Lacking Telephones	2.59%	0.288 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	15.20%		
16.) Unemployment Rate	8.84%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	2.21%		

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



Social Vulnerability - Impacts on Housing & Disaster Resiliency

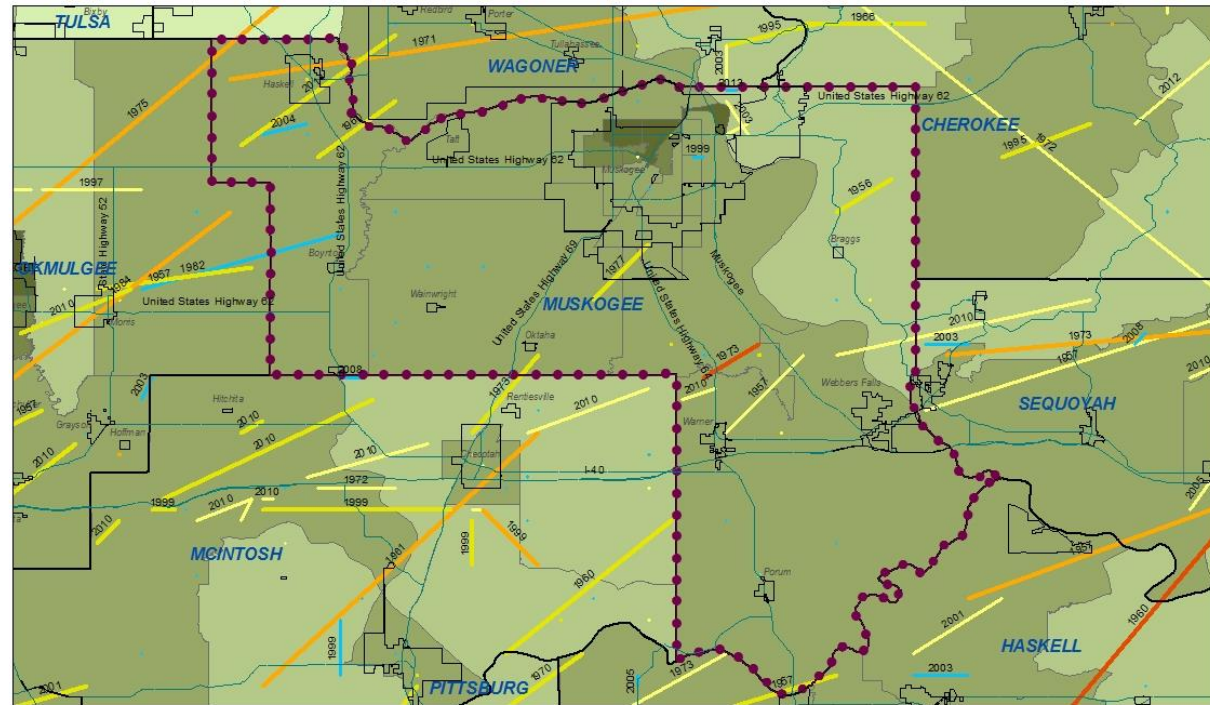
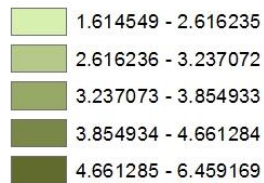
Tornado Events 1950 - 2014

Muskogee County

Tornado Magnitude



Social Vulnerability Index



19XX or 20XX Year of Event

Oklahoma Municipal Boundaries

Selected County Boundary

COUNTY NAME



0 3.75 7.5 15 Miles

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

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 greater gap or disadvantage prior to the event (Shannon Van Zandt, Texas A&M, Hazard Planning).

This county has an elevated 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 Muskogee area has particularly higher scores for social vulnerability. 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.