

## Special Topics

## Rogers 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 2 key cities within the county including Claremore (the county seat) and Catoosa. Towns include Chelsea, Foyil, Inola, Oologah, Talala, Valley Park and Verdigris. Though partly in Rogers County, Collinsville (primarily in Tulsa County), Owasso (primarily in Tulsa County) and Tulsa (primarily in Tulsa County) are addressed in the Tulsa County Assessment. Likewise, Fair Oaks (primarily in Wagoner County) is addressed in the Wagoner County Assessment.

**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. Of the 2 cities, Claremore has a comprehensive plan that has been adopted. Of these plans the following plans contain language in the plan that addresses land use decisions that reduce placing housing and businesses within historical areas of risk (e.g. flooding) and other supporting actions to increase disaster resiliency.

Claremore-Rogers County has a joint Comprehensive Plan: 2025 - Language in plan that address disaster resiliency relates to not allowing building within a flood zone.

Based on the review of the existing and available comprehensive plans for the area, it is recommended that any future comprehensive planning work done include coordination and goals to address disaster resiliency.

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.

Rogers County adopted a Hazard Mitigation Plan on August 31, 2010 that is due for updating.

The City of Claremore has a Hazard Mitigation Plan that was adopted on November 21, 2012.

#### Emergency Operation Plan

The City of Claremore has adopted an Emergency Operations Plan (EOP) in 2011.

Claremore public Schools also have an EOP adopted in 2012.

As of the time the HMP was approved, mitigation measures in the plan called for construction of an Emergency Operations Center/911 center.

Rogers County has a mobile Emergency Operations Center.

Rogers County has a Community Emergency Response Team (CERT)

Rogers County has a Mass Notification service.

City of Claremore has 8 storm sirens.

### **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.

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

The City of Claremore 2012 Hazard Mitigation Plan has several Goals and Objectives. The following specifically addresses storm shelters and safe rooms.

Goal 3 Tornado Hazard: To reduce the risk from tornados in the City of Claremore

Objectives:

1. Encourage building of individual safe rooms and storm shelters.

The following are high priority mitigation measures within the City of Claremore HMP:

<b>Prioritized Mitigation Measures</b>		
<b>Rank</b>	<b>Lead/Responsible Department</b>	<b>Mitigation Strategy</b>
1	City Emergency Management	Purchase and install NOAA weather radios in City facilities.
2	City Emergency Management	Develop an "all media program" including the City's web page to educate the City residents about mitigating the risk of life and property associated with the occurrence of hazards.
3	City Building Operations	Install water saving fixtures in all City facilities.
4	City Public Works	Develop detailed soils maps to determine risk areas.
5	City Electric Department	Bury overhead power lines to make them more hazard resistant.
6	City Emergency Management	Construct an Emergency Operations Center.
7	City Administration	Safe rooms at City facilities including the Community Center.

8	City Administration	Develop a fee in lieu regulation that would provide an alternative for land developers to contribute to a fund to construct a regional detention facility instead of building individual storm water detention facilities.
9	Public Works	Install placards on buildings showing their address so emergency responders can positively locate emergency request calls.
10	Public Works	Extend Master Drainage Plan to include fence line to better provide information on flood hazards.
11	Public Works	Formalize maintenance plan/procedures for storm water system.
12	City Administration	Draft an ordinance to require all new buildings to have a shelter to withstand tornadoes and high wind events.
13	City Administration	Improve building construction standards to insure buildings are built to withstand hazards.
14	City Administration	Encourage shelter/safe room construction at high hazard areas such as mobile home parks and apartment complexes.
15	Emergency Management	Additional emergency warning sirens to cover large outdoor gathering areas.
16	Electric Department	Install lightning protection systems for city facilities and private critical facilities.
17	Public Works	Construct indoor storage for all city vehicles (5 structures) to protect from hail.
18	City Administration	Encourage planning/education of safety procedures for large outdoor gatherings.
19	Emergency Management	Designate emergency routes/procedures in ordinance or policy to maintain traffic flow through City during snow and ice events.
20	Public Works	Update ordinances to require snow removal for facilities requiring emergency services.
21	Emergency Management	Prepare facilities for use as possible warming shelters for citizens displaced during severe winter storms.
22	Emergency Management	Prepare facilities for use as possible cooling shelters for citizens displaced during extreme heat events.
23	Public Works	Construction of additional water supply storage capacity to maintain an acceptable supply of water to city residents during periods of drought.
24	Fire Department	Adopt Wildland/Urban Interface programs and procedures.
25	Emergency Management	Reactivate/revitalize the Local Emergency Planning Commission for hazard material event response.
26	Emergency Management	Strengthen/formalize evacuation and warning procedures for public evacuations and warnings to the public.
27	City Administration	Incorporate an EOC into the Fire Administration/Senior Center Facility being renovated for such purposes. Include emergency power capabilities to increase structural requirements to allow for its use as a storm shelter for the occupants of the facility.

28	Public Works	Install emergency power to the Water Treatment Plant so the plan can maintain operation during a power emergency.
29	Emergency Management	Improve interoperability and redundancy in radio communications for emergency responders.

<b>Claremore Public Schools Mitigation Measures</b>		
1	Claremore Schools Building Operations	Install water saving fixtures in school facilities.
2	Claremore Schools Building Operations	Purchase and install two backup generators.
3	Claremore Schools Building Operations	Acquisition of snow removal equipment and sand spreaders.
4	Claremore Schools Building Operations	Outdoor warning systems to provide immediate notification of approaching hazards to students and staff outside of the school buildings.
5	Claremore Schools Building Operations	2-way radios for all school buildings – for staff to use out in the school facilities to hazard response coordinators when inspecting facilities during and after hazard events.
6	Claremore Schools Building Operations	Install energy efficient windows in school buildings.
7	Claremore Schools Building Operations	Install NOAA weather radios in school facilities.
8	Claremore Schools Building Operations	Develop an “all media program” to educate the school staff, students, and parents about mitigation the risk of life and property associated the occurrence of hazards.
9	Claremore Schools Building Operations	Develop detailed soils maps to identify the soil’s construction properties including shrink-swell potential, to insure proper foundation design and construction of future improvements and buildings at each school site.

Historical natural disasters in Rogers County are documented in the City of Claremore 2012 Hazard Mitigation Plan (HMP). Typical hazard disasters in the region include flooding, severe storms, wildfires, severe winter storms, and tornadoes.

#### **Dam Failure Risks**

Historical Context: There are 30 dams listed in the Rogers County Dam Safety Program. Claremore Lake Dam is classified as High Hazard. There has not been a historical dam breach in Rogers County.

Mitigation Strategy / Recommendations from HMP:

### **Drought**

Historical Context: Rogers County has experienced 8 drought events from 2006 through 2011. No loss of crops or property damage were reported.

Mitigation Strategy / Recommendations from HMP:

- Construction of additional water supply storage capacity to maintain an acceptable supply of water to city residents during periods of drought.

### **Earthquake**

Historical Context: According to the Oklahoma Geological Survey, Rogers County and City of Claremore have had 0 earthquakes from 2006 through 2011.

Mitigation Strategy / Recommendations from HMP: Rogers 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:

- Develop detailed soils maps to determine risk areas.

### **Extreme Heat**

Historical Context: According to the NCDC, Rogers County experienced 11 extreme heat events from 2006 through 2011.

Mitigation Strategy / Recommendations from HMP:

- Prepare facilities for use as possible cooling shelters for citizens displaced during extreme heat events.

### **Flood**

Historical Context: According to the NCDC, City of Claremore experienced 3 flood events between 2006 and 2011.

There are seven repetitive loss structures in Claremore that are insured through NFIP. As grant funds become available, the regulating jurisdiction is working with the property owner to remove the structure from the floodplain.

Mitigation Strategy / Recommendations from HMP:

### **Hail**

Historical Context: City of Claremore has reported 12 hail events from 2006 through 2011.

Mitigation Strategy / Recommendations from HMP:

- Construct indoor storage for all city vehicles (5 structures) to protect from hail.

### **Hazardous Materials, Fixed Site (and Transportation Incidents)**

Historical Context: The City of Claremore responded 405 hazard events between 2006 and 2011.

Mitigation Strategy / Recommendations from HMP:

### **High winds**

Historical Context: According to the NCDC data, City of Claremore experienced 17 wind events between 2006 and 2011 that resulted in \$80,000 in damage.

Mitigation Strategy / Recommendations from HMP:

- Improve building construction standards to insure buildings are built to withstand hazards.

### **Lightning**

Historical Context: According to the NCDC, City of Claremore experienced zero lightning events between 2006 and 2011.

Mitigation Strategy / Recommendations from HMP:

- Install lightning protection systems for city facilities and private critical facilities.

### **Tornado**

Historical Context: According to the NCDC, there were 8 tornadoes in and around the Claremore area between 1950 and 2010.

- May 18, 1989, an F-1 tornado touched down in Claremore resulting in one injury and not fatalities. Damage estimates are not available.

Mitigation Strategy / Recommendations from HMP:

- Safe rooms at City facilities including the Community Center.
- Draft an ordinance to require all new buildings to have a shelter to withstand tornadoes and high wind events.
- Improve building construction standards to insure buildings are built to withstand hazards.
- Encourage shelter/safe room construction at high hazard areas such as mobile home parks and apartment complexes.
- Additional emergency warning sirens to cover large outdoor gathering areas.
- Incorporate an EOC into the Fire Administration/Senior Center Facility being renovated for such purposes. Include emergency power capabilities to increase structural requirements to allow for its use as a storm shelter for the occupants of the facility.

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.

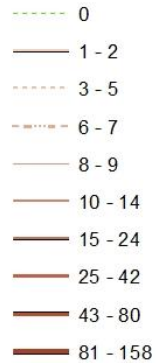


# Social Vulnerability - Impacts on Housing & Disaster Resiliency

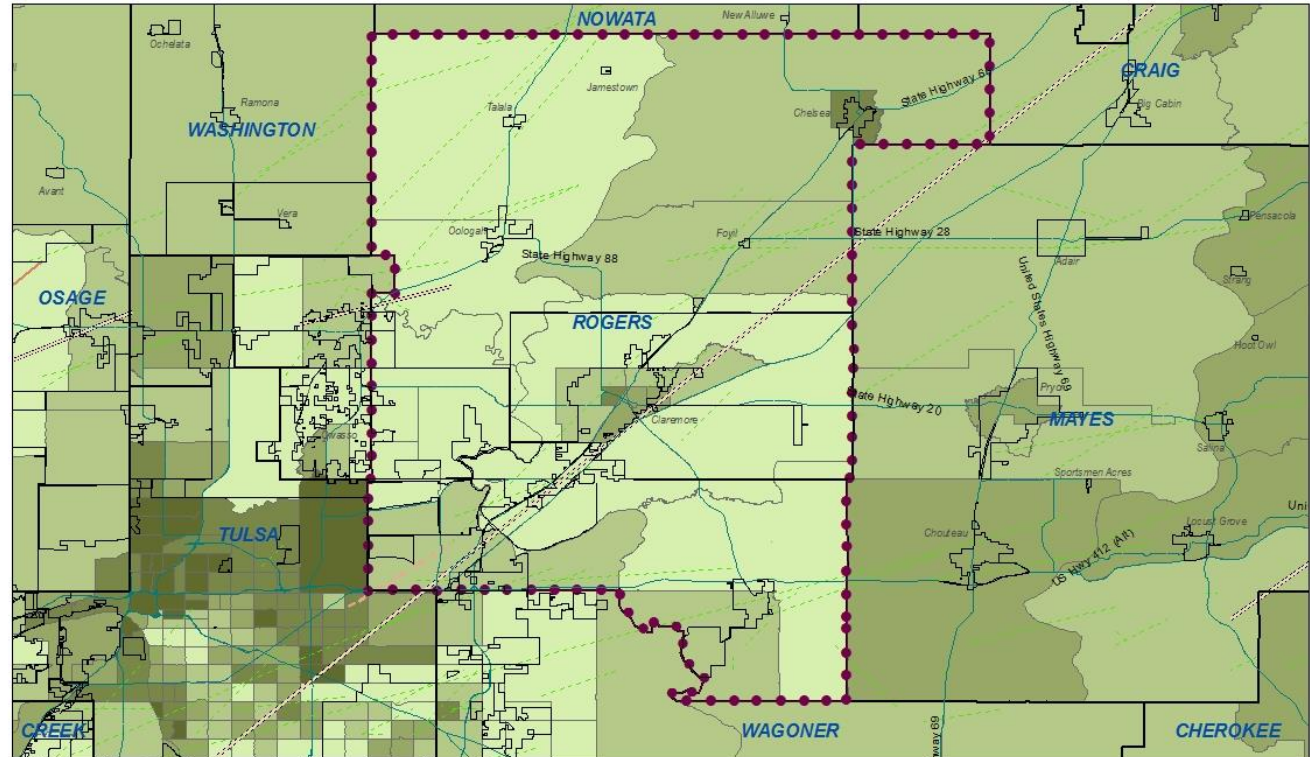
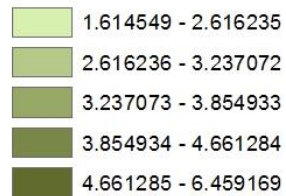
## Tornado Events 1950 - 2014

### Rogers 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

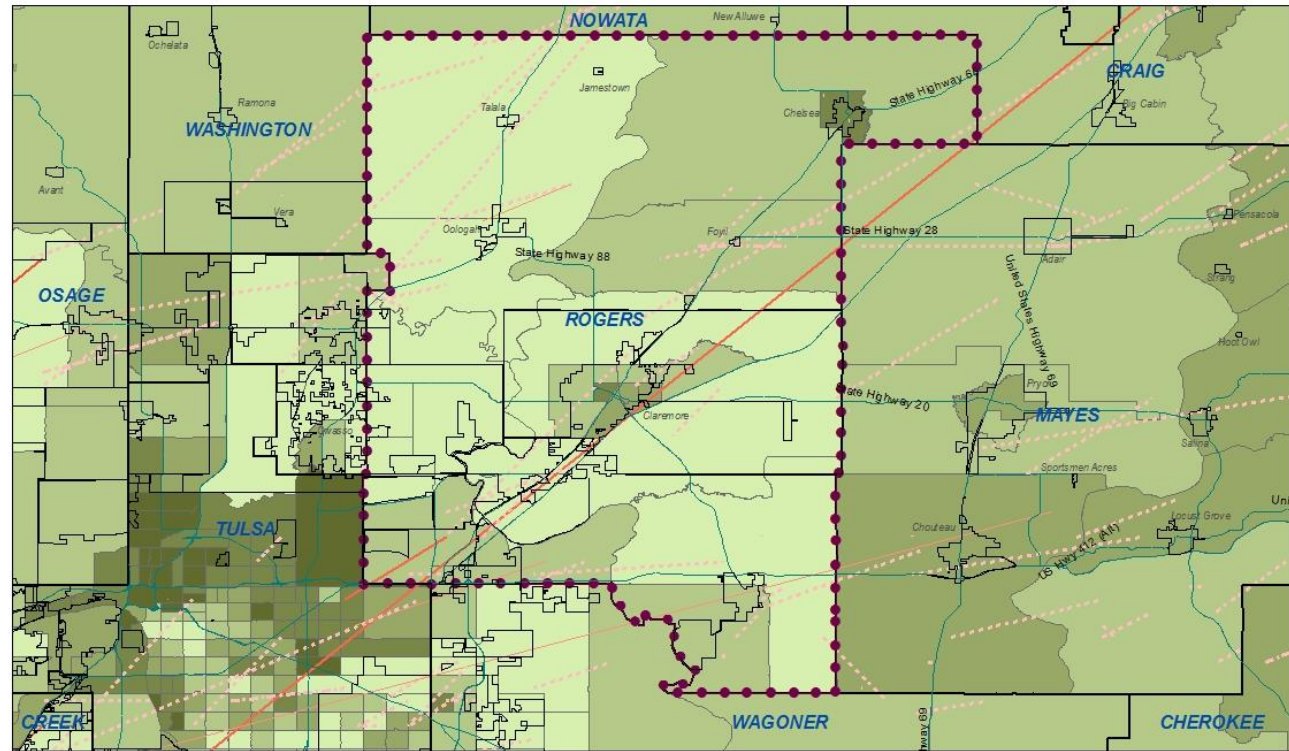
### Rogers County

**# 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



19XX or 20XX Year of Event

Selected County Boundary

Oklahoma Municipal Boundaries

COUNTY NAME



0 3.5 7 14 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



# Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014  
Rogers County

**Tornado prior to 1996**  
\$ losses associated with event

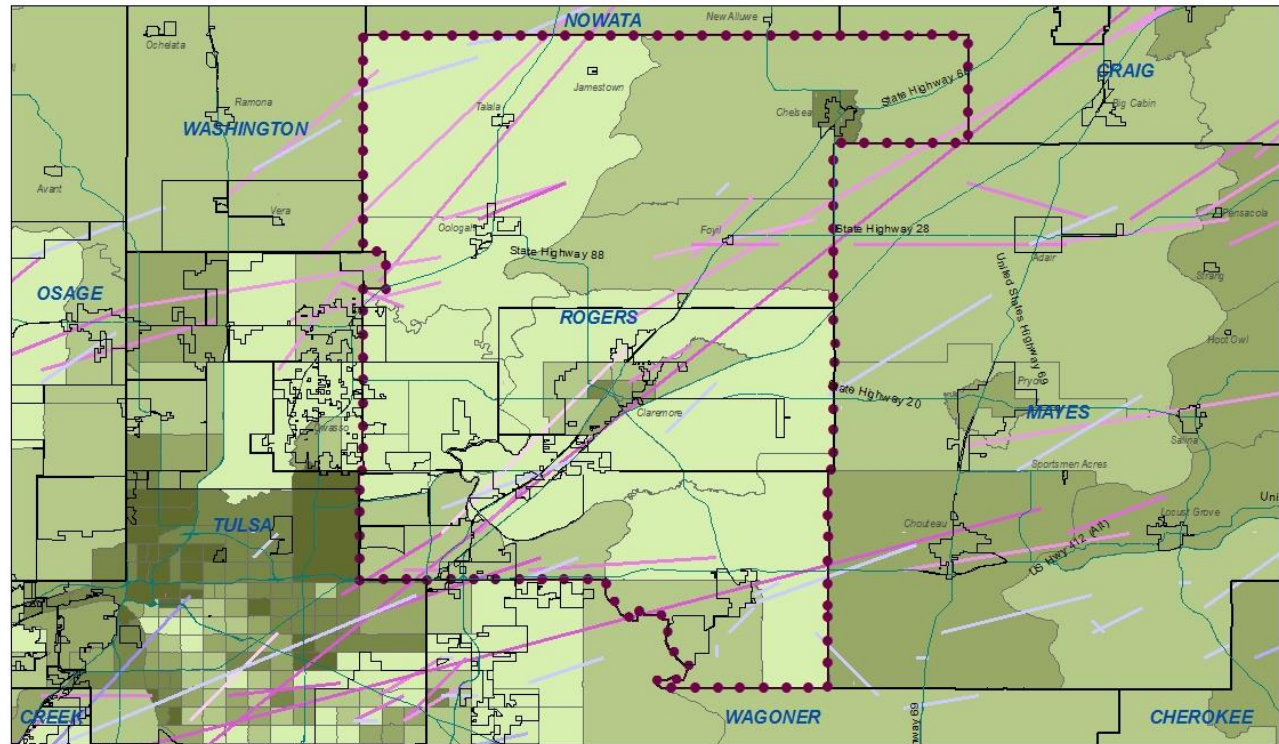
- >\$50
- \$50-\$500
- \$500-\$5,000
- \$5,000-\$50,000
- \$50,000-\$500,000
- \$500,000-\$5,000,000
- \$5,000,000-\$50,000,000
- \$50,000,000

**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



19XX or 20XX Year of Event ● Selected County Boundary

Oklahoma Municipal Boundaries

COUNTY NAME



0 3.5 7 14 Miles

Sources: Shannon van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08301, B25044, B25041, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007

### **Wildfires/Urban (Structure) Fires**

Historical Context: The City of Claremore's Fire Department responded to 191 grass fires from 2006 to 2011. (The Claremore HMP did not distinguish between Wildfires and Urban Fires.)

Mitigation Strategy / Recommendations from HMP:

- Adopt Wildland/Urban Interface programs and procedures.

### **Winter Storms**

Historical Context: There have been 17 winter storm events in City of Claremore from 2006 to 2011 that resulted in damages of \$70,000,000.

Mitigation Strategy / Recommendations from HMP:

- Designate emergency routes/procedures in ordinance or policy to maintain traffic flow through City during snow and ice events.
- Update ordinances to require snow removal for facilities requiring emergency services.
- Prepare facilities for use as possible warming shelters for citizens displaced during severe winter storms.

### **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.

Rogers County has a storm shelter program whereby residents can register locations of private shelters by telephone.

<http://www.rcsheriff.org/page.php?id=8>

Verdigris and Catoosa are in the process of building storm shelters at public schools.

[http://www.claremoreprogress.com/news/rogers-county-schools-build-storm-shelters/article\\_45b8ffa2-4286-11e5-92fe-b76edccad514.html](http://www.claremoreprogress.com/news/rogers-county-schools-build-storm-shelters/article_45b8ffa2-4286-11e5-92fe-b76edccad514.html)

### **C.2.1.3 Public Policy and Governance to Build Disaster Resiliency**

City of Claremore follows the State of Oklahoma adopted building codes using the 2009 International Building Code. The City of Claremore has a comprehensive plan, zoning code (updated 2011), and subdivision regulations (adopted 2001).

City of Claremore Hazard Mitigation Planning Team includes the City and the Claremore Public Schools.

#### **C.2.1.4 Local Emergency Response Agency Structure**

Rogers County has clearly defined Emergency Measures and Activities (Section 4.2.4) along with the responsible party for carrying out each activity such as activating the emergency operations room, shutting off power to threatened areas, ordering evacuation, opening evacuation shelters, and monitoring water levels, etc.

#### **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.

#### **Rogers County Emergency Notification and Warning Systems**

##### *NOAA Weather Radios*

The City of Claremore HMP states that the community should consider a NOAA weather radio program.

##### *Warning Systems*

City of Claremore outdoor warning system includes 8 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.

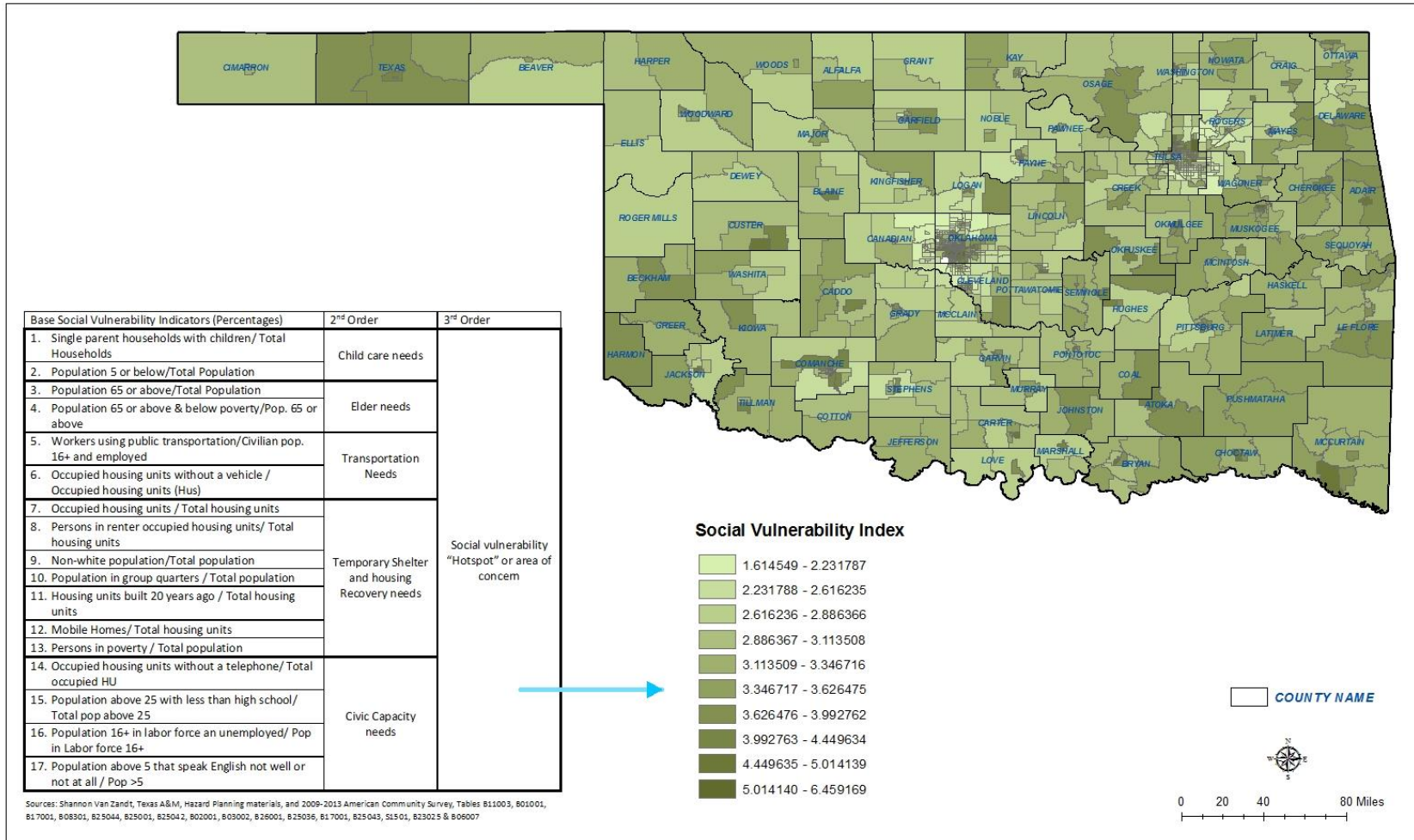
<b>Social Vulnerability Analysis - Rogers County</b>		
<b>Base Social Vulnerability Indicators (%)</b>	<b>2nd Order</b>	<b>3rd Order</b>
1.) Single Parent Households	10.71%	0.167
2.) Population Under 5	6.01%	(Child Care Needs)
3.) Population 65 or Above	13.97%	0.199
4.) Population 65 or Above Poverty Rate	5.89%	(Elder Needs)
5.) Workers Using Public Transportation	0.15%	0.034
6.) Occupied Housing Units w/o Vehicle	3.29%	(Transportation Needs)
7.) Housing Unit Occupancy Rate	92.49%	
8.) Rental Occupancy Rate	21.11%	2.182
9.) Non-White Population	26.53%	(Temporary Shelter and Housing Recovery Needs)
10.) Population in Group Quarters	1.15%	
11.) Housing Units Built Prior to 1990	55.85%	
12.) Mobile Homes, RVs, Vans, etc.	11.82%	
13.) Poverty Rate	9.26%	
14.) Housing Units Lacking Telephones	1.88%	
15.) Age 25+ With Less Than High School Diploma	9.60%	0.192
16.) Unemployment Rate	6.37%	(Civic Capacity Needs)
17.) Age 5+ Which Cannot Speak English Well or Not At All	1.37%	
		<b>2.774 Social Vulnerability 'Hotspot' or Area of Concern</b>
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



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



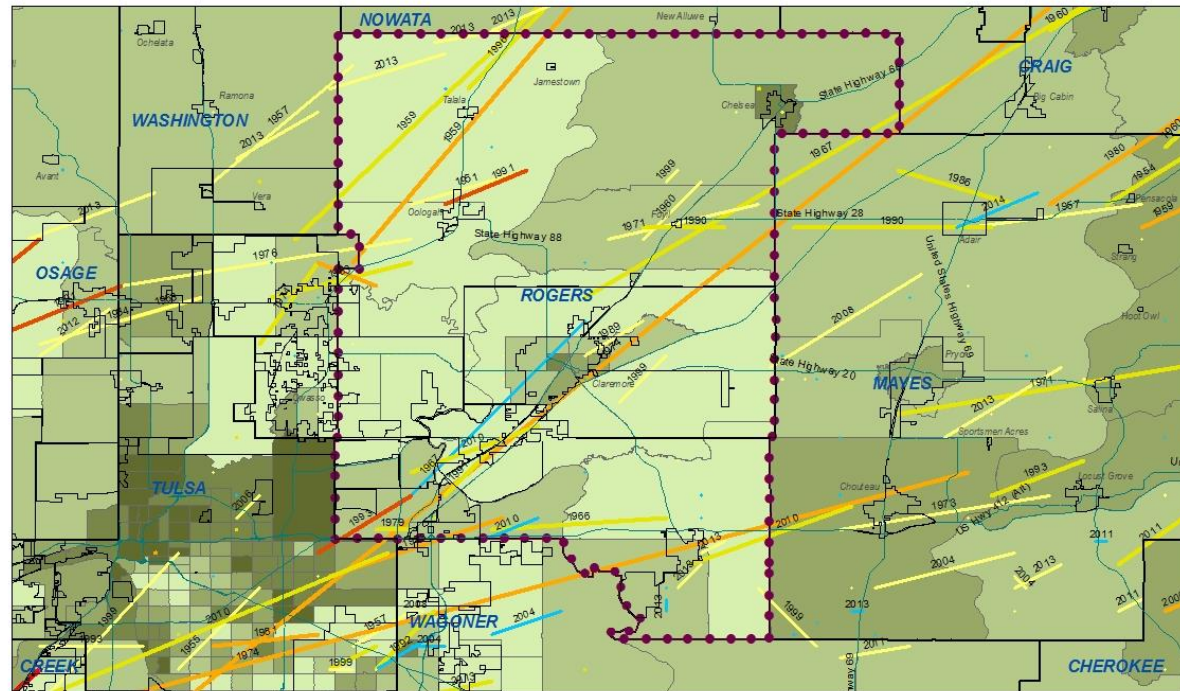
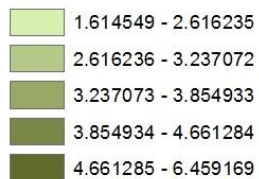
# Social Vulnerability - Impacts on Housing & Disaster Resiliency

## Tornado Events 1950 - 2014 Rogers County

**Tornado Magnitude**



**Social Vulnerability Index**



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, B23023 & B06007

19XX or 20XX Year of Event

□ Oklahoma Municipal Boundaries

Selected County Boundary

□ COUNTY NAME



0 3.5 7 14 Miles

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 falls below state score per this index for social vulnerability when comparing as a county to other counties in the state. The immediate census tract near Claremore has an elevated score where increased social vulnerability is notable.

**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.