

## Special Topics

## Tillman 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 7 key cities within the county (Frederick, Grandfield, Tipton, Davidson, Manitou, Hollister, Loveland).

**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.

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.

Tillman County does have a Hazard Mitigation Plan.

#### 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.

##### Dam Failures

“Thirty six dams exist in Tillman County. None are classified as significant or high hazard.

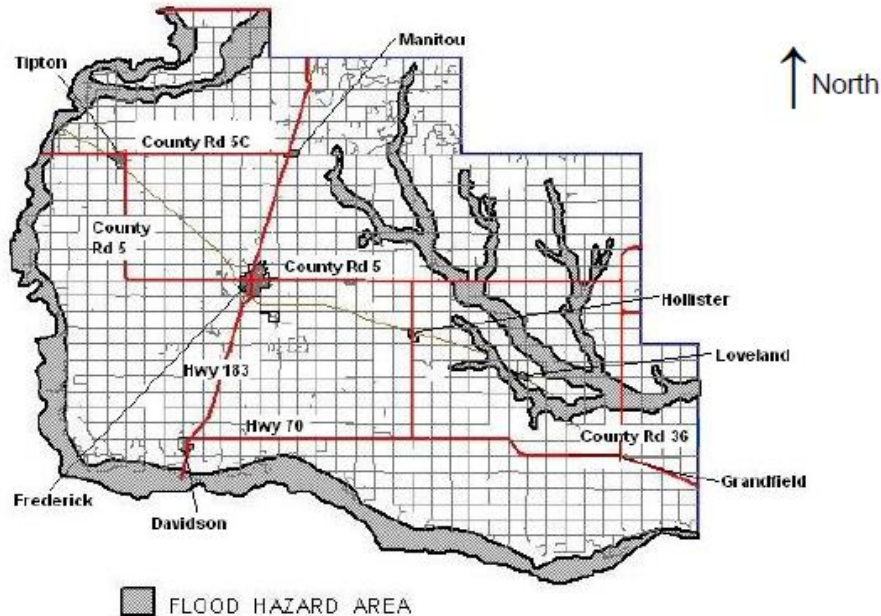
Inundation zones identified but because of low hazard dams information is not available.

There are not any previous occurrences of dam failure and no other extent is available.” HMP, P. 19

“Dam failures have not occurred in any years between 1950 and 2007. Damages to personal property is zero.” P. 21

## Flooding

XIV. Figure: Flood Zones of Tillman County.



HMP, p. 40

“National Climatic Data Center storm event statistics record 12 flooding events in Tillman County during 1995-2007. The reported damage totaled \$1.262 million.” HMP, p. 42

## “Previous Occurrences of Flooding.

- September 22, 1997 - After 9.5 inches of rain fell in less than 24 hours, with most of the rain falling in a four hour period from 21:30 CST on the 22nd to 01:30 CST on the 23rd, streets of Tipton looked more like rivers than roads. Water up to five feet deep flowed down Main Street in downtown Tipton. **At least 19 residences, four businesses, a post office, and a church were flooded.** Highway 5 near town was also impassable. **Damage was reported at \$125,000.**
- May 27, 1999 - **Several houses were reported to be flooded in Frederick in Tillman County, and two homes needed to be evacuated.** Portions of State Route 36, and State Route 5 in Tillman County were also reported to be covered by water. **Damage was reported at \$60,000.**
- June 10, 1999 - In Frederick in Tillman County, flooding was reported on S. Main St.
- October 22, 2000 – Railroad tracks north of Frederick were washed out due to rushing water. Highway 183 was closed between Frederick and Manitou, while State Highway 5c was closed between Manitou and Tipton. No damage amount was reported. October 22, 2000 – In the city of Tipton in Tillman County, six homes were flooded and several streets were covered with a half foot of water. A couple was rescued from their home three miles east of Manitou in Tillman County, while a family was rescued from their home one mile east of Frederick in Tillman County, both due to high water. A vehicle

traveling on Red River Gin Road, three miles south of Frederick in Tillman County, was swept off the road and into a creek. Both occupants were rescued by boat and treated for injuries, one for a broken leg and the other for lacerations. Many roads, including large segments of Highway 183, were closed during this time. **Damage was reported at \$75,000.**" HMP, p. 42

"The boundary of a **100-year frequency flood** was digitized into an ArcView map layer. That map layer was superimposed over newest available aerial photographs of Tillman County. The resulting map was visually searched for homes. **This search found located zero homes.** From County assessor records a **list of 37 rural non-home land parcels with "improvements" was identified. The locations were digitized into an Arc View map layer. The 100-year flood frequency map layer was superimposed to identify any of these „improvements" in flood hazard. There were none in the flood hazard area.** Since Tillman County has not previously had a flood insurance program there are no repetitive loss structures." (HMP, p43)

#### Tornados

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

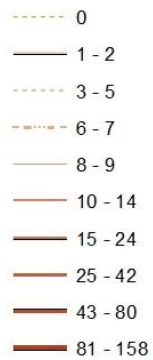
Historic data on tornados between 1950-2014 there are 74 tornados documented. There were 138 injuries that occurred connected to these tornados, with 68 of those injuries happening in the 1978 tornado. There were 12 fatalities connected to tornadoes during this time period, 11 of which occurred in 1978. Property losses between 1950-1996 ranged from \$1,804,105.00 to \$18,041,250.00 . (The accounting methods used for losses changed in 1996.) The losses estimated between 1996-2014 was \$760,000.00 .

# Social Vulnerability - Impacts on Housing & Disaster Resiliency

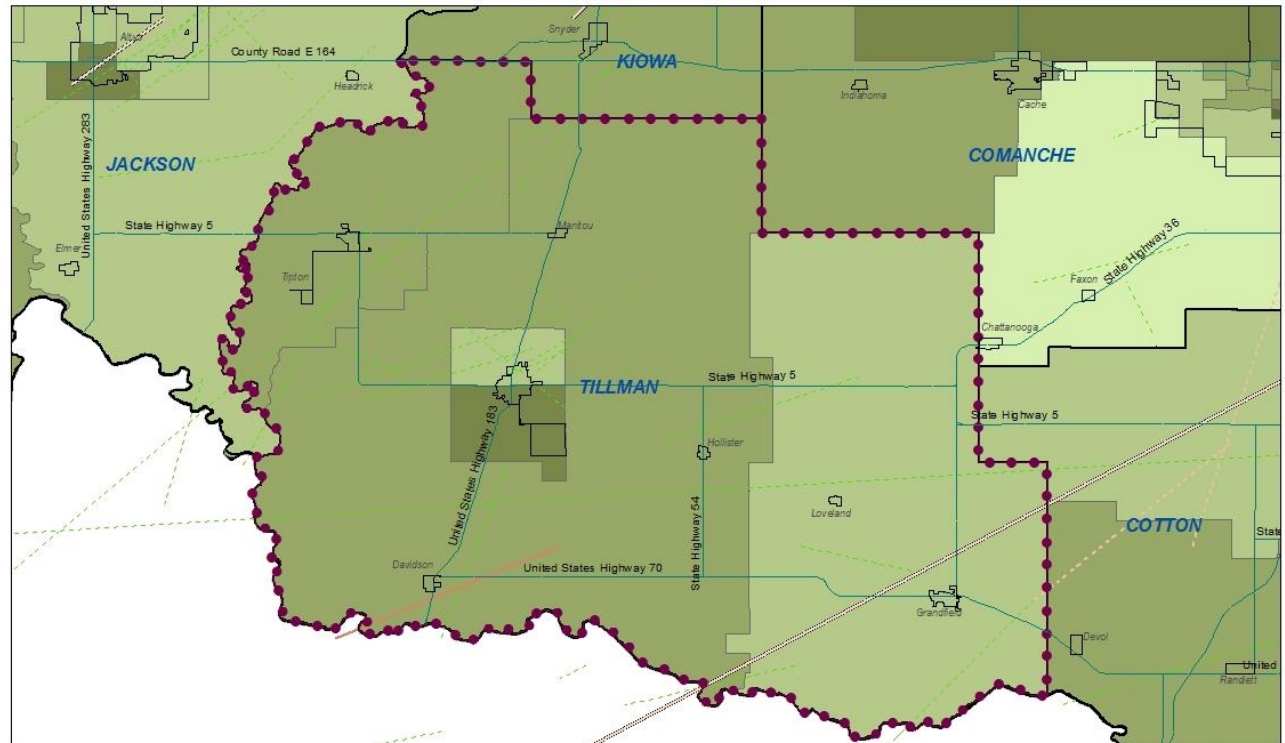
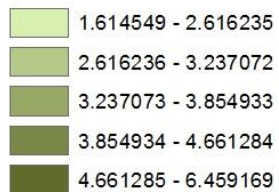
## Tornado Events 1950 - 2014

### Tillman County

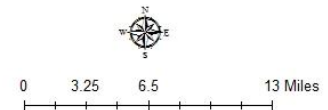
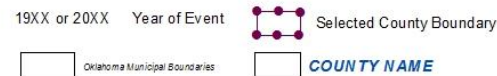
**# of fatalities associated with event**



**Social Vulnerability Index**



Sources: Shannon Van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08501, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007



# Social Vulnerability - Impacts on Housing & Disaster Resiliency

## Tornado Events 1950 - 2014

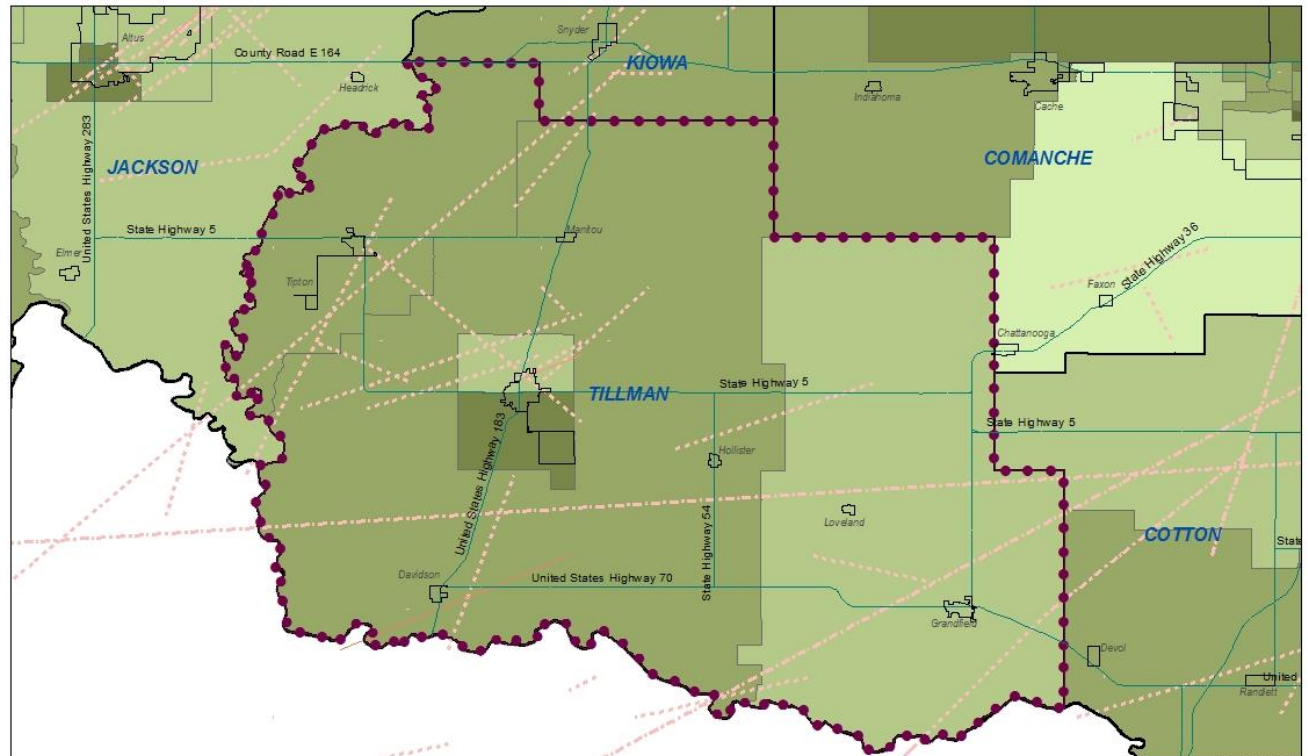
### Tillman County

**# 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



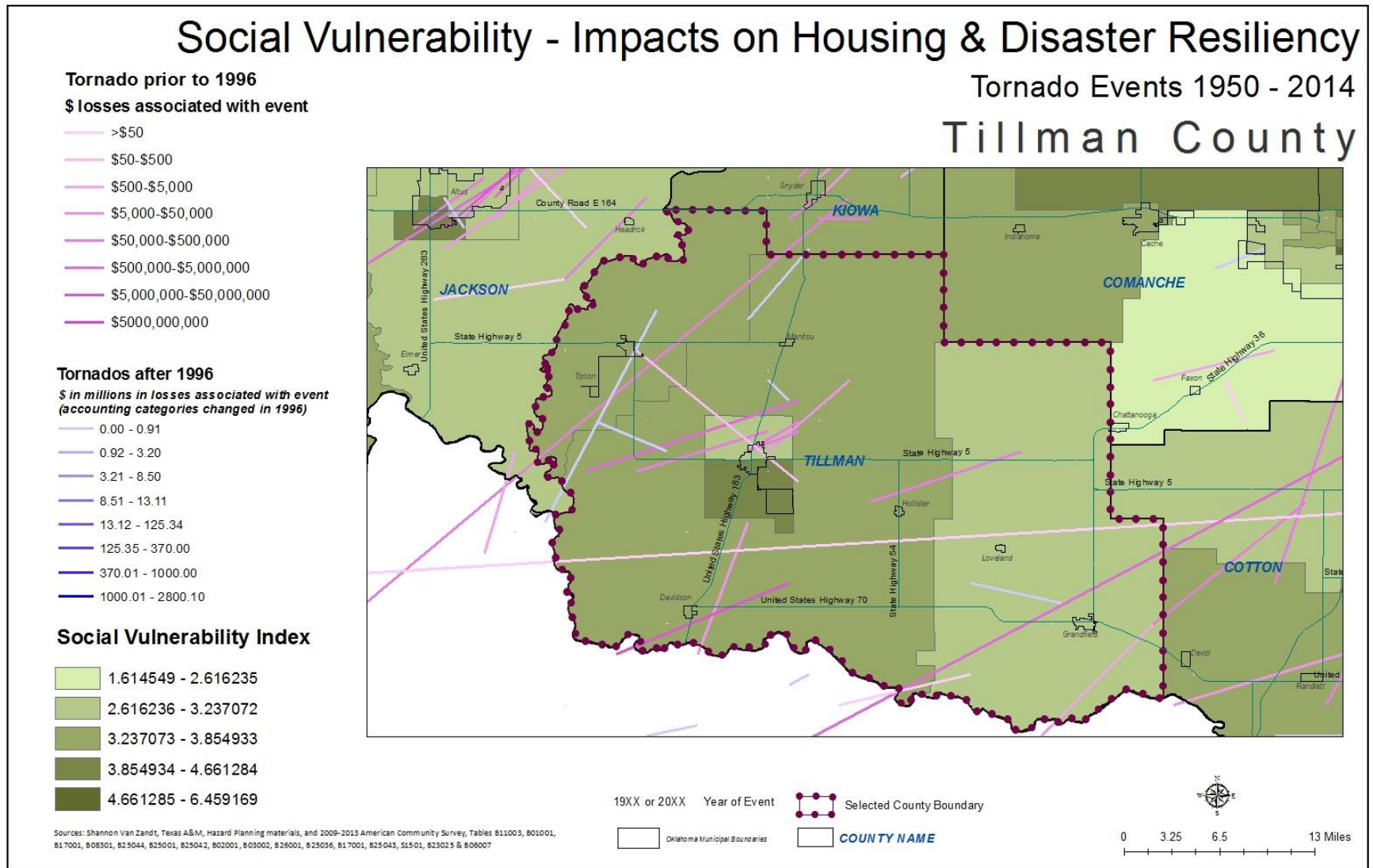
COUNTY NAME



0 3.25 6.5 13 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





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

Tillman County was considering a bid for a public shelter construction (12/2015), final decision not determined.

Tillman County HMP includes the following recommendations:

- **Action Item # T-HW 2:** Educate the public in the benefits of installing residential and commercial storm shelters and safe rooms. (p. 91)
- **Action Item # T-HW 5:** Install residential and commercial storm shelters. (10 new storm shelters) (p.92)

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

Information not available.

### C.2.1.4 Local Emergency Response Agency Structure

Information not available.

### C.2.1.5 Threat & Hazard Warning Systems

- Sirens (12 sirens in Tillman County) <http://www.ksw.com/story/29119029/frederick-explains-why-sirens-didnt-go-off?clienttype=mobile>
- Phone notification (nixle)
- Emergency Broadcast System / radio transmissions
- Facebook

### 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 - Tillman County

Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	11.19%	0.177	<b>3.543 Social Vulnerability 'Hotspot' or Area of Concern</b>
2.) Population Under 5	6.53%	(Child Care Needs)	
3.) Population 65 or Above	17.73%	0.312	
4.) Population 65 or Above & Below Poverty Rate	13.48%	(Elder Needs)	
5.) Workers Using Public Transportation	0.42%	0.069	
6.) Occupied Housing Units w/o Vehicle	6.47%	(Transportation Needs)	
7.) Housing Unit Occupancy Rate	74.16%	2.59	

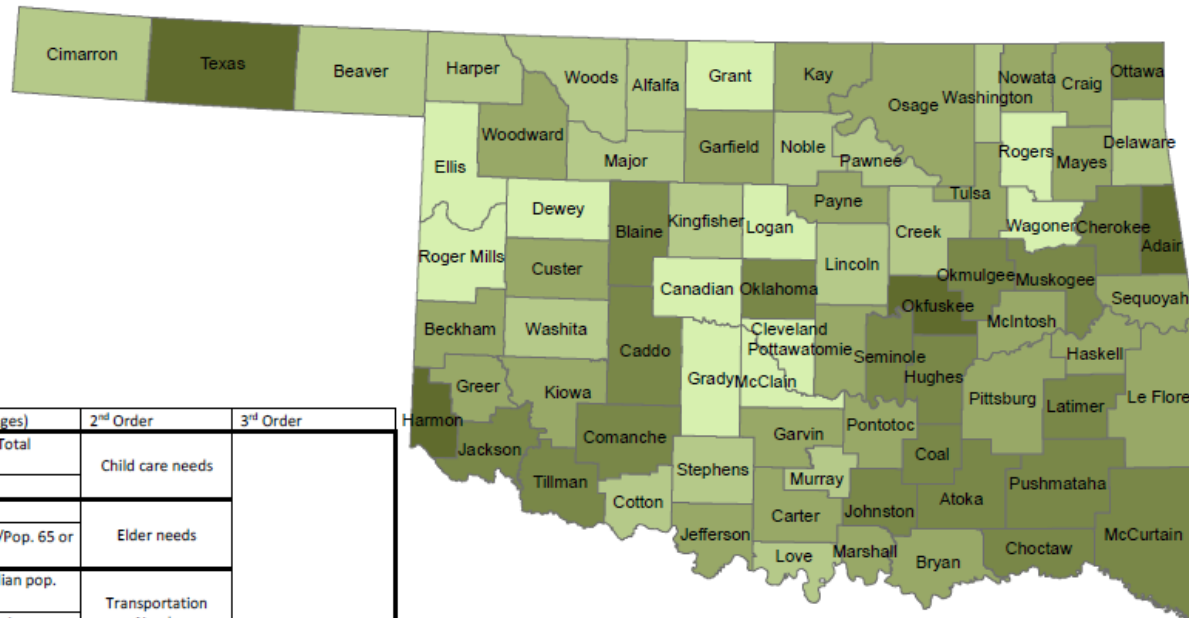


8.) Rental Occupancy Rate	26.52%	(Temporary Shelter and Housing Recovery Needs)	
9.) Non-White Population	36.35%		
10.) Population in Group Quarters	4.60%		
11.) Housing Units Built Prior to 1990	90.81%		
12.) Mobile Homes, RVs, Vans, etc.	6.37%		
13.) Poverty Rate	20.22%		
14.) Housing Units Lacking Telephones	3.92%	0.395 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	22.70%		
16.) Unemployment Rate	8.56%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	4.31%		

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



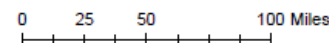
### Levels of Social Vulnerability Analysis

Base Social Vulnerability Indicators (Percentages)	2 <sup>nd</sup> Order	3 <sup>rd</sup> 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		
4. Population 65 or above & below poverty/Pop. 65 or above	Elder needs	
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	Civic Capacity needs	
14. Occupied housing units without a telephone/ Total occupied HU		
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		

### Legend

#### Social Vulnerability "Hot Spots"

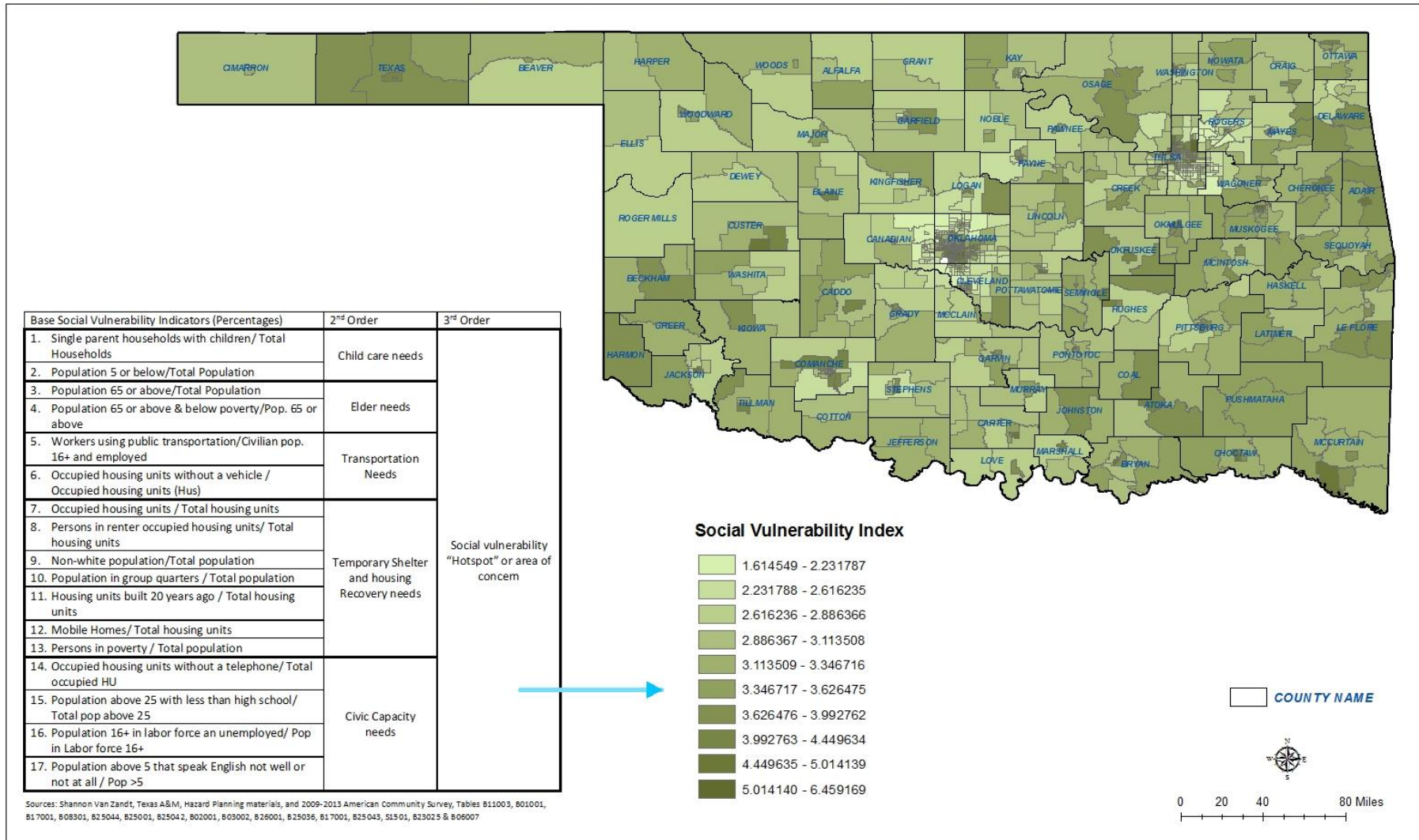
- 2.6340 - 2.9760
- 2.9761 - 3.2170
- 3.2171 - 3.4180
- 3.4181 - 3.6370
- 3.6371 - 3.9500



Source: Shannon Van Zandt, Texas A&M, Hazard Planning materials; 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B02001, B03001, B04001, B05001, B06001, B07001, B08001, B09001, B10001, B12001, B13001, B14001, B15001, B16001, B18001, B19001, B20001, B21001, B22001, B23001, B24001, B25001, B26001, B27001, B28001, B29001, B30001, B31001, B32001, B33001, B34001, B35001, B36001, B37001, B38001, B39001, B40001, B41001, B42001, B43001, B44001, B45001, B46001, B47001, B48001, B49001, B50001, B51001, B52001, B53001, B54001, B55001, B56001, B57001, B58001, B59001, B60001, B61001, B62001, B63001, B64001, B65001, B66001, B67001, B68001, B69001, B70001, B71001, B72001, B73001, B74001, B75001, B76001, B77001, B78001, B79001, B80001, B81001, B82001, B83001, B84001, B85001, B86001, B87001, B88001, B89001, B90001, B91001, B92001, B93001, B94001, B95001, B96001, B97001, B98001, B99001, B100001



# 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

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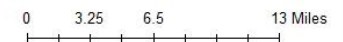
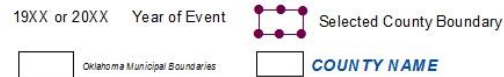
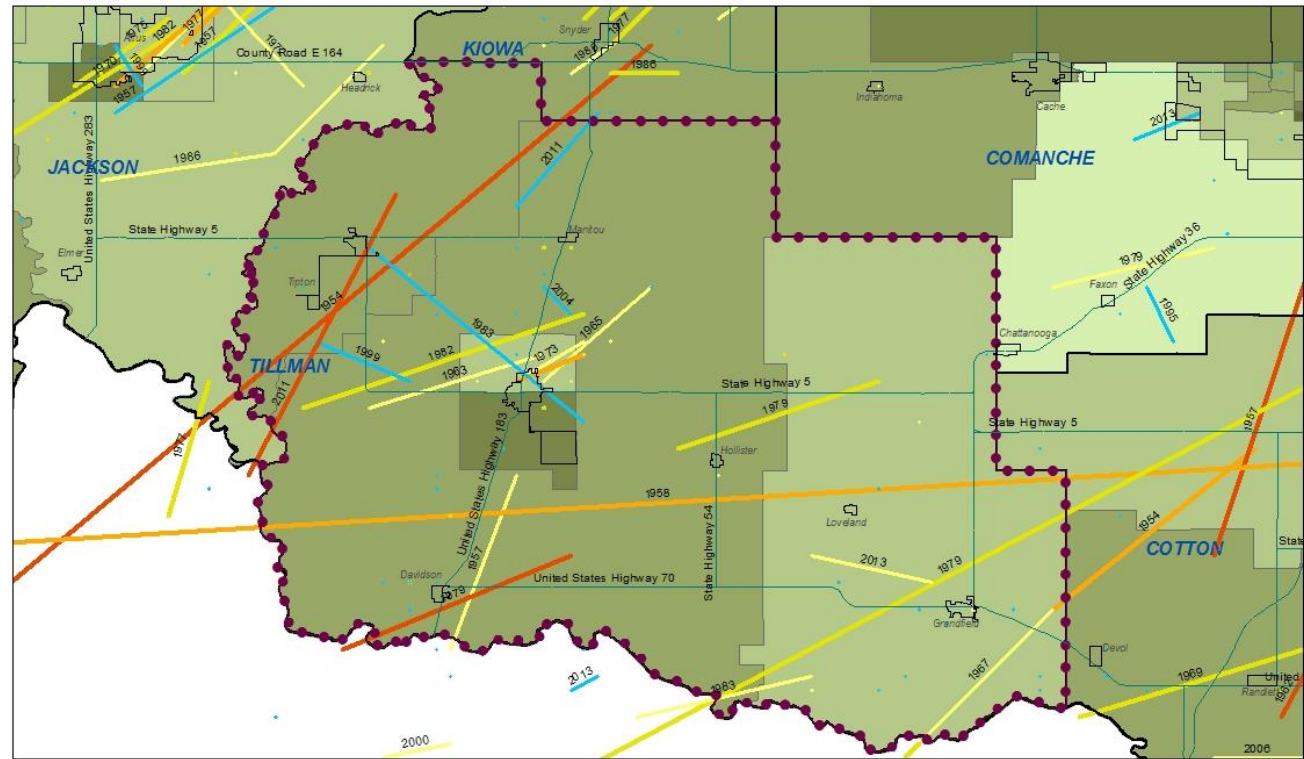
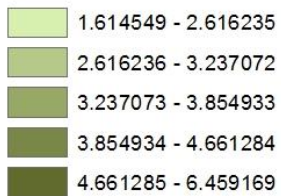
## Tornado Events 1950 - 2014

### Tillman 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, B25042, 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 Frederick area and western portion of the county have particularly higher 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.