Special Topics

Le Flore 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 4 key cities within the county: Poteau, Heavener, Pocola, and Spiro.

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 4 cities, no adopted comprehensive plans were found. How flood plain applications, etc. were found regarding disaster resiliency. See following section for further details -*Public Policy and Governance to Build 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.

No HMP was found for Le Flore County. However the Le Flore County Emergency Management website does identify the key disaster for the county: winter weather, wildfires, tornados, floods, lightning, and earthquakes. The site also provides a description of the disaster, safety instructions, and information for shelter and preparation, etc.

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

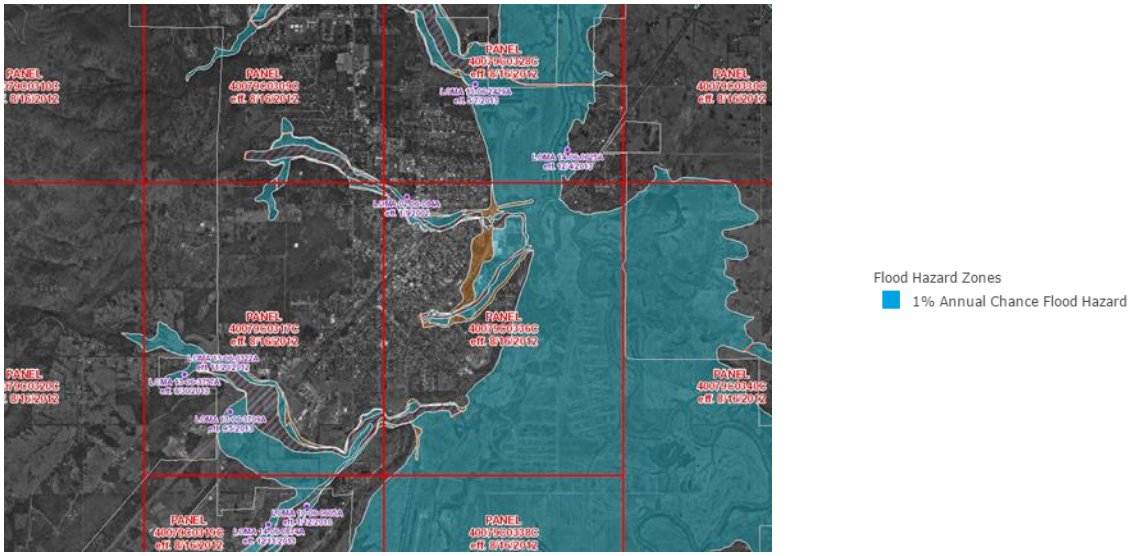
Data on historical damages and casualties is typically collected as part of a **Hazard Mitigation Plan** preparation to determine the appropriate planning measures and actions to take before and after an event.

No HMP was found. However according to http://www.city-data.com/city/Poteau-Oklahoma.html, Le Flore County had 18 declared natural disasters declared. Major Disasters (Presidential) Declared- 12 and Emergencies Declared- 6. Casualty data was found via NOAA.

Flooding

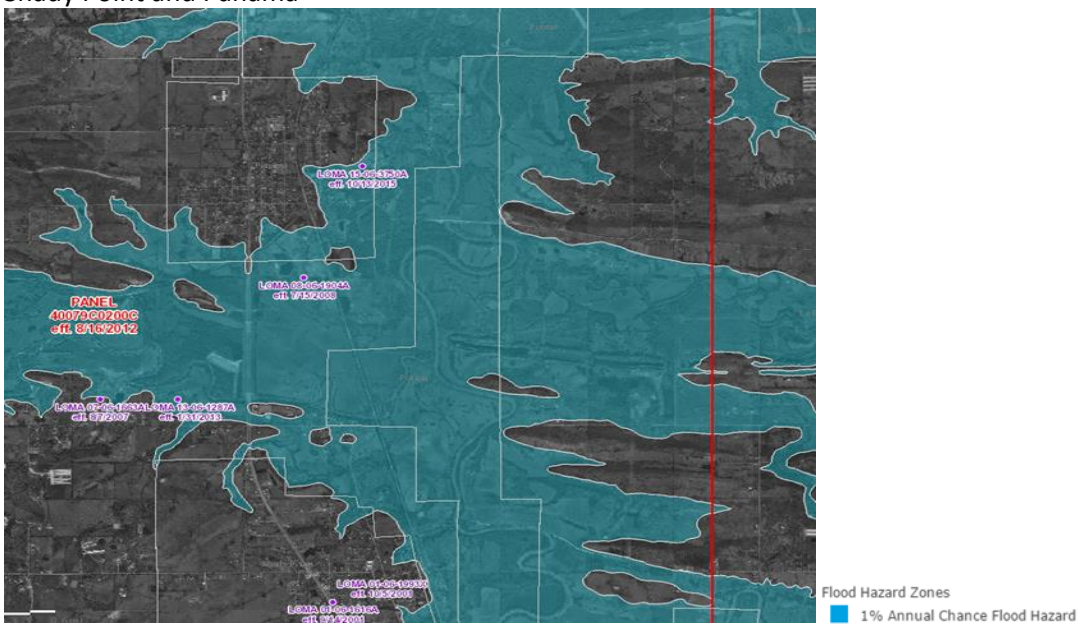
All parts of the county may be subject to flash flooding, freeze-thaw flooding and extreme precipitation that can cause flooding, unrelated to the streams and rivers. Development in the floodplain, however, increases risk of damages and property loss potentially repeatedly.

Poteau



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

Shady Point and Panama

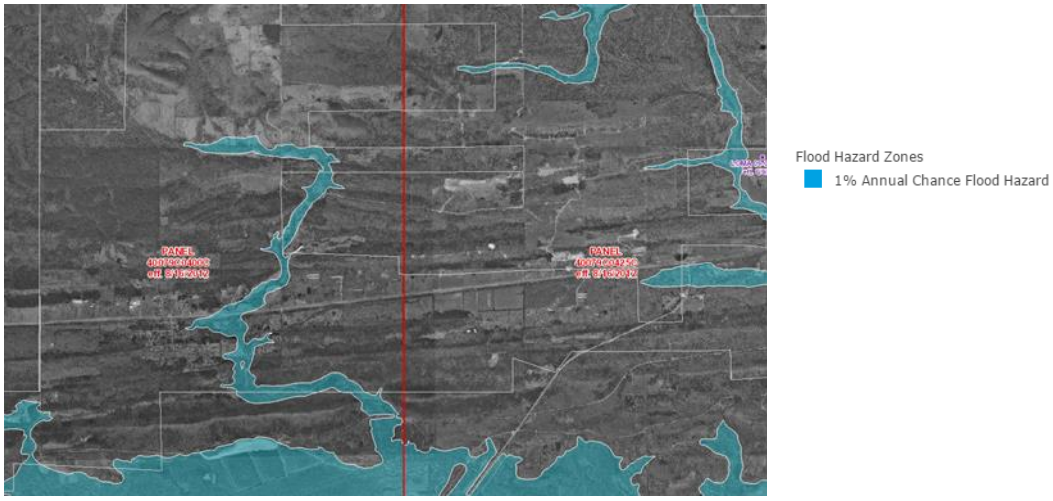


FEMA's National Flood Hazard Layer http://fema.maps.arcgis.com/

Spiro

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

Fanshawe



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

Tornado

- On 3/26/1976, a category F5 (max. wind speeds 261-318 mph) tornado 10.6 miles away from the Poteau city center killed 2 people and injured 64 people and caused between $500,000 and $5,000,000 in damages.
- On 5/5/1961, a category F4 (max. wind speeds 207-260 mph) tornado 7.6 miles away from the city center killed 16 people and injured 58 people and caused between $50,000 and $500,000 in damages.

Earthquake

- On 1/21/1982 at 00:33:54, a magnitude 4.7 (4.5 MB, 4.7 LG, 4.5 LG, Class: Light, Intensity: IV - V) earthquake occurred 137.3 miles away from the city center.
- On 5/4/2001 at 06:42:12, a magnitude 4.7 (4.2 MB, 4.7 LG, 4.5 LG, Depth: 6.2 mi) earthquake occurred 138.2 miles away from Poteau center

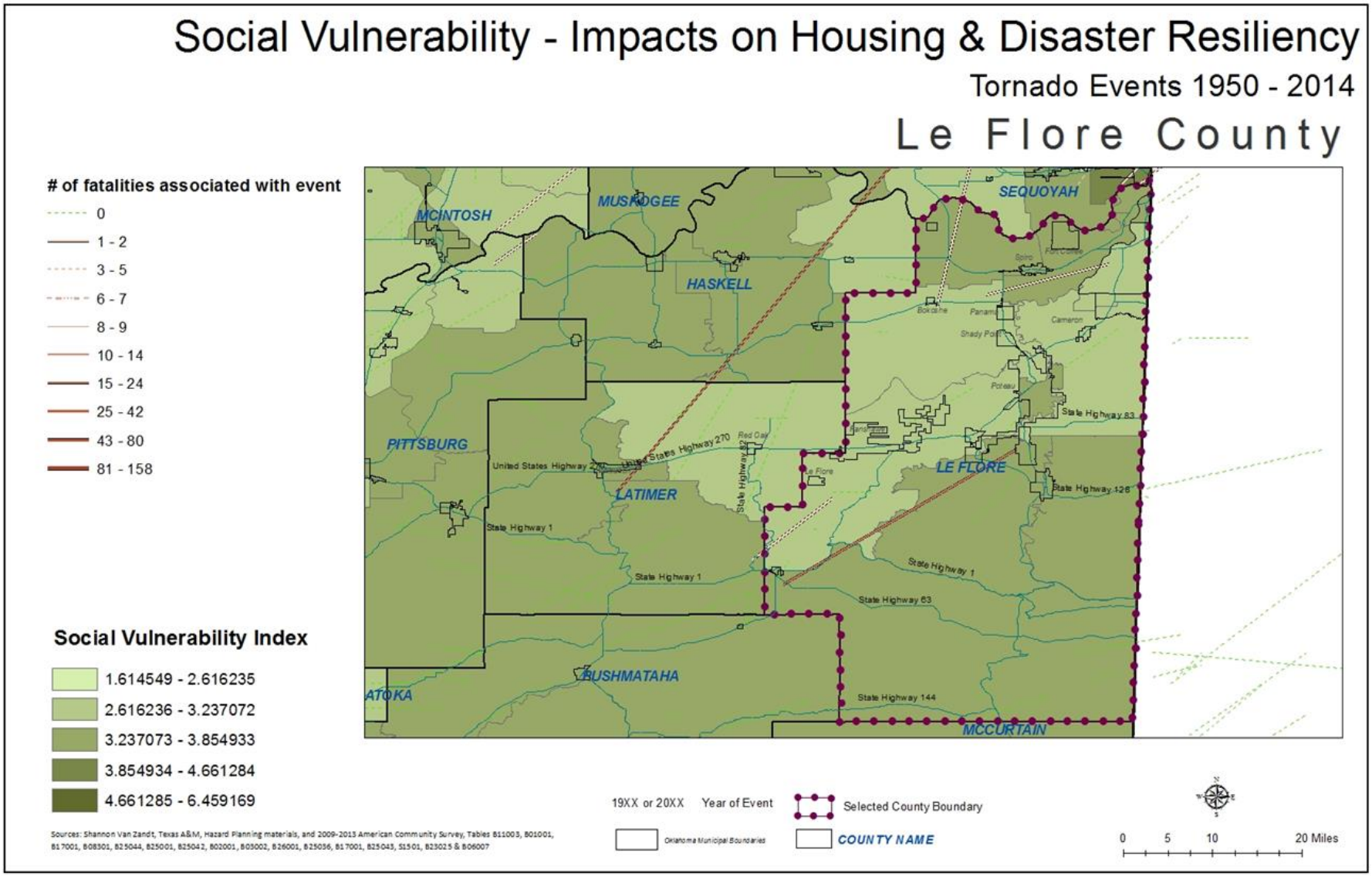
- On 9/6/1997 at 23:38:00, a magnitude 4.5 (4.5 LG, 4.2 LG, Depth: 3.1 mi) earthquake occurred 106.1 miles away from the city center
- On 3/25/1976 at 00:41:20, a magnitude 5.0 (4.9 MB, 5.0 LG, Class: Moderate, Intensity: VI - VII) earthquake occurred 246.0 miles away from the city center
- On 5/4/1991 at 01:18:54, a magnitude 5.0 (4.4 MB, 4.6 LG, 5.0 LG, Depth: 3.1 mi) earthquake occurred 289.0 miles away from Poteau center
- On 1/18/1995 at 15:51:39, a magnitude 4.2 (4.0 LG, 4.2 LG, Depth: 3.1 mi) earthquake occurred 169.4 miles away from the city center

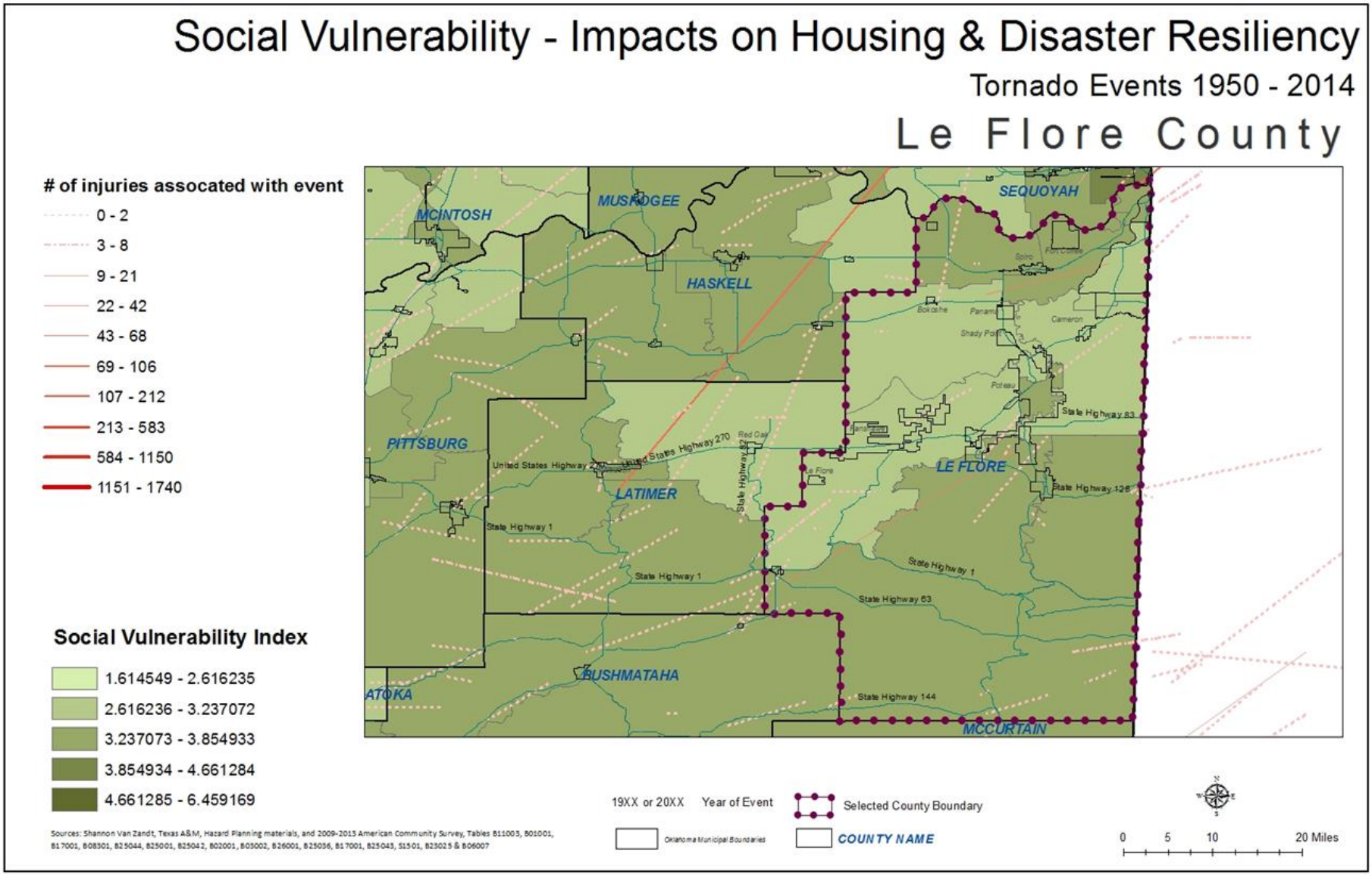
NOAA data shows the following historic data on disaster events for the county:

Approximately 10 total tornadoes in Le Flore County prior to 1950. This includes 20 deaths and 87 injuries.

Approximately 61 total tornadoes in Le Flore County from 1950-2014 (F0-F5). This includes:

- F5 Tornado – x1 in 1976; resulting in 2 deaths and 64 injuries.
- F4 Tornado – x2 in 1961 and 1976; resulting in 17 deaths and 62 injuries.
- F3 Tornado – x4 in 1960, 1980, and 1983; resulting in 1 death and 15 injuries.


Social Vulnerability - Impacts on Housing & Disaster Resiliency
Tornado Events 1950 - 2014
Le Flore County
# of fatalities associated with event
0
1 - 2
3 - 5
6 - 7
8 - 9
10 - 14
15 - 24
25 - 42
43 - 80
81 - 158
MCINTOSH
MUSKOGEE
SEQUOYAH
HASKELL
PITTSBURG
LATIMER
LE FLORE
MCCURTAIN
BUSHMATAHA
ATOKA
United States Highway 270
State Highway 1
State Highway 63
State Highway 83
State Highway 126
State Highway 144
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 5 10 20 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
Le Flore County
# of injuries assocated with event
0 - 2
3 - 8
9 - 21
22 - 42
43 - 68
69 - 106
107 - 212
213 - 583
584 - 1150
1151 - 1740
MCINTOSH
MUSKOGEE
SEQUOYAH
HASKELL
PITTSBURG
LATIMER
LE FLORE
State Highway 83
State Highway 1
State Highway 63
State Highway 144
BUSHMATAHA
ATOKA
MCCURTAIN
Social Vulnerability Index
1.614549 - 2.616235
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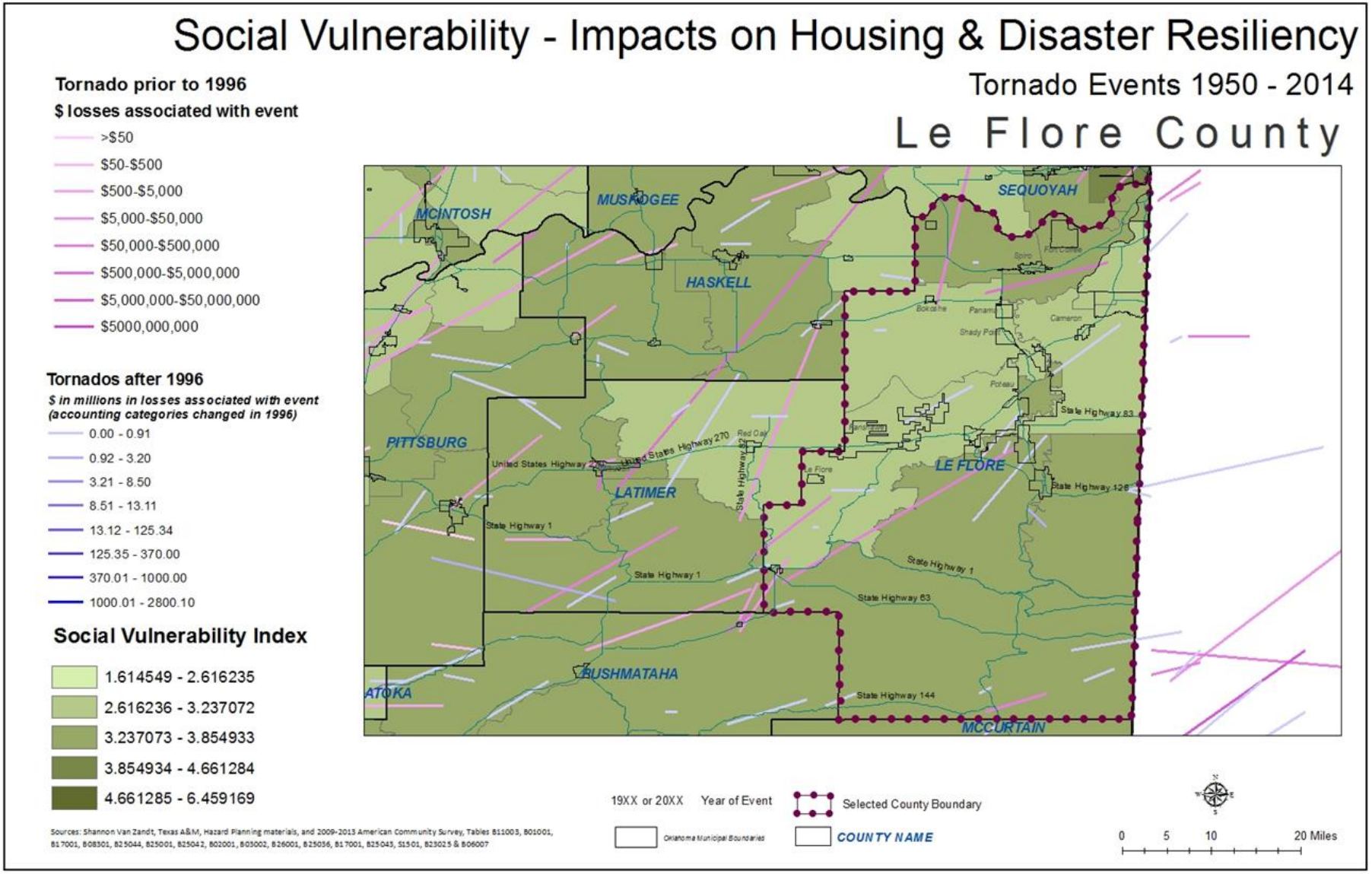
3.237073 - 3.854933
3.854934 - 4.661284
4.661285 - 6.459169
19XX or 20XX Year of Event
Selected County Boundary
Oklahoma Municipal Boundaries
COUNTY NAME
0 5 10 20 Miles


Social Vulnerability - Impacts on Housing & Disaster Resiliency
Tornado Events 1950 - 2014
Le Flore 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
MCINTOSH
MUSKOGEE
SEQUOYAH
HASKELL
PITTSBURG
LATIMER
LE FLORE
BUSHMATAHA
ATOKA
MCCURTAIN
United States Highway 270
State Highway 1
State Highway 63
State Highway 144
State Highway 83
State Highway 82
State Highway 126
19XX or 20XX Year of Event
Selected County Boundary
Oklahoma Municipal Boundaries
COUNTY NAME
0 5 10 20 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

According to the Le Flore County Emergency Management website, there are 10 public storm shelters. See *http://www.lcem.us/publicshelters.html#*

- Arkoma- First Baptist Church
- Heavener- Saferoom between the High School and Elementary School
- Howe- New Highschool Gym
- Panama- Panama Middle School
- Pocola- Elementary School
- Poteau- High School
- Poteau- Pansy Kidd Middle School
- Poteau- Upper Elementary School
- Spiro- High School Safe Room
- Wister- Behind new High School Gym

Le Flore County Emergency Management also maintains an online registry of private storm shelters. However, the estimates of were not found regarding number of shelters listed in registry. See http://www.lcem.us/shelterregistration.html

C.2.1.3 Public Policy and Governance to Build Disaster Resiliency

Poteau – According to Poteau City Code (reference http://sterlingcodifiers.com/codebook/index.php?book_id=1010)

- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters.
- Prevent or regulate the construction of flood barriers which will increase flood hazards to other lands. (1990 Code § 12-503)
- All new construction or substantial improvements shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed or located so as to prevent water from entering or accumulating within the components during conditions of flooding;
- New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharges from the systems into floodwaters;
- On site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding. (1990 Code § 12-516)
- Regarding floodways- Encroachments are prohibited, including fill, new construction, substantial improvements and other developments unless certification by a professional registered engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels within the community during occurrence of the base flood discharge;
- The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use; and
- The relationship of the proposed use to the comprehensive plan for that area. (1990 Code § 12-514)

Heavener

- The City of Heavener requires that for all future residential development the lowest floor must be elevated to or higher than the base flood elevation (100-year flood plain). See *http://www.cityofheavener.us/?page_id=232*

Pocola -According to the Town Ordinances (*http://www.townofpocola.com/TownOrdinances.pdf*)

- Adoption of FEMA FLOOD INSURANCE RATE MAPs (FIRM).
- The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than thirty six inches (36") in height above grade and be securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement.
- Anchoring: All new construction or substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;
- Methods And Practices: All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage;
- Resistant Materials: All new construction or substantial improvements shall be constructed with materials resistant to flood damage;
- Water Supply Systems: All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system;
- SPECIFIC STANDARDS: In all areas of special flood hazard where base flood elevation data has been provided as set forth in section 12-3-2 and subsection 12-4-2H of this title, and subsection 12-5-3C of this chapter, the following provisions are required:

C.2.1.4 Local Emergency Response Agency Structure

Information not available.

C.2.1.5 Threat & Hazard Warning Systems

The identified Threat & Hazard Warning Systems for Le FLore County include:

- ☐ Sirens (City of Pocola website states that city has sirens “throughout” city however no quantities were found. See *http://www.townofpocola.com/EM%20EAS%20ACTIVATION%20SOG.pdf*. Additional resources indicate that outdoor warning sirens are present in the City of Poteau. See *http://www.4029tv.com/news/tornado-sirens-accidentally-sound-in-leflore-county/31993252*.
- ☐ Social Media (Facebook page operated by Le Flore County Emergency Management and twitter account. See *https://www.facebook.com/lcemcst/* and *https://twitter.com/LeFloreCountyEM?ref_src=twsrc%5Etfw*)
- ☐ Town of Pocola Emergency Management suggests using *www.wunderground.com* (see *http://www.townofpocola.com/eoc.html*)

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.

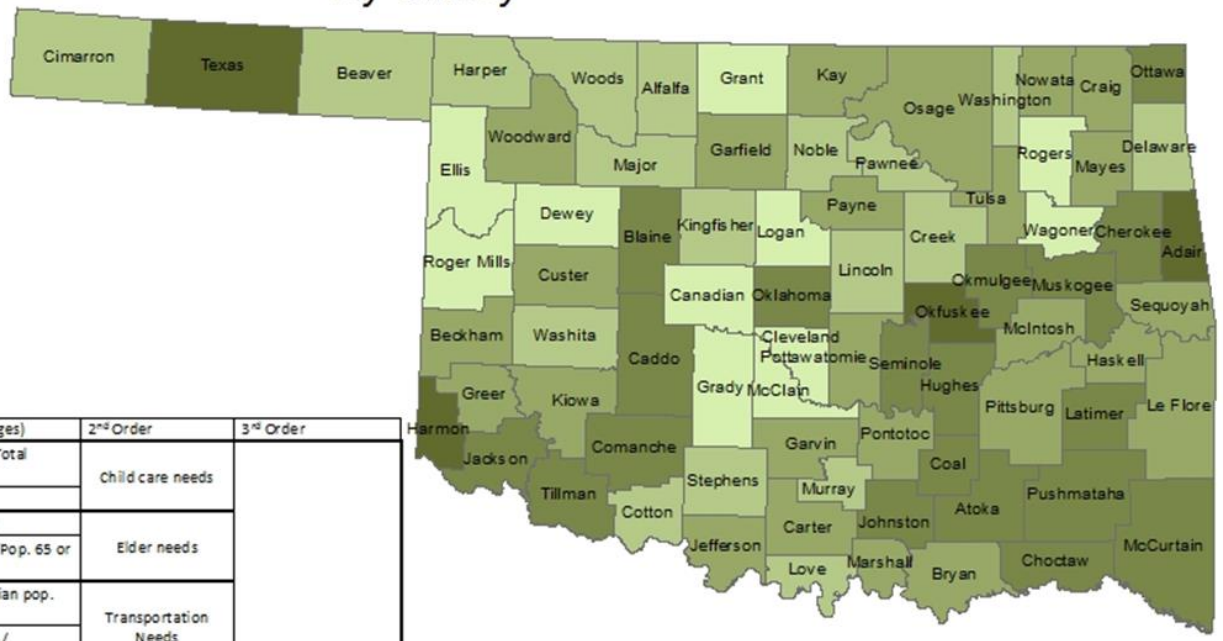
Social Vulnerability Analysis - Le Flore County

Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	13.35%	0.197 (Child Care Needs)	**3.418 Social Vulnerability 'Hotspot' or Area of Concern**
2.) Population Under 5	6.35%		
3.) Population 65 or Above	15.66%	0.303 (Elder Needs)	
4.) Population 65 or Above & Below Poverty Rate	14.60%		
5.) Workers Using Public Transportation	0.28%	0.054 (Transportation Needs)	
6.) Occupied Housing Units w/o Vehicle	5.17%		
7.) Housing Unit Occupancy Rate	85.80%	2.491 (Temporary Shelter and Housing Recovery Needs)	
8.) Rental Occupancy Rate	25.86%		
9.) Non-White Population	27.11%		
10.) Population in Group Quarters	3.25%		
11.) Housing Units Built Prior to 1990	66.97%		
12.) Mobile Homes, RVs, Vans, etc.	17.87%		
13.) Poverty Rate	22.24%		
14.) Housing Units Lacking Telephones	3.36%	0.373 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	19.50%		
16.) Unemployment Rate	11.62%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	2.79%		

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"

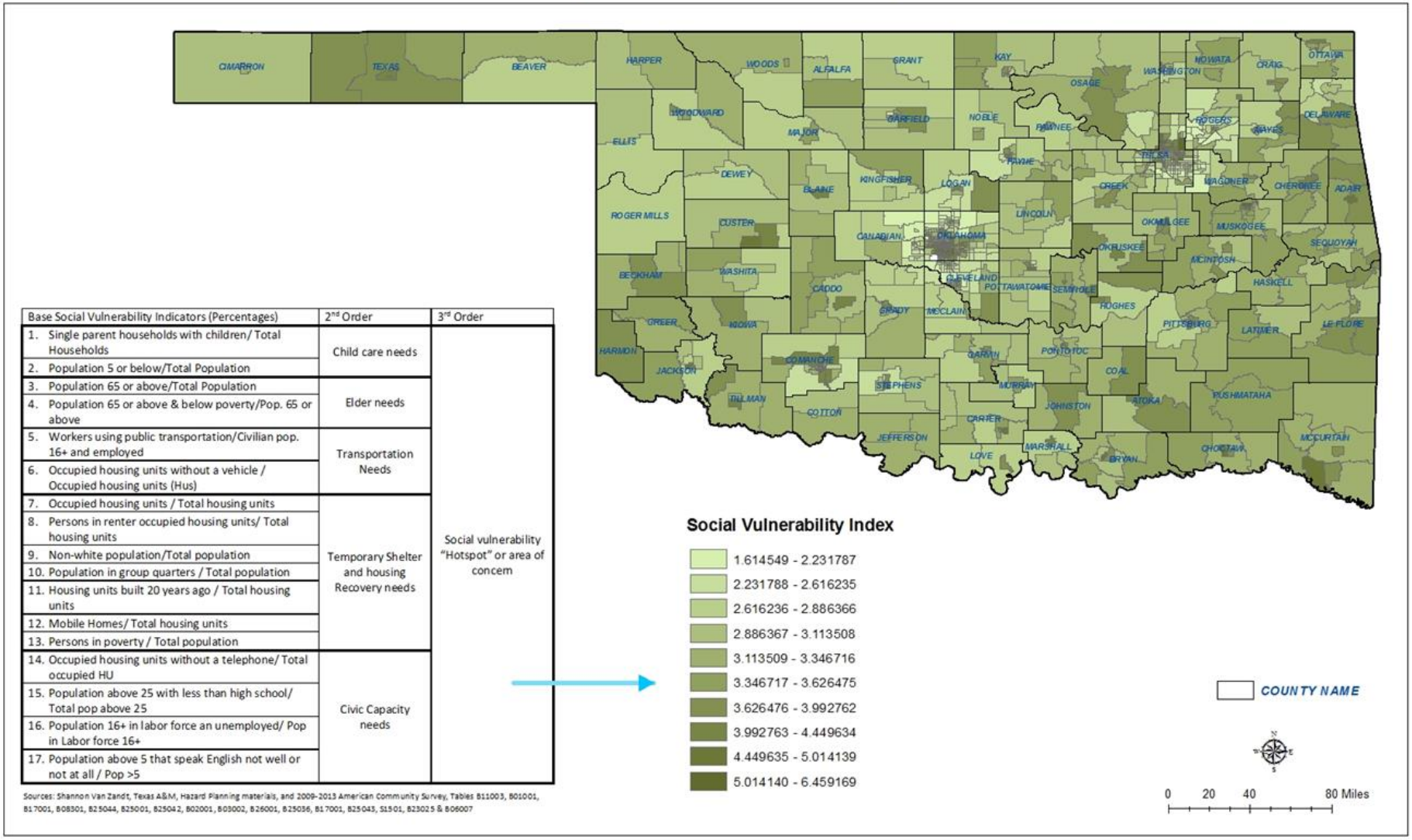
- 2.6340 - 2.9760
- 2.9761 - 3.2170
- 3.2171 - 3.4180
- 3.4181 - 3.6370
- 3.6371 - 3.9500

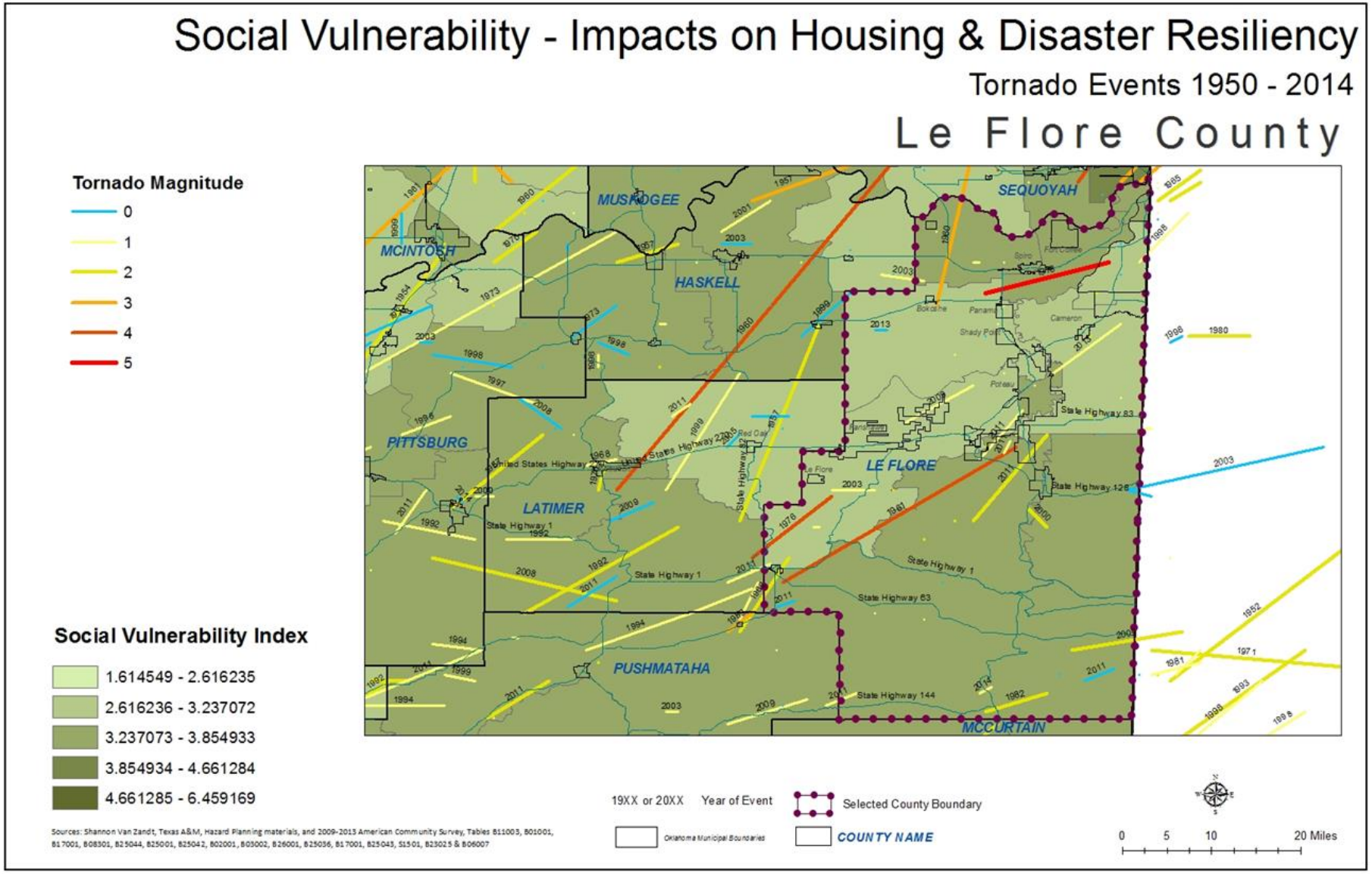
0 25 50 100 Miles

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
Le Flore County
Tornado Magnitude
0
1
2
3
4
5
MUSKOGEE
SEQUOYAH
MCINTOSH
HASKELL
PITTSBURG
LE FLORE
LATIMER
PUSHMATAHA
MCCURTAIN
State Highway 83
State Highway 1
State Highway 63
State Highway 144
State Highway 2
State Highway 82
State Highway 112
Social Vulnerability Index
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19XX or 20XX Year of Event
Selected County Boundary
Oklahoma Municipal Boundaries
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0 5 10 20 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 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 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 southern portion of the county has a 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:

- Apply for grants/funding to develop a county hazard mitigation plan. The HMP must then be approved by the state and FEMA. Include attention to areas within the county that may have compounding social vulnerability factors.
- Pursue efforts to strengthen building codes related to tornadoes and natural disasters should be considered (such as the use of "hurricane clips" for all new residential construction).
- Pursue funding/grants for public shelters. As the city pursues 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.