

## Special Topics

## Oklahoma 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 10 key cities within the county (Edmond, Harrah, Midwest City, Nichols Hills, Nicoma Park, Oklahoma City, Spencer, The Village, Warr Acres) . There are also several towns within the county (Arcadia, Bethany, Choctaw, Del City, Forest Park, Jones, Lake Aluma, Luther, Smith Village, Valley Brook, Woodlawn Park).

**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.

Oklahoma County does have a Hazard Mitigation Plan (several additional HMPs at the city level).

#### 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.

The Oklahoma County HMP addressed the key hazards that have direct impacts on planning for housing.

##### Dam Failures

“The dam failure hazard is a significant concern to Oklahoma County due to potential failure of 65 dams reported dams in the County, 14 of which are classified as high hazard. The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources.” (Oklahoma County HMP, p.112)

“There have been no recorded complete dam failures in the past 100 years in Oklahoma County.” P. 113

##### Flooding

Oklahoma County HMP highlights the flooding issues by city:

- City of Choctaw – The City has low-lying areas that are subject to periodic flooding caused by overflow of the Choctaw Creek and its tributaries, along with the North Canadian River. The most severe flooding occurs upstream from roadways that restrict the flow. Flooding along the Creek has not caused extensive property damage; however, future development could increase the threat of flood problems.
- City of Del City – Flooding in the City is mainly caused by the Crutchko and Cherry Creeks. Areas where natural and man-made obstructions in the floodplains have an increased severity of flooding.
- City of Edmond – Flooding in the City typically results from intense thunderstorms associated with squall line activity. The greatest potential for flood damage in the City exists along the upper portion of Spring Creek, west of Bryant Avenue. The main reasons why this area floods is due to increased urbanization, residential development along the floodplain, and inadequate bridge and culvert openings.
- City of Midwest City – Low-lying areas in the City are subject to periodic flooding caused by overflow of Crutchko, Soldier and Silver Creeks. Most flooding occurs upstream from roadways that restrict the flow. Urban expansion and future development in floodplains could increase the severity of flooding in the City.
- Town of Nicoma Park – Low-lying areas in the Town are subject to periodic flooding caused by overflow of Choctaw Creek and its tributaries. The most severe flooding occurs as a result of thunderstorms and intense rainfall. Most flooding occurs upstream from roadways that restrict the flow.
- City of Spencer – Low-lying areas in the City are subject to periodic flooding caused by overflow from the North Canadian River, Crutchko Creek, Silver Creek and Tributary 9. The most severe flooding typically occurs after thunderstorms with intense rainfall. Most flooding occurs upstream from roadways that restrict the flow.
- City of The Village – Potential for flood damage exists within the City along the Chisholm Creek channel from Barclay Road downstream to Hefner Road. The potential for the greatest flood damage exists for the homes bordering Village Drive from Goldstone Terrace to Finley Drive and within the apartment complex along the floodplains from Finley Drive to Cavanaugh.
- City of Warr Acres – Low-lying areas in the City are subject to periodic flooding caused by overflow of Spring Creek. The most severe flooding occurs as a result of thunderstorms and intense rainfall. Most flooding occurs upstream from roadway and ponds that restrict the flow (FEMA, 2009).

Table 5.3.6-3. Estimated Oklahoma County Population Vulnerable to the 100-Year and 500-Year MRP Flood Hazard

Municipality	Population In 100-Year Flood Boundary	Population In 500-Year Flood Boundary
Arcadia (T)	7	20
Bethany (C)	142	142
Choctaw (C)	984	993
Del City (C)	2,167	3,135
Edmond (C)	2,687	2,866
Forest Park (T)	0	0
Harrah (C)	329	331
Luther (T)	125	129
Midwest City (C)	1,844	2,209
Nichols Hills (C)	0	0
Nicoma Park (C)	148	231
Spencer (C)	77	88
The Village	89	165
Unincorporated County	1,419	1,426
Valley Brook (T)	0	0
Warr Acres (C)	16	16
<b>Total</b>	<b>10,034</b>	<b>11,751</b>

Source: Census, 2010; FEMA, 2009

Table 5.3.6-4. Estimated Oklahoma County Population Displaced or Seeking Short-Term Shelter from the 100-Year and 500-Year MRP Events

Municipality	100 Year				500 Year			
	Displaced Persons	Percent Displaced	Persons Seeking Short-Term Sheltering	Percent Seeking Shelter	Displaced Persons	Percent Displaced	Persons Seeking Short-Term Sheltering	Percent Seeking Shelter
Arcadia (T)	23	8.2	5	1.8	33	11.8	8	2.9
Bethany (C)	1,384	6.9	1,101	5.5	1,598	7.9	1,332	6.6
Choctaw (C)	517	5.5	184	2.0	607	6.4	263	2.8
Del City (C)	2,805	12.7	2,472	11.2	3,438	15.5	3,123	14.1
Edmond (C)	2,211	3.2	1,713	2.5	2,351	3.4	1,831	2.7
Forest Park (T)	2	0.2	0	0.0	2	0.2	0	0.0
Harrah (C)	171	3.7	43	0.9	277	6.0	123	2.7
Luther (T)	57	5.9	12	1.3	72	7.5	23	2.4
Midwest City (C)	2,628	4.9	2,315	4.3	2,864	5.3	2,584	4.8
Nichols Hills (C)	67	1.7	33	0.8	91	2.2	57	1.4
Nicoma Park (C)	103	4.3	23	1.0	133	5.5	36	1.5
Spencer (C)	126	3.4	35	0.9	143	3.8	48	1.3
The Village	439	4.3	366	3.6	548	5.4	457	4.5
Unincorporated County	895	6.8	289	2.2	1,164	8.9	457	3.5
Valley Brook (T)	74	8.9	74	8.9	81	9.8	81	9.8
Warr Acres (C)	662	6.0	570	5.2	762	6.9	680	6.2
<b>Total</b>	<b>12,164</b>	<b>5.4</b>	<b>9,235</b>	<b>3.3</b>	<b>14,164</b>	<b>6.7</b>	<b>11,103</b>	<b>4.2</b>

Source: HAZUS-MH 2.0

Note: The percent of the population displaced and seeking shelter was calculated using the 2000 U.S. Census data in HAZUS-MH 2.0.

(Oklahoma County HMP, p.232-234)

The above tables from the Oklahoma County HMP are outlining the level of risk, displacement and shelter needs related to flooding event potentially.

Further more the replacement costs for buildings in the floodplain that could be damaged in a flood event was also estimated:

**SECTION 5.3.6: RISK ASSESSMENT – FLOOD**

Table 5.3.6-6. Estimated HAZUS General Building Stock Replacement Value (Structure and Contents) Located in the 100- and 500-Year MRP Flood Boundaries

Municipality	Total Buildings (All Occupancy Classes)				Residential Buildings		Commercial Buildings		Industrial Buildings	
	100 Year	% Total	500 Year	% Total	100 Year	500 Year	100 Year	500 Year	100 Year	500 Year
Arcadia (T)	\$1,259,000	2.9	\$1,466,000	3.4	\$1,035,000	\$1,242,000	\$0	\$0	\$224,000	\$224,000
Bethany (C)	\$14,644,000	0.6	\$14,644,000	0.6	\$11,432,000	\$11,432,000	\$1,560,000	\$1,560,000	\$0	\$0
Choctaw (C)	\$32,651,000	3.2	\$33,249,000	3.3	\$25,911,000	\$26,509,000	\$4,869,000	\$4,869,000	\$1,191,000	\$1,191,000
Del City (C)	\$263,381,000	11.3	\$327,238,000	14.0	\$204,276,000	\$261,031,000	\$28,099,000	\$33,325,000	\$22,618,000	\$22,618,000
Edmond (C)	\$362,668,000	3.9	\$383,384,000	4.1	\$317,252,000	\$335,205,000	\$33,130,000	\$35,506,000	\$8,142,000	\$8,405,000
Forest Park (T)	\$0	0.0	\$0	0.0	\$0	\$0	\$0	\$0	\$0	\$0
Harrah (C)	\$32,169,000	7.2	\$32,169,000	7.2	\$25,554,000	\$25,554,000	\$4,155,000	\$4,155,000	\$2,002,000	\$2,002,000
Luther (T)	\$4,926,000	5.4	\$5,213,000	5.7	\$1,976,000	\$2,263,000	\$1,470,000	\$1,470,000	\$1,480,000	\$1,480,000
Midwest City (C)	\$209,401,000	3.8	\$250,465,000	4.5	\$156,104,000	\$192,668,000	\$29,566,000	\$33,286,000	\$8,525,000	\$8,525,000
Nichols Hills (C)	\$0	0.0	\$13,530,000	1.8	\$0	\$13,138,000	\$0	\$392,000	\$0	\$0
Nicom Park (C)	\$36,504,000	12.2	\$38,660,000	13.0	\$24,676,000	\$26,426,000	\$5,408,000	\$5,814,000	\$5,302,000	\$5,302,000
Spencer (C)	\$16,271,000	4.2	\$16,271,000	4.2	\$13,017,000	\$13,017,000	\$392,000	\$392,000	\$0	\$0
The Village (C)	\$0	0.0	\$8,609,000	0.7	\$0	\$8,463,000	\$0	\$156,000	\$0	\$0
Unincorporated County	\$127,435,000	9.7	\$128,356,000	9.7	\$97,706,000	\$98,627,000	\$23,134,000	\$23,134,000	\$2,971,000	\$2,971,000
Valley Brook (T)	\$126,000	0.2	\$126,000	0.2	\$0	\$0	\$126,000	\$126,000	\$0	\$0
Warr Acres (C)	\$115,011,000	8.7	\$115,011,000	8.7	\$108,718,000	\$108,718,000	\$2,666,000	\$2,666,000	\$333,000	\$333,000
<b>Total</b>	<b>\$1,218,448,000</b>	<b>4.8</b>	<b>\$1,388,391,000</b>	<b>6.1</b>	<b>\$887,867,000</b>	<b>\$1,124,283,000</b>	<b>\$134,676,000</b>	<b>\$148,861,000</b>	<b>\$63,388,000</b>	<b>\$63,861,000</b>

Source: HAZUS-MH 2.0

Notes:

1. Values represent replacement values (RV) for building structure and contents.
2. The general building stock valuations provided in HAZUS-MH 2.0 are Replacement Cost Value from RSMeans as of 2006.

**SECTION 5.3.6: RISK ASSESSMENT – FLOOD**

Table 5.3.6-7. Estimated General Building Stock Replacement Value (Structure and Contents) Located in the 100- and 500-Year MRP Flood Boundaries

Municipality	Agricultural Buildings		Religious Buildings		Government Buildings		Educational Buildings	
	100 Year	500 Year	100 Year	500 Year	100 Year	500 Year	100 Year	500 Year
Arcadia (T)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bethany (C)	\$0	\$0	\$0	\$0	\$1,652,000	\$1,652,000	\$0	\$0
Choctaw (C)	\$0	\$0	\$680,000	\$680,000	\$0	\$0	\$0	\$0
Del City (C)	\$0	\$0	\$3,710,000	\$3,710,000	\$1,870,000	\$3,746,000	\$2,808,000	\$2,808,000
Edmond (C)	\$294,000	\$418,000	\$724,000	\$724,000	\$0	\$0	\$3,126,000	\$3,126,000
Forest Park (T)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Harrah (C)	\$458,000	\$458,000	\$0	\$0	\$0	\$0	\$0	\$0
Luther (T)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Midwest City (C)	\$360,000	\$484,000	\$4,958,000	\$5,614,000	\$262,000	\$262,000	\$9,626,000	\$9,626,000
Nichols Hills (C)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Nicom Park (C)	\$262,000	\$262,000	\$656,000	\$656,000	\$200,000	\$200,000	\$0	\$0
Spencer (C)	\$0	\$0	\$2,196,000	\$2,196,000	\$666,000	\$666,000	\$0	\$0
The Village (C)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unincorporated County	\$1,596,000	\$1,596,000	\$464,000	\$464,000	\$0	\$0	\$1,564,000	\$1,564,000
Valley Brook (T)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Warr Acres (C)	\$0	\$0	\$0	\$0	\$0	\$0	\$2,694,000	\$2,694,000
<b>Total</b>	<b>\$2,970,000</b>	<b>\$3,218,000</b>	<b>\$13,348,000</b>	<b>\$14,044,000</b>	<b>\$4,860,000</b>	<b>\$6,628,000</b>	<b>\$19,818,000</b>	<b>\$19,818,000</b>

Source: HAZUS-MH 2.0

Notes:

1. Values represent replacement values (RV) for building structure and contents.
2. The general building stock valuations provided in HAZUS-MH 2.0 are Replacement Cost Value from RSMeans as of 2006.



Oklahoma City (OKC) HMP summarized the following hazards for the metro area:

Figure 2-3: Summary of Hazard Identification

Hazards	Identifiers / How Identified	Support / Why Identified
<b>Dam Failure</b>	<ul style="list-style-type: none"> <li>□ Input from US Army Corps of Engineers</li> <li>□ Input from Oklahoma Water Resources Board (OWRB), Dam Safety Division</li> </ul>	<ul style="list-style-type: none"> <li>□ Population and buildings in spill of dam are vulnerable in event of release or dam failure</li> <li>□ Need EOP for Dam Break release</li> <li>□ Various dam release rates should be GIS mapped, and properties risk identified</li> </ul>
<b>Drought</b>	<ul style="list-style-type: none"> <li>□ Historical vulnerability to drought</li> <li>□ Input from Oklahoma City Departments of Public Works and Water/ Wastewater Management</li> <li>□ Water supply currently mitigated and supported by sources with potential to be depleted</li> </ul>	<ul style="list-style-type: none"> <li>□ Continuing mid-west and west drought and impacts on Oklahoma communities</li> <li>□ Need to ensure future water resources for Oklahoma City area</li> <li>□ Increasing growth in city and demand on water supply</li> </ul>
<b>Earthquake</b>	<ul style="list-style-type: none"> <li>□ Historic records of area earthquakes</li> <li>□ Input from USGS</li> <li>□ Input from Oklahoma Geological Survey</li> </ul>	<ul style="list-style-type: none"> <li>□ Oklahoma City has a history of mild earthquakes</li> <li>□ Need Emergency Operations Plan</li> <li>□ Not considered a threat therefore majority of residents and facilities are not fully prepared</li> </ul>
<b>Extreme Heat</b>	<ul style="list-style-type: none"> <li>□ Number of heat-related deaths and injuries</li> <li>□ Weather conditions in Oklahoma City</li> <li>□ Public outreach efforts</li> <li>□ Input from National Climatic Data Center and National Center for Disease Control</li> </ul>	<ul style="list-style-type: none"> <li>□ High percentage of poor and elderly populations at risk</li> <li>□ \$2 million in Agricultural losses</li> <li>□ Local community organizations have invested in educational campaigns</li> </ul>
<b>Flood</b>	<ul style="list-style-type: none"> <li>□ Historical floods and damages</li> <li>□ Review of FEMA and City floodplain maps</li> <li>□ Review of recent disaster declarations (Mother's Day Flood)</li> <li>□ 85 NFIP Repetitive Loss Properties</li> </ul>	<ul style="list-style-type: none"> <li>□ Since 1994, floods have caused \$610,000 in estimated property damage and resulted in one death</li> </ul>

Hazards (CONTINUED)	Identifiers / How Identified	Support / Why Identified
<b>Severe Thunderstorms (Hail)</b>	<ul style="list-style-type: none"> <li>□ National Climatic Data Center and State Disaster Declarations</li> <li>□ Loss information provided by national insurance companies</li> </ul>	<ul style="list-style-type: none"> <li>□ April 21, 2004, damage estimated in the millions and one fatality</li> <li>□ There have been approximately 605 hail events since 1950.</li> </ul>
<b>Severe Thunderstorms (Lightning)</b>	<ul style="list-style-type: none"> <li>□ National Climatic Data Center information and statistics</li> </ul>	<ul style="list-style-type: none"> <li>□ In the last ten years there have been 2 deaths, 11 injuries, and an estimated \$4.6 billion in damages</li> </ul>
<b>Winter Storm</b>	<ul style="list-style-type: none"> <li>□ Review of past disaster declarations</li> <li>□ Input from Oklahoma City Office of Emergency Management</li> <li>□ Input from Oklahoma City Department of Public Works</li> <li>□ Input from area utility companies</li> </ul>	<ul style="list-style-type: none"> <li>□ Occur almost annually in Oklahoma City area</li> <li>□ Wide-spread economic disruption</li> <li>□ Potential for widespread public utility outages as on January 2002 where over 250,000 residents were without power and storms resulted in an estimated \$3,000,000 in damages.</li> </ul>
<b>Tornado</b>	<ul style="list-style-type: none"> <li>□ Review of recent disaster declarations</li> <li>□ Input from Emergency Manager</li> <li>□ Input from citizen's questionnaires</li> <li>□ Consensus of Hazard Mitigation Citizens Advisory Committee</li> <li>□ Review of data from the National Climatic Data Center</li> </ul>	<ul style="list-style-type: none"> <li>□ Located in "Tornado Alley"</li> <li>□ An average of 52 tornadoes per year in Oklahoma</li> <li>□ Oklahoma City tornado in May of 1999 killed 36 people and had 583 direct injuries, 1800 homes destroyed and 2500 damaged – approximately one billion dollars in damage</li> <li>□ All citizens and buildings are at risk</li> </ul>
<b>High Winds</b>	<ul style="list-style-type: none"> <li>□ National Weather Service data</li> <li>□ Loss information provided by national Insurance Companies</li> </ul>	<ul style="list-style-type: none"> <li>□ 156 high wind-related events in Oklahoma County in the last 10 years, and millions of dollars in damage</li> </ul>
<b>Urban Fires</b>	<ul style="list-style-type: none"> <li>□ Input from Fire Department</li> </ul>	<ul style="list-style-type: none"> <li>□ From 1994 to 2003 a total of 115 fatalities</li> <li>□ Since 1994 to 2003, between 9 and 28.8 million in property loss occurs</li> </ul>
<b>Wildfire</b>	<ul style="list-style-type: none"> <li>□ Input from Oklahoma City Fire Department</li> <li>□ Input from Rural Fire Departments</li> <li>□ Input from surrounding county and community fire departments</li> <li>□ Input from State Fire Marshal</li> </ul>	<ul style="list-style-type: none"> <li>□ Fires of the urban/rural interface threatened Oklahoma City properties as in July 26, 2000, where 80 acres of grass was consumed.</li> </ul>
<b>Hazardous Materials Transport</b>	<ul style="list-style-type: none"> <li>□ Input from City Fire and Police Department and the Hazard Material Transport Focus Group</li> <li>□ Input from Public Works and Transportation Departments</li> </ul>	<ul style="list-style-type: none"> <li>□ Improper disposal of contaminants and high costs associated with clean-up and treatment</li> <li>□ Need for development of Hazardous Transport Routes in Oklahoma City</li> </ul>

**Flooding**

According to the OKC HMP, the metro area has had 16 floods between Jan. 1, 1994 and Jan. 4 2004, where a total of 1 fatality occurred and \$580,000 damages (p. 95).

The City of OKC has had trouble with implementing a repetitive loss plan to purchase and/or relocate owners off of such properties (p. 96).

As part of the OKC HMP flood section the plan estimated the total number of structures in the floodplain (p. 98):



Figure 3.5-2: General Statistics on Structures – Oklahoma City

Occupancy Class	Total Number of Structures	Total Number of Structures within 100-Year Floodplain	Percentage of Structures in Floodplain	Total Footprint within 100-Year Floodplain (ft <sup>2</sup> )
<b>Commercial</b>	13,688	594	4.3%	5,680,638
<b>Government</b>				
Local	130	10	7.7%	57,886
State	74	1	1.4%	3,145
Federal	25	2	8.0%	120,949
County	13	1	7.7%	18,141
<b>Hospital</b>	11	0	0.0%	
<b>Industrial</b>	2,791	409	14.7%	2,464,157
<b>Multi-family</b>				
Apartment	1,222	23	1.9%	118,927
Nursing Home/ Retirement	14	0	0.0%	
Motel/ Hotel	59	4	6.8%	230,877
<b>Mobile Home</b>	1,777	132	7.4%	97,548
<b>Residential – Single Family</b>	175,882	6,590	3.7%	12,574,376
<b>School</b>	119	0	0.0%	
<b>Total</b>	<b>195,805</b>	<b>7,766</b>	<b>4.0%</b>	<b>21,366,644</b>

The plan further assesses the cost to replace these structures:

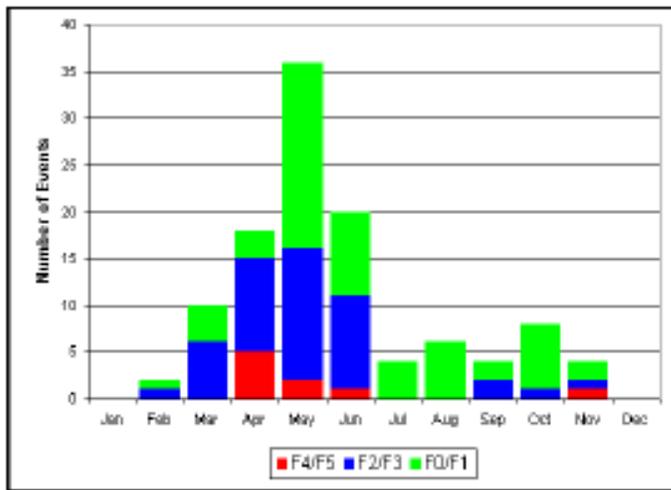
Figure 3.5-3: General Statistics on Building Replacement Values (Oklahoma City)

Occupancy Class	Building Area footprint within 100-Year Floodplain	Building Replacement Value (\$/ft <sup>2</sup> )	Building Replacement Value in 100-year Floodplain (\$)
<b>Commercial</b>	5,680,638	\$97	\$551,021,886
<b>Government</b>			
Local	57,886	\$88	\$5,093,968
State	3,145	\$88	\$276,760
Federal	120,949	\$88	\$10,643,512
County	18,141	\$88	\$1,596,408
<b>Hospital</b>	0	\$145	\$0
<b>Industrial</b>	2,464,157	\$69	\$170,026,833
<b>Multi-family</b>			
Apartment	118,927	\$98	\$11,654,846
Nursing Home/ Retirement	0	\$89	\$0
Motel/ Hotel	230,877	\$102	\$23,549,454
<b>Mobile Home</b>	97,548	\$52	\$5,072,496
<b>Residential – Single Family</b>	12,574,376	\$77	\$968,226,952
<b>School</b>	0	\$91	\$0
<b>Total</b>	<b>21,366,644</b>		<b>\$1,747,163,115</b>

Note: Grouped occupancy class values stated as an average.

(OKC HMP, p. 99)

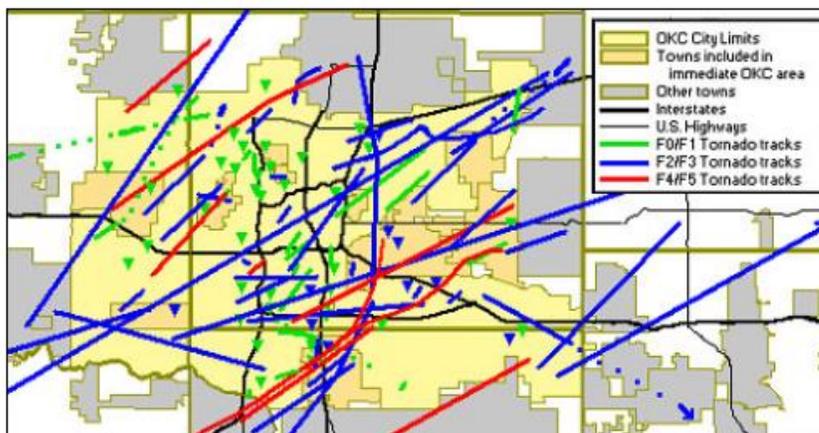
**Tornadoes**



**Figure 3.1-1: Tornadoes in the Oklahoma City Area by Month from 1890-2003 (112 Tornadoes)**

(OKC HMP, p. 60)

“According to the NCDC storm events database, 87 tornadoes were reported in OKC between Jan. 1, 1950 and Dec. 31, 2003. Of these 87 tornadoes, 3 were not rated, 15 were classified as F0, 28 were classified as F1, 21 were classified as F2, 12 were classified as F3 and 3 were classified as F4. However May 3, 1999 tornado was rated F5.” OKC HMP, P. 63



**Figure 3.1-6: Oklahoma City Historical Tornado Paths**

(OKC HMP, p. 63)

**Figure 3.1-7: Oklahoma and Cleveland Counties  
May 3, 1999, Damages**

Type	Destroyed	Damaged
Homes	1,780	6,550
Apartments	473	568
Businesses	85	42
Churches	3	-
Schools	2	-

(OKC HMP, p 66)

The OKC HMP also recommends individuals construct private safe rooms and shelters (p. 167), and for shelters to be constructed with multifamily units and mobile home parks (p. 182).

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

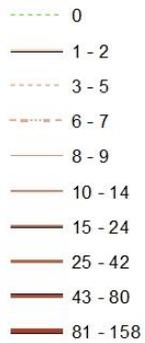
Historic data on tornados between 1950-2014 there are 111 tornados documented. There were 1040 injuries that occurred connected to these tornados, with 8 of those injuries happening in the 2013 tornado. There were 45 fatalities connected to tornadoes during this time period, 2 of which occurred in 2010 and 36 occurred in the 1999 tornado. Property losses between 1950-1996 ranged from \$16,750,102.00 to \$167,501,100.00. (The accounting methods used for losses changed in 1996.) The losses estimated between 1996-2014 was \$1,400,430,000.00 .

# Social Vulnerability - Impacts on Housing & Disaster Resiliency

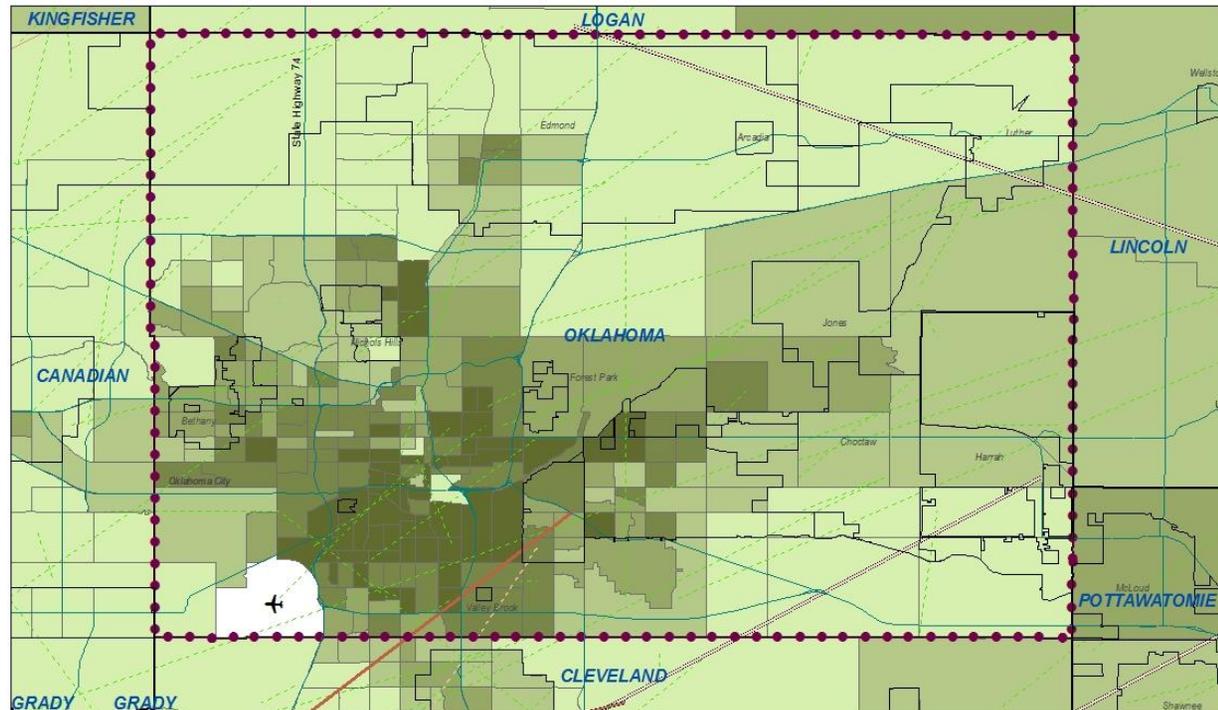
## Tornado Events 1950 - 2014

### Oklahoma 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, B08301, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007

19XX or 20XX Year of Event

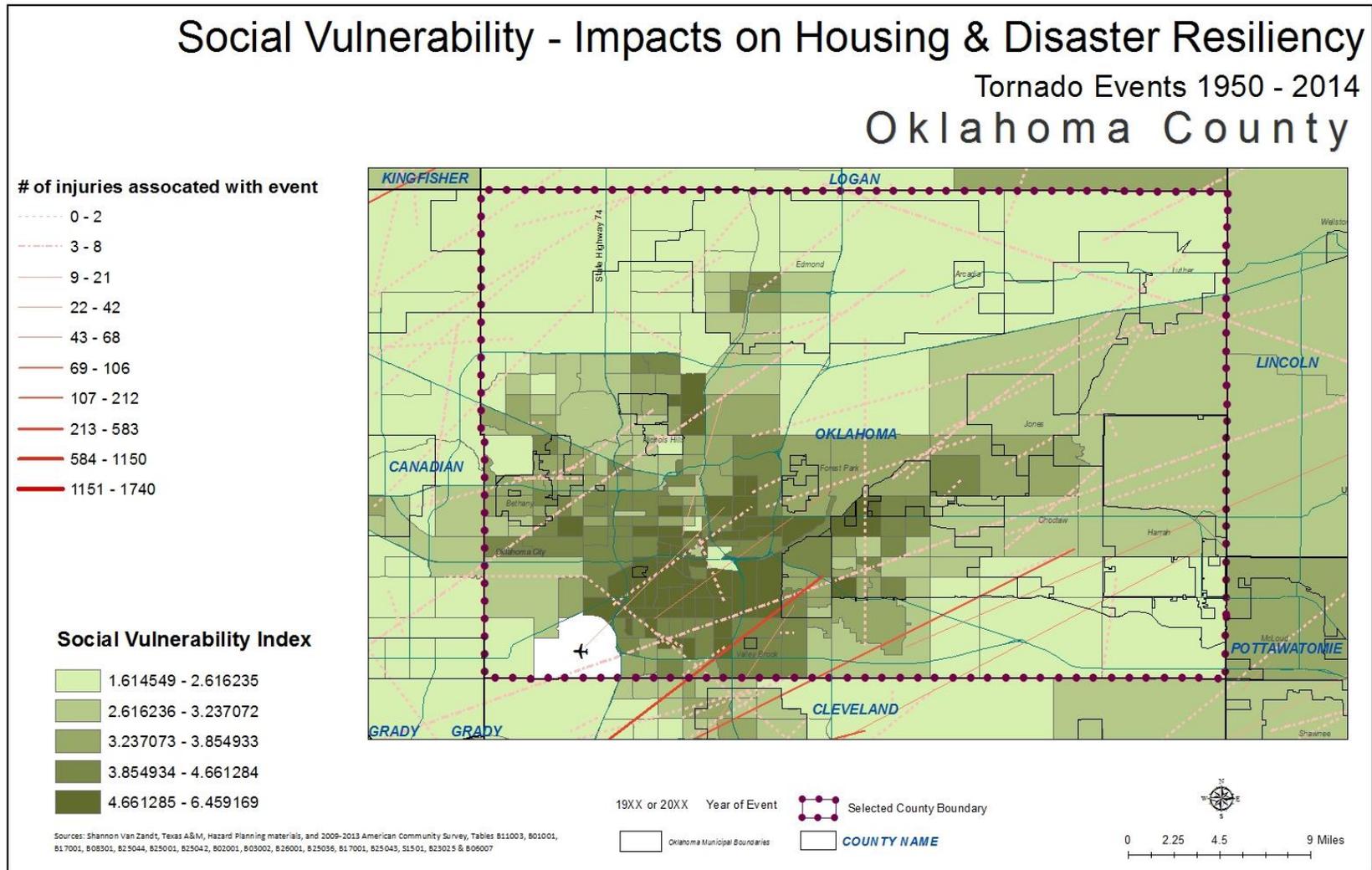
Oklahoma Municipal Boundaries

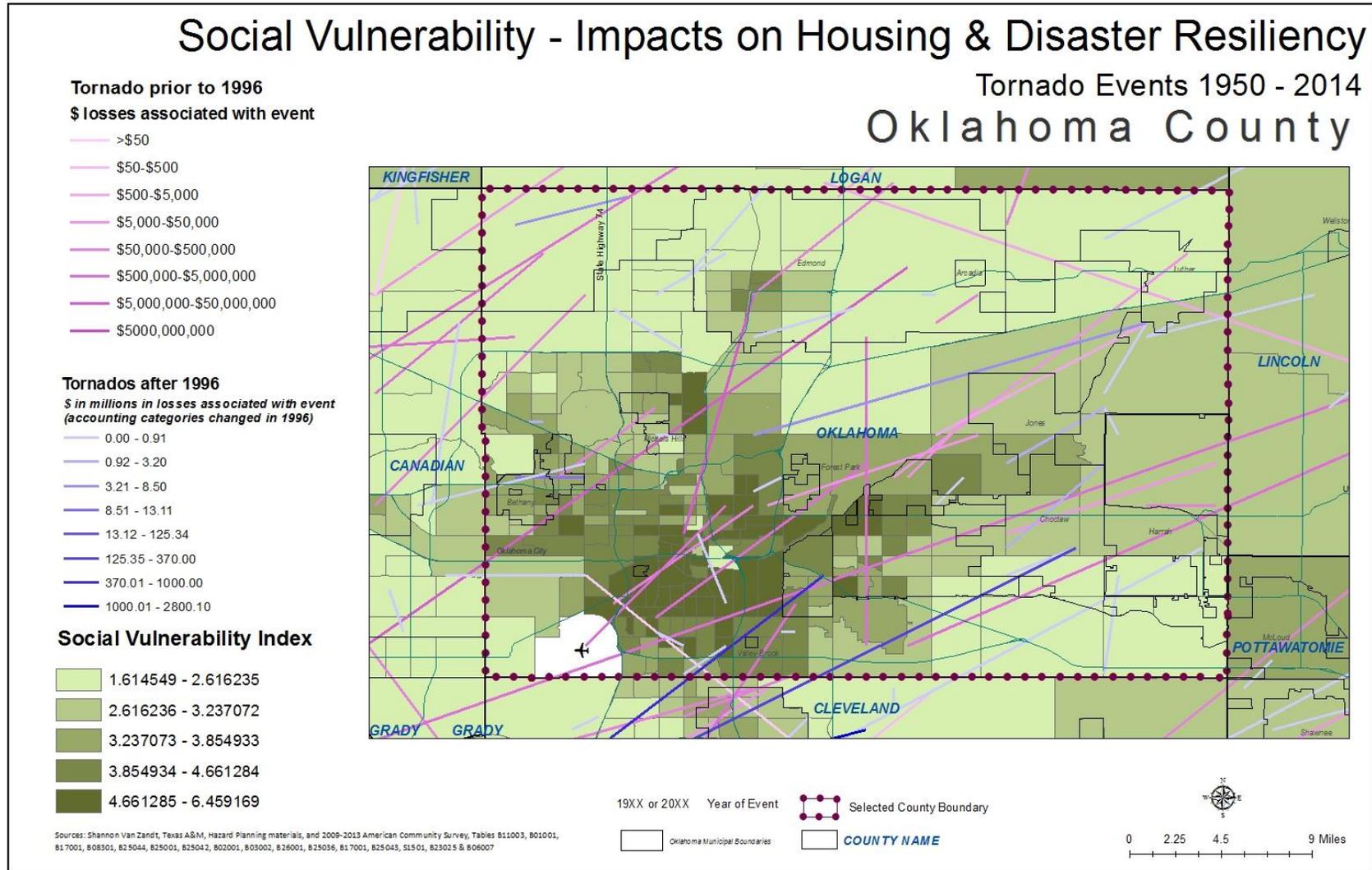
Selected County Boundary

COUNTY NAME



0 2.25 4.5 9 Miles





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

Shelter registries:

OKC Online registration:

<https://www.okc.gov/action/StormShelter/Welcome.aspx>

Oklahoma County Online registration

<https://www.oklahomacounty.org/sheriff/stormshelter/>

City of Nichols Hills Online registration:

<http://www.nicholshills.net/sectionindex.asp?sectionid=65>

Edmond Online registration:

<http://edmondok.com/index.aspx?NID=500>

City of Warr Acres

<http://www.warracres-ok.gov/news.php?extend.120.1>

City of Midwest City Online Registration:

<http://midwestcityok.org/storm-shelter-registration>

Public Shelters;

Edmond: Will Rogers Elementary School, 1215 E Ninth St.; Northern Hills Elementary School, 901 E Wayne St.

Luther: Luther High School, 320 NE 2; Luther Middle School, 915 S Dogwood St.

Warr Acres:

Lillie Sloan Park, 5900 block of NW 40; Cherokee Hills Park, NW 67 and Cherokee; Warr Acres City Hall, 5930 NW 49.

Nicoma Park: Nicoma Park Elementary School, 11601 Jeffords Ave.

Choctaw: First Baptist Church, 2700 Main St.

Midwest City: Reed Center, 5800 Will Rogers Drive.

In event of a power outage: Oklahoma City- 330 SW 4th St.

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

Information not available.

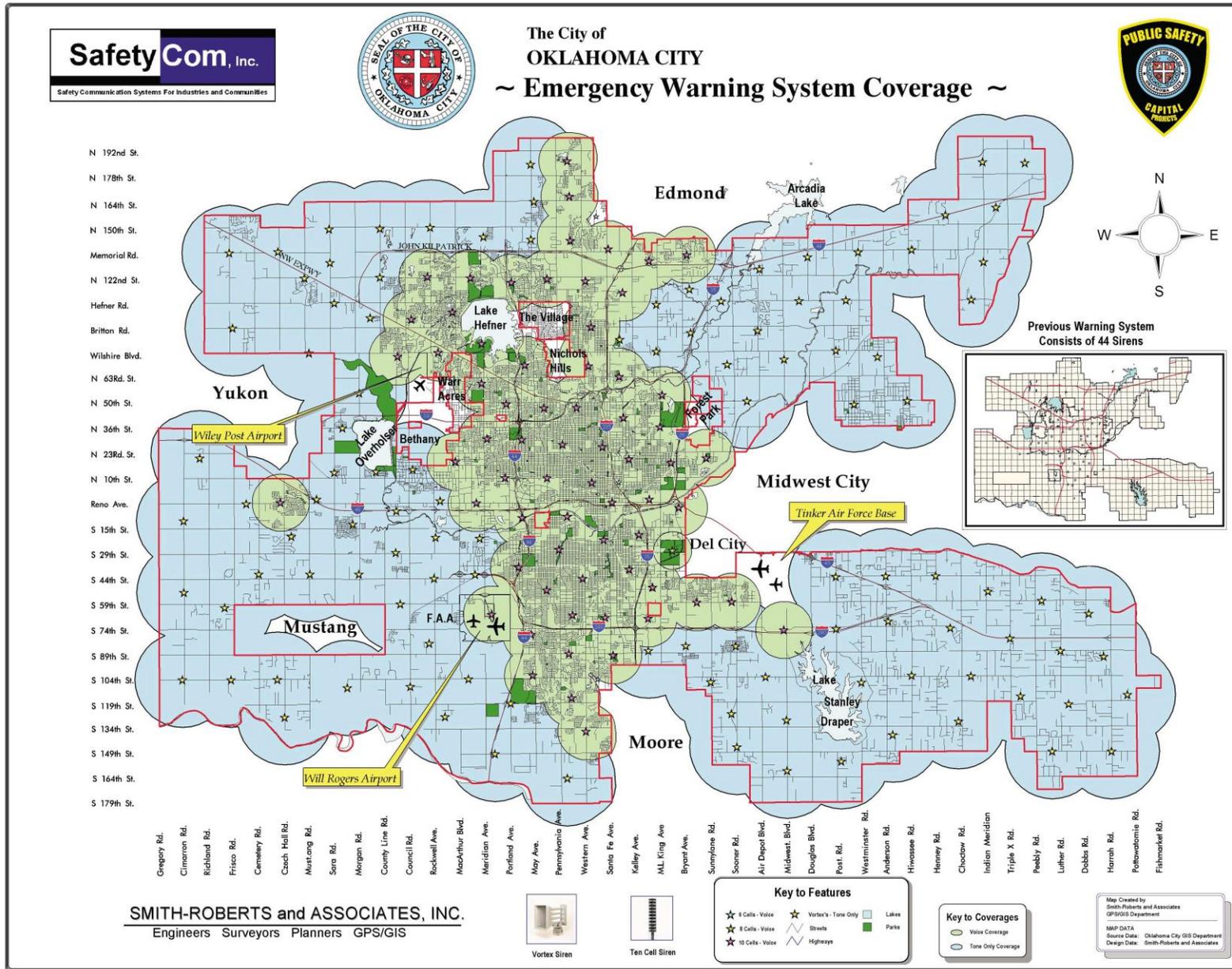
**C.2.1.4 Local Emergency Response Agency Structure**

Information not available.

**C.2.1.5 Threat & Hazard Warning Systems**

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

- Sirens
- Phone notification
- Emergency Broadcast System

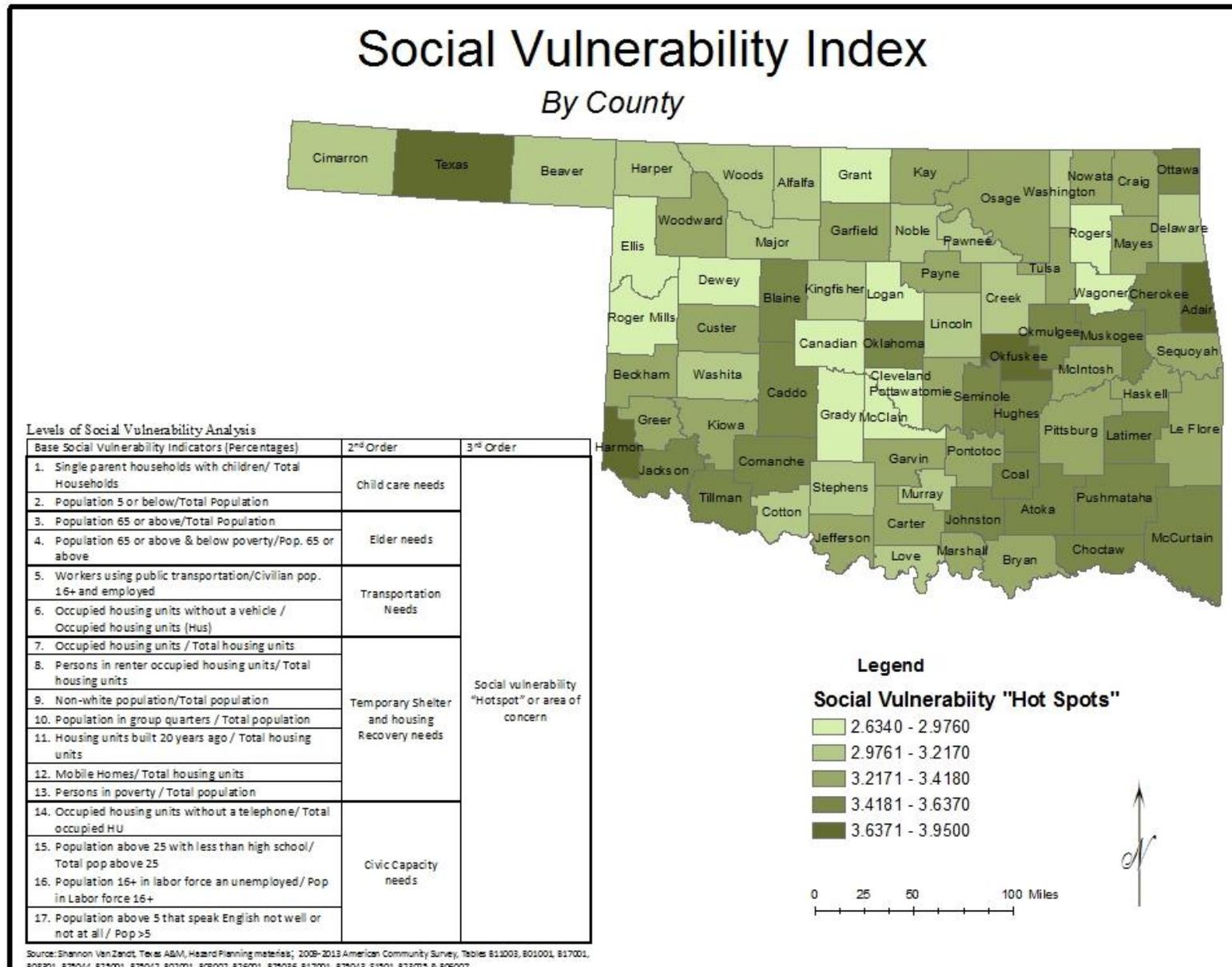


## Social Vulnerability

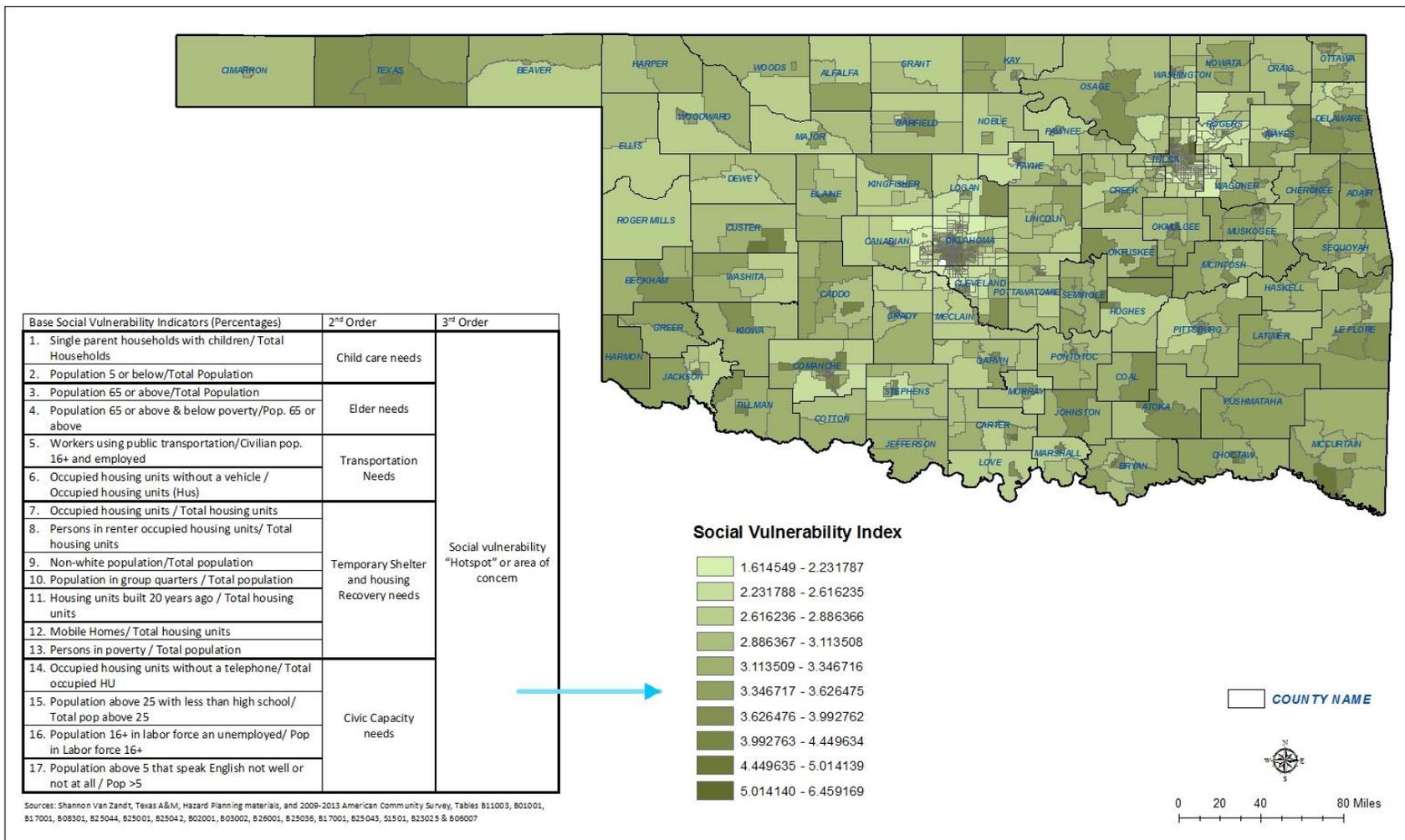
Based on the research work done by the Texas A&M University Hazard Reduction and Recovery Center, an added component is being included in this section. Social vulnerability can place households at a further disadvantage during and after a disaster. This analysis is assessing for the county the levels 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 - Oklahoma County</b>			
<b>Base Social Vulnerability Indicators (%)</b>		<b>2nd Order</b>	<b>3rd Order</b>
1.) Single Parent Households	17.59%	0.254	<b>3.544 Social Vulnerability 'Hotspot' or Area of Concern</b>
2.) Population Under 5	7.79%	(Child Care Needs)	
3.) Population 65 or Above	12.09%	0.207	
4.) Population 65 or Above & Below Poverty Rate	8.60%	(Elder Needs)	
5.) Workers Using Public Transportation	0.58%	0.074	
6.) Occupied Housing Units w/o Vehicle	6.86%	(Transportation Needs)	
7.) Housing Unit Occupancy Rate	88.72%	<b>2.702 (Temporary Shelter and Housing Recovery Needs)</b>	
8.) Rental Occupancy Rate	40.06%		
9.) Non-White Population	41.09%		
10.) Population in Group Quarters	1.91%		
11.) Housing Units Built Prior to 1990	77.11%		
12.) Mobile Homes, RVs, Vans, etc.	2.87%	<b>0.307 (Civic Capacity Needs)</b>	
13.) Poverty Rate	18.46%		
14.) Housing Units Lacking Telephones	1.95%		
15.) Age 25+ With Less Than High School Diploma	14.20%		
16.) Unemployment Rate	6.69%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	7.82%		

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

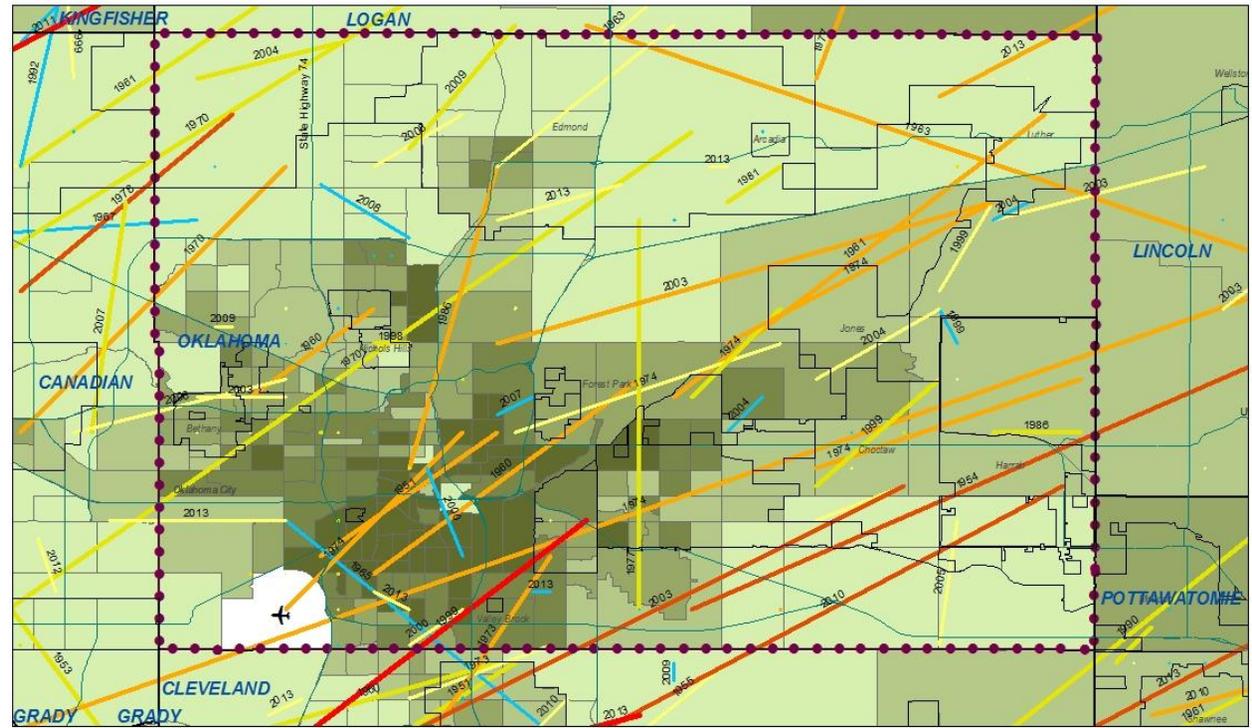
## Tornado Events 1950 - 2014

### Oklahoma County

**Tornado Magnitude**

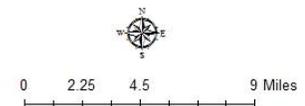


**Social Vulnerability Index**



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  
 Selected County Boundary  
 Oklahoma Municipal Boundaries  
 COUNTY NAME



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 OKC area including south OKC and the northeast OKC portions of the city and 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.