

Special Topics

Harmon 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 (Hollis, Gould). The entire population of the county is under 3,000, therefore a comprehensive is plan is not expected.

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.

Harmon County does have a Hazard Mitigation Plan.

“Harmon County does have an EOP in place. The Harmon County EOP was used as a reference in preparing this Hazard Mitigation Plan. (HMP, p. 13)

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.

Vulnerability to the various risks relevant within the county was prepared in the HMP:

HAZARD VULNERABILITY BY JURISDICTION											
	DAM FAILURE	DROUGHT	EARTHQUAKE	EXTREME HEAT	FLOOD	HAIL	HIGH WINDS	LIGHTNING	TORNADO	WILDFIRE	WINTER STORM
COUNTY											
Harmon		X	X	X	X	X	X	X	X	X	X
SCHOOLS											
Hollis		X	X	X		X	X	X	X		X
CITIES/TOWNS											
Hollis		X	X	X	X	X	X	X	X	X	X
Gould		X	X	X		X	X	X	X	X	X

p.18



Dam Failures

"Dam failures in Harmon County and participating jurisdictions have not occurred in any years between 1950 and 2013. Damages to personal property are estimated at \$0.00." p. 20

Flooding

Previous Occurrences

National Climatic Data Center storm event statistics record 3 flooding events in Harmon County and the City of Hollis during 2000- 2013. (P. 30)

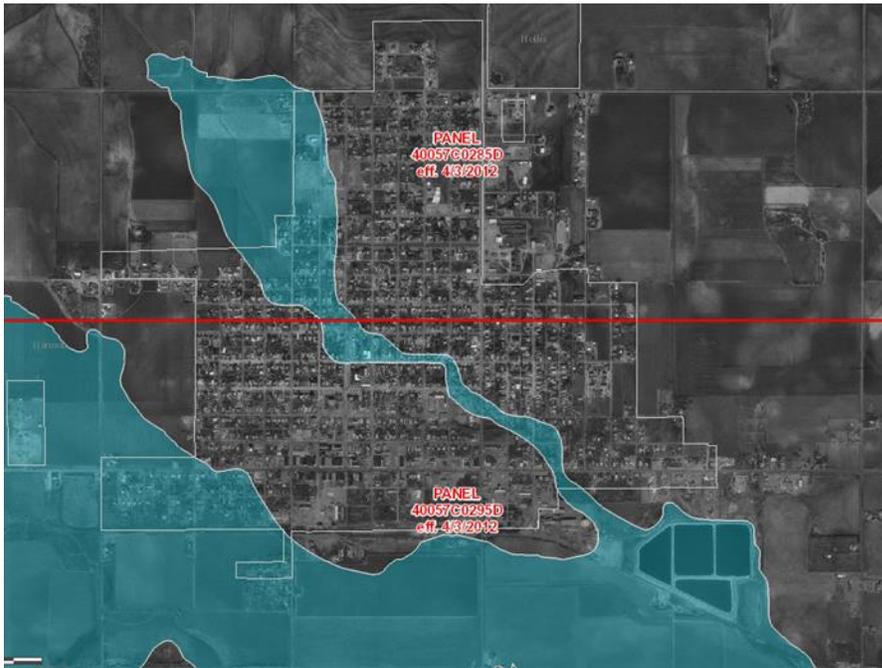
"Flood Events

September 11, 2003 - Precipitation totals of 5 to 9+ inches fell during the late evening hours of September 10 and early morning hours of September 11 over parts of west central and southwestern Oklahoma and the eastern Texas Panhandle. The subsequent heavy runoff from these torrential rains initially produced flash flooding in this area, especially in and near the city of Erick, where the cooperative observer reported a storm total of 8.61 inches, and an unofficial total of 9.45 inches was measured. The runoff from these heavy rains eventually moved from small creeks and tributaries into the three main rivers in the region, and produced either flooding or bank full conditions along these rivers. The river most affected was the Elm Fork of the North Fork Red River in Greer, Harmon, and Beckham counties. Moderate flood levels were reached at two river gage sites. Heavy rainfall amounts of 4 to 5+ inches near Sayre also produced minor flooding along the North Fork of the Red River, as floodwaters overflowed its banks on September 11, briefly covering parts of Sayre City Park and a golf course, and leaving behind trash and other flood debris. Bank full conditions were also observed farther downstream on the North Fork as the high water traveled through eastern Beckham County, and along the Greer-Kiowa county line to the headwaters of Hollis-Lugert Lake. Bank full conditions also occurred along the Salt Fork of the Red River in southwestern Oklahoma. Three crests within a foot of flood stage were observed at the USGS river gage site on the Oklahoma Highway 34 Bridge at the city of Mangum on September 11.

September 9, 2007 - In September 9th saw yet another day of thunderstorms with very heavy rainfall. Thunderstorms developed over southwest Oklahoma and moved southeast to near the Red River. Flash flooding occurred as slow moving thunderstorms repeatedly affected the same areas. No damage was reported with the flooding. The county road was closed due to rising water over the roadway.

September 11, 2008 - A prolonged area of southwest flow aloft developed over much of Oklahoma during the period from the 10th through the 12th. Numerous upper level disturbances moving through the flow, as well as a very moist air mass allowed for several rounds of showers and thunderstorms to develop and move northeast, much of the time moving over the same areas. Moisture associated with the remnants of Tropical Storm Lowell added to the mix, with an added depth of moisture that only made the situation worse. Rainfall rates of one to one-and-a-half inches were common, with some areas receiving near three inch per hour rates. Widespread flooding was reported over a large portion of northern Oklahoma. Numerous homes and business' were flooded. At least a half to two-thirds of the roadways from Woodward to Kay County was closed at some point during the event. Numerous roadways were damaged, with at least 125 miles of roadway damaged in Alfalfa County alone. Half of the roadways in Pond Creek and Lamont were damaged, and 40 percent of the bridges were damaged. Numerous rounds of the precipitation allowed for widespread river flooding as well. The Chikaskia River reached its highest level ever recorded. This caused several homes to be destroyed. In all, 20 homes were completely destroyed, 14 homes sustained major damage, 52 homes sustained minor damage, and 96 homes sustained at least some damage. Damage totals for the event reached over \$8 million. A foot of water accumulated over a couple of roadways, including a small area of Highway 30. One car was stalled due to driving into the high water."

Hollis



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

Flood Hazard Zones

■ 1% Annual Chance Flood Hazard

Gould



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

Flood Hazard Zones

■ 1% Annual Chance Flood Hazard

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

Historic data on tornados between 1950-2014 there are 24 tornados documented. There were 6 injuries that occurred connected to these tornados, with 2 of those injuries happening in the 1976 tornado. There were 0 fatalities connected to tornadoes during this time period. Property losses between 1950-1996 ranged from \$271,005.00 to \$2,710,250.00. (The accounting methods used for losses changed in 1996.) The losses estimated between 1996-2014 was \$100,000.00.

Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014

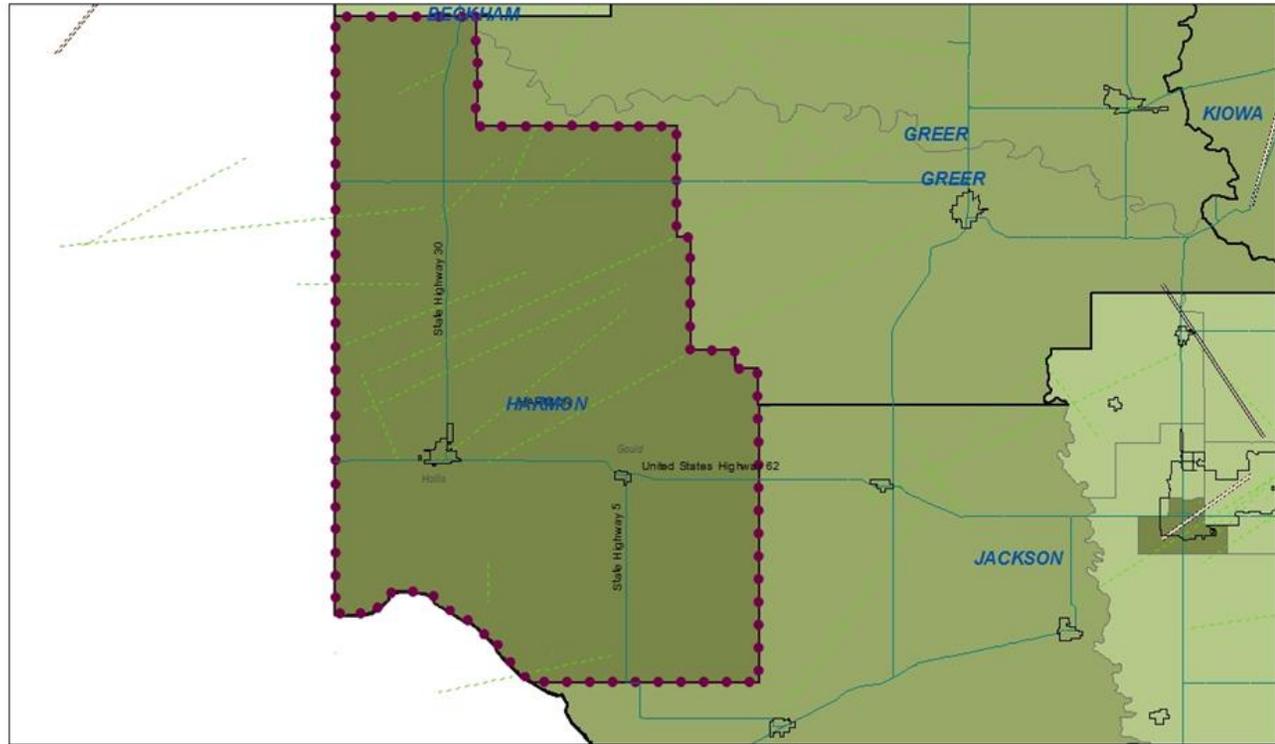
Harmon County

of fatalities associated with event

- 0
- 1 - 2
- - - 3 - 5
- · - · 6 - 7
- 8 - 9
- 10 - 14
- 15 - 24
- 25 - 42
- 43 - 80
- 81 - 158

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

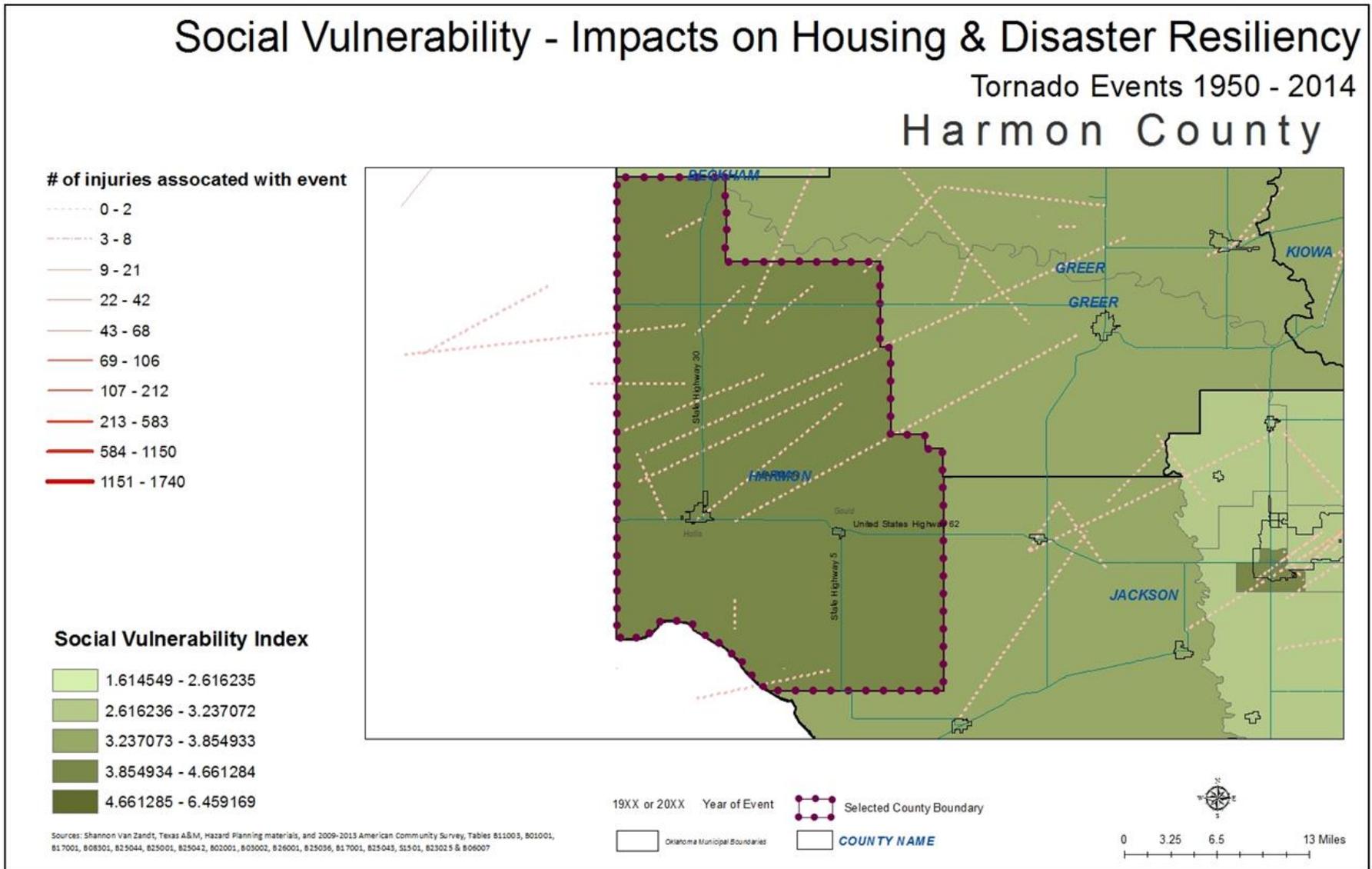
Oklahoma Municipal Boundaries

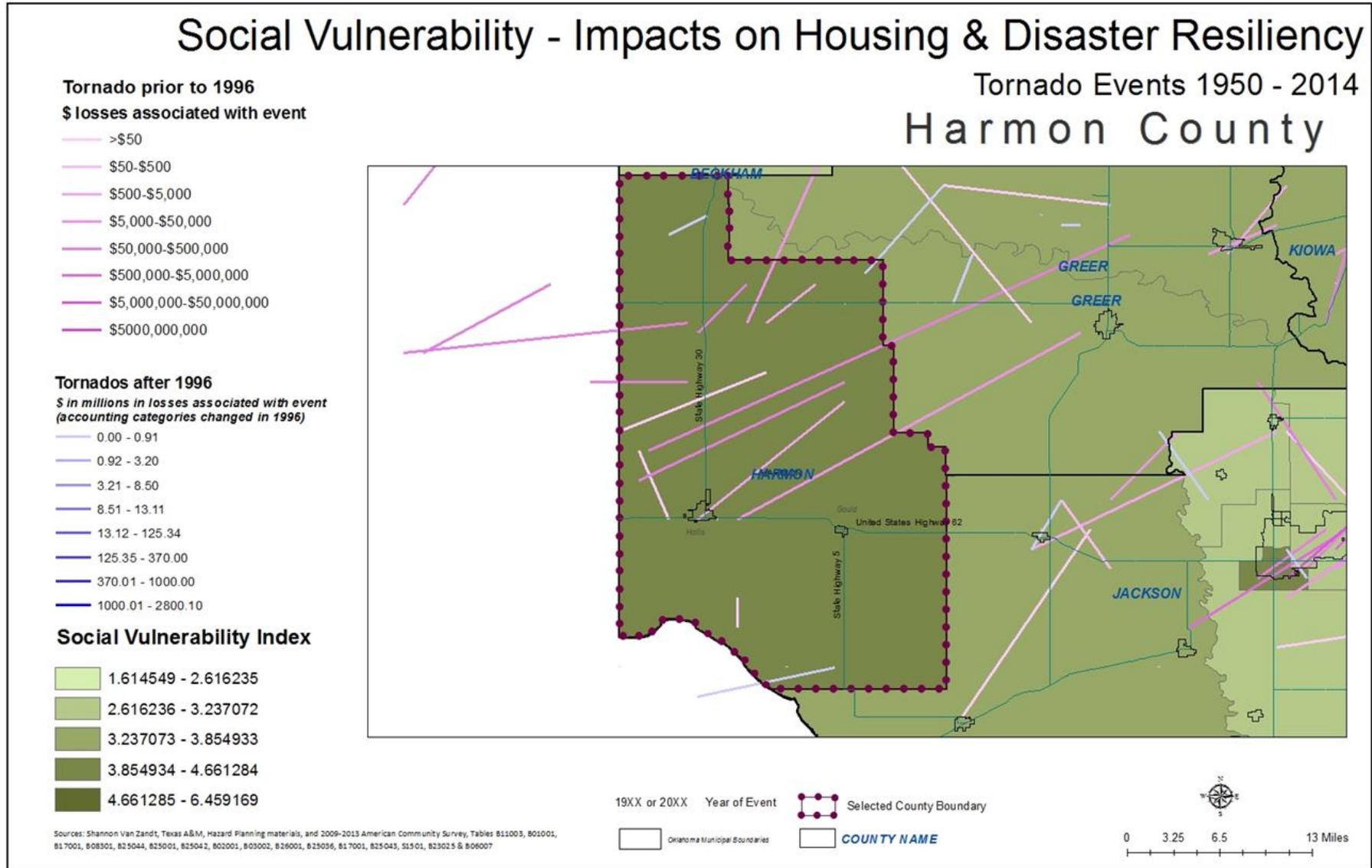
COUNTY NAME



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

Harmon County HMP recommends:

- Construct Storm Shelter (p. 56)

No registry was found.

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 Harmon County include:

- Sirens (HMP recommend storm sirens p. 56)

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.

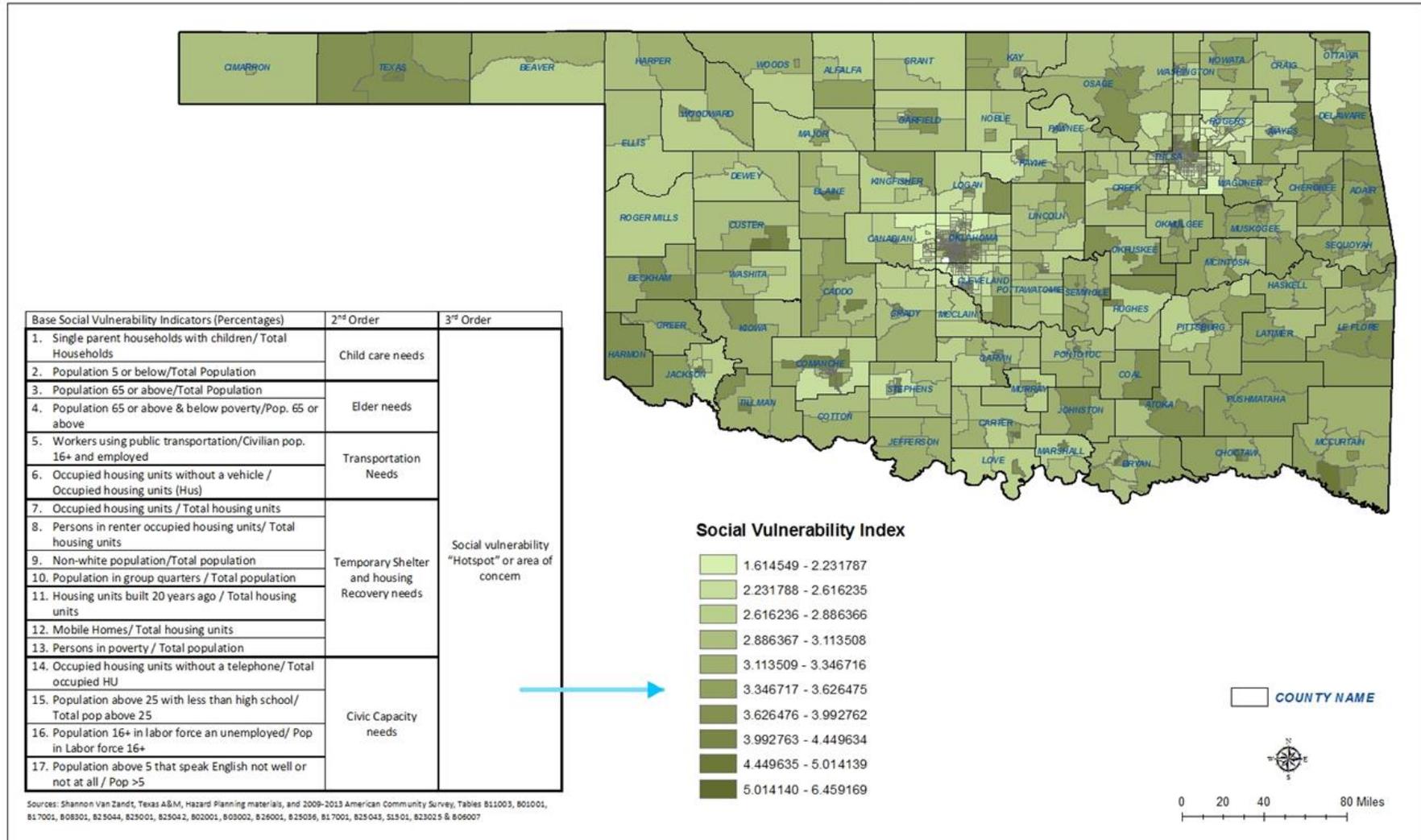
Social Vulnerability Analysis - Harmon County

Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	18.79%	0.264	3.923 Social Vulnerability 'Hotspot' or Area of Concern
2.) Population Under 5	7.64%	(Child Care Needs)	
3.) Population 65 or Above	17.97%	0.341	
4.) Population 65 or Above & Below Poverty Rate	16.18%	(Elder Needs)	
5.) Workers Using Public Transportation	0.00%	0.09	
6.) Occupied Housing Units w/o Vehicle	9.04%	(Transportation Needs)	
7.) Housing Unit Occupancy Rate	71.45%	2.748 (Temporary Shelter and Housing Recovery Needs)	
8.) Rental Occupancy Rate	34.99%		
9.) Non-White Population	37.80%		
10.) Population in Group Quarters	4.46%		
11.) Housing Units Built Prior to 1990	94.12%		
12.) Mobile Homes, RVs, Vans, etc.	3.23%		
13.) Poverty Rate	28.79%		
14.) Housing Units Lacking Telephones	7.32%	0.478 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	24.60%		
16.) Unemployment Rate	10.04%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	5.84%		

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

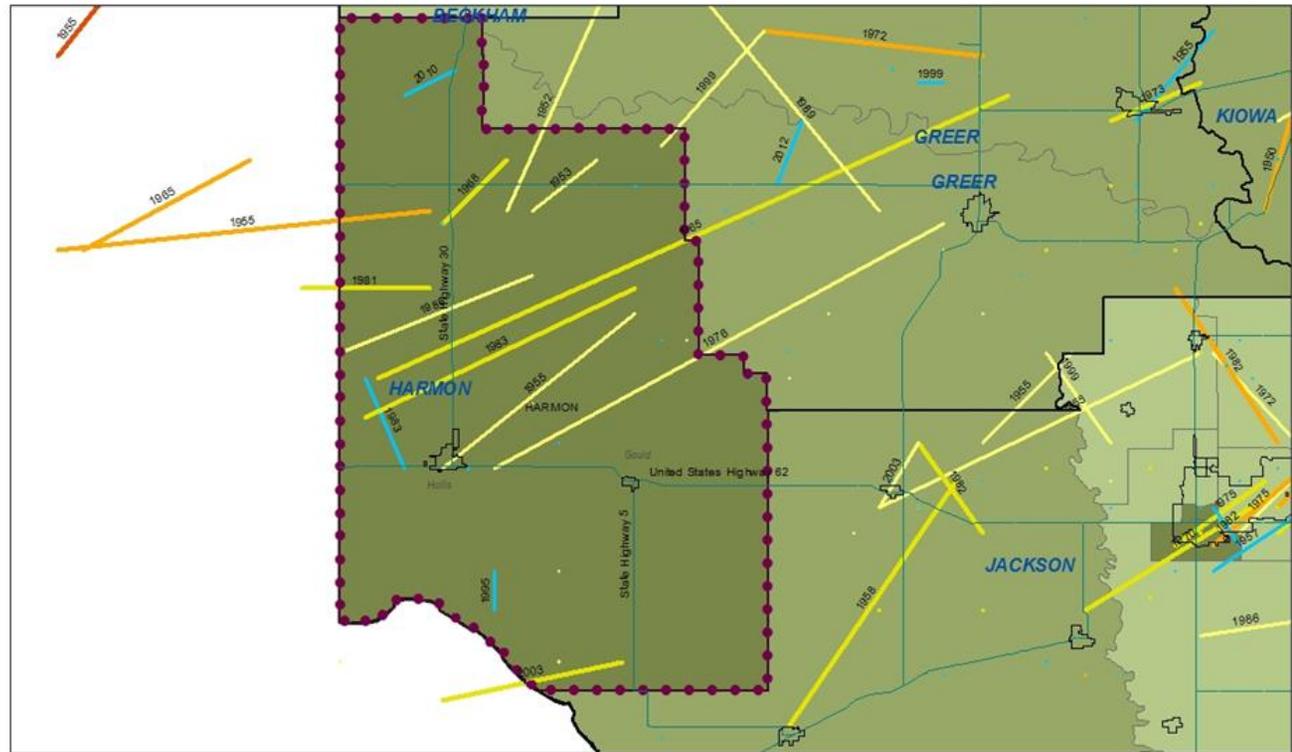
Tornado Events 1950 - 2014

Harmon County

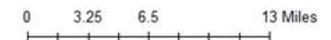
Tornado Magnitude



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 811003, 801001, 817001, 808501, 825044, 825001, 825042, 802001, 803002, 826001, 825036, 817001, 825043, 51501, 823025 & 806007

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 one of the highest scores per this index for social vulnerability when comparing as a county to other counties in the state. Looking at the census tract level, the entire rural county (low population overall) has particularly higher scores for all tracts 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 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.