Special Topics

Custer 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 5 key cities within the county (Clinton, Weatherford, Arapaho, Custer City, Thomas.

> **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.

> Custer 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.

Summary highlights from the Custer County HMP discuss the major risks and mitigation plans for the county.

Table 4-1: VULNERABILITY MATRIX

PLACE	DAM FAILURE	DROUGHT	EARTHQUAKE	EXTREME HEAT	FLOODING	HAIL	SPECIAL EVENT*	HIGH WIND	LIGHTNING	TORNADO	WILDFIRE	WINTER STORM (ICE & SNOW)	LANDSLIDE/ ROCK FALL	EXPANSIVE SOIL	THUNDERSTORM
Oklahoma	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Custer County 2004	X	X	X		X	X	X	X	X	X	X	X			X
Custer County 2010	X	X	X	X	X	X	X	X	X	X	X	X			X**

p.27

Scored risk level and probability for occurrence:

TABLE 4-4: CUSTER COUNTY HAZARD ANALYSIS SCORING RESULTS

CRITERIA	DAM FAILURE	DROUGHT	EARTHQUAKE	EXTREME HEAT	FLOODING	HAIL	HAZARDOUS MATERIALS	HIGH WIND	LIGHTNING	TORNADO	WILDFIRE	WINTER STORM (SNOW AND ICE)
SPEED OF ONSET	42	23	92	91	70	92	89	74	92	75	90	71
HISTORY	23	88	46	91	81	92	89	92	91	92	92	91
PROBABILITY	24	59	23	89	67	88	89	92	92	92	90	88
SEVERITY OF IMPACT	92	69	23	48	57	47	44	50	71	92	69	76
VULNERABILITY	30	69	23	27	67	27	23	47	24	65	28	80
TOTAL	211	308	207	346	342	346	334	355	370	416	369	406
RANKING	10	9	11	6	7	6	8	5	3	1	4	2

p. 29

Dam Failure

Lower probability of negative impacts was suggested by the HMP due to no past failures since 1950 (p. 30)

Flooding

Location:
"The Washita River runs through the county from the northwest to the south central. In addition to this major river there are also several large streams in the county. Foss Reservoir was built on the Washita River in 1961. The lake covers 6,800 acres at an average depth of 20 feet. In addition to Foss
Lake there are also 131 small conservation dams throughout the Custer County watershed. While these dams have greatly reduced flooding in Custer County, the county is still subject to riverine and flash flooding." P. 37

"National Flood Insurance Program data was reviewed and incorporated into the plan including a FIRM Map for the Town of Butler, City of Clinton and City of Weatherford."

"FEMA records indicate that the Town of Arapaho is rated as NSFHA (No Special Flood Hazard Area) with the town being rated as 'Zone C'."

"The Town of Custer City and City of Thomas have not been mapped or evaluated as part of the NFIP."

"The entities currently participating in the NFIP are as follows: Custer County, Town of Arapaho, Town of Butler, City of Clinton and City of Weatherford. To stay in compliance with the NFIP each jurisdiction has a flood plain manager and they regulate and monitor any special flood hazard areas." P. 20

The Custer County HMP explored scenarios based on the higher probability natural risks to the area and estimated damages. This allowed the county to explore options for preparedness and recovery. In a scenario involving flooding the following was the estimated damages:

TABLE A

Existing Assets Vulnerable to Flood Damage			
Asset	**Number**	**Unit Valuation**	**Vulnerable Asset Valuation**
Buildings – Housing Units	4713	$64,054 ea.	$301,886,502
Buildings – Commercial	737	$139,013 ea.	$102,452,581
Critical Facility – Courthouse	0	0	0
Critical Facility – County Barns	0	0	0
City Hall/Fire Station	6	$927,421 ea.	$5,564,526
Infrastructure - Bridges	47	1650 ft. @ $2500/ft.	$4,125,000
TOTALS	5,503	-	$414,028,609

p. 57

Mitigation Strategy contain in the Custer County HMP related to flooding (p. 64):

Flooding

A mitigation strategy for flooding includes participation in the (NFIP) National Flood Insurance Program. Steps to be taken by jurisdictions to remain in compliance or become a participant in the NFIP include:

A. Identify all areas within a jurisdiction that have the potential for flooding and determine if the area is currently identified by the NFIP.

B. Analyze and gather data pertaining to identified flood zones including; history of flooding in the jurisdiction, repetitive loss areas, and existing FIRM maps. An analysis of the information will then be used to determine:

1. Are the existing flood zones and maps up-to-date?
2. Have areas of new development within a jurisdiction been evaluated, and included in the NFIP?
3. Have mitigation efforts and flood control projects remedied the hazard potential for flooding in an area? If so, has the area been reevaluated and mapped as necessary?

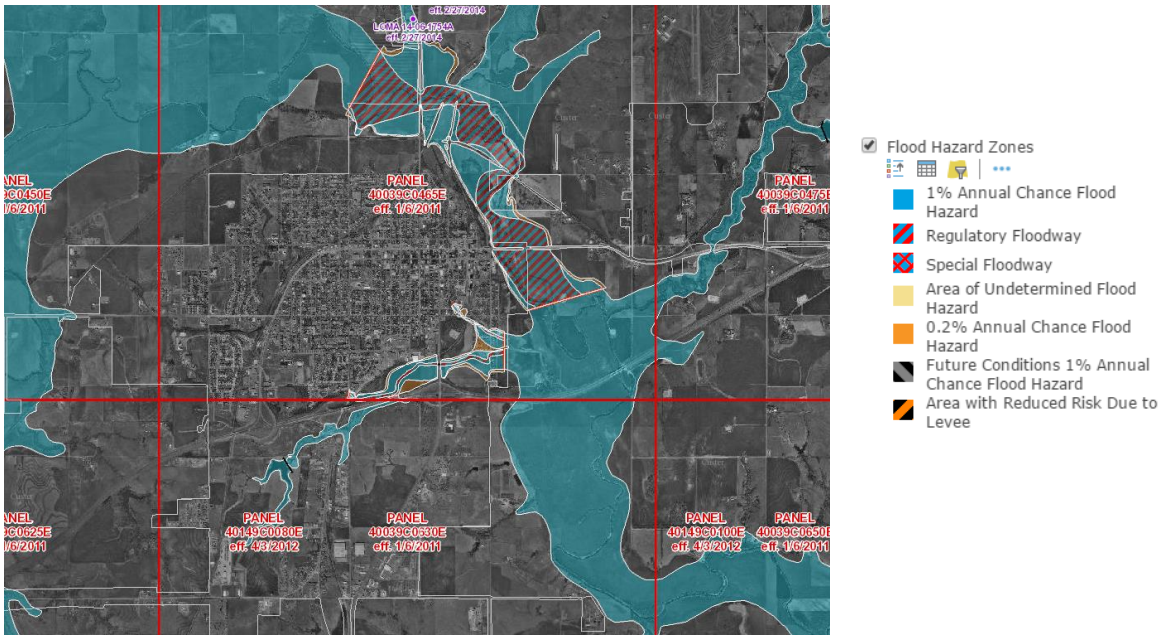
C. Prioritize actions to be taken by revising and updating current NFIP jurisdictions and adding jurisdictions that are not currently members. The STAPLEE criterion, as discussed in Chapter 5, allows for prioritization when including the NFIP as a mitigation project. Overflow of waterways and roadways can occur during high precipitation events within Custer County.

The county has been able to rip/wrap several washout and erosion areas; this is an excellent way to mitigate the erosion of county roadways. The county also removes debris and has strategies in place to clear the drainage ditches along the roads. There are no repetitive loss structures in Custer County. (p.57)

Flooding

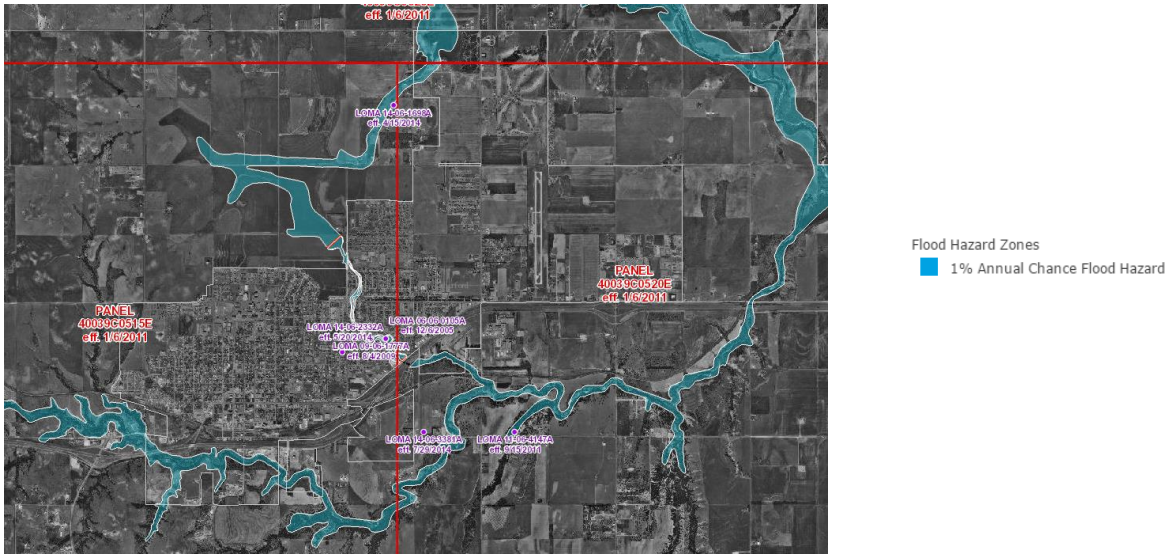
All parts of the county may be subject to flash flooding, freeze-thaw flooding and extreme precipitation that can cause flooding, unrelated to the streams and rivers. Development in the floodplain, however, increases risk of damages and property loss potentially repeatedly.

Clinton



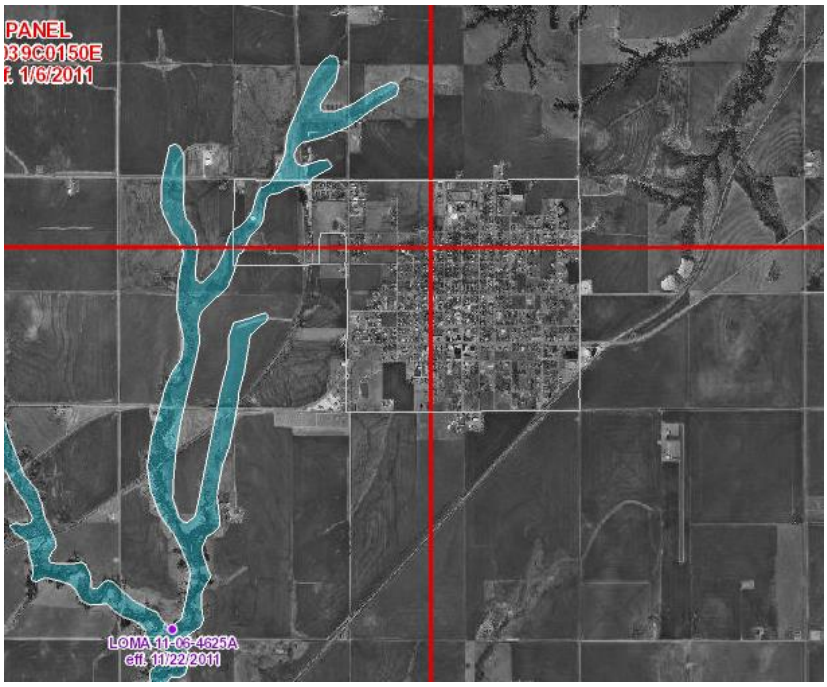
FEMA's National Flood Hazard Layer http://fema.maps.arcgis.com/

Weatherford



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

Thomas

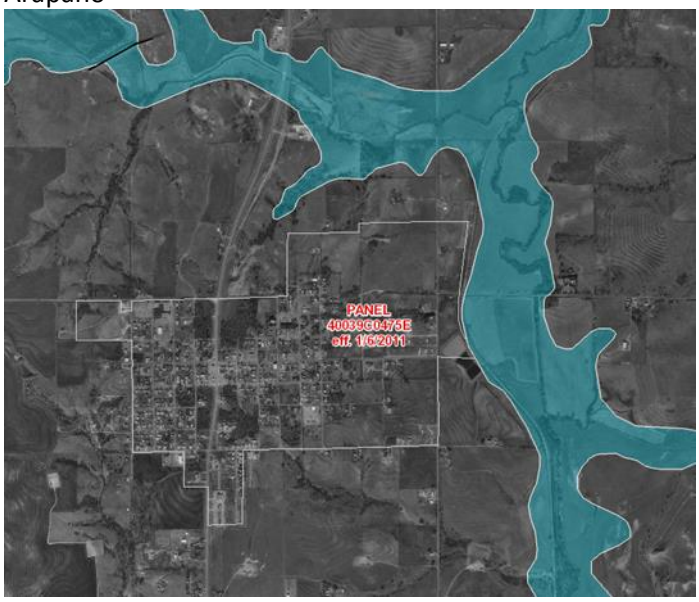


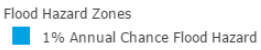
FEMA's National Flood Hazard Layer http://fema.maps.arcgis.com/

Custer City

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

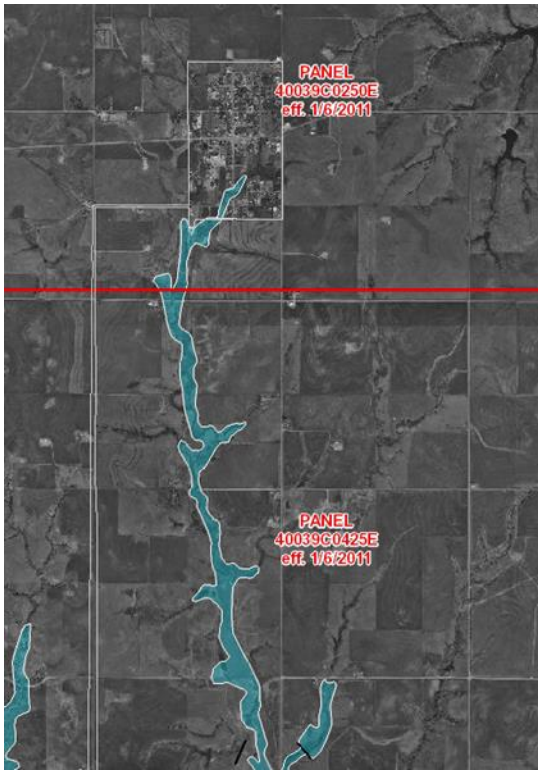
Arapaho

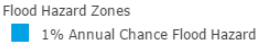




FEMA's National Flood Hazard Layer http://fema.maps.arcgis.com/

Butler





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

Tornados

"***History:*** There have been 52 tornados recorded in Custer County since 1950 according to the NCDC queries. There were 17 injuries and 4 deaths recorded as a result of these tornados. While none of these tornados have been in the EF5 size category or directly hit a heavily populated area in the county, they pose a threat as a major disaster." P. 36

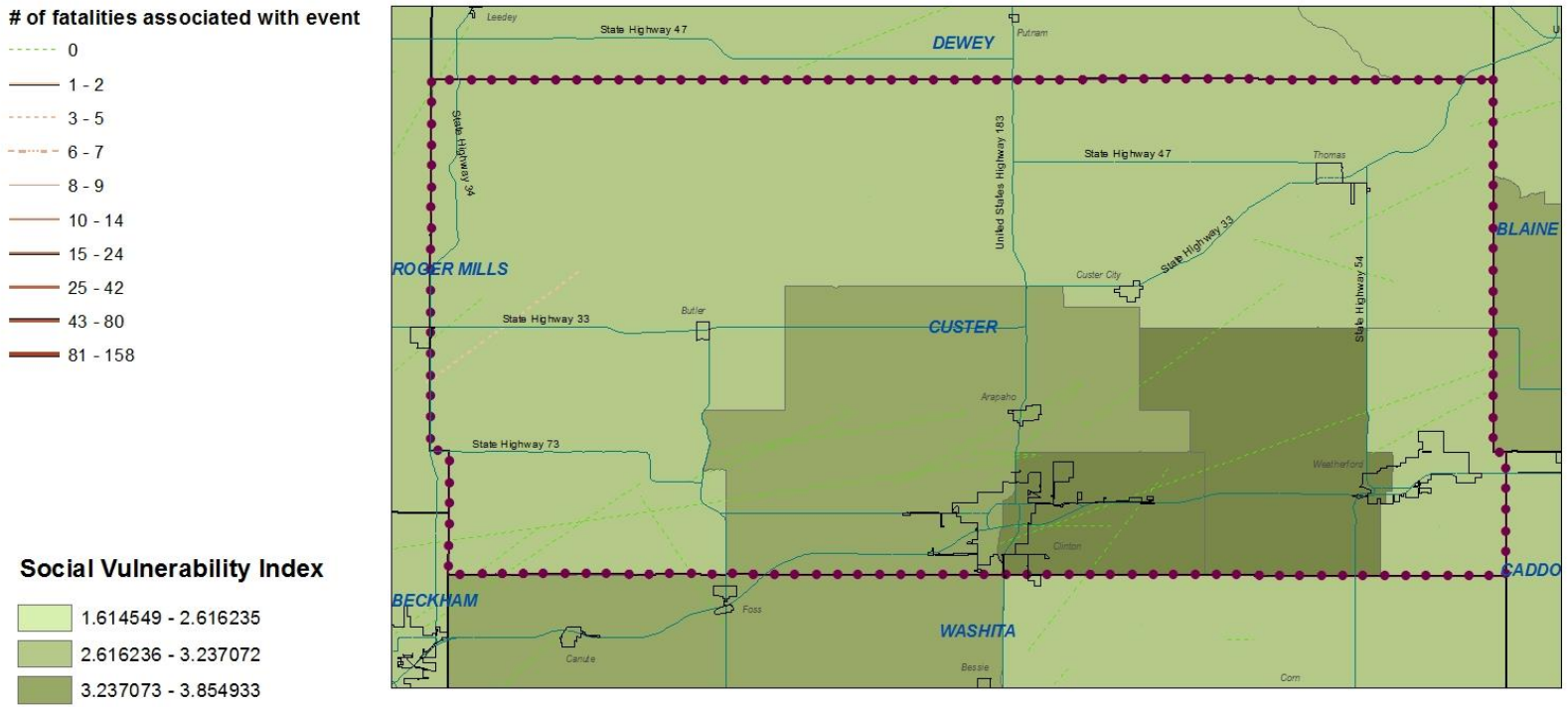
NOAA data shows the following historic data on disaster events for the county:

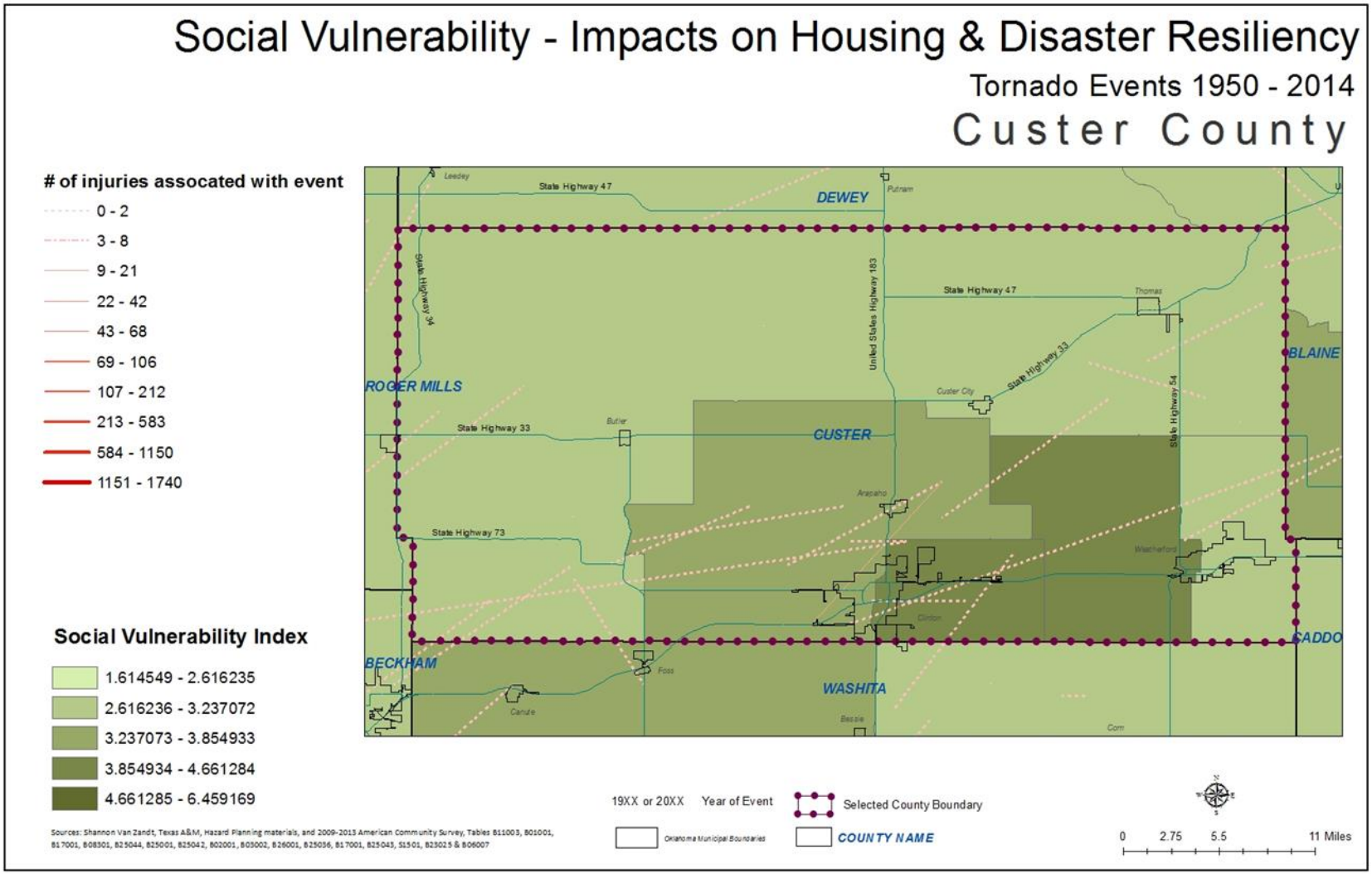
Historic data on tornados between 1950-2014 there are 57 tornados documented. There were 18 injuries that occurred connected to these tornados, with 12 of those injuries happening in the 1981 tornado. There were 4 fatalities connected to tornadoes during this time period, 2 of which occurred in 1994. Property losses between 1950-1996 ranged from $6,427,153.00 to $64,271,650.00. (The accounting methods used for losses changed in 1996.) The losses estimated between 1996-2014 was $1,110,000.00.

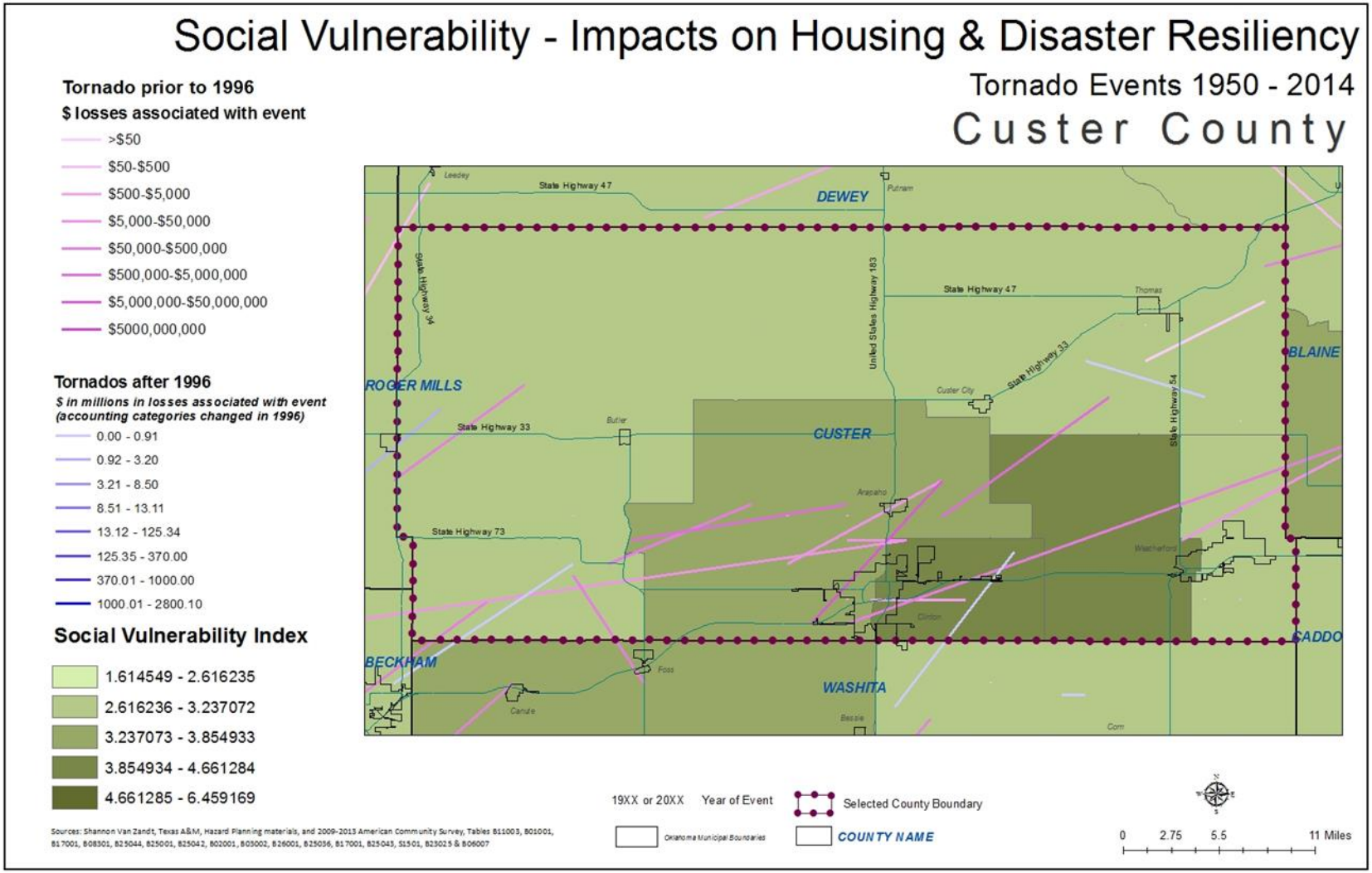
Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014

Custer County




Social Vulnerability - Impacts on Housing & Disaster Resiliency
Tornado Events 1950 - 2014
Custer 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
Social Vulnerability Index
1.614549 - 2.616235
2.616236 - 3.237072
3.237073 - 3.854933
3.854934 - 4.661284
4.661285 - 6.459169
DEWEY
BLAINE
ROGER MILLS
CUSTER
CADDO
BECKHAM
WASHITA
State Highway 47
State Highway 33
State Highway 73
State Highway 54
United States Highway 183
Leedey
Putnam
Thomas
Custer City
Butler
Arapaho
Weatherford
Clinton
Foss
Canute
Bessie
Corn
19XX or 20XX Year of Event
Selected County Boundary
Oklahoma Municipal Boundaries
COUNTY NAME
0 2.75 5.5 11 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
Custer 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
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
Selected County Boundary
Oklahoma Municipal Boundaries
COUNTY NAME
0 2.75 5.5 11 Miles
DEWEY
BLAINE
ROGER MILLS
CUSTER
BECKHAM
WASHITA
CADDO
State Highway 47
State Highway 34
United States Highway 183
State Highway 33
State Highway 54
State Highway 73
Leedey
Putnam
Thomas
Custer City
Butler
Arapaho
Weatherford
Clinton
Foss
Canute
Bessie
Corn

The Custer County HMP explored scenarios based on the higher probability natural risks to the area and estimated damages. This allowed the county to explore options for preparedness and recovery. In a scenario involving high winds and tornados the following was the estimated damages:

> "A large damaging tornado in Custer County has the potential to do a minimum of $63,981,208 dollars in damage and affect 26,142 citizens. This of course is not always the case, since tornados may just strike a small portion of the county, the outskirts of a town, or remain in open country posing no risk to structures on people." P. 56

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

The following projects were not started due to lack of funding in the Town of Arapaho.

- Construct community shelter that will hold at least 350 adults. (p. 76)

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

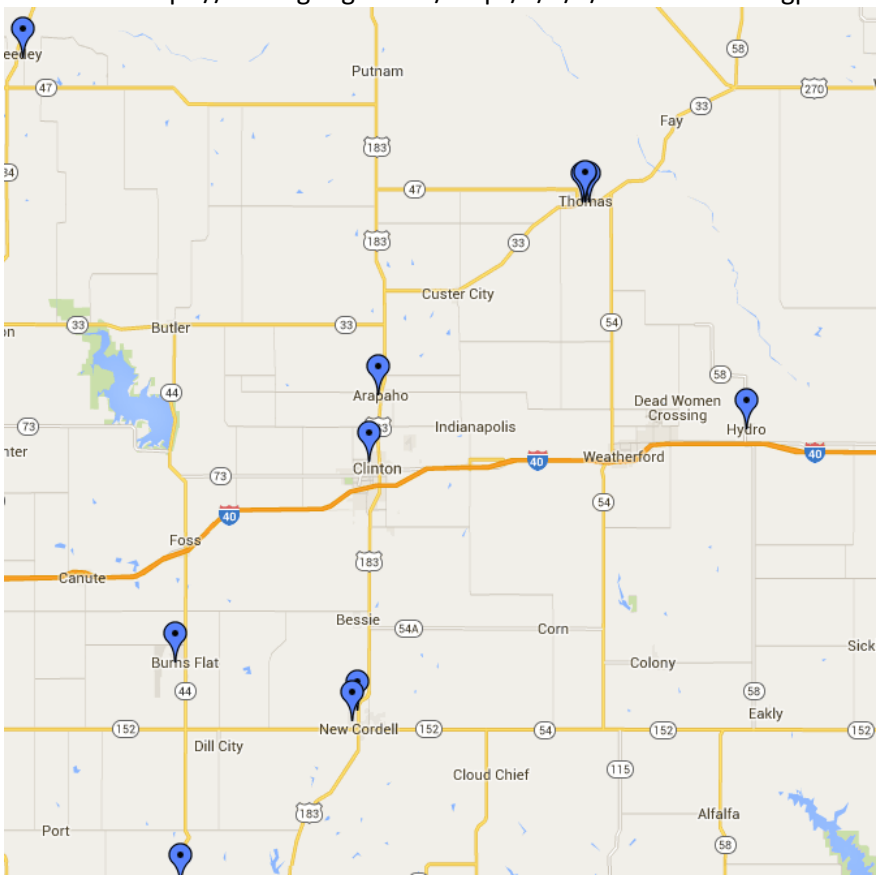
City of Clinton Online registration:
http://www.clintonok.gov/residents/public-safety/emergency-management-system/storm-shelter-registration

As part of the Custer County HMP:

13 Partner with local radio and television stations to announce warnings.
16 Prepare weather warning system for interstate travelers (radio station to integrate public warnings over radio and scroll across the vehicle radio screen)
21 Conduct and individual safe room project for Custer County residents. (estimated to cost $800,000)
22 Educate public regarding flood insurance and the NFIP. (estimated to cost $10,000) P. 68

Town of Arapaho – purchase of 2 sirens, part of HMP p. 78

Google Mapped sirens in Oklahoma:https://www.google.com/maps/d/u/0/viewer?mid=zkgp3PmLxLzg.kXQeGF45FpQg&hl=en



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.

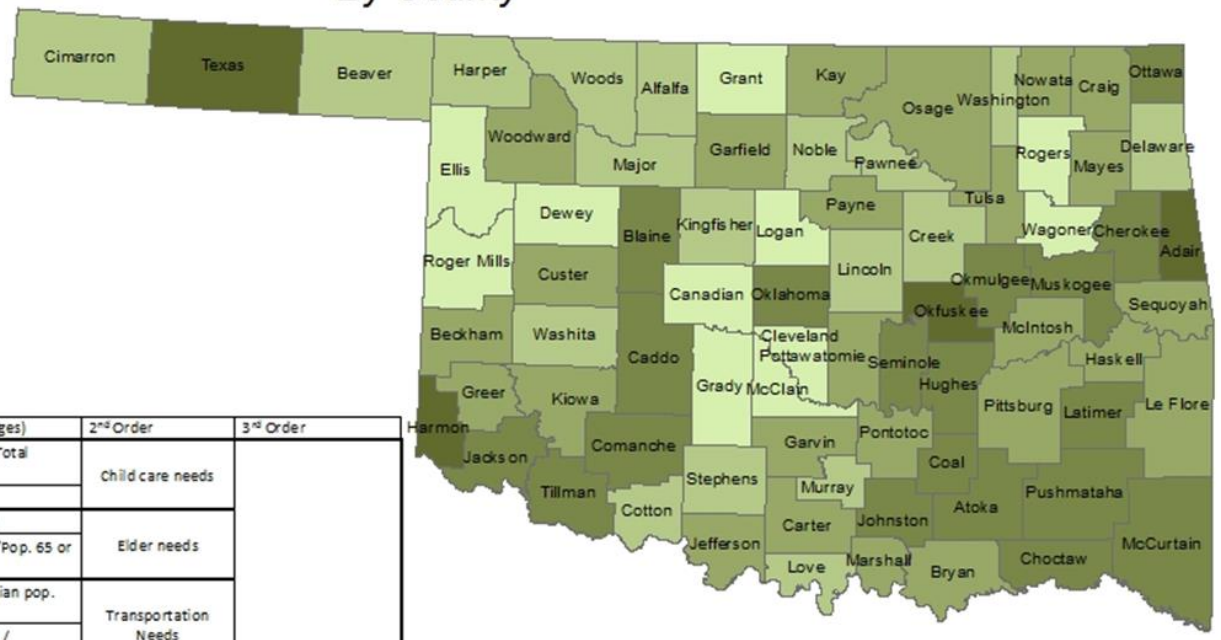
Social Vulnerability Analysis - Custer County

Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	13.91%	0.213 (Child Care Needs)	**3.406 Social Vulnerability 'Hotspot' or Area of Concern**
2.) Population Under 5	7.35%		
3.) Population 65 or Above	12.91%	0.201 (Elder Needs)	
4.) Population 65 or Above & Below Poverty Rate	7.18%		
5.) Workers Using Public Transportation	0.12%	0.04 (Transportation Needs)	
6.) Occupied Housing Units w/o Vehicle	3.84%		
7.) Housing Unit Occupancy Rate	86.28%	2.69 (Temporary Shelter and Housing Recovery Needs)	
8.) Rental Occupancy Rate	37.21%		
9.) Non-White Population	27.78%		
10.) Population in Group Quarters	5.71%		
11.) Housing Units Built Prior to 1990	79.04%		
12.) Mobile Homes, RVs, Vans, etc.	13.89%		
13.) Poverty Rate	19.15%		
14.) Housing Units Lacking Telephones	2.05%	0.262 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	14.90%		
16.) Unemployment Rate	3.74%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	5.53%		

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 Van Zandt, Texas A&M, Hazard Planning materials; 2008-2013 American Community Survey, Tables B11003, B01001, B17001,

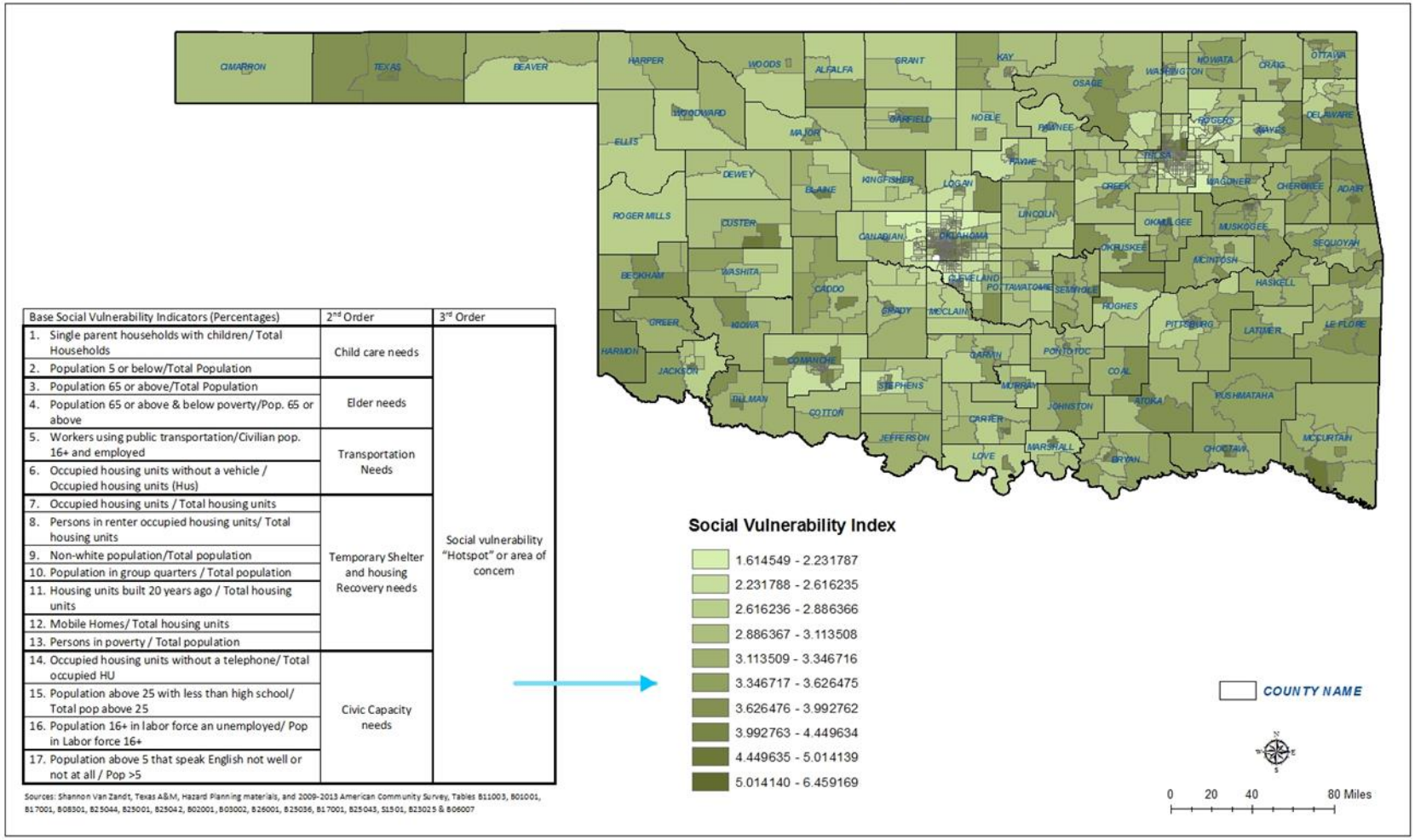
Legend

Social Vulnerabiity "Hot Spots"

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

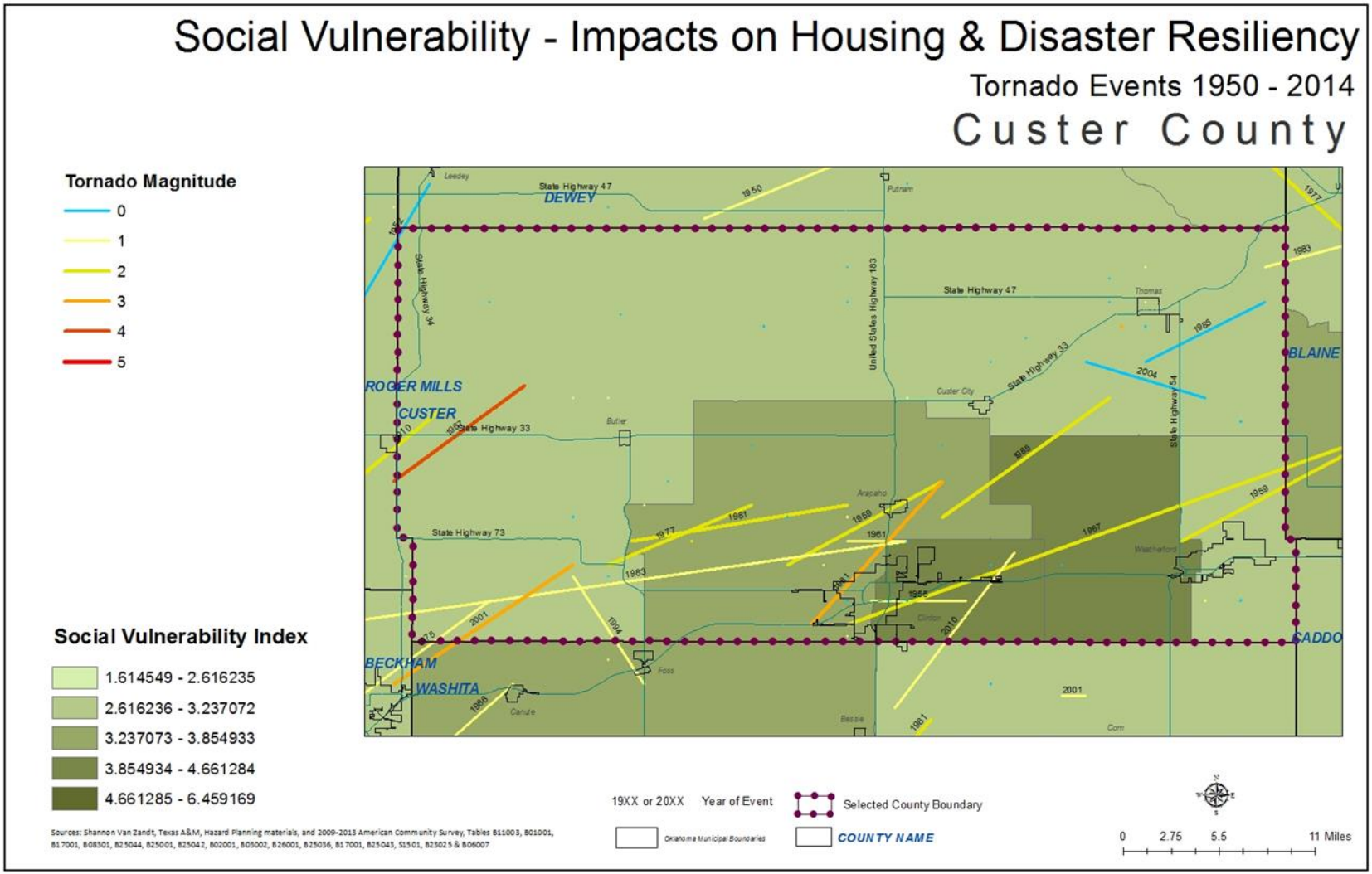
0 25 50 100 Miles

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
Custer County
Tornado Magnitude
0
1
2
3
4
5
DEWEY
ROGER MILLS
CUSTER
BECKHAM
WASHITA
BLAINE
CADDO
State Highway 47
State Highway 34
State Highway 33
State Highway 73
State Highway 54
United States Highway 183
Leedey
Putnam
Thomas
Custer City
Butler
Arapaho
Weatherford
Clinton
Foss
Canute
Bessie
Corn
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 2.75 5.5 11 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 Weatherford and Clinton areas 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.