Special Topics

Texas 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 approximately 12 cities/towns/urbanized areas within the county.

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. Guymon has been developing a comprehensive plan for the last year.

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.

- City of Guymon has an Emergency Operations Plan (2013)
- Texas County has a FEMA approved Hazard Mitigation Plan (2014)

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

From the Texas County HMP between 1950 – 2013 there were 548 severe weather events (p.59):

420 Hailstorms
252 High Wind Events
68 Tornadoes
10 Floods
439 Wildfires
8 Droughts
3 Lightning
12 Extreme Heat
0 Dam Failures
0 “Felt” Earthquakes

Hailstorms

The Texas County HMP indicates that hailstorms occur at least once every fifty years with losses in one storm in 1994 $5,000 Town of Goodwell, $50,000 Optima, and $500,000 in Hardesty. The expectation is for 5 events (hailstorms) per year (Oklahoma Climatological Survey; Texas County HMP 2014).

High Wind Events

"Damaging winds occur relatively frequently across Texas County, including all participating jurisdictions and schools, usually in association with severe thunderstorms" (Texas County HMP 2014). Historically, high winds have caused 13 injuries and $4.096M in damages from 1956-2013 (Texas County HMP 2014). Vulnerability was assessed related to fire and power failure from downed power poles.

Severe Winter Storms

While winter extreme temperatures are prevalent across the state, Texas County HMP 2014 noted that 1 death occurred in 1997 from a blizzard event and that the Town of Goodwell had one of the top ten snowstorms in the state:

Top Ten Oklahoma Snowstorms (1951-2001)

Rank	Date(s)	Max	Location
1.	21-22 February 1971	36	Buffalo
2.	24-25 Nov 1992	22	Laverne
3.	16 March 1970	20	Bartlesville
	16-17 January 2001	20	Kenton
5.	8-9 March 1994	19	Stillwater
	12-14 March 1999	19	Medford
7.	4-5 March 1989	18	Kansas
→	18-19 January 1990	18	Goodwell
	22-24 December 1997	18	Laverne
	18-19 March 1999	18	Kenton

Tornados

Historic data on tornados between 1961-2014 there are 71 tornados documented. There were 13 injuries that occurred connected to these tornados, with 12 of those injuries happening in the 1982 tornado. There were 0 fatalities connected to tornadoes during this time period. Property losses between 1961-1996 ranged from $222,603 - $2,226,150. (The accounting methods used for losses changed in 1996.) The losses estimated between 1996-2014 was $830,000. (NOAA Tornado Shapefile)

The following maps are showing the Social Vulnerability Index (see last section for details) overlayed with historic tornados. This provides a glimpse into how portions of the county that may currently be socially vulnerable (child care needs, transportation needs, elder needs, housing recovery needs, and civic capacity needs). Any disaster event, including tornados, could have dramatic impacts on these households. These maps are showing where a physical hazard, in this case tornados, may further impact socially vulnerable areas.

Texas County Hazard Mitigation Planning Update Committee in preparing the HMP estimated potential losses in the future and impacts on their community:

Estimated Losses – Major EF-5 Tornado Affecting 70% of Structures & Population of Texas County

Texas County – Potential Loss Scenario (Tornado or High Wind Event)							
Type of Structures	Total #	Hazard Area # (70%)	Hazard Area $	50% of Structures Destroyed	25% of Structures Received 50% Damage	25 % of Structures Received 25% Damage	Total Damages
Residential	8,208	5,745	$502,113,000	$251,056,500	$62,753,200	$31,376,600	$345,186,300
Commercial/Industrial	1,164	815	$90,230,280	$45,115,140	$11,292,624	$5,646,312	$62,054,076
Government	26	18	$7,800,560	$3,900,280	$975,070	$487,535	$5,362,885
Schools / Education	270	189	$109,139,559	$54,569,780	$13,642,444	$6,821,222	$75,033,446
Total # of Structures	9,668						
Structures Damaged	6,767						
All Property In County	$1,013,305,986						
Damages (Hazard Area)	$487,636,707						
Total County Population	20,640						
Population Hazard Area	14,448						

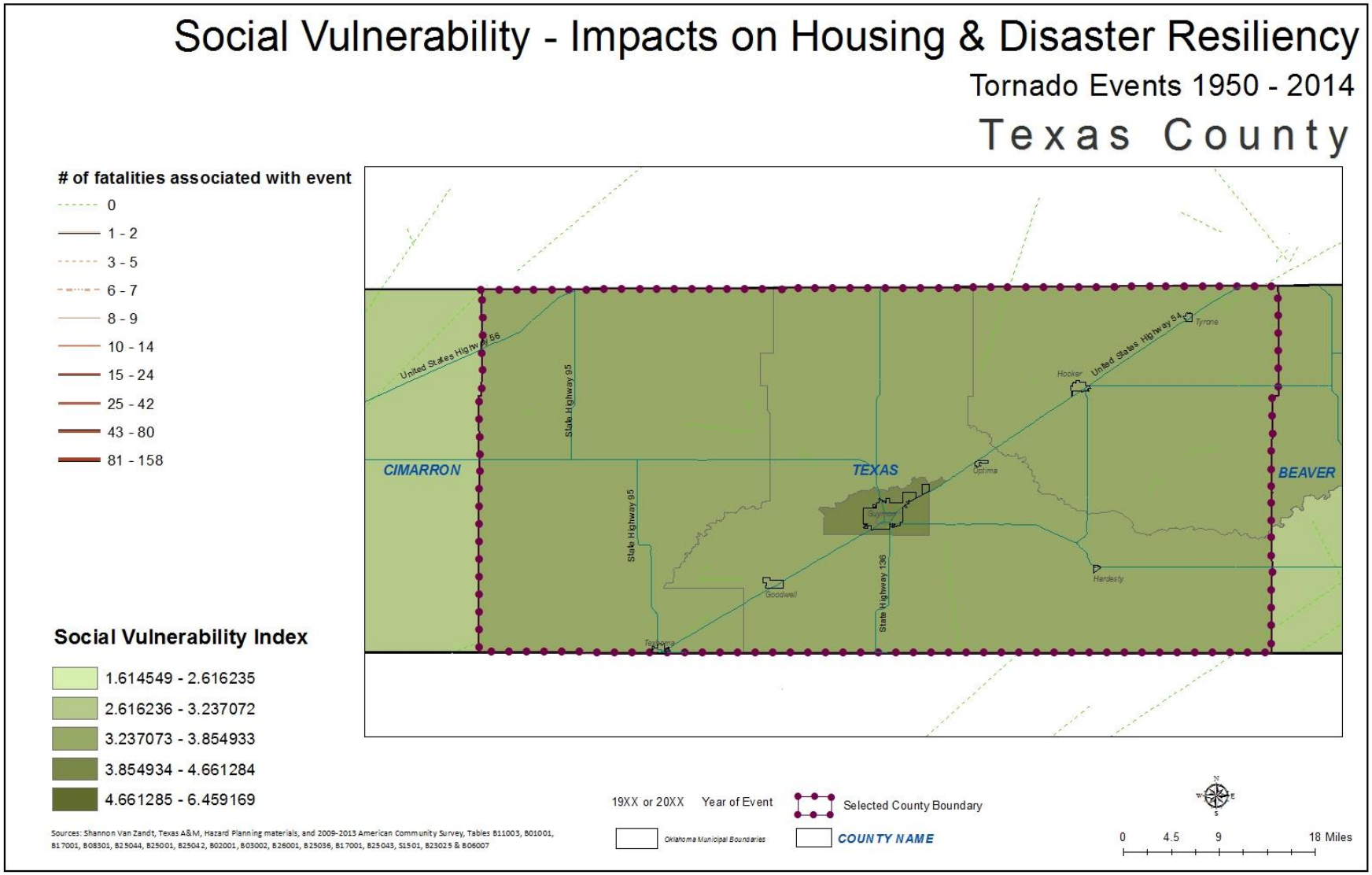
(All fractions added to nearest whole number)

These estimates and projections are intended for the community to understand the need to plan in advance and be prepared for recovery after an event.

Mitigation strategies outlined in the HMP that are directly connected to housing strategies include:

"Goal 3: To determine which areas are considered high-risk areas, or suffer repetitive losses associated with natural disasters, and reduce the total number of these areas.

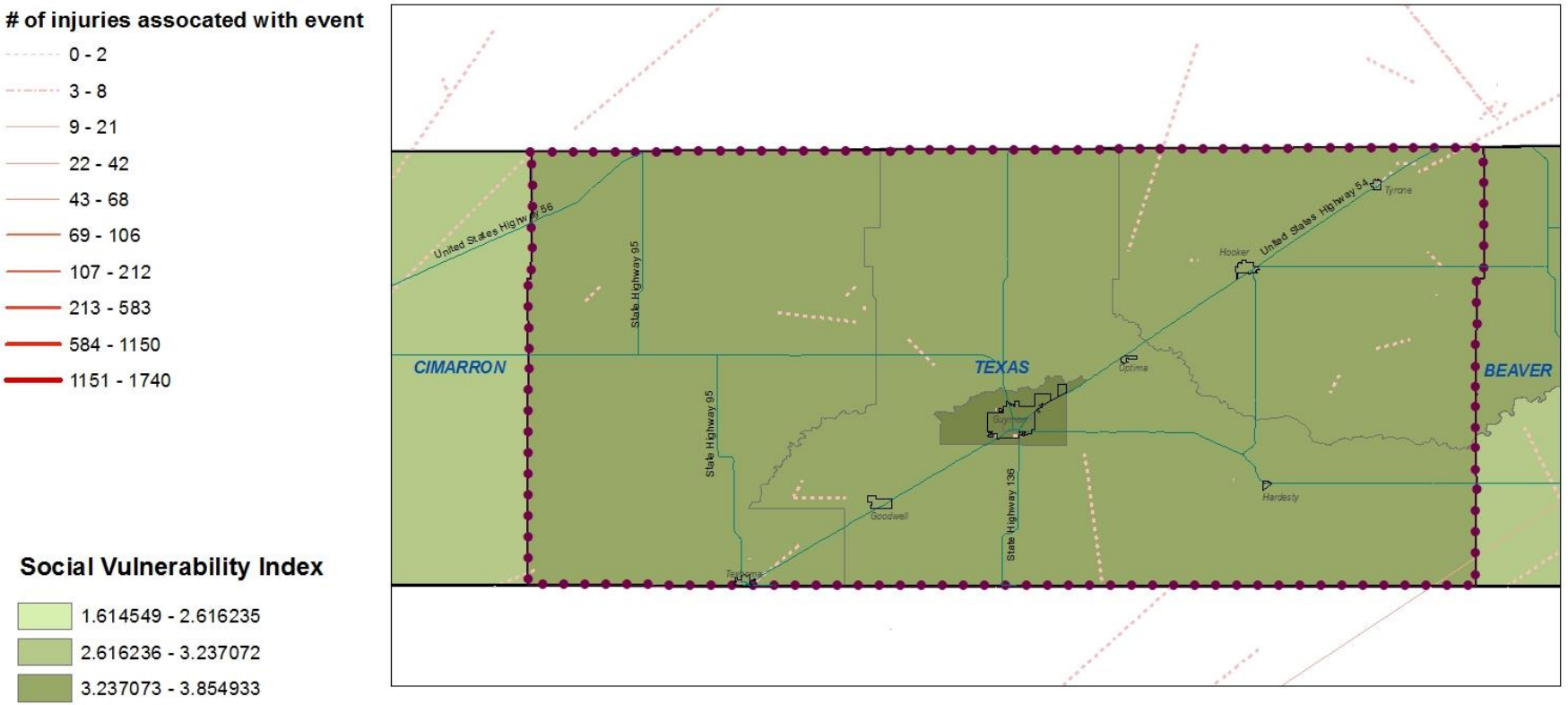
- Objective**:** To identify structures and locations that suffers repetitive losses from disasters. This objective could include the purchase, relocation, retrofitting or removal of structures located in areas of unusually high fire danger. This also addresses county roads that frequently wash out when it rains." (Texas County HMP, p196)


Social Vulnerability - Impacts on Housing & Disaster Resiliency
Tornado Events 1950 - 2014
Texas 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
CIMARRON
TEXAS
BEAVER
United States Highway 56
State Highway 95
United States Highway 54
Tyrone
Hooker
Optima
Guymon
Goodwell
Hardesty
Texhoma
State Highway 136
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 4.5 9 18 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

Texas 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

19XX or 20XX Year of Event

Selected County Boundary

Oklahoma Municipal Boundaries

COUNTY NAME

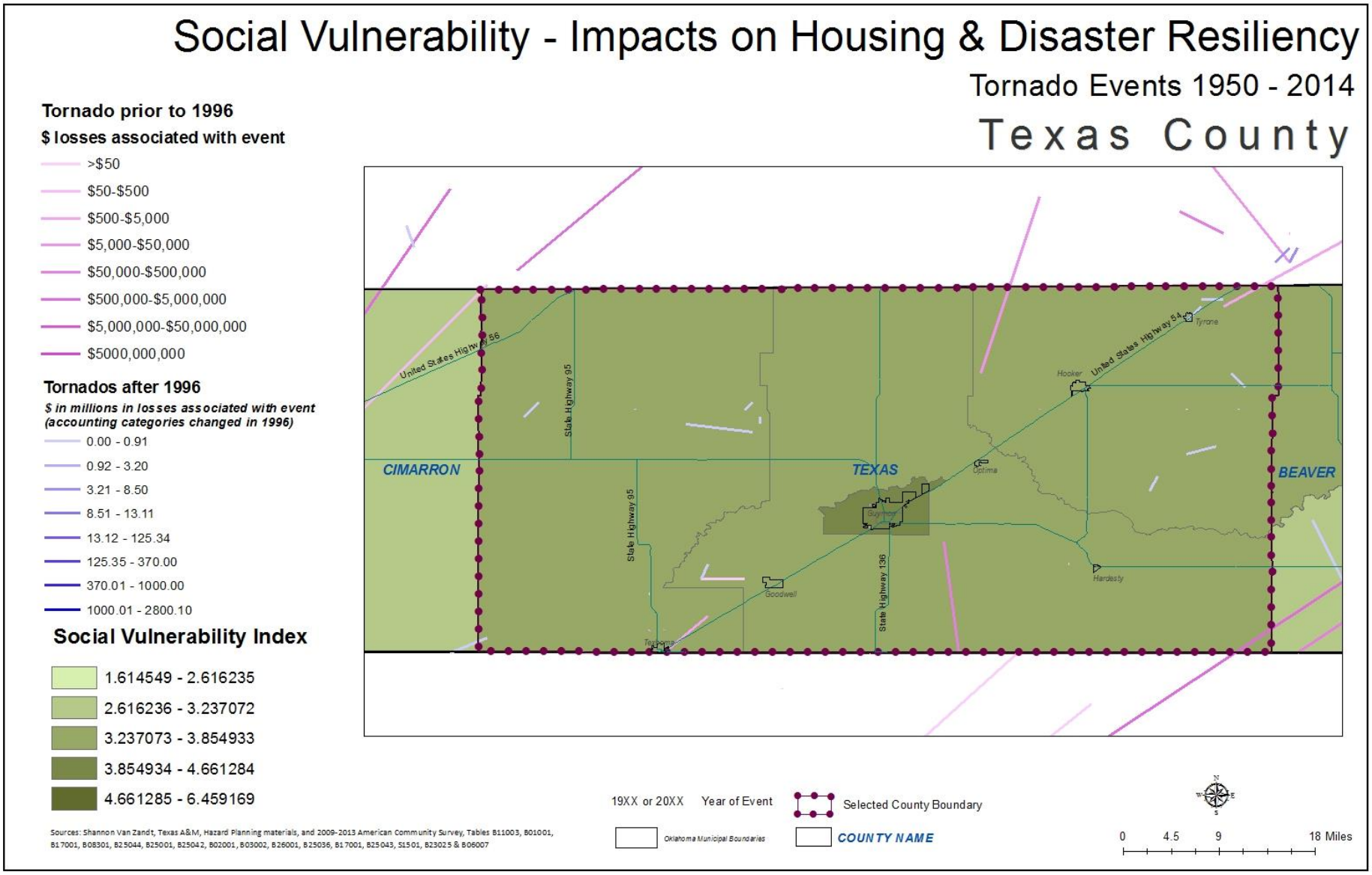
0 4.5 9 18 Miles

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

Texas County



Flooding

The primary water feature, North Fork Frisco Creek, may cause flooding in parts of the county flood. 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.

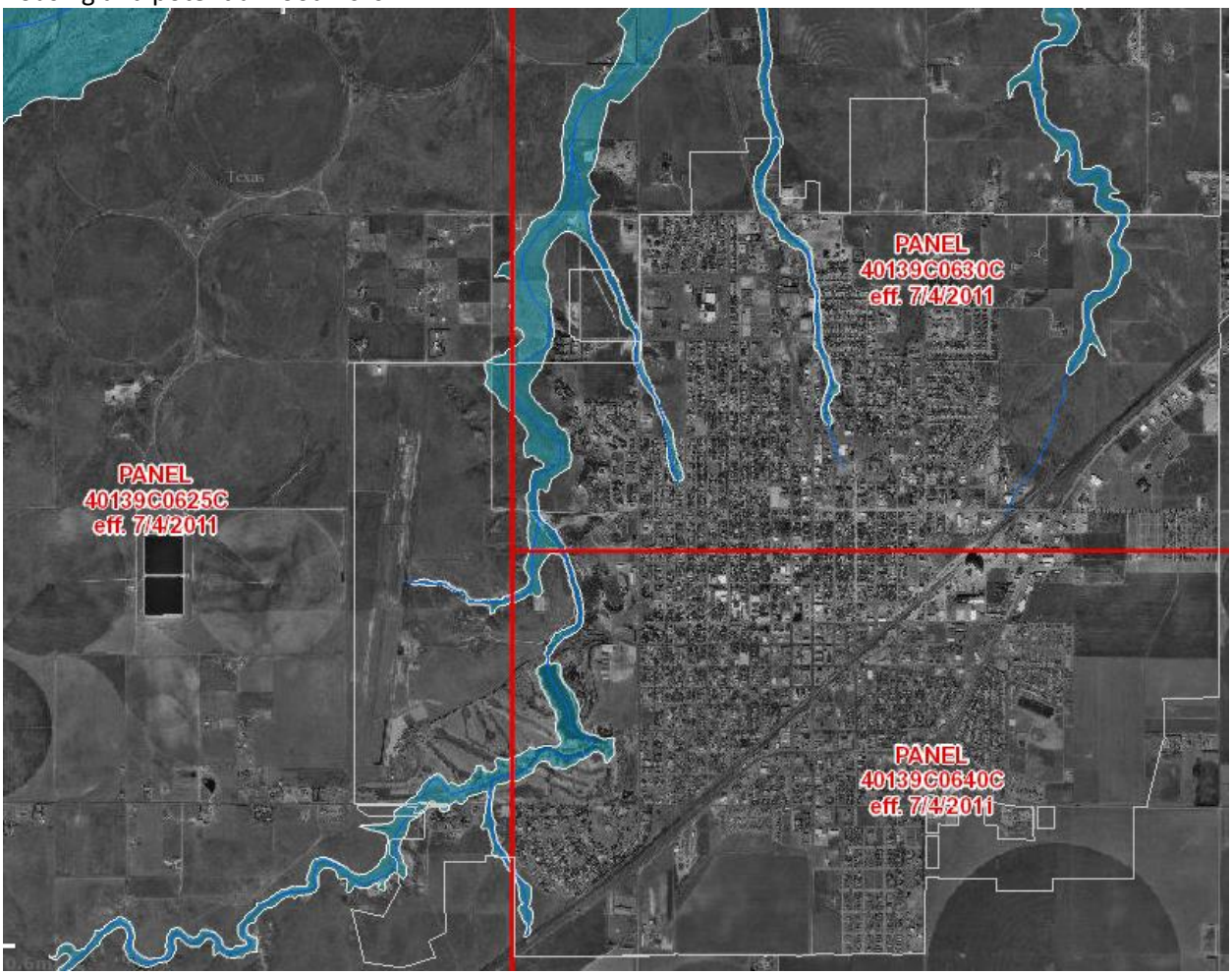
Texoma – fully developed outside of floodplain

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

Goodwell - does have a portion of their community within the floodzone, therefore housing (and ideally businesses) should not be developed there.

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

Guymon – has development nearing the North Frisco Creek. At present, there is some housing that abuts several of the unnamed tributaries, but the main flood area appears to have a buffer between housing and potential flood risks.



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

Flood Hazard Zones

1% Annual Chance Flood Hazard

Optima, Hardesty, Hooker and Tyrone all are a safe distance from creek/stream flooding events.

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

The Texas County HMP made several recommendations for their residents related to preparedness. The HMP indicates there are "several storm shelters" (approximately 24) in the incorporated areas of the county and promotes individual homes and businesses to receive tax credits and install shelters.

"Texas County Emergency Manager Harold Tyson has released an updated list of Texas County's storm shelters:" http://www.guymondailyherald.com/content/texas-county-storm-shelter-list#sthash.S3zNHEmZ.dpuf

GOODWELL
Methodist Church Basement 203 N. Main
Baptist Church Basement 203 N. College Ave.
Goodwell High School Eagle Blvd.
OPSU campus — Sewell-Loofb; Noble Center

GUYMON
Academy Elementary; 604 N. Academy
Carrier School; 103 N. Perkins
Elk's Lodge; SW 5th and Sunset
Hope Community Church of God; 401 S Pracht
Homer Long School; 1518 N. Beaver
Living Word Fellowship; 802 N. Roosevelt
Methodist Church; 523 N. Roosevelt
St. Peters Catholic Church; 1220 N. Quinn
Sunset Lane Baptist Church; 1515 N. Sunset Lane

HARDESTY
Apostolic Faith Church; 221 SW Crawford
Hardesty High School (Auditorium Basement); 321 SW 5thHOOKER
St Johns Lutheran Church; 301 N. Jackson
First Christian Church; 322 N. Broadway
United Methodist Church; 202 E. Imo
Oliver Warner Library; 109 S. Broadway
Grade School; 502 N. Jefferson
First Baptist Church; 601 N. Jefferson

TEXHOMA
Texhoma High School Dome Building; 5th and Elm Street
Texhoma Public Library; 212 W. Main

TYRONE
Baptist Church; Florence Street Tyrone School

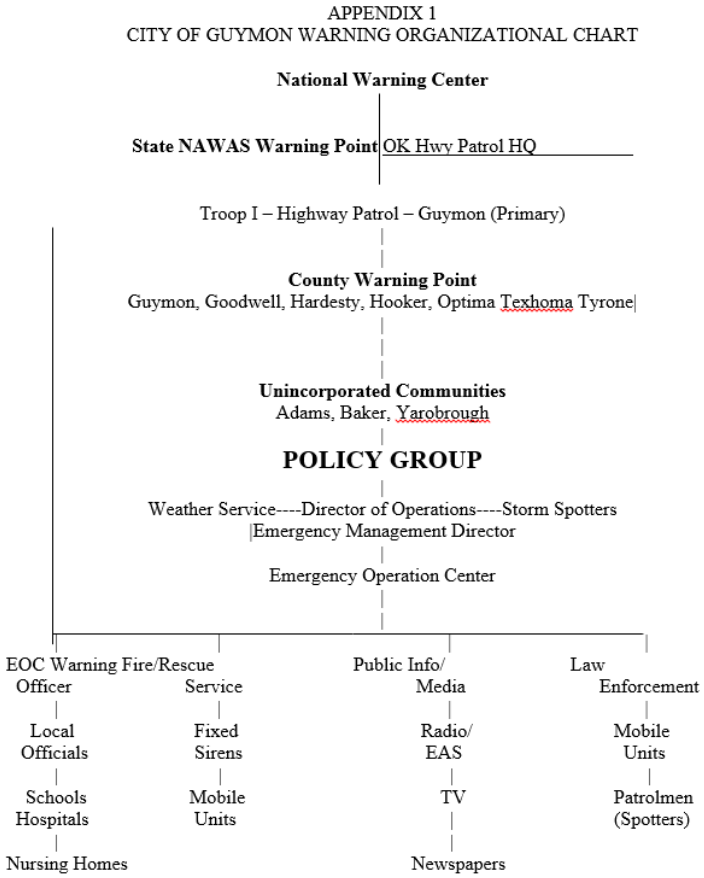
See more at: http://www.guymondailyherald.com/content/texas-county-storm-shelter-list#sthash.S3zNHEmZ.dpuf

C.2.1.3 Public Policy and Governance to Build Disaster Resiliency

The HMP is encouraging the county to work towards addressing hailstorms, high wind and severe winter storms through improving building codes such as hail resistant shingles, buildings resistant to straightline wind, and to bury key utility lines and tree trimming. (p. 198).

C.2.1.4 Local Emergency Response Agency Structure

The City of Guymon has a clear delineation of responsibility in the Emergency Operations Plan dated Oct. 10, 2013. Succession of leadership is included in the EOP. Additionally under Direction and Control there are two groups – Policy group and Emergency Services Coordination Group. Logistics and responsibilities are clearly stated. A flow chart for the communications of warnings was also included:



C.2.1.5 Threat & Hazard Warning Systems

There are nine radio-activated sirens (activated by Fire Chief) in Guymon (City of Guymon EOP, 2013). The HMP indicates: "Tornado sirens are located in all the participating communities in Texas County, except Optima. The Town of Tyrone, while having one siren, does not have adequate coverage of their town."(p. 199). The HMP recommends the use of NOAA weather radios where sirens are insufficient.

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.

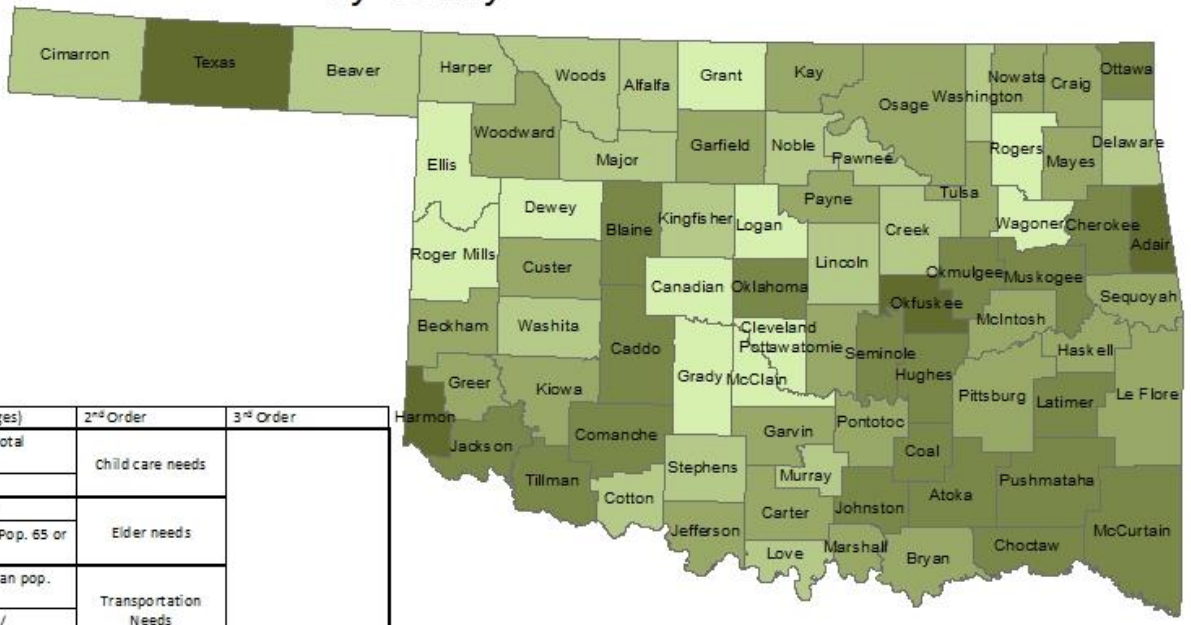
Social Vulnerability Analysis - Texas County

Base Social Vulnerability Indicators (%)		2nd Order	3rd Order
1.) Single Parent Households	14.19%	0.228 (Child Care Needs)	**3.95 Social Vulnerability 'Hotspot' or Area of Concern**
2.) Population Under 5	8.57%		
3.) Population 65 or Above	10.21%	0.175 (Elder Needs)	
4.) Population 65 or Above & Below Poverty Rate	7.25%		
5.) Workers Using Public Transportation	0.24%	0.027 (Transportation Needs)	
6.) Occupied Housing Units w/o Vehicle	2.44%		
7.) Housing Unit Occupancy Rate	87.70%	2.922 (Temporary Shelter and Housing Recovery Needs)	
8.) Rental Occupancy Rate	35.42%		
9.) Non-White Population	49.58%		
10.) Population in Group Quarters	2.53%		
11.) Housing Units Built Prior to 1990	82.51%		
12.) Mobile Homes, RVs, Vans, etc.	21.68%		
13.) Poverty Rate	12.82%		
14.) Housing Units Lacking Telephones	2.55%	0.598 (Civic Capacity Needs)	
15.) Age 25+ With Less Than High School Diploma	29.00%		
16.) Unemployment Rate	6.56%		
17.) Age 5+ Which Cannot Speak English Well or Not At All	21.71%		

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		
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14. Occupied housing units without a telephone/ Total occupied HU	Civic Capacity needs	
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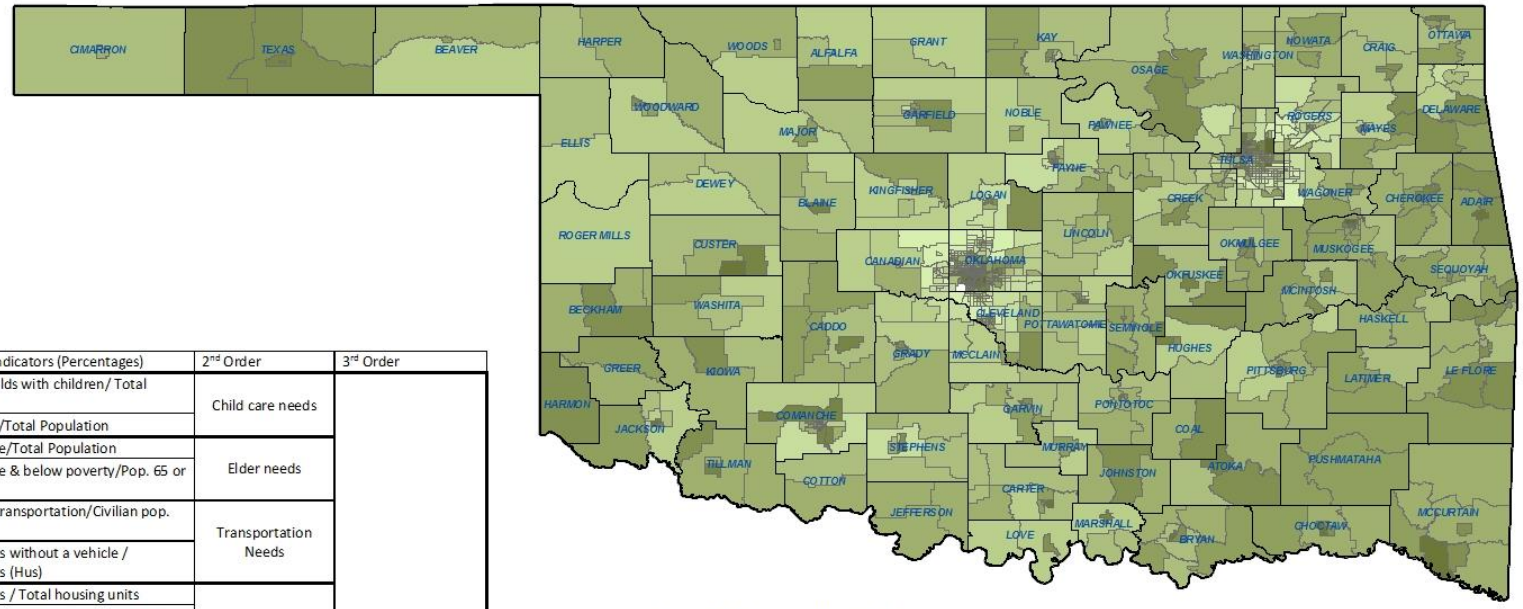
16. Population 16+ in labor force an unemployed/ Pop in Labor force 16+		
17. Population above 5 that speak English not well or not at all / Pop >5		

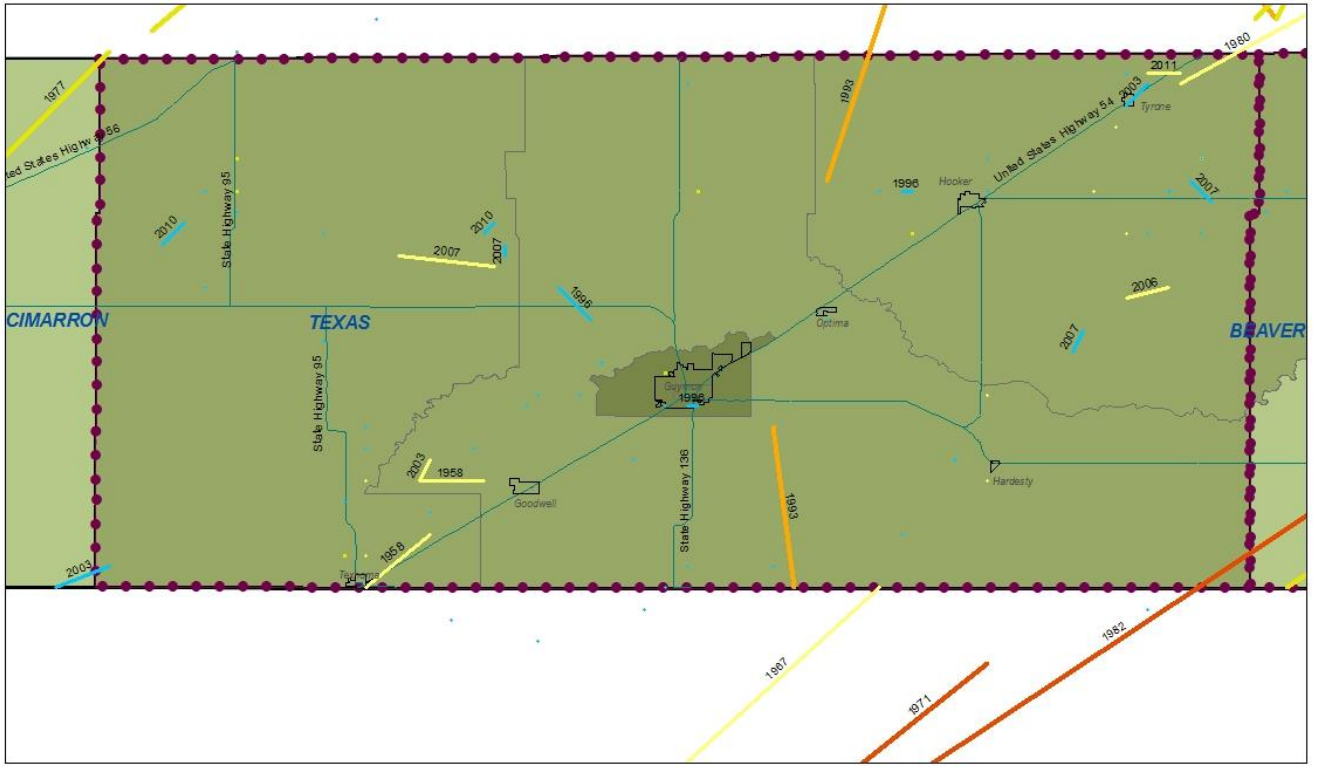
Sources: Shannon Van Zandt, Texas A&M, Hazard Planning materials, and 2009-2013 American Community Survey, Tables B11003, B01001, B17001, B08301, B25044, B25001, B25042, B02001, B03002, B26001, B25036, B17001, B25043, S1501, B23025 & B06007



Social Vulnerability - Impacts on Housing & Disaster Resiliency

Tornado Events 1950 - 2014

Texas County



Tornado Magnitude

- 0
- 1
- 2
- 3
- 4
- 5

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 4 8 16 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 falls above average with more hotspots per this index for social vulnerability per county when comparing as a county to other counties in the state. The area more vulnerable by census tract is primarily in the Guymon area. The population of the county is in mainly in the Guymon area and combined with the factors of the index make the city area the more vulnerable portion of the county.

Recommendations for this county:

- Housing should continue to avoid potential flood prone areas, and existing housing impacted by repeated floods should ideally be moved/removed.
- 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.
- Increase outdoor sirens consistent with developed Texas County HMP to insure coverage for the county.