The 2012 Texas Rural Survey: Natural Disaster Issues

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The Rural Reality

Rural areas are home to many of the industrial, agricultural, cultural, and natural resources that make Texas a great state. Rural areas are also home to one of our greatest resources – *people*.

Data from the United States Census Bureau suggest that nearly 3.8 million people live in rural areas throughout the Lone Star State.[1] In other words, the population of rural Texas is greater than or roughly equal to the resident populations of 24 other individual states.

In Texas, rural people and communities face certain challenges that differ from their urban and suburban counterparts. It is important to keep in mind, however, that Texas is not alone is this respect. Research indicates that the social and economic fabric of rural areas throughout the United States has been progressively weakened by a number of regional, national, and global changes over the past few decades. Transformations in economic, demographic, social, and spatial organization have had profound effects on rural areas all across this country.[2]

As in most other states, rural areas in Texas have been, and continue to be, impacted by these structural-level occurrences. An examination of county-level data shows that between 2000 and 2010, 39% of the nonmetropolitan counties in Texas experienced a reduction in their resident populations. Further, nonmetropolitan counties within Texas maintain, on average, lower per capita incomes, higher poverty rates, greater levels of aged dependency ratios with fewer workers to support those over age 65, and lower labor force participation rates than do urban areas.

U.S. Census Bureau data affirm that Texas residents living in nonmetropolitan counties are *older*, *less educated*, and *poorer* than their metropolitan counterparts. In addition, the quantity and quality of many amenities and public services are frequently inadequate to meet the needs of rural Texans. In rural Texas, pressing needs exist for job creation, increased incomes, economic growth, modernization, improved service delivery, and business recruitment, retention and expansion activities.

The Texas Rural Survey

Between July 2012 and October 2012, a random sample of 4,111 individuals living in 22 rural places in Texas were contacted and asked to participate in the Texas Rural Survey. This report explains the methodology and summarizes the findings of that study.

Methodology

Study Site Selection

The first step of this research required the selection of case study sites. According to the Texas State Data Center, there were a total of 1,752 places in the state of Texas in 2010. This total includes both incorporated places (concentrations of populations having legally defined boundaries) and census designated places (concentrations of population that are locally identifiable by name but not legally incorporated).

Of those 1,752 places, 1,511 (86%) had a population of 10,000 or fewer in 2010. Upon examination of the 1,511 places with populations under 10,000, we noticed what

[1] U.S. Census Bureau, 2010 Census.

[2] Brown, David L. and Kai A. Schafft. 2011. *Rural People and Communities in the 21st Century: Resilience and Transformation*. Cambridge, UK: Polity Press.

appeared to be "natural breaks" in the sizes of population. About one-third of the 1,511 places had populations of 499 or fewer. Another one-third had populations between 500 and 1,999 residents. The remaining one-third had populations between 2,000 and 10,000. As of the 2010 Census, these 1,511 places represented roughly 11% of the total population of Texas, or approximately 2.7 million people. To use the previous analogy, the number of Texans living in these 1,511 places was greater than or roughly equal to the resident populations of about 16 other states.

In accordance with the research design of the project, one place within each of the three population categories (499 or fewer, 500-1,999, and 2,000-10,000) was selected as a study site within each of the seven Texas Department of Agriculture's Rural Economic Development Regions (see Appendix A). Due to the large percentage of places with populations of 499 or fewer in the West Region, an additional place in the population category was selected as a study site. Hence, the total number of places included as study sites was 22. The 22 randomly selected places chosen to serve as study sites are shown in Appendix A.

Data Collection

A standard self-administered mail survey following the methodological procedures espoused by the tailored design method (TDM), which incorporates repeated mailings to sampled individuals, was used to gather the data.[3] The TDM uses a multiple-contact approach to increase response rates from the sample population.

In July of 2012, an informational letter was first mailed to a stratified random sample of 4,124 households across the 22 study sites. The informational letter, which was printed in English on one side and Spanish on the other side, informed residents that their household was randomly selected for participation in an upcoming study on rural Texas. Included with the letter was a pre-paid addressed postcard. Residents were instructed to return the postcard if they preferred to receive a copy of the questionnaire printed in Spanish. Instructions on the postcard were printed in both English and Spanish. Thirteen households requested that the survey questionnaire not be sent. Those 13 addresses were not replaced. Hence, the final sample size was 4,111.

In August of 2012, the survey questionnaire was mailed to the sampled households. To obtain a representative sample of individuals within households, a response from the adult who most recently celebrated his/her birthday was requested in the cover letter. The survey questionnaire, organized as a self-completion booklet, contained 46 questions and required approximately 50 minutes to complete. After the initial survey mailing and two follow-up mailings during September and October of 2012, a total of 712 completed questionnaires were returned.

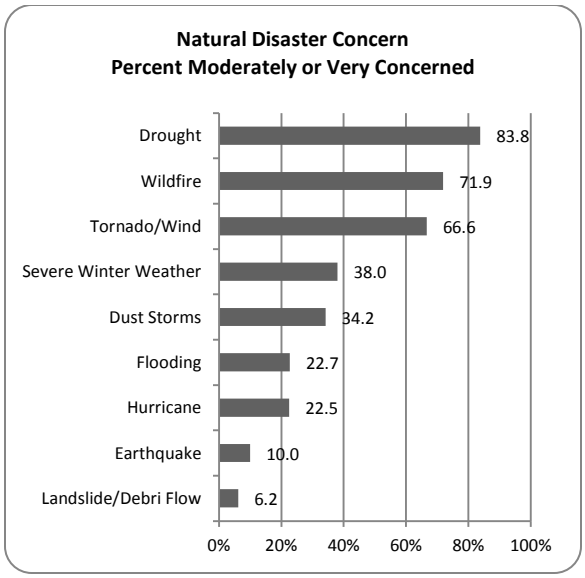
Natural Disaster Issues

The survey instrument included two measures regarding natural disaster issues: 1) concern for natural disaster affecting the local community and 2) impression of the community's ability to recover following a disaster.

Concern for Natural Disasters

Respondents were asked to indicate their level of concern for nine natural disasters (drought, dust storm, earthquake, flood, hurricane, landslide/debris flow, wildfire, tornado/wind storm, severe winter storm) affecting their community. Response categories included: "not concerned at all," "slightly concerned," "moderately concerned," and "very concerned."

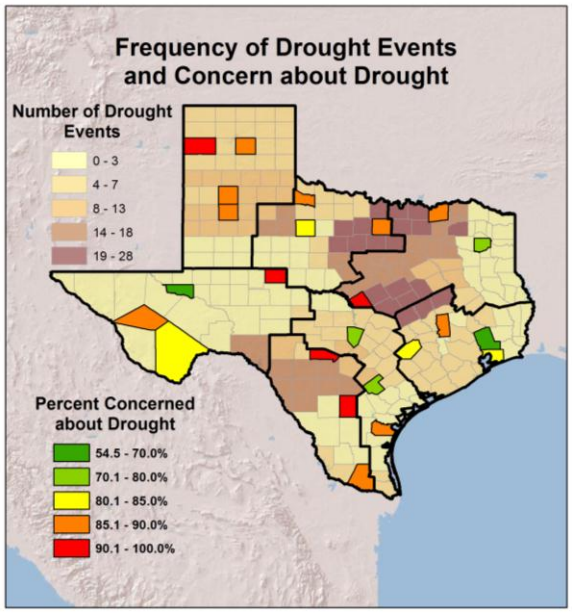
[3] Dillman, Don A., Jolene D. Smyth, and Leah Melani Christian. 2009. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method.* Hoboken, NJ: John Wiley & Sons, Inc.

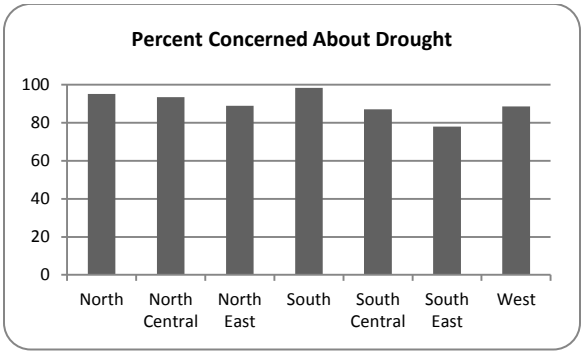


Most concern was expressed for drought, wildfire, and tornado/wind respectively. The high concern for drought is likely related to the extraordinary climatic conditions of 2011 and 2012.

Historically, hazard events have impacted certain parts of the state more than others. The historical occurrence of hazard events is indicative of future risk and is likely correlated with differing levels of concern between regions of the state. Using the Spatial Hazard Events and Losses Database for the United States (SHELDUS), natural hazard events occurring between 1960 and 2010 in Texas were mapped.[4] SHELDUS is the most comprehensive inventory of natural hazard impacts available at the county level. For each respective natural disaster, the following figures illustrate 1) the historical occurrence, 2) levels of concern by place, and 3) levels of concern by region.[5]

Drought



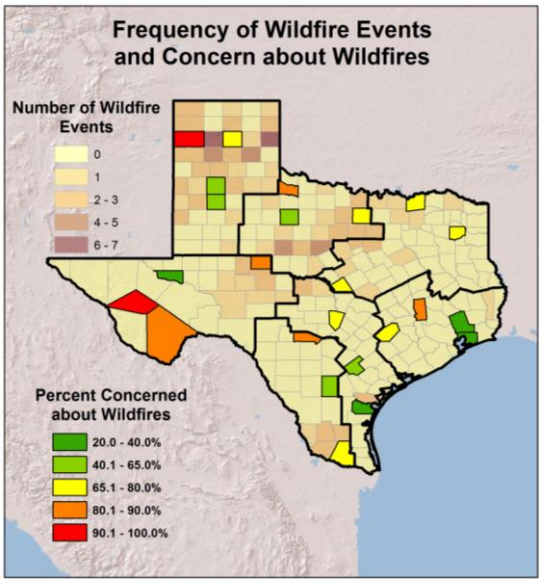


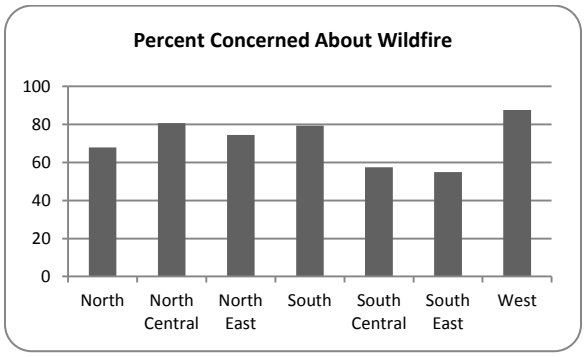
- More rural Texans were concerned about drought (84%) than any other natural hazard.
- Drought concern was more evenly distributed across regions than concern for other hazards.
- Concern is high both in areas historically affected by drought and in areas that are not.

[4] Hazards & Vulnerability Research Institute. 2012." The Spatial Hazard Events and Losses Database for the United States," Version 10.0 [Online Database]. Columbia, SC: University of South Carolina. Available at http://www.sheldus.org.

[5] In each of the maps, entire counties are highlighted. However, it is important to note that concern was only measured within the selected place, not across the entire county.

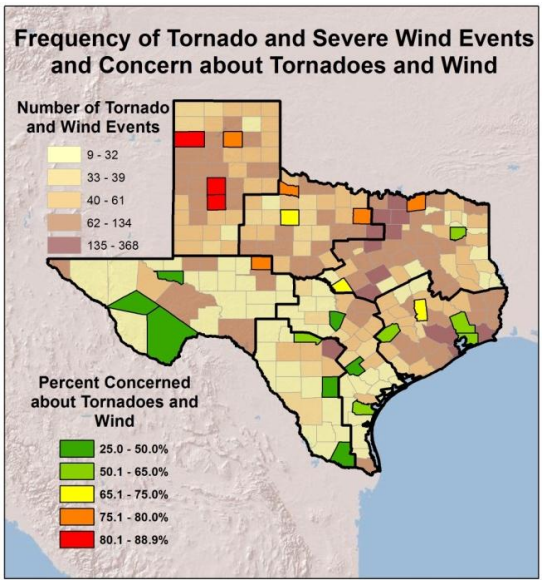
Wildfire

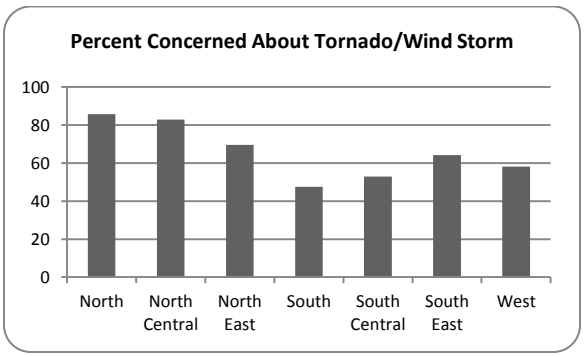




- Rural Texas residents reported a high level of concern for wildfires.
  - This is likely related to the extraordinary climatic conditions of 2011 and 2012.
- Note that historic data illustrated on the map are inclusive of events in 2010 but do not include events from 2011 and 2012, years in which numerous wildfires occurred across the state.

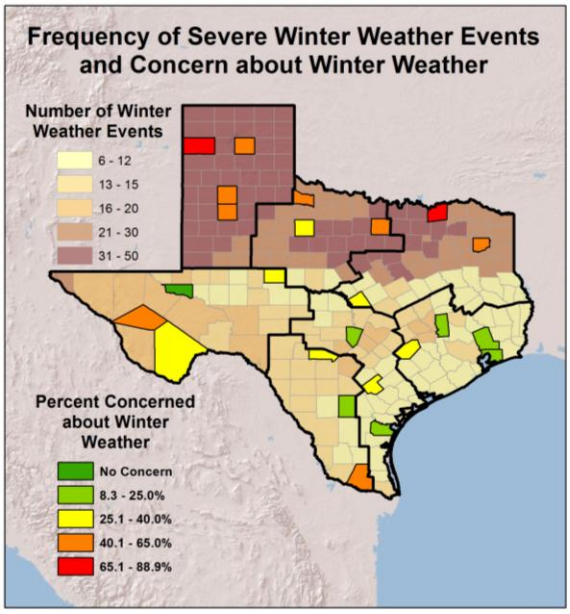
Tornado/Wind Storm

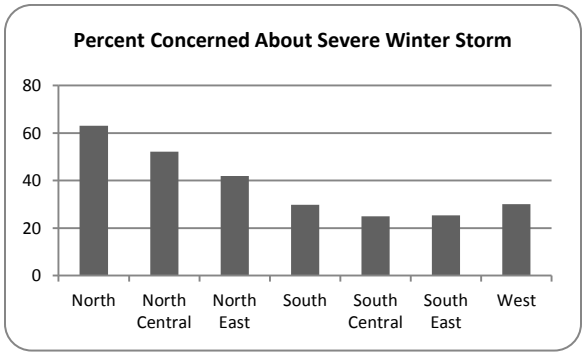




- There are relatively high levels of concern about tornadoes and severe wind among rural Texans.
- Historic events show high numbers of tornadoes and severe wind events in many areas of Texas, although the concern is highest among residents in the northern part of the state.

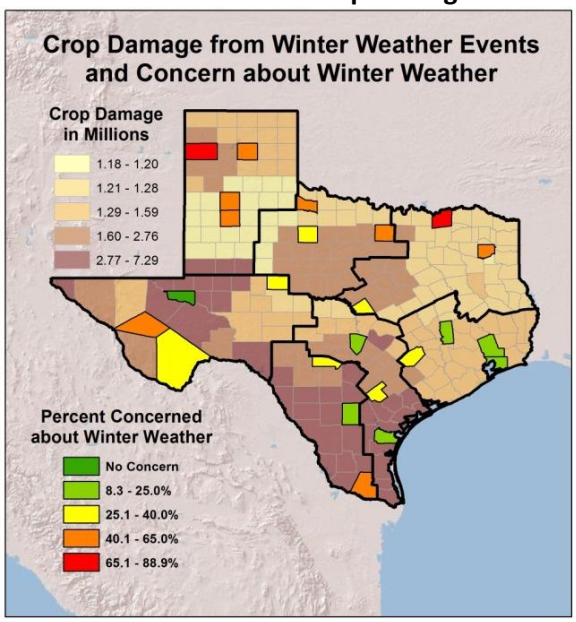
Winter Weather





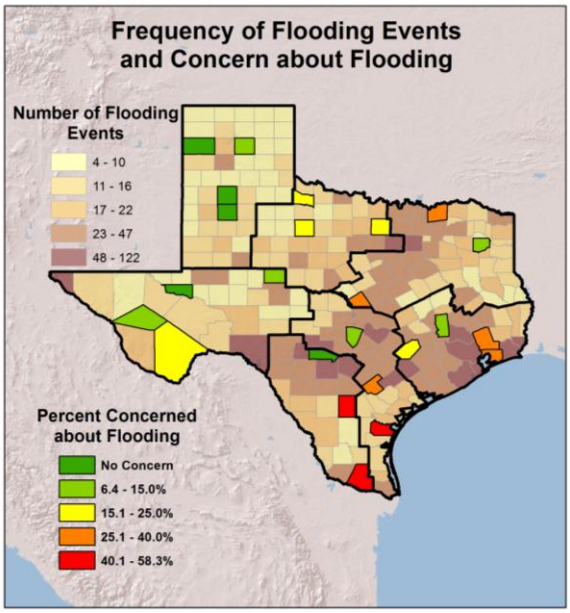
- Patterns of concern for winter weather events reflect historical occurrences of winter weather.
- Both historical occurrence and resident concern for winter weather are highest in northern regions.

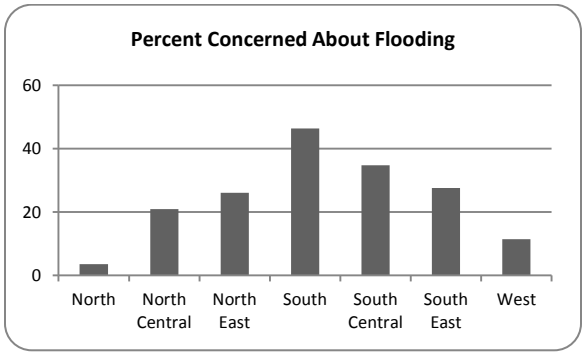
Winter Weather Crop Damage



- However, winter weather crop damage tells a different story. The south and west regions have been impacted most severely in terms of crop damage from winter weather events.
  - Crops grown in the south and west regions are particularly susceptible to low temperatures so when severe winter weather does occur in these areas it has a greater negative impact on crops.

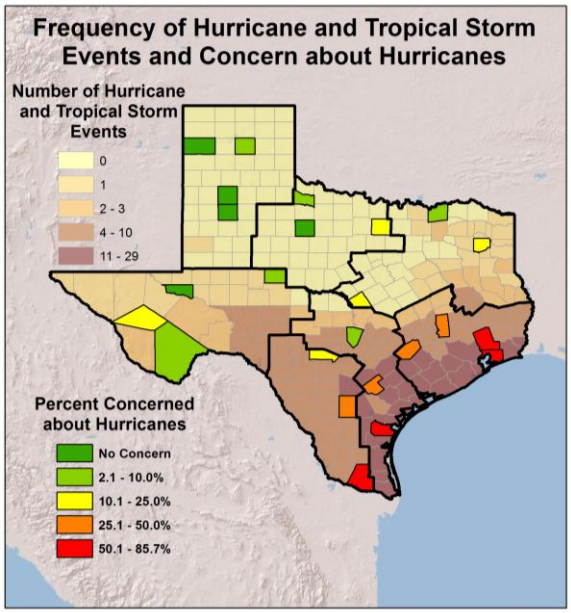
Flooding

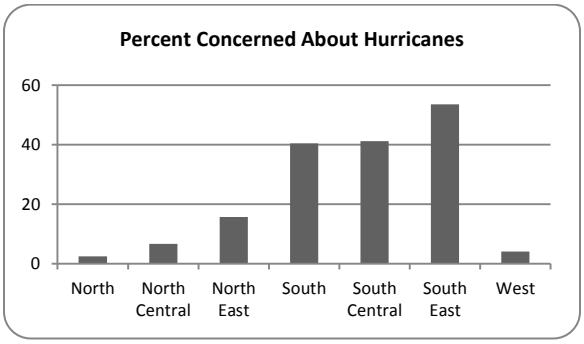




- Although the southern portions of the state report higher incidences of flooding, rural Texans report relatively low levels of concern in these regions.
  - This low concern may reflect concern regarding the recent exceptional drought conditions and therefore may represent a temporary shift in concern.

Hurricanes

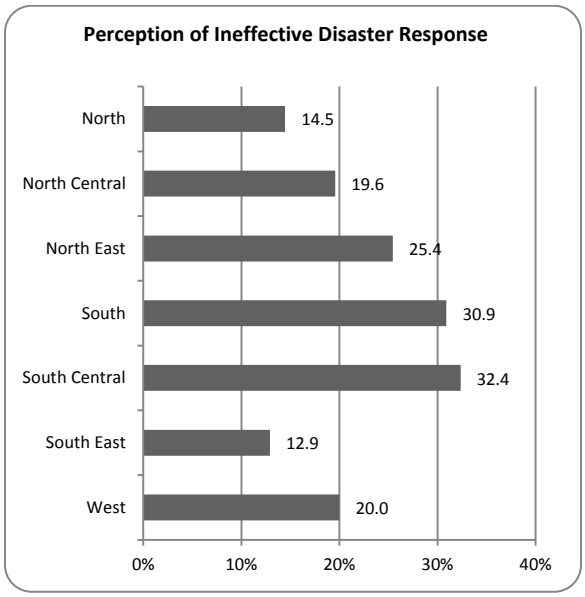




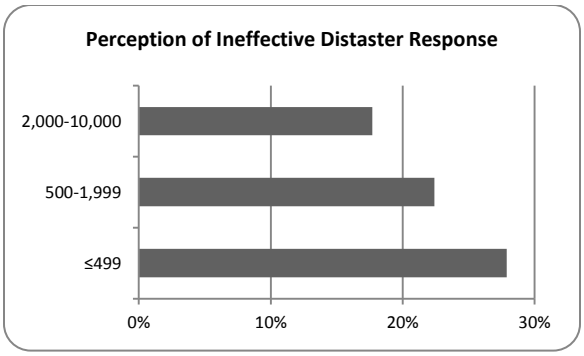
- Concern about hurricanes reflects historical vulnerability to hurricane events, with coastal regions reporting the highest levels of concern.

Perceptions of Community Preparedness for Natural Disasters

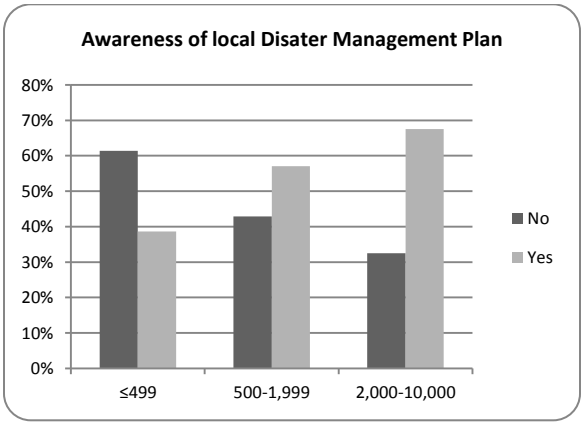
Respondents were asked to indicate agreement with five statements related to their community's ability to recover following a natural disaster. Response categories included: "strongly agree," "agree," "disagree," and "strongly disagree."



- Various regional differences were identified.
  - South central, south, and northeast regions of Texas had relatively higher proportions of residents who were uncertain that their community could respond to community needs in a disaster.
  - This is important since these regions are vulnerable to a variety of natural hazards.



- Differences between population size categories were identified.
  - Residents in the smallest, most rural places were more likely to feel uncertain about their community's ability to respond effectively to a disaster.



- 36% of places sampled revealed a majority of residents who said that their local community did not have a disaster management plan.
- When viewed by size of place, over 60% of residents in the smallest population category are unaware of a local disaster management plan.
- Calls to county emergency managers within the selected places confirmed that these counties do have disaster management plans in place.

Conclusions

Residents in rural Texas express concern about a wide range of natural hazards. Across the state, residents indicated the highest level of concern for drought, wildfires, and tornado/high winds. Data from the Spatial Hazard Events and Losses Database for the United States were used to map the history of natural hazard events in Texas. Comparing hazard history to the measured levels of concern, findings indicate that past experience with natural hazards, in general, corresponds to heightened levels of concern about the hazard type. For example, concern about hurricanes was highest along the Gulf Coast and concern about tornadoes/high winds was highest in the north and north central regions of the state.

In the case of drought, flooding, and severe winter weather, the Texas Rural Survey data reveal some unexpected findings. First, concern for drought is widespread in rural Texas. Even in areas that lacked historical experiences with drought, residents still indicated high levels of concern for this hazard type. Second, residents living in areas with a history of floods indicated relatively low concern about future flooding. Third, concern about severe winter weather was highest in the northern regions of the state, where winter weather has historically occurred. However, historical crop damage resulting from severe winter weather is highest in the south and west. Residents in these regions expressed relatively low levels of concern about severe winter weather.

In terms of perceptions of community preparedness for natural disasters, residents of the smallest rural areas seem to be the most uncertain about their community's ability to respond to a natural disaster. Notably, many rural residents indicated that their area did not have an emergency management plan. Subsequent verification with county officials confirmed that all counties where these respondents reside do have emergency management plans. The revelation that the most rural residents are not aware of these plans indicates a pressing need to inform rural residents about their community's disaster preparedness and include them in emergency preparedness initiatives.

Appendix A