The 2013 Texas Rural Survey
Environmental Hazard Issues

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Rural Texas

Of the 25.1 million people living in Texas, 3.8 million (15.3%) live in rural areas.[1] According to the Census Bureau, the land area of Texas is approximately 261,232 square miles, which approaches the area covered by New Mexico, Oklahoma, Arkansas, and Louisiana combined. With such a large geographic expanse, much of the population is concentrated in dense urban areas, whereas the 15.3 percent of the population residing in rural areas is spread across 96.7 percent of the state.[2] Located throughout these rural spaces are a majority of the industrial, agricultural, cultural, and natural resources that drive the state's development and ultimately link urban and rural people and places.

As rural places face the significant social and economic challenges that accompany population decline, it is imperative that researchers work to understand, strengthen, and maintain rural areas. In 2012, the Center for Rural Studies at Sam Houston State University conducted the first Texas Rural Survey. Between August and October 2012, Texas residents from 22 rural places[3] were randomly selected to complete a questionnaire. The findings from the study were used to develop a series of summary reports regarding public services and community amenities, public perceptions of urban and rural living, economic development strategies and efforts, medical and healthcare services, and natural disaster issues.

The results from the 2012 survey prompted an interest in a subsequent study. In 2013, the Texas Rural Survey was revised and sent to residents of 22 additional rural Texas places. This report explains the methodology and summarizes the findings from one topical section of the study.

The 2013 Texas Rural Survey

Between June and August 2013, a random sample of 5,608 individuals living in 22 Texas rural places were contacted and asked to participate in the 2013 Texas Rural Survey. This report explains the methodology and summarizes the findings from one topical section of the study.

Methodology

Study Site Selection

In 2010, according to the Texas State Data Center, there were 1,752 places in Texas with 1,511 (86%) of those places having a population of 10,000 or less. Following the methodology used in the 2012 Texas Rural Survey, one place within each of 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 Rural Economic Development Regions as classified by the Texas Department of Agriculture. In addition, because there are a large number of places in the 499 or fewer population category in the West Region, an additional study site was added to the sample. In total, 22 places were randomly selected as study sites (see Appendix). Study sites included both incorporated places (concentrations of

[1, 2] U.S. Census Bureau. 2010a. "2010 Census Urban Lists Record Layouts." http://www.census.gov/geo/reference/ua/ualists_layout.html

[3] For our purposes, the term "places" refers to incorporated places and census designated places.

population having legally defined boundaries) and census designated places (concentrations of population that are locally identifiable by name but not legally incorporated).[4]

Data Collection

Following the multiple contact approach of the tailored design method,[5] standard self-administered mail surveys were distributed to households in the study site locations. In early June 2013, an informational letter was mailed to a stratified random sample of 5,608 households across the 22 study sites. The informational letter, printed in English on one side and Spanish on the other, notified residents that their household had been randomly selected to participate in an upcoming study focused on rural Texas. The letter contained instructions for completing the questionnaire in one of two ways: (1) online at the provided URL, or (2) by returning the mailed questionnaire they would soon receive. Of the selected households, no rejections to participation in the study nor mistaken addresses were identified. Therefore, the final sample size remained at 5,608.

Later in June 2013, the survey questionnaire was mailed to the sampled households. In order to obtain a representative sample of individuals within the households, the cover letter requested that the adult in the household who had most recently celebrated his or her birthday would be the one to complete and return the survey. The 52-item survey questionnaire was offered in English and Spanish as a self-completion booklet and online, and it required approximately 50 minutes to complete. After the initial survey mailing and two follow-up mailings during July and August, 757 completed questionnaires[6] were returned for a response rate of 13.5 percent.

Environmental Hazard Issues

The survey instrument included seven measures related to natural and technological hazards: 1) concern for natural and technological hazards affecting the local community; 2) impression of the community's ability to respond to and recover from a disaster; 3) respondents' types of property insurance; 4) household evacuation plans; 5) concern about evacuation; 6) knowledge of the community's disaster management plan; and 7) perceptions of long-term changes in weather patterns.

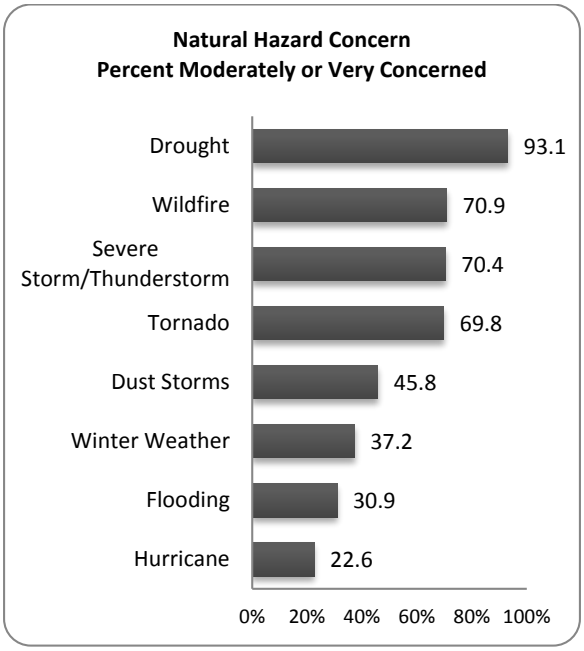
Respondents were asked to indicate their level of concern for 16 different environmental hazards (drought, dust storm, flood, hurricane, wildfire, tornado, severe storms/ thunderstorms, winter weather, air pollution, contaminated water supply, contaminated soil, landfills, illegal dumping, toxic waste, oil spills, and industrial accidents—e.g., explosions, chemical spills/releases) affecting their community. Response categories included "not at all concerned," "slightly concerned," "moderately concerned," and "very concerned."

[4] U.S. Census Bureau, 2012. "Geography." http://www.census.gov/geo/index.html

[5] 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.

[6] One household requested a Spanish mail survey, and one completed the Spanish version online. In total, 701 completed the mail survey and 56 completed the online survey.

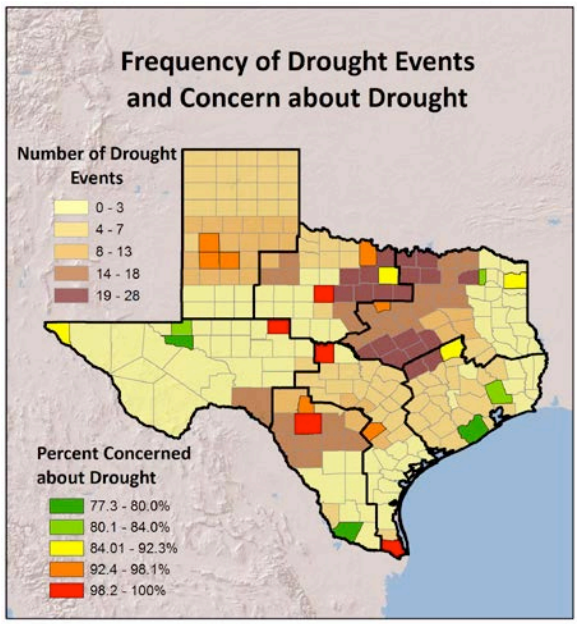
Natural Hazards Issues

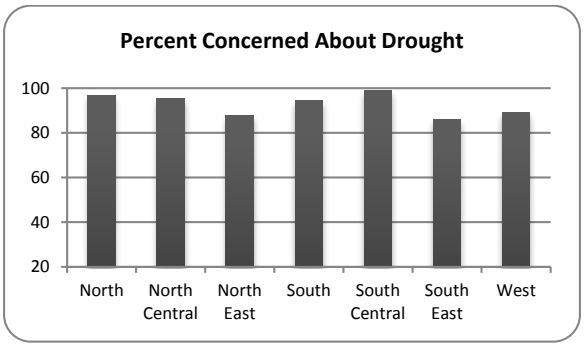


In regard to natural hazards, most concern was expressed for drought, wildfire, severe storms/thunderstorms, and tornadoes, respectively.

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. Natural hazard events occurring between 1960 and 2010 in Texas were mapped using the Spatial Hazard Events and Losses Database for the United States (SHELDUS).[7] 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.[8]

Drought



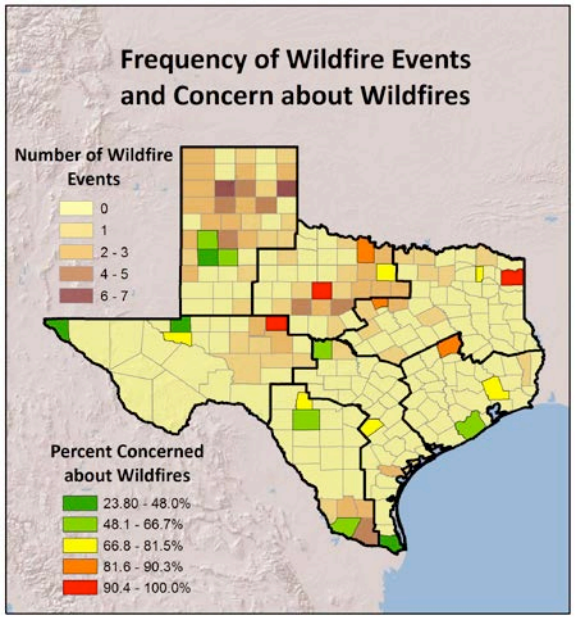


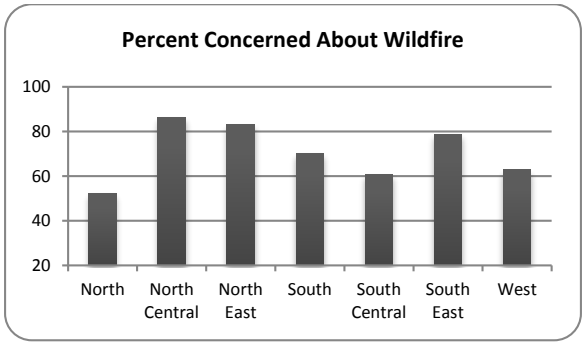
Results reveal some important findings regarding drought and concern for drought. More rural Texans were concerned about drought (93.1%) than concerned about other environmental hazards. Drought concern was also more evenly distributed across regions than concern for other hazards. Concern was high both in areas historically affected by drought and in areas that were not.

[7] 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.

[8] In each of the maps, entire counties are highlighted. However, concern was only measured within the selected place, not across the entire county.

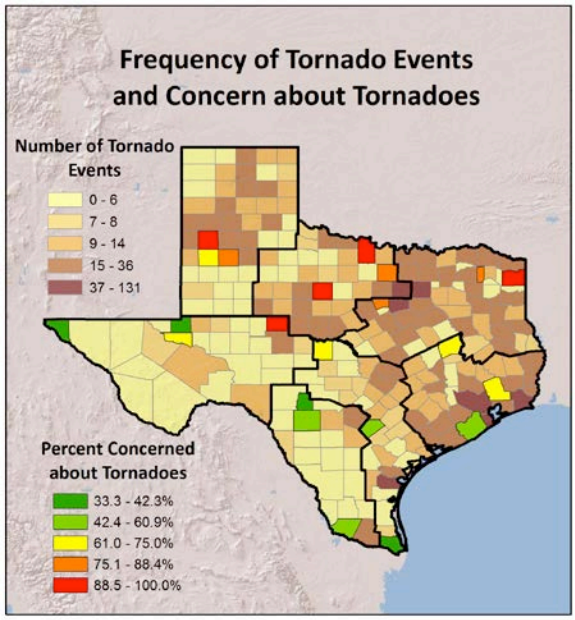
Wildfire

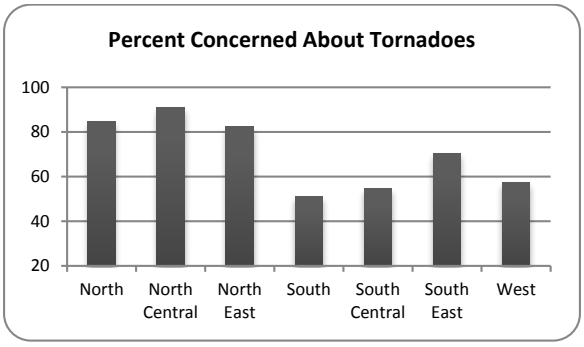




Rural Texas residents reported a high level of concern for wildfires. Over 70 percent (70.9%) of respondents indicated high or moderately high concern about wildfires. However, concern about wildfires did not correspond to historical impacts of wildfire events.[9]

Tornadoes

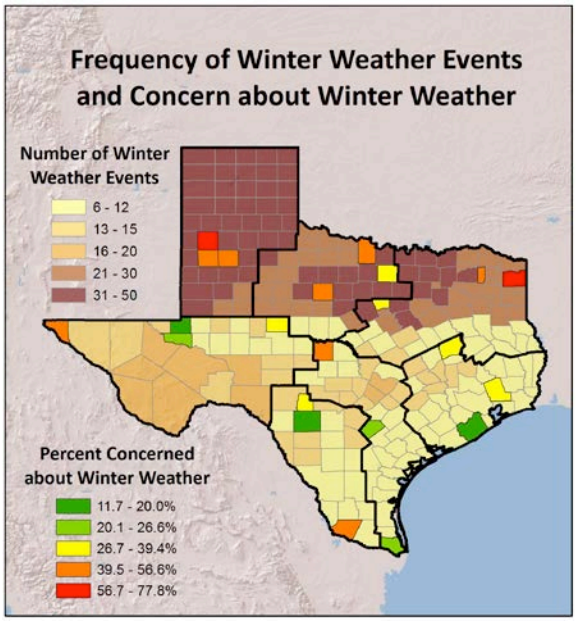


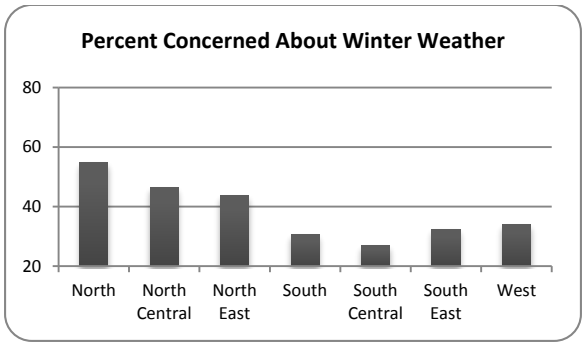


There were relatively high levels of concern about tornadoes among rural Texans. Almost 70 percent (69.8%) of respondents indicated high or moderately high levels of concern about tornadoes. Historic events show high numbers of tornadoes in many areas of Texas, although the concern was highest among residents in the northern part of the state.

[9] 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.

Winter Weather

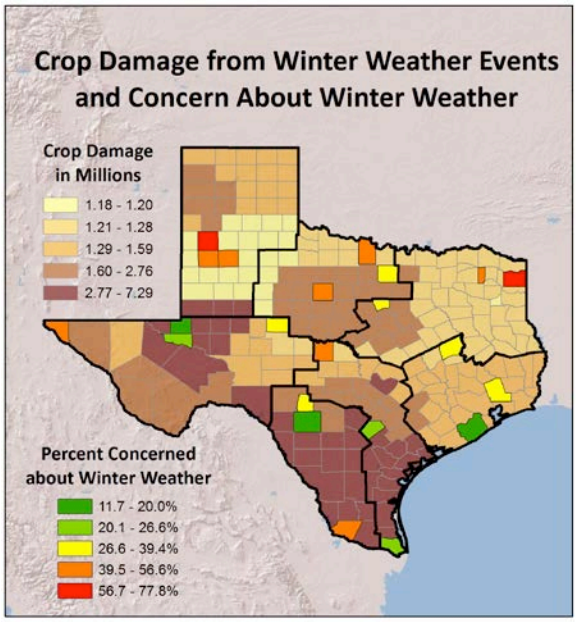




Patterns of concern for winter weather events reflected historical occurrences of winter weather. Both historical occurrence and resident concern for winter weather were highest in the northern regions.

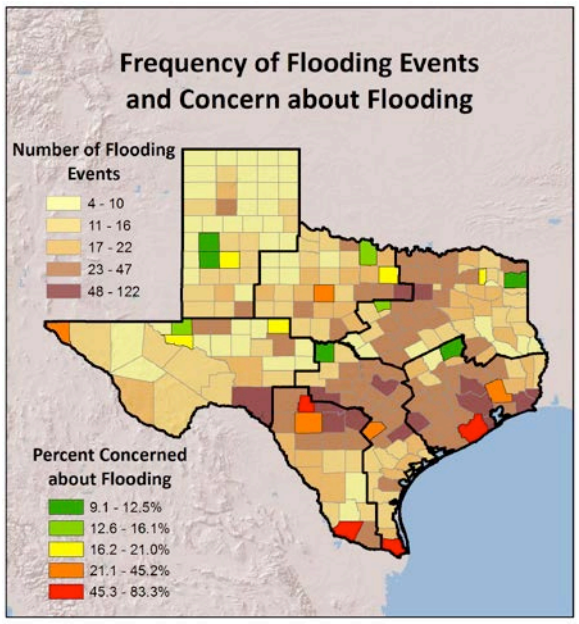
On the whole, concern about winter weather is relatively low in Texas. Only 38.1% of respondents indicated moderate to high levels of concern about this type of hazard.

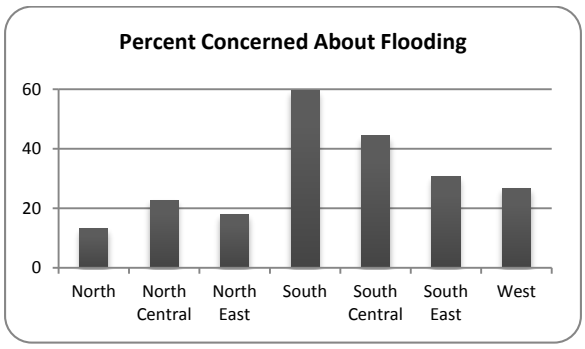
Winter Weather Crop Damage



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

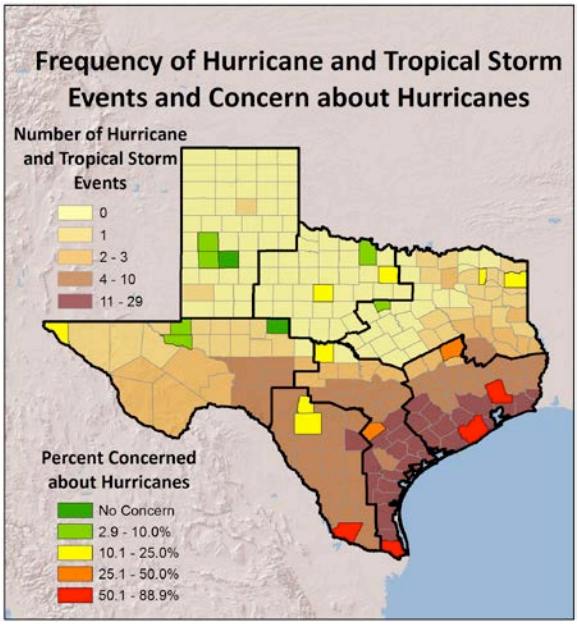


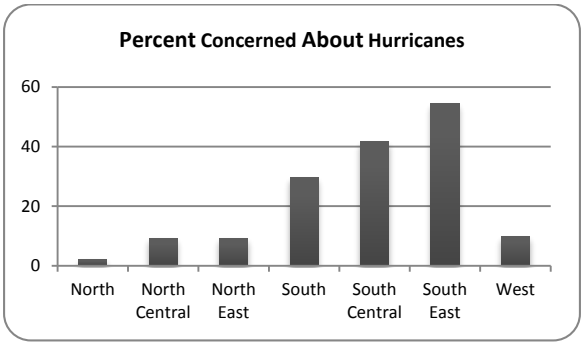


Concern about flooding is relatively low in rural Texas, as approximately 30.9% of respondents indicate moderate to high levels of concern about this type of hazard.

The southern portions of the state reported higher incidences of flooding and rural Texans in these regions reported relatively higher levels of concern about floods.

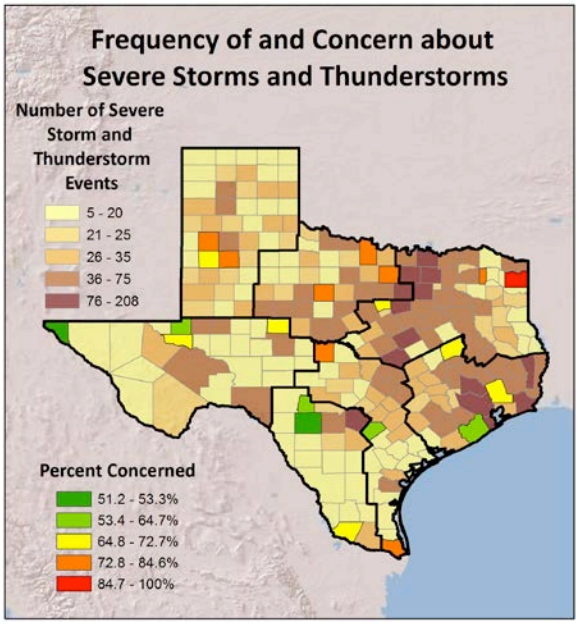
Hurricanes

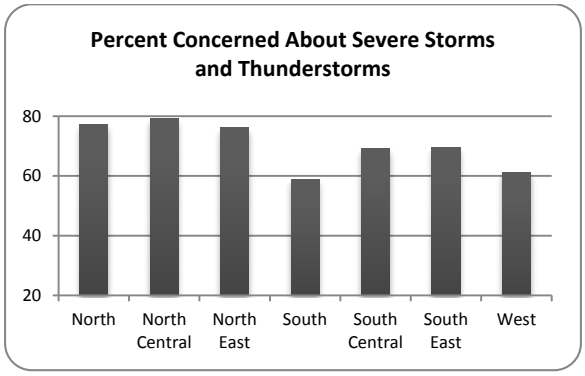




In general, rural Texans report relatively low levels of concern about hurricanes, with 23.4% of respondents indicating moderate to high levels of concern about these hazards. However, concern about hurricanes reflected historical vulnerability to hurricane events, with coastal regions reporting the highest levels of concern.

Severe Storms and Thunderstorms

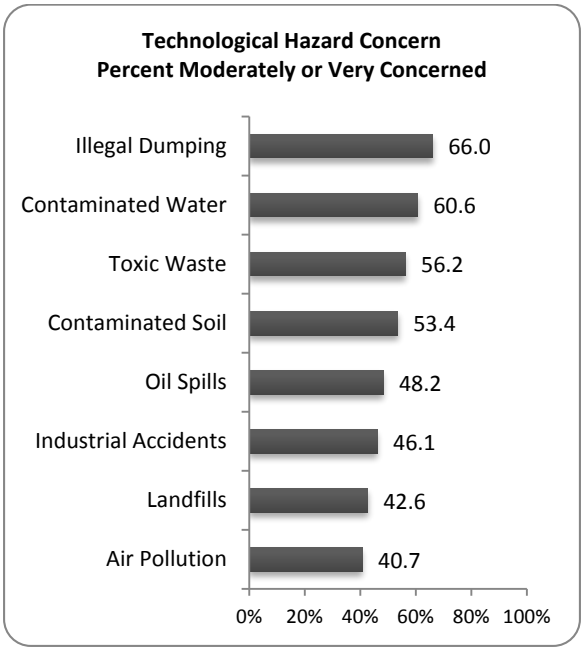


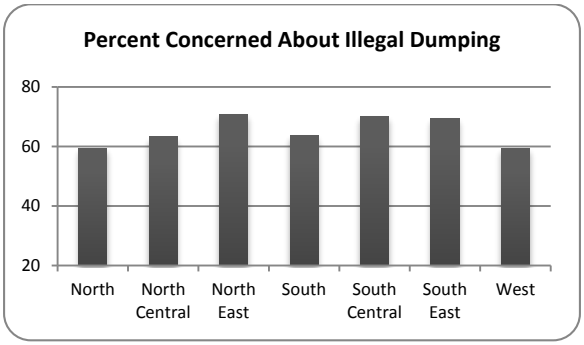


There was little regional difference in concern about severe storms and thunderstorms in rural Texas. However, concern about severe storms and thunderstorms was relatively high among rural Texans. Approximately 69.7% of respondents indicated moderate to high levels of concern about severe storms and thunderstorms. The highest levels of concern about severe storms and thunderstorms was indicated by rural Texans living in the northern portion of the state.

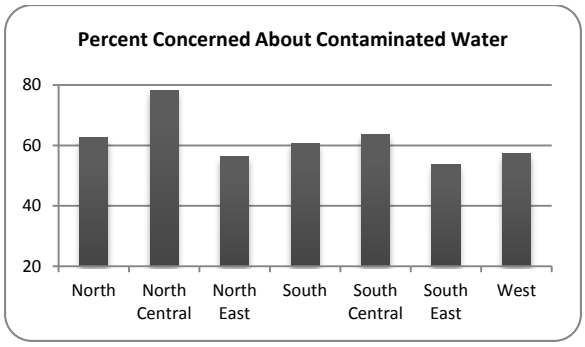
Technological Hazards

In regard to technological and environmental hazards, most concern was expressed for illegal dumping, contaminated water, toxic waste and contaminated soil respectively. In relative terms, rural residents were least concerned about air pollution, landfills and industrial accidents.

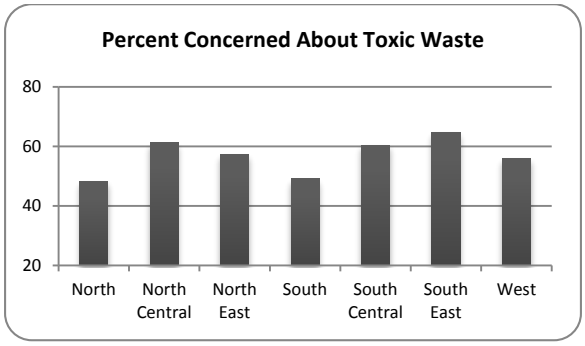




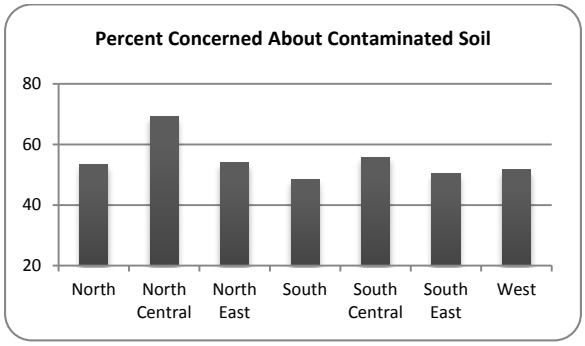
The highest levels of concern about illegal dumping were found in the north east, south central, and south east regions of Texas.



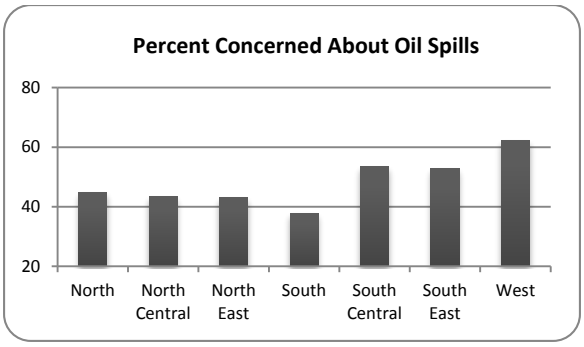
Concern about contaminated water was highest among rural residents in the north central region of the state. In contrast, those in the south eastern region were least likely to be concerned about contaminated water.



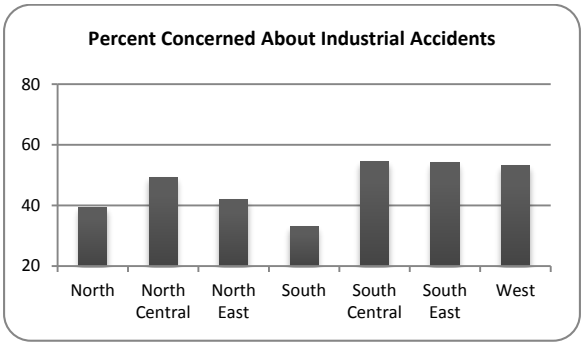
Concern about toxic waste was highest in the south east and north central regions. Rural residents in the north and south regions indicated the lowest levels of concern about toxic waste.



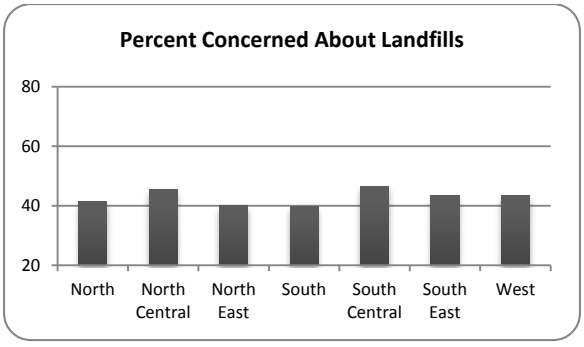
Concern about contaminated soil was highest in the north central region of the state.



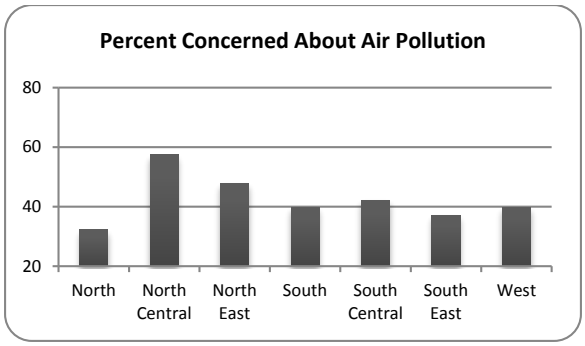
Concern about oil spills was highest in the south, south central and western regions of Texas.



Concern about industrial accidents was highest among resident of the south central, south east and west regions.



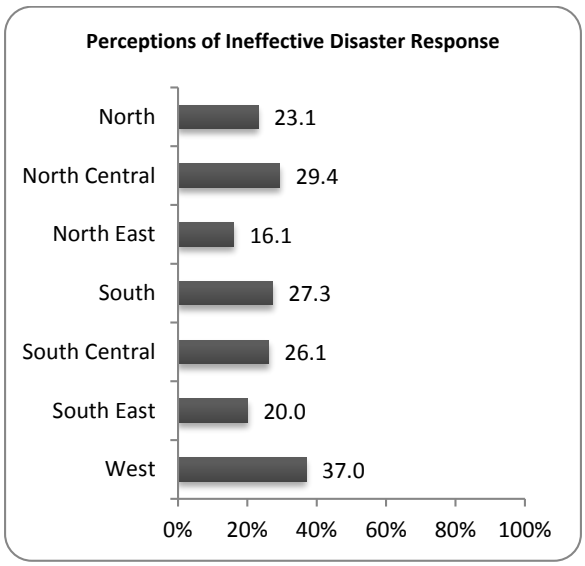
Concern about landfills was highest in the south central and north central regions of the state. However, there was little variation between these regions as concern fluctuated between 39 and 46 percent of respondents for any given region.



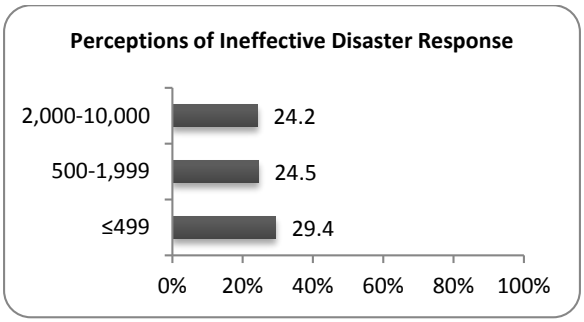
Concern about air pollution was highest in the north central and north east regions of the state.

Perceptions of Community Efficacy in Responding to Disaster and Disaster Preparedness

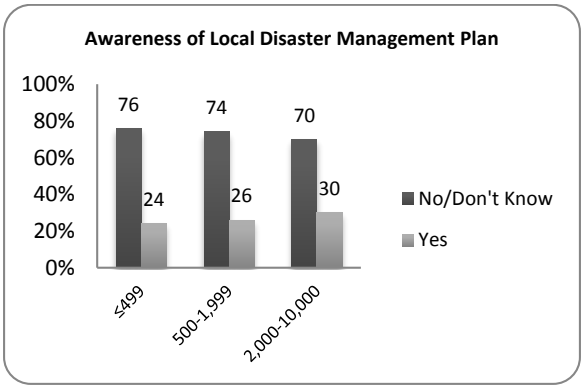
Respondents were asked to indicate agreement with five statements related to their community's ability to recover following a disaster. Response categories included: "strongly agree," "agree," "disagree," and "strongly disagree."



Various regional differences were identified. West, north central, and south 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 also identified. Residents in the smallest places were more likely to feel uncertain about their community's ability to respond effectively to a disaster.



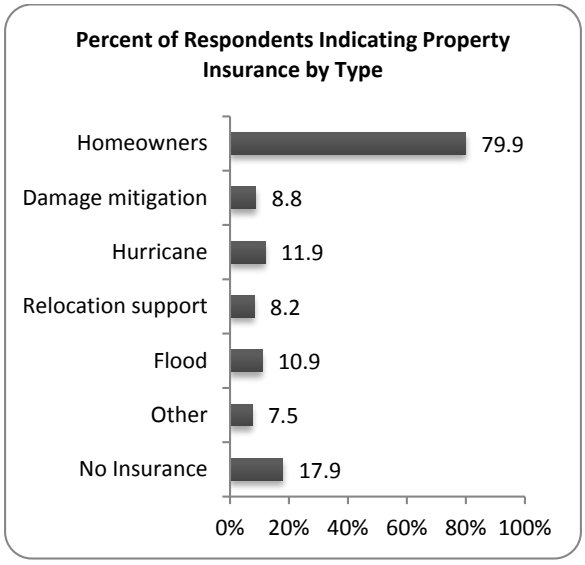
Approximately 73% of respondents indicated that they did not know that their local community has a disaster management plan. When viewed by size of place, over 76% of residents in the smallest population category were unaware of a local disaster management plan.[10]

[10] Following the Texas Disaster Act, "state law requires every political subdivision (county and incorporated city) in Texas to prepare and keep current a local or inter-jurisdictional emergency management plan."

Texas Department of Public Safety; Texas Division of Emergency Management. 2008. *Local Emergency Management Planning Guide.* https://www.txdps.state.tx.us/internetforms/Forms/TDEM-10.pdf.

Property Damage Insurance Coverage

Insurance is an essential component of disaster preparedness and recovery. Respondents were asked to indicate what type of property damage insurance they had. Response categories included "Homeowners," "Damage mitigation (Mold, etc.)," "Hurricane (wind only)," "Relocation support (temporary housing, etc.)," "Flood (all causes)," "Other (please specify), and "I have no property damage insurance."



The majority of respondents (79.9%) indicated they possessed homeowners insurance. However, very few respondents indicated they possessed other types of insurance, and 17.9 percent of respondents indicated they had no insurance.

Respondents were asked to indicate whether they had family or friends outside of the area who they could stay with in the event of a community-wide evacuation. Almost 15 percent of respondents indicated they did not have friends or family available in the event of an evacuation.

Concluding Comments

Residents in rural Texas expressed concern about a wide range of environmental hazards. Across the state, residents indicated the highest level of concern for drought, wildfires, severe storms and thunderstorms, tornadoes, illegal dumping, contaminated water, and toxic waste. 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 indicated that past experience with natural hazards, in general, correspond 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 and severe winter weather the Texas Rural Survey data revealed some unexpected findings. First, concern for drought was 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, 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 was highest in the south and west. Residents in these regions expressed relatively low levels of concern about severe winter weather. Third, there was less regional variation in residential concern about technological hazards when compared to concern about natural hazards. For example, a majority of respondents in each region indicated concern about illegal dumping and contaminated water.

In terms of perceptions of community preparedness for natural disasters, residents of the smallest rural places seemed to be the most uncertain about their community's ability to respond to a natural disaster. Notably, many of the most rural residents indicated that their area did not have an emergency management plan. The revelation that the most rural residents were 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.

Two other findings regarding preparedness and disaster response are worth noting. First, even though most respondents indicated that they have homeowners insurance, the vast majority do not have other types of insurance relevant to disaster events, e.g. flood or damage mitigation. Second, while most respondents indicated that they had friends or family they could rely on in case of an evacuation, a substantial proportion did not.

Appendix