

Impacts of Human-Induced Seismic Activity on Residential

Populations in Pawnee, OK

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Abstract

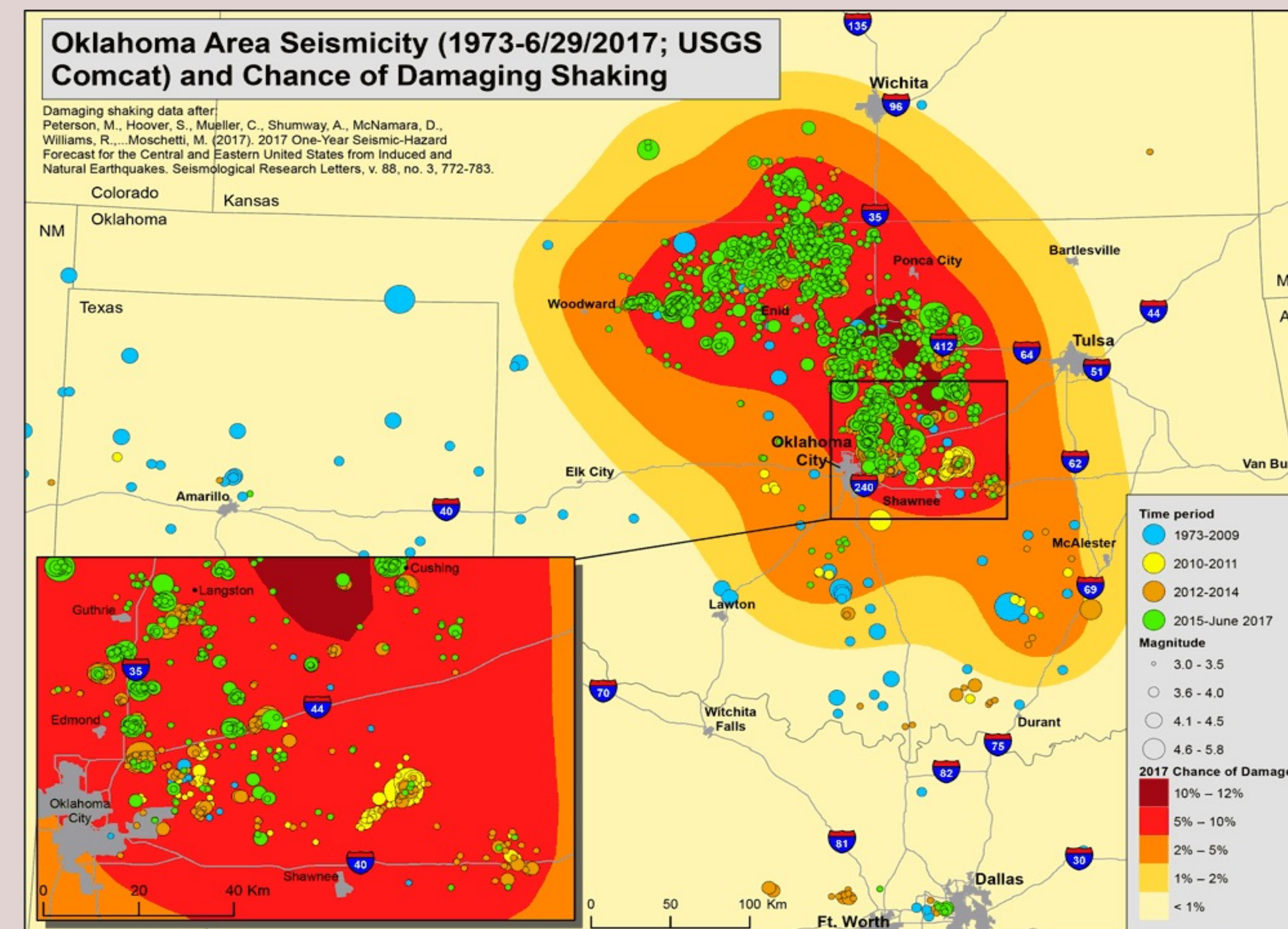
Since 2009, the small, residential town of Pawnee, Oklahoma has experienced frequent and significant human-induced earthquakes resulting from the routine underground disposal of fracking wastewater. The strongest earthquake in Oklahoma history hit Pawnee in September 2016, and the area continues to experience frequent seismic activity. The situation in Pawnee raises considerable political and environmental questions about the continuing ramifications of the quakes. However, the personal stories of those directly affected by the quakes are typically underreported. To understand the personal impacts of these earthquakes, this project used comprehensive surveys meant to prompt emotional and descriptive recollections of these events from residents with first-hand knowledge of the quakes. A wide range of opinions were collected from a population with differing ages and demographic backgrounds. While many reported instances of damage to personal property and impacts on their emotional well-being, others stated there were no issues in their community stemming from the quakes. While some trends in the responses may be highlighted, overall, the qualitative collection of these stories have proven invaluable since they provide insight into the personal lives of these residents and how the earthquakes have affected their daily experiences. In continuing this research, visiting the town of Pawnee in person and collecting stories orally from the residents would be a great addition to the written accounts already collected. Reaching residents through social media and email has proven difficult, especially for a survey that requires significant detail and time. The research is still ongoing, and we hope to gather more survey responses in order to conduct a more comprehensive analysis.

Introduction

The town of Pawnee, Oklahoma experienced a record-breaking 5.6 magnitude earthquake in September of 2016 following the routine, underground disposal of fracking wastewater. Since this incident, Pawnee and its surrounding areas have continued to experience near-daily seismic activity at the hands of big businesses with strong governmental ties resulting in dire losses to personal property, a diminishing sense of residential security, and a decline in environmental conditions. Legal suits have been filed against governmental leaders and corporations on behalf of tribes and business owners who have suffered. While many Pawnee residents suffered damages and personal injuries from the recurring earthquakes, most media coverage has focused on the environmental and legal implications rather than personal narratives. Collecting these oral histories has provided an opportunity for residents to voice their opinions and document the personal damages they've endured. Their personal recollections also help to show the implications of the quakes on residential well-being, security, and the relationships between government-backed corporations and tribal claims in the area.

Methods

The application, Qualtrics, was utilized to digitally collect qualitative survey responses from Pawnee residents. The survey focused on open-ended questions intended to evoke the most detailed responses concerning earthquake-induced damages, tribal concerns, environmental implications, and personal narratives about the phenomena. The survey was distributed via social media platforms like local Facebook groups, as well as through email using connections from various tribal, college, environmental, and community historical organizations to reach different demographics. While only a fraction of targeted contacts responded to the survey, follow-up emails were sent to remind these previous contacts of the project and its intentions. The transcripts of the surveys were gathered and qualitatively analyzed to uncover experiential similarities in the various ramifications of human-induced seismic activity on the residential population of Pawnee, Oklahoma.



Visual mapping of the seismic activity within the Oklahoma area between the years 1973 and 2017. (Figure 1)

“The Pawnee Nation College building lost their chimneys due to the quakes and all buildings had large cracks near windows. We developed an earthquake emergency plan and all students and staff had to be trained...in case of a large earthquake.” (Anonymous Pawnee resident)

“...the quakes were passed off as natural. Most people knew better, but being an oil/gas state the truth (Salt water disposal into the crust) was not acknowledged by the powerful oil gas industry until the last few years...” (Anonymous participant, 67 year old resident, science teacher)

“Earthquakes are not easy to live with. My husband is disabled and could not leave the house... I don't think we can sell our house. Fracking is all around.” (Anonymous 68 year old Executive Director for the Pawnee Seed Preservation Society)

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References

Figure 1: “USGS Earthquake Hazards Program.” *U.S. Geological Survey*, National Institute of Standards and Technology, Sept. 2017, <https://earthquake.usgs.gov/>.

Results

The results of the survey are qualitative in nature and are meant to focus on the stories and viewpoints of individual civilians—not a simple collection of statistics. In nature, they should be considered as unique accounts and perspectives, however, there were some points of agreement amongst survey responders:

- Beliefs on what causes the earthquakes: 90% of responders recorded the cause of the earthquakes as environmental misuse due to fracking or disposal of wastewater into the ground. The frequency and magnitude of the earthquakes correlated with times where oil companies in the area were fracking.
- Damages: minor damages, most reported that the closer to the epicenter, the more damage they were able to view. One noted that lower-income Pawnee nation housing was deeply affected by the earthquakes.
- Feelings of security in their town: frequency of the earthquakes has normalized the experience to the point where they have been accepted as just another component of life in and/or surrounding Pawnee.
- Knowledge of governmental relief: Most didn't have insurance to cover damages since the earthquakes were unprecedented. None of the survey responders were aware of financial aid programs for repairing damages. Participants experienced damages ranging from none to \$150,000 that they couldn't afford to repair.

Conclusion

- These stories have been habitually neglected by the media which tends to primarily focus instead on what the earthquakes mean to certain political questions, including how the local government should react or compensate homeowners or the dozens of class action lawsuits filed against these fracking companies.
- Collecting personal stories is important to preserving history and can help inform the elected officials and their constituencies in making decisions that reflect the needs and views of affected civilians. Media often wants to push stories for views—stories with inherent drama or conflict—not ones that are raw, descriptive, and uncensored from civilians who experience these earthquakes firsthand.
- In analyzing the results, many participants indicated that politicians and the media were both hesitant to blame fracking companies explicitly despite most of the public knowing the environmental implications of the wastewater disposal. This silence results from the deep historical roots of the oil industry in the area and economic activity they promote. However, if media sources become hesitant to tell the truth, how will the general public gain access to crucial information?
- In producing this fiction novel, which seeks to tackle a wide range of characters and plot lines, the author intends to accurately reflect the views of civilians living in Pawnee. Representing the concerns of civilians who have experienced the earthquakes authentically is important to the integrity of the work.
- Along with an overall lack of participation in the survey, participants gradually stopped answering the questions as they progressed. To combat this issue, further research could incentivize participation or ask more pointed questions to more closely follow trends in opinions rather than collecting descriptive accounts from the survey participants. Gathering detailed personal stories may reach their full potential if collected through means of virtual communication in order to point questioning towards the unique views of the participants and to engage them more.