Editorial Preface

Aiming Toward Building Disaster Resilient Communities

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The publishing of this volume 2, issue 1 of the "International Journal of Disaster Response and Emergency Management" coincides with the beginning of the official hurricane season on June 1 and ends on November 30. However, this year marked an early entry into the official hurricane season when a subtropical storm with a maximum sustained wind speed of 40 mph in a location nearly 300 miles west-southwest of Bermuda was named Andrea on May 20, 2019 (NOAA, 2019a). According to the NOAA, this also marked the fifth year in a row during which the first named storm developed before the start of the official hurricane season. On May 23, 2019, the area more than 150 miles southwest of Jefferson, Missouri was badly hit by a tornado. The tornado was part of a deadly spring storm system of twisters, drenching rain, flash flooding, and hail that left a trail of destruction in the central United States. According to the NOAA, the tornado was loosely classified as a "wedge" tornado, which could produce a Fujita Scale rating of F4 (207-260 mph, causing devastating damage) or F5 (261-318, causing incredible damage), a maximum damage rating (NOAA, 2019b, 2019c).[1]

In May, NOAA's Storm Predication Center recorded a total of 555 preliminary tornados, approximately twice the 1991-2010 average of 276 tornadoes in the same month (Figure 1) (NOAA National Center for Environmental Information, 2019). The majority of tornados in the month of May occurred in three waves that took place as three multi-day events in the Central Plains and Midwestern states. The first wave of 76 tornados developed between May 17 and 18 in Texas, Oklahoma, Arkansas, and Louisiana, resulting in several fatalities. The second wave consisted of 119 tornadoes during a three-day event which lasted between May 20 and 22 in west central Texas, Oklahoma, and Missouri. The last wave consisted of 190 tornados during a four-day event between May 26 and 29 in eastern Colorado and Pennsylvania. This last wave was the most prolific tornado outbreak; it included an EF4 tornado as ranked by the Enhanced Fujita scale. This tornado resulted in heavy damage, with one fatality report near Dayton, Ohio on May 27. The gradations of damage caused by each of the five levels on the Enhanced Fujita scale are depicted in Figure 2.[2]

The May tornado outbreaks demonstrated not only the increased frequency of the disasters, but also the greater intensity of these tornados. The tornados in May caused catastrophic damage and flooding which severely impacted the lives of millions of people in the central U.S. In one disaster event, two tornados touched down just half an hour apart near Dayton, Ohio on Monday, May 29, 2019, and left the neighborhood with catastrophic damage (Ries, Murphy, & Wagner, 2019). In another event, an EF3 tornado touched down in the city of Celina, Ohio; its strong winds ripped off the roof of a building, flipped cars, and killed one person. The same storm system caused historic flooding in Oklahoma and Arkansas. In Sand Spring, Oklahoma, homeowners struggled to save their properties from flooding from the floodgates of the Keystone Dam. At the storm's height, the amount of water that it would take to fill three Olympic-sized swimming pools (about 2 million gallons) was released per second, leaving the entire neighborhood underwater (Ries et al., 2019). In Jefferson City, Missouri, the EF-3 monster tornado ripped a 20-mile long and a mile-wide trail of and caused the complete collapse of homes and other buildings (Figure 3 and 4) (NWS, 2019). At the time this editorial was written, the official damage assessment has not yet been completed (Office of Governor Michael L. Parson, 2019) and we

Figure 1. Tornado reports between May 1 and 31, 2019 (Edwards et al., 2013)

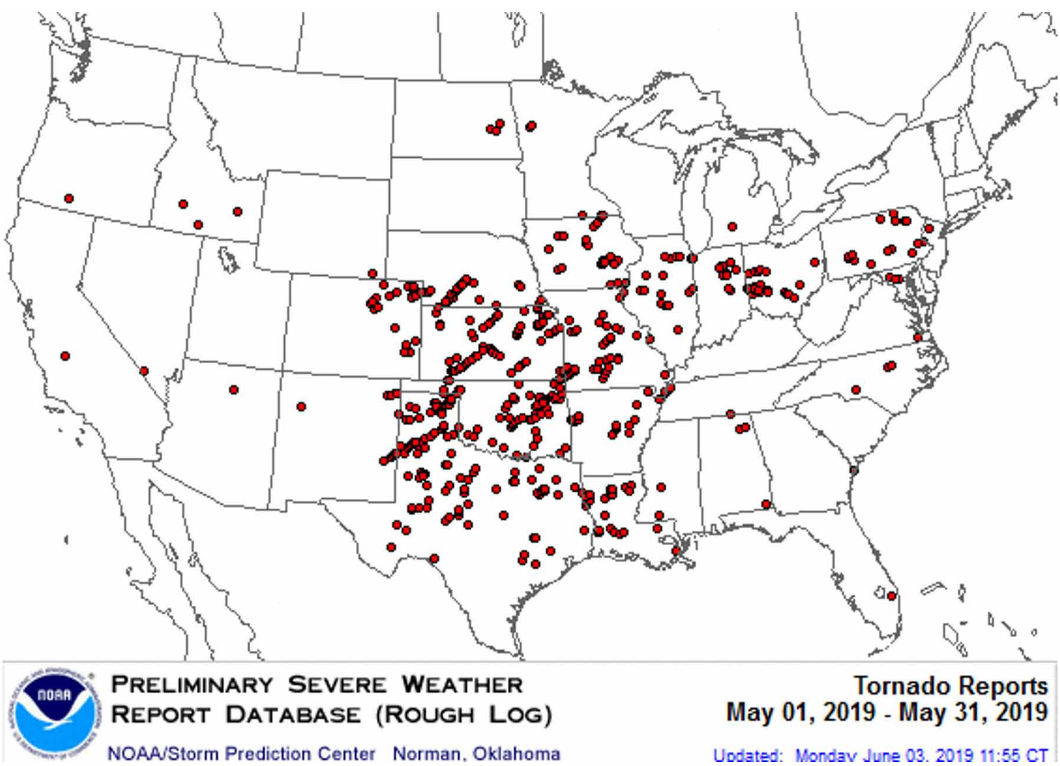

Figure 2. Gradations of damage ranging from EF0 (upper-left corner) to EF5 (lower-right corner) (NOAA, 2019b)

Figure 3. Preliminary tornado report in Jefferson City in Missouri (Schmidt, 2019)

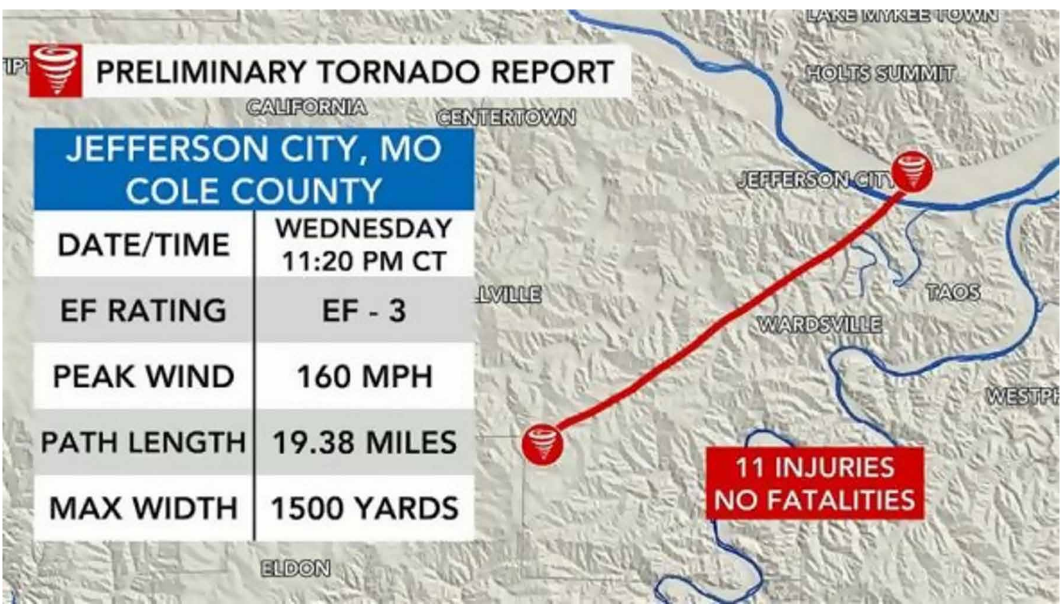

Figure 4. Walls collapsed by 150 mph winds around 11:33 PM in Jefferson, Missouri (NWS, 2019)

were not able to evaluate the damage in a comparative study with the damage caused by the previous tornados.

Having discussed the frequency and intensity of the recent disasters, we could easily relate them to the predicted future disasters by the Fourth National Climate Assessment Report which was prepared based on findings of over 6,000 unique references (US GCP, 2018). Due to climate change, there are three anticipated heightened possibilities for future disasters of which include droughts and storms, seal level rise, and wind speeds in tropical storms (USGS, 2018). We have witnessed the current disasters which are, in fact, in line with the predictions of the FNCA report. To effectively combat the frequent, intense, and destructive natural disasters, the country aims towards building disaster resiliency. According to the National Academies, resilience is defined as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events. Enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses—rather than waiting for an event to occur and paying for it afterward" (The National Academies, 2012). As per this definition, disaster resilience embraces three key concepts: better anticipation, better planning, and mitigating post-event costs, all of which are vital to successfully building disaster resilience.

In responding to the current devasting disasters, the key stakeholders revealed reliance on a reactive approach for which people must inevitably pay afterward, not a proactive approach through which risks could be mitigated before the disaster. On May 23, 2019, right after the monster tornado touched down in Jefferson City, Mayor Carrie Tergin made a statement to CNN: "We were already prepared somewhat but we were definitely not prepared for this" (CNN, 2019). This suggests that the city authorities were unable to anticipate and plan effectively to reduce disaster losses. One of the tornado victims mentioned in her Facebook post that "My house is gone… Our cars are gone. We're alive but not okay" (Wagner, Ries, Murphy, & Rocha, 2019). In Oklahoma, as of June 17, 2019, FEMA has provided with a total of $10.42 billion ($9.32 billion for total housing assistant and $1.10 billion other needs assistance) as individual assistance for 1,185 applicants who were impacted by severe storms, straight-line winds, tornadoes, and flooding between May 07 and June 09, 2019 (FEMA, 2019).

The country can no longer afford to continue the current approach for responding to disasters. It is time for all key stakeholders build disaster resiliency by balancing proactive and reactive approaches. Disaster and emergency management is a profession, and academic institutions provide professional training to develop required skills and knowledge in effectively managing disasters and emergencies. These curricula should be designed to cultivate a culture of proactive preparedness and to develop the knowledge and skills for disaster resilience. At the University of Texas Rio Grande Valley (UTRGV), which has set an exemplary standard for proactive disaster resilience, the Department of Sociology offers a course named "Disaster and Society" which at both the undergraduate and graduate level. The course is listed as one of the required core courses for the Disaster Studies MA program (more information at https://www.utrgv.edu/sociology/graduate/disaster-studies-ma/index.htm).

The course incorporates a service-learning component, which provides students with opportunities to learn from practitioners and policymakers—including emergency coordinators at city, state, county and federal level governments, city mayors, congressmen, and non-profit executives. In addition, under the supervision of the course instructor, students conduct a research study on disaster preparedness of individuals with a disability condition. At the end of the course, the instructor organizes a forum in which emergency coordinators and planners from the city, county, and regional offices speak as panelists (Figures 5 and 7). Students provide these panelists with their study findings and advocate for proactive approaches to help prepare for future disasters (Figure 6). In the past, students learned from their findings that individuals who are vulnerable to disasters prepare less and are less willing to evacuate. From this learning experience, students realized that there was a pressing need for proactiveness in preparing for future disasters. Previous panelists have said that they were thankful that students provided their findings because it helped them make data-driven decisions for how to help prepare community individuals with disabilities. Normally, these practitioners and policymakers were focused on day-to-day responsibilities, so they said that they did not have time to conduct such research themselves (Hernandez, 2019).

In this issue, we introduce four articles. The first article discusses challenges to combat natural disasters and the socio-economic impact of these disasters on humans and the environment (Prasad, 2019). This article focuses on Nepal, a country prone to natural disasters. Through the use of publicly available data, the author explains how the country sets goals for disaster risk reduction and argues that additional efforts must

Figure 5. A group of panelists and students in Disaster and Society class posting for a group photo at the forum for disaster preparedness of individuals living with a disability in the Rio Grande Valley on May 7, 2019

Figure 6. Students in disaster and society class presenting their study's findings to a group of panelists on May 7, 2019

Figure 7. A group of panelists who are emergency coordinators, planners, and professors listening

be made by all key stakeholders at various levels of government in all four phases of disaster management—mitigation, preparedness, response, and recovery—in order to reduce the risk of natural disasters and lessen their impact. In addition, the article highlights the importance of continuous efforts by documenting a twelve-year journey toward preparedness. It discusses both preliminary success and the many challenges that Nepal faces in this journey.

The second article explores the disaster response phase in the disaster management process (Krieken, 2019). The author argues that empowering individuals to make their own decisions in responding to disasters is essential. Factors that influence this empowerment include participation in decision-making, use of social capital within the community, thinking and doing "SMART," recognizing community power, building capacity, and helping your neighbors. Project managers who are responsible for coordinating with the community should be aware of the importance of empowerment; they must avoid telling the community members what they are supposed to do when responding to disasters.

The third article discusses a novel technology that could be used in search and rescue activities wherein it is impossible to simply reach out to victims trapped in unreachable places (Shethwala, Patel, Shah, & Sheth, 2019). A Biomorphic Hyper-Redundant snake-like robot could reach small places and traverse any surface in search and rescue operations. The technology is based on a YOLO algorithm and could be used for other search and rescue domains such as military, underwater, aerospace, and nuclear efforts.

The last article discusses how to identify accident and incident factors in military aviation in the German Armed Forces (Nitzschner, Nagler, & Stein, 2019). The authors used the Human Factors Analysis and Classification System (HFACS), an accident investigation tool for analyzing human error in aviation. The authors conducted two studies with both manned aircrafts and unmanned military aircrafts to identify factors that contribute to the accidents and incidents. In the first study, the factors observed were preconditions for unsafe acts and unsafe acts whereas in the latter study, technical issues and human factors were observed.

Last but, not least, we would like to express our sincere appreciation to all reviewers and authors for their kind contribution.

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REFERENCES

CNN. (2019, May 23). Millions bracing for more severe weather after tornado. Retrieved from https://www.msn.com/en-us/news/video/millions-bracing-for-more-severe-weather-after-tornado/vi-AABONhI

Edwards, R., LaDue, J. G., Ferree, J. T., Scharfenberg, K., Maier, C., & Coulbourne, W. L. (2013). Tornado intensity estimation: Past, present, and future. *Bulletin of the American Meteorological Society*, *94*(5), 641–653. doi:10.1175/BAMS-D-11-00006.1

FEMA. (2019). *Oklahoma Severe Storms, Straight-line Winds, Tornadoes, And Flooding (DR-4438)*. Retrieved from https://www.fema.gov/disaster/4438

Hernandez, M. E. (2019, March 31). UTRGV students share disaster preparedness research findings with area officials. *UTRGV*. Retrieved from https://www.utrgv.edu/newsroom/2019/05/31-utrgv-students-share-disaster-preparedness-research-findings-with-area-officials.htm

Krieken, T. V. (2019). Factors affecting Community Empowerment during Disaster Recovery. *International Journal of Disaster Response and Emergency Management*, *2*(1).

Nitzschner, M. M., Nagler, U. K. J., & Stein, M. (2019). Identifying Accident Factors in Military Aviation. *International Journal of Disaster Response and Emergency Management*, *2*(1).

NOAA. (2019a). First Storm of 2019 Atlantic Hurricane Season Named from National Oceanic and Atmospheric Administration (NOAA). Retrieved from https://www.nesdis.noaa.gov/content/first-storm-2019-atlantic-hurricane-season-named

NOAA. (2019b). Fujita Tornado Damage Scale. from National Oceanic and Atmospheric Administration (NOAA). Retrieved from https://www.spc.noaa.gov/faq/tornado/f-scale.html

NOAA. (2019c). Wage Tornado. from National Oceanic and Atmospheric Administration (NOAA). Retrieved from https://www.spc.noaa.gov/faq/tornado/binger.htm

NOAA National Center for Environmental Information. (2019). State of the Climate: Tornadoes for May 2019. Retrieved from https://www.ncdc.noaa.gov/sotc/tornadoes/201905

NWS. (2019). May 21-23, 2019 Severe Thunderstorms. Retrieved from https://www.weather.gov/lsx/May2122SevereStorms

Office of Governor Michael L. Parson. (2019). Missouri Requests Joint Federal, State, and Local Damage Assessments in Preparation for 2nd Federal Disaster Declaration Request this Spring. Retrieved from https://governor.mo.gov/press-releases/archive/missouri-requests-joint-federal-state-and-local-damage-assessments

Prasad, U. S. (2019). The Economics of Disaster Risk Management in Nepal. *International Journal of Disaster Response and Emergency Management*, *2*(1).

Ries, B., Murphy, P. P., & Wagner, M. (Writers). (2019). Unprecedented stretch of tornadoes and floods hit the US [Video]. CNN.

Schmidt, A. (2019, May 25). Monster tornado that ripped 20-mile trail of destruction through Missouri capital was almost a mile wide. *Accuweather*. Retrieved from https://www.accuweather.com/en/weather-news/monster-tornado-that-ripped-20-mile-trail-of-destruction-through-missouri-capital-was-almost-a-mile-wide/70008358

Shethwala, Y. D., Patel, R. P., Shah, D. R., & Sheth, S. M. (2019). A Novel Concept of Biomorphic Hyper-Redundant Snake Robot. *International Journal of Disaster Response and Emergency Management*, *2*(1).

The National Academies. (2012). *Disaster Resilience: A National Imperative*. Washington, DC: The National Academies Press.

US GCP. (2018). *Fourth National Climate Assessment*. Retrieved from https://www.globalchange.gov/nca4

USGS. (2018). How can climate change affect natural disasters? Retrieved from https://www.usgs.gov/faqs/how-can-climate-change-affect-natural-disasters-1?qt-news_science_products=0#qt-news_science_products

Wagner, M., Ries, B., Murphy, P. P., & Rocha, V. (2019). Deadly tornadoes hit Missouri. *CNN*. Retrieved from https://www.cnn.com/us/live-news/missouri-tornadoes-may-2019/index.html

ENDNOTES

1 Fujita Scale of F4 (207-260 mph wind speed) and F5 (261-318 mph) are equivalent to Enhanced Fujita Scale of EF5 (>200 mph)

2 Enhanced Fujita Scale (EF0= 65-85 mph wind speed; EF1= 86-110; EF2= 111-135; EF3= 136-165; EF4= 166-200; EF5= >200)