

OKLAHOMA WILDFIRES: EXAMINING EXTENSION
PARTNERSHIPS IN LARGE ANIMAL DISASTER
PREPARDNESS

By

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Abstract:

Oklahoma wildfires negatively impact livestock communities throughout the state. To reduce these impacts, two stakeholders have been given responsibility to assist with disaster preparations, Emergency Managers (EMs) and Extension Educators (EXTs). The purpose of this study was to evaluate these stakeholders' roles, needs, training, resources, and partnerships, in regard to livestock related disaster planning for wildfires. Four EMs and four EXTs who worked in rural communities significantly affected by wildfires were interviewed while reflecting on preparedness for previous wildfires. Transcribed interviews were coded, with categories created with Community Capitals Framework. Categories included: natural, built, human, social, financial, political, and cultural capitals. Capital frequency and overall count were evaluated, and themes were recorded. Four individuals identified roles in livestock disaster planning and four reported these roles as formal. Three respondents reported receiving training. Only two reported knowing about available training opportunities, while five reported training needs. Numerous physical and social resources were reported as available for planning and response. Interactions between EMs and EXTs were reported by all respondents (n = 8), with some interactions being limited (n = 2). Only five of these interactions occurred before recent fires. Social and built capital was referenced by 100% of respondents. Human (87.5%), cultural (62.50%), political (37.5%), natural (25%), and financial (12.50%) capitals were also referenced with varying frequencies amongst respondents. Few EMs and EXTs previously planned for livestock related disasters. Therefore, specific roles should be assigned and communicated by the state. Respondents reported training was needed but were unaware of trainings available. As national and state training programs are offered better communication on availability of programs is warranted. Collaborative conversations should be encouraged between EMs and EXTs to allow for greater identification of physical and social resources. Interactions between EMs and EXTs are occurring, but not for livestock disaster planning purposes. Therefore, partnerships should be encouraged to occur for livestock disaster planning specifically. Assessment of the strength, quality, and longevity of these relationships should be evaluated in future studies as well as exploration of capital needs for livestock related disasters.

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CHAPTER I

INTRODUCTION

The purpose of this research was to evaluate current partnerships between Extension Educators (EXT) and Emergency Managers (EM) in Oklahoma counties affected by significant wildfires between 2016 and 2018. This study was specifically interested in disaster planning for livestock related disasters occurring between these two groups within the county and what these relationships consisted of. Disaster preparedness for livestock related disasters, trainings received, physical and social resources available, and current relationship status' between EXTs and EMs were explored. This chapter includes a brief history of wildfires in Oklahoma, Oklahoma livestock industries and how they are affected by wildfires, disaster preparedness, and the roles EXT are supposed to play in planning for livestock related disasters.

Oklahoma Wildfires

Wildfires commonly occur in the state of Oklahoma, with an average of 1, 458 wildfires per month between 2000-2007 (Reid, Fuhlendorf, & Weir, 2010). These wildfires impact the state's environment, economy, and social structures in local

communities by destroying property, ruining facilities, and causing animal losses (Diaz, 2012; Palliser, 2012; Schwartz, 2007). These impacts have cost the state of Oklahoma millions of dollars, accounting for over five million dollars in losses in 2016 alone (National Interagency Coordination Center [NICC], 2017). Summing up these losses requires not only property damages, but also losses in livestock production, as Oklahoma livestock industries are significant both state-wide and nationally.

Oklahoma serves as a major source of livestock production in the United States (USA), ranking 3rd in beef cattle production, 9th in hog production, 13th in broiler production, and 6th in meat goat production (United States Department of Agriculture Economic Research Service [USDA ERS], 2017; Oklahoma Department of Agriculture, Food and Forestry, 2017; United States Department of Agriculture [USDA], 2012, Extension, 2010). Additionally, Oklahoma has a robust equine industry that contributes to the state's economy with a gross domestic product (GDP) of \$3.9 billion (American Horse Council Foundation, 2018). Fires create stressors for livestock and can result in the loss of animal life. Moreover, economic losses and environmental impacts from disasters can create a strain on farmers and local communities. In 2017, wildfires affecting three counties in Oklahoma had an estimated economic impact of \$16 million on livestock industries respectively (Stotts, 2017). With these fires, over 3,000 head of cattle and 6,000 sows were reported as lost (Stotts, 2017). Land vegetation, which is often utilized as a food resource for livestock, has also been significantly impacted by wildfires throughout the state. Between 2008 and 2016, Oklahoma received twenty-one percent of livestock forage disaster program funding from the national government (MacLachlan, Ramos, Hungerford, & Edwards, 2018).

Along with economic and environmental damages, disasters can also impact the physical and psychological wellbeing of individuals, particularly those with animals affected by the disaster (Thompson & Every, 2016; Peck, 2005; Peck, Grant, McArther, & Gooden, 2002). Those around wildfires or experiencing loss due to wildfires are at an increased risk for morbidity (Johnston et al., 2012), respiratory issues (Reid et al., 2016), and psychological hardships (Peck, 2005). In 2017, three individual deaths were linked to individuals moving livestock during a wildfire (Levenson, Andone, & Burnside, 2017). Due to these detrimental effects from wildfires, it is important for areas that might be affected to be well prepared.

Disaster Preparedness and The Cooperative Extension System

Predominantly, disaster preparedness consists of planning, writing procedures, training personnel, ensuring equipment is ready, and conducting exercises (Spencer, 2011). However, any actions done before a disaster to reduce losses would qualify (Federal Emergency Management Agency [FEMA], 2015). This should be done as disaster preparedness can increase community resiliency and reduce losses in times of trouble (Spencer, 2011). Many individuals can, and should, be involved in these actions. One organization identified as a participant in disaster preparedness is the Cooperative Extension System (FEMA, 2017).

The Cooperative Extension System (CES) has been referenced, both by the state and national government, as a resource when preparing for livestock related disasters. Extension Educators are present in each county throughout Oklahoma, and the CES is considered an educational resource and important member in community disaster

planning (FEMA, 2017). Researchers in Extension education have recognized the value in partnerships between Extension educators and Emergency Managers for disaster planning and have encouraged relationship building (Eighmy, Hall, Sahr, Gebeke, & Hvidsten, 2012; Smith, Black, & Williams, 2012). Additionally, partnerships are urged to create county emergency plans that include actions for livestock (Eighmy et al., 2012; Smith et al., 2012). These partnerships and plans, if created, can improve emergency outcomes and therefore, are strongly encouraged (Porr, Shultz, Gimenez, & Splan, 2016).

Significance and Problem Statement

Understanding the current state of partnerships between Extension Educators and Emergency Managers in Oklahoma counties affected by wildfires can reveal the current state of preparedness for those counties. Exploring the strength of community assets could also provide insight to the community's resiliency, as capital presence and strength can increase resiliency and decrease overall losses. Additionally, this evaluation may identify gaps in communication, training, resources and knowledge needs. Once identified, investment into areas lacking resources may reduce future livestock related losses attributed to wildfire in these community's and throughout the state of Oklahoma. Additionally, this information may be informative to those who assist with Extension programming, as it might identify knowledge gaps needing to be filled.

While some evaluation of Extension partnerships for disasters has occurred (Eighmy et al., 2012), none have focused on these partnerships specifically in reference to livestock related disasters. Also, no studies have been conducted looking at these partnerships within the state of Oklahoma respectively. Since these partnerships are

required by the national government (FEMA, 2017) and are encouraged by researchers (Eighmy et al., 2012; Smith et al., 2012) to promote community resiliency, evaluation of the current state of these partnerships is warranted. The impact of wildfires on the state of Oklahoma and the livestock industries within it, also merit these evaluations occur within the state. Determining the current state of these partnerships and the capitals, or assets, found within these communities can also provide an understanding of the community's current strengths and weaknesses. While this has not been done within livestock disaster preparedness research, community evaluations post disaster have been conducted to explore capital presence in disaster research (Smith & Boruff, 2011; Stofferahn, 2012).

Purpose and Objectives

The purpose of this project is to evaluate partnerships between Extension Educators and Emergency Management in regard to large animal disaster preparedness for recent wildfires in the state of Oklahoma. This project will allow for better understanding of communication and knowledge gaps found among Extension Educators and Emergency Management during recent fires. Research questions include:

1. What do Emergency Managers and Extension Educators know about livestock disaster preparedness and response?
2. What role do Emergency Managers and Extension Educators play in emergency management planning for livestock disaster response?
3. What resources (both physical and social) have Emergency Managers and Extension Educators utilized in the past for livestock disaster planning and response?
4. What informal and formal networks exist between Emergency Management and Extension Educators before and after disasters?

CHAPTER II

REVIEW OF LITERATURE

This chapter focuses on the history of wildfires, the effects of wildfires and how they specifically impact the state of Oklahoma and the livestock industries therein. The importance of disaster planning and those involved in it are also explored. Additionally, the theoretical perspective of this study, the Community Capitals Framework, is introduced and explained. A literature review of research done regarding Extension disaster roles, Extension partnerships in disaster planning, and application of the Community Capitals Framework in agriculture, disaster, and Extension research is also presented.

History of Wildfires

The Department of Homeland Security (DHP)(n.d.) defines a wildfire as an “unplanned, unwanted fire burning in a natural area, such as a grassland or prairie”. Categorized as a natural disaster, wildfires are attributed with having the potential to threaten the safety and infrastructure of the country (DHP, n.d.). Wildfires are often large and destructive in nature. The United States Forest Service (USFS, n.d.) reports that wildfires are responsible for over 7 million acres of U.S. land being burned each year. Additionally, there are often multiple fires in one year. The National Interagency Fire

Center (NIFC) reports that in 2017, 71,499 fires occurred in the United States, burning a total of 10,026,086 acres (NIFC, 2017). Suppression of these fires is imperative and can be economically quite costly. Federal Firefighting costs for suppression alone reached an all-time high in 2017, with a total of \$2,918,165,000 spent throughout the year (NIFC, 2017).

Along with increasing costs, size and damaging effects of wildfires has been increasing since 2000 (Gorte, 2013). A report by Gorte (2013), reveals wildfire seasons are also becoming more severe and the cost of fighting them is continuing to rise (Gorte, 2013). The severity, size, and season length of wildfires has also increased (Westerling, Hidalgo, & Swetnam, 2006; Gillett, Weaver, Zwiers, & Flannigan, 2004). The USFS (n.d.) has recognized the increase in fire season length, size, and extreme behaviors, as well as many changes in fire patterns due to climate change. Westerling et al. (2006) found a strong statistical relationship between wildfire and hydroclimate, determining sub-regional climate changes are contributing to wildfire frequency and duration. Humidity (Crimmins, 2006; Evett, Mohrle, Hall, Brown, & Stephens, 2008), rainfall (Weir, Reid, & Fuhlendorf, 2017; Reid, 2010), windspeed (Reid, 2010) and air temperature (Westerling et al., 2006; Heyerdahl, Morgan, & Riser, 2008) have all been identified by researchers as factors in the size and likelihood of wildfires.

The state of Oklahoma is well acquainted with the presence of wildfires. Past research on Oklahoma wildfires reported that, on average, Oklahoma experienced 1,458 wildfires per month from 2000-2007 (Reid et al., 2010). According to the National Interagency Coordination Center (NIFC, 2017) 1,906 wildland fires occurred in Oklahoma, burning 502,625 acres, in 2017 alone. In 2016, the statistics were slightly

higher with 1,938 wildland fires and 767,780 Oklahoma acres burned (NIFC, 2016). The National Interagency Coordination Center (NICC) (2016b) deemed two of the 2016 Oklahoma wildfires as significant, with fires and complexes burning over 40,000 acres. The two fires deemed significant were the Anderson Creek Fire and the 350 Complex Fire. The Anderson Creek Fire had estimated costs of \$1,750,000 burning 367,740 acres, while the estimated cost of the 350 Complex Fire was \$900,000 and it burned 57,167 acres (NICC, 2016). In 2017, only one fire was deemed significant by NICC, the NW Oklahoma Complex (NICC, 2017). Estimated cost of the NW Oklahoma Complex doubled that of the 2016 fires, costing \$3,200,000 and burning 779,292 acres (NICC, 2017). While not considered “significant” by NICC, it is important to recognize that individually, six other Oklahoma fires individually burned over 25,000 acres between 2016 and 2018 (Oklahoma Forestry Services, n.d.).

Researchers have explored factors contributing to Oklahoma wildfires and identified when fires are most likely to occur (Reid et al., 2010). In an analysis of wildfires between 2000 and 2007, the months of January and December were identified as the months with the greatest number of wildfires (Reid et al., 2010). These months were also when vegetation was dormant and precipitation was low, factors that could contribute to fire development (Reid et al., 2010). Like other research, Reid et al. (2010) also found Oklahoma wildfire size had a strong correlation between humidity, rainfall, and wind speed.

Effects of Wildfires

The increasing frequency of wildfires has created a growing concern among affected communities. The economy, environment, and lives of those within a community can be impacted by wildfires. Additionally, local, state, and national economies can be affected. Timber, tourism, recreation, and agriculture are all community industries affected by wildfire (Diaz, 2012). Losses in these industries from wildfires varies, but can be quite large. In 1998, fires cost the state of Florida over \$138 million in tourism alone (Diaz, 2013). Economic stress can also occur when communities deal with the aftermath of wildfire destruction on infrastructure, such as the rebuilding of facilities and water quality mitigation (Diaz, 2012). Two studies in Florida and California found total economic losses due to wildfire to be \$1,864 - \$6,516 per acre (Diaz, 2013). In Oklahoma, economists totaled wildfire losses in 2016 alone to be over five million dollars (NICC, 2017).

Wildfires affect the environment, both positively and negatively. On the negative side, wildfires disrupt native plant species, increase hardy invasive species, accelerate erosion, cause loss of food resources for wildlife species, and impact animal stress and livelihood (Schwartz, 2007). Additionally, fire-suppression materials have been found to be harmful to aquatic animals when suppression chemicals are used in the environment (Palliser, 2012; USFS, n.d.). Wildfires have also been found to effect water quality. In 2011, Smith, Sheridan, Lane, Nyman, and Haydon determined wildfires negatively influence erosion rates, runoff generation, pollution, and nutrient content within water supplies (Smith et al., 2011). Conversely, wildfires can also benefit the environment by reducing pest populations, insect populations, and disease presence (Palliser, 2012). Fire

may also remove unwanted species, improve habitats, recycle nutrients to the soil, and promote growth of certain plant species (Palliser, 2012).

Beyond economics and environment, wildfires have been found to directly affect the health, both physically and psychologically, of those exposed or impacted by wildfire. Smoke inhalation is unsafe and has been linked with morbidity (Johnston et al., 2012; Reid et al., 2016). A study done by Johnston et al. (2012) explored mortality rates due to inhalation of landscape fire smoke by estimating exposure of individuals using a model estimating regional emissions. These estimates were used in mathematical equations that incorporated regional mortality history to find an estimated mortality rate specifically attributed to inhalation of landscape fire smoke (Johnston et al., 2012). From these equations, Johnston et al. (2012) estimated exposure to landscape fire smoke is responsible for 339,000 deaths annually throughout the world. Specific causes of mortality from smoke is unknown, as smoke can affect individuals in numerous ways. In a review of the scientific literature concerning wildfire smoke exposure, Reid et al. (2016) found wildfire smoke inhalation has been significantly associated with a decline in lung function and, specifically, an increase in asthma and chronic obstructive pulmonary disease presence. Additionally, Reid et al. (2016) determined research should be conducted to investigate other correlations, particularly correlations between smoke exposure and cardiovascular effects, birth and mental health outcomes, and overall mortality.

The emotional and psychological status of those involved with or affected by a wildfire is also an area of concern. All losses resulting from wildfire can cause

psychological hardships on those in affected areas. Home, property, and human losses due to disaster can cause emotional distress. New research has given attention to those who lose animals in disasters (Thompson & Every, 2016; Peck et al., 2002; Peck, 2005). The human-animal bond has been researched and linkages have been identified between it and the loss of human life in disasters (Thompson, 2015). For example, the 2001 outbreak of Foot and Mouth disease in England that resulted in mass death of farm animals, has been linked to an increase in psychological morbidity in farmers in rural communities (Peck, 2005). Peck et al. (2002) also found few farmers affected by the death of their animals reported a willingness to seek help from social or health authorities. Instead, farmers looked mostly to community members for support (Peck, 2005). Concern for pet safety can also delay people exiting from dangerous areas, as many people refuse to evacuate due to the presence of their animals. Farmers, ranchers and private horse owners alike strive to protect their pets and livestock during times of disaster, often at the expense of their own personal livelihood. Recently, three individuals died while trying to move livestock in the Oklahoma, Kansas and Texas wildfires (Levenson, Andone, & Burnside, 2017). Therefore, when animals are affected by wildfires, there should be a concern for human well-being, as well.

Wildfires and the Livestock Industry

Oklahoma Livestock Industries

Agriculture is a major contributor to the United States economy and the Oklahoma livestock industry serves as a large participant. The USDA reports \$992 billion of U.S. gross domestic product (GDP) contributed by agriculture, food, and

related industries (USDA ERS, 2018). Oklahoma is a major contributor to this GDP. In the 2017 USDA census study, the state of Oklahoma was ranked 23rd in cash receipts (USDA ERS, 2017). Specifically, in cash receipts for animals and animal products, Oklahoma had a total of \$372,301,967 in state receipts for these agriculture commodities (USDA ERS, 2017). Oklahoma has 77,200 farms, and a net farm income of \$1,390,127,000 (USDA ERS, 2017b). The 2017 agriculture economic review for Oklahoma, found cash receipts for livestock related products accounted for 78% of total agricultural receipts. Cash receipts for cattle and calves equated to \$3.26 billion and hog sales equated for \$918 million (Oklahoma Department of Agriculture, Food and Forestry [ODAFF], 2018). Additionally, poultry accounted for \$745 million in cash receipts (ODAFF, 2018). All cash receipts for these commodities experienced an increase of at least 6 percent in comparison to previous years (USDA ERS, 2017).

Specific to livestock, the state of Oklahoma is a strong contributor to the U.S. in terms of production. In 2017, the USDA state census ranked Oklahoma 3rd in beef cows with 2,131,000 head, 5th in cattle and calves with 5,100,000 head and 9th in feedlot cattle with 330,000 head (ODAFF, 2017). State rankings for other Oklahoma livestock commodities include: 9th in hog production, 13th in broiler production, 18th in dairy goat production, 26th in sheep and lambs and 31st in dairy cattle production (USDA, 2012). A 2007 report noted Oklahoma also ranked 6th in meat goat production (Extension, 2010). This mass production quantity in 9 unique animal industries makes Oklahoma an important supplier in the United States agricultural production system.

Oklahoma is also a major player in the equine industry, with a total of 251,000 horses in the state (American Horse Council Foundation, 2018). Multiple equine

disciplines are represented in Oklahoma and numerous equine events are held across the state. The horse racing industry alone has a direct economic impact of \$482 million to the Oklahoma economy. The recreational use of horses in the state also contributes a total of \$1.2 billion in impact. In 2012, over 612 horse events occurred in the state of Oklahoma (American Veterinary Medical Association, 2012). These events provide extreme economic benefits to communities. For example, equine events held in Oklahoma City alone account for over \$100 million in economic impact annually (Department of Agricultural Economics Oklahoma State University, 1989). As a whole, the Oklahoma equine industry has a GDP of \$3.9 billion and contributes 39,000 jobs (American Horse Council Foundation, 2018).

Oklahoma Wildfires and Livestock

Oklahoma wildfires have had significant impact on the livestock industries found within the state. Since Oklahoma provides such a large contribution to the United States GDP, it is important to recognize how these fires impact the livestock industry specifically. Additionally, recognizing how individuals and local communities can be affected due to livestock losses is essential.

In 2017, Derrell Peel, an agricultural economist who works for Oklahoma State University, shared wildfires affecting three Oklahoma counties in March of that year had an estimated economic impact of over \$16 million (Stotts, 2017). For the cattle industry, losses were broken down into livestock injuries and losses, fences and facilities burned, emergency feed needs, and loss of pasture and hay. These losses amounted to over \$14.6 million worth of losses to cattle operations (Stotts, 2017). Peel estimated that on top of

the monetary losses, over 3,000 head of cattle were lost (Stotts, 2017). These fires also affected the swine industry, with estimated losses of over \$2 million (Stotts, 2017). Over 6,000 sows were reported lost and an unknown number of weaned pigs also perished (Stotts, 2017). Just over a year later, two fires in April 2018 substantially impacted the Oklahoma livestock industry. Peel estimated these fires resulted in a loss of \$26.4 million dollars to cattle operations (Hays, 2018). Projected numbers for cattle losses included 1,600 deaths and over 2,000 miles of fencing. Official numbers have yet to be released for the 2018 fires.

The Federal Government is aware of the financial impact on the economy resulting from livestock losses due to wildfires and have thus, created assistance programs. In 2014, the USDA passed a law to permanently establish three programs providing aid to livestock producers after severe weather events. One of these programs, the Livestock Forage Disaster Program (LFP), is vital to livestock producers affected specifically by wildfire (USDA, 2018b). The LFP provides funding for land that has been compromised by wildfire or drought in which grazing capacity has been altered. For this program, LFP will provide partial feed costs on a per-animal basis for livestock fed on compromised land. A review of LFP and other Farm Act funding programs of United States agriculture was conducted in 2018 (MacLachlan et al., 2018). This review found that of the \$6.77 billion distributed by the LFP from 2008-2016, Oklahoma received one of the largest payment concentrations, receiving 21 percent of all payments. Payments from the LFP have continued to increase (MacLachlan et al., 2018; Covey & Kuhns, 2014). Ad hoc disaster assistance payments increased by \$0.9 billion from 2017 to 2018

(USDA, 2018b). Payments for livestock disaster programs are forecasted to increase substantially (USDA, 2018b).

The Role of Disaster Preparedness

The significant costs of natural disasters on the U.S. economy, the U.S. livestock industries, and on the lives of those in communities has resulted in national recognition. Since wildfires are considered natural disasters by FEMA, disaster phases recognized by the government are applied to these unplanned fire events. Phases of disaster are broken down into four key areas: preparedness, response, recovery, and mitigation (FEMA, 2015). The four phases are used by federal, state, and local governments to assist with categorizing Emergency Management methods (FEMA, 2015). Additionally, these phases are used in disaster research and are well known in disaster coordination. According to FEMA (2015), preparedness is the time in which preparations are made for a disaster through plans and activities with the aim to decrease losses. Spencer (2011) defines disaster preparedness similarly, stating disaster preparedness are “actions performed before an emergency” (2011). According to Spencer, these actions include holding planning and coordination meetings, writing procedures, training staff and volunteers, scheduling emergency drills and exercises, and ensuring emergency equipment is available and ready to use (Spencer, 2011).

FEMA addressed the importance of disaster preparedness in the Comprehensive Preparedness Guide 101 (FEMA, 2010), stating “engaging the community in the planning process will improve community resiliency by increasing the understanding of threats and hazards, participating in the planning process, and communicating the expected

actions for the community to undertake during an emergency.” Despite the importance, emergency preparedness can be quite challenging for rural communities. Spencer identified these challenges to include: resource limitations, remoteness, low population density and communication issues (Spencer, 2011). These challenges can make preparedness difficult, but community entities are still requested to participate in coordination and planning for disasters. Extension, or the Cooperative Extension System (CES), is one entity given a role in disaster assistance. This role in disaster has been given to the CES at the national, regional, and county level, where the CES is referenced as a resource for all phases of disaster (FEMA, 2015). The government, and other organizations, call for Extension to take part in all four phases of disaster and to collaborate with stakeholders. The CES is also a resource for livestock knowledge, and as such, has been specifically sought out for help during livestock related disasters (FEMA, 2016).

Extension and Disaster Preparedness

The Cooperative Extension Service

In 1914, the United States formalized a new responsibility for land-grant universities through the Smith Lever Act (National Institute of Food and Agriculture [NIFA], n.d.c). The act called for universities to be active in the application of education and research to rural agriculture communities. This was achieved by the creation of the CES, or Extension. This new service allowed academics to aid farmers during wartime by educating them on production methods. These new methods helped increase agricultural production during shortages of labor, food, and money. An increasing population

compounded these issues, forcing agricultural industries to meet a rising demand. As the population migrated to more urbanized areas, the CES continued to serve as a resource. However, the roles of the CES began to transform, as the CES now supplied education in different topics other than agriculture. These new additions included family nutrition, economics, positive youth development and many other areas where education assisted with societal needs (NIFA, n.d.a).

Today, the CES continues to serve numerous roles in the Land-Grant University system. It is recognized as a non-credit educational network that partners with local, state, and federal governments (NIFA, n.d.b). The United States Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA) serves as the federal partner for the CES (NIFA, n.d.c). NIFA supports the CES by providing public needs directly to regions and counties throughout the United States (NIFA, n.d.a). This partnership connects the CES directly with federal agencies, making it an important piece of the federal agriculture system.

The CES's Role in Disaster Defined

In 1979, the Federal Emergency Management Agency (FEMA) was created to assist with disasters and this agency assigned roles to the CES in all four phases of disaster (FEMA, 2018a). FEMA also identifies the CES as an assistant with the National Preparedness Goal, which lists disaster prevention, protection, mitigation, response, and recovery as its mission areas (FEMA, 2018b; Black, 2012). Specifically, FEMA named the CES as an agency who should help with agriculture and livestock disaster assistance (FEMA, 2017). Recognition of the CES in this area is also found with FEMA's

educational trainings in the Emergency Management Institute (FEMA, 2013).

Additionally, FEMA has included the CES as support for the core capabilities needed in times of national disasters found in the Emergency Support Function #11 (ESF-11) for Agriculture and Natural Resources (FEMA, 2016). In ESF-11, the Extension Disaster Education Network (EDEN), a multi-state collaboration by the CES to increase disaster services to citizens, is listed as a support agency during national emergencies (FEMA, 2016; NIFA, n.d.c).

EDEN was formed in 1996 when a group of Extension directors developed a multi-state collaboration to respond to disasters more effectively (EDEN, 2018). EDEN is now a national collaboration and funded in part by NIFA. EDEN's mission is to reduce disaster impact by sharing research-based educational materials (EDEN, 2018b). EDEN believes local Extension staff should build partnerships, provide education, assume local roles, and collaborate in disaster preparation, mitigation, and recovery (EDEN, 2018b; NIFA, n.d.c). EDEN's push for national collaboration and the inclusion of EDEN in federal documents further details Extension's role. This identification reveals a national expectation of Extension to be active in disaster aid, particularly those involving livestock and agriculture. Due to the partnership the CES has with the USDA, it is significant to point out that the CES may serve additional roles not specified. The USDA is listed in multiple FEMA documents as a resource during disasters, while the CES may not be explicitly named (FEMA, 2016).

Extension workers also recognize the need for regional collaboration. Many states have their own disaster education program (Texas A&M AgriLife Extension, 2018; University of Illinois Extension, 2018; Purdue Agriculture, n.d.). Some states have also

prioritized research and clarified the role of county Extension workers in disaster preparedness and response (Eighmy et al., 2012). According to Eighmy et al. (2012), county Extension Educators should be actively involved in emergency planning, collaboration, and recovery assistance. Due to the definition of these roles, Extension personnel may contribute to planning for livestock related disasters as directed by FEMA in ESF-11. However, these roles should be done in partnership with other disaster agencies to ensure an affective plan is in place for livestock.

The CES's Defined Role with Emergency Management

Researchers state relationships should exist between county Extension staff and emergency managers respectively (Eighmy et al., 2012; Smith et al., 2012). These relationships should be fostered at both the county and state level. Some state support functions require coordination between emergency management and the CES to be active (Vermont Emergency Management, 2015; Eighmy et al., 2012). Additionally, these collaborations are consistently referenced in academic research in Extension (Porr, Brown, & Splan, 2016; Smith et al., 2012). Porr et al. (2016) recognized Extension training programs may increase partnerships between Extension and emergency management. According to Porr et al. (2016), these partnerships could allow for greater local community support (Porr et al., 2016). To evaluate the effectiveness of these programs, Porr et al. (2016) conducted research to assess the impact of a Technical Large Animal Emergency Rescue training that took place over the course of two years. Beginning in 2011, the training was offered to firefighters, police officers, animal control, veterinarians, and other emergency responders (Porr, Brown, & Splan, 2011). The goal of the training was to increase knowledge of animal behavior. In their evaluation, Porr et al.

(2016) shared an unexpected implication from the research was the relationships the training fostered. The researchers determined these new relationships could improve future outcomes in emergencies situations and should be supported (Porr et al., 2016).

Smith, Black, and Williams (2012) also recognized the need for collaboration between emergency management and Extension professionals. Recognizing EDEN as a resource, the researchers felt the CES should aid in training. Smith et al. (2012) highlighted Extension's ability to promote community involvement in emergency prevention, mitigation, preparedness, and recovery. However, Smith et al. (2012) pointed out the CES must also be actively involved in emergency management's exercises and understand the National Incident Management System (NIMS) and the Incident Command System (ICS) (Smith et al., 2012).

A study by Eighmy et al. (2012) conducted a survey to evaluate the defined roles of Extension at the county level. Among the results, researchers concluded over half of the county Extension offices in North Dakota had a role in county emergency planning (Eighmy et al., 2012). Extension personnel were also listed as potential, or current, members of the county Emergency Management Boards (Eighmy et al., 2012).

Research on CES's Past Roles in Disaster Preparedness

When discussing disaster preparation, most of the research literature references EDEN as CES's tool for preparedness. After the 1993 floods in North Dakota, the CES recognized a need for better preparedness (Koch, 1999). The CES met this need by creating EDEN, an established CES network. Koch (1999) shared EDEN served as a positive resource for the CES after the 1997 floods. Multiple states used EDEN's pre-

made materials while assisting communities affected by the floods (Koch, 1999).

Additionally, EDEN representatives were acknowledged by Koch (1999) as a source of information for planning new programs to educate Extension staff.

Lynette Black (2012) sought to find other areas in which the CES could aid in disaster preparedness. Black (2012) pointed to EDEN as a source for preparedness, but found additional programs led by the CES to also be areas of interest. These programs included: 4-H Youth Development, Teen Community Emergency Response Team, and the Alert, Evacuate, and Shelter. Black (2012) also referenced multiple surveys that found youth as a practical resource for the dissemination of emergency preparedness information. One way youth aided in preparedness was through the collection of geospatial map data (Powell, Smith, & Black, 2009).

Other state CES's have worked to create and evaluate Extension education programs for preparedness. Gary, Allred, and LoGiusice (2014) conducted an evaluation of a preparedness program the CES of Cornell University created. The evaluation showed an effective increase in participant knowledge of flood adaptation and post-flood responses post training (Gary, Allred, & LoGudice, 2014). Therefore, workshops conducted by the CES have positively affected people and their ability to be prepared (Gary et al., 2014). Mississippi created trainings as well, with Downey et al. (2018) creating a program to assist with volunteer and donation management.

Evaluation of the Extension personnel and their ability to respond to disaster demands has also occurred. Telg et al. (2008) used a survey to determine Extension faculty's preparedness and needs. The researchers determined that while materials were

available, Extension faculty were ill-prepared for the 2004 Florida hurricanes (Telg et al., 2008). Telg et al. (2008) shared faculty's professional development and training should be prioritized for the future. One way this might be done is through facilitated scenario planning preparation (Rowntree, Raven, Schwehofer, Buskirk, & Colyn, 2012). Eighmy et al. (2012) also sought to determine Extension personnel's preparedness levels and needs. The researchers found gaps in current trainings for preparedness (Eighmy et al., 2012). In response, the North Dakota Extension Service created new materials to meet these needs (Eighmy et al., 2012).

Extension Partnerships and Livestock Related Disaster Preparedness for Wildfires

Wildfires are one disaster type for which preparedness is imperative. Wildfires can affect communities, individuals within them, and livestock in the given area. Impacts can come in many forms including strains on the economy, environment, and individual well-being. Wildfires have been identified as a contributor to the deterioration of health of an individual, both physiologically and psychologically (Johnston et al., 2012; Reid et al., 2016; Peck et al., 2002). Those with livestock are at a particular risk, as loss of livestock due to disaster has been associated with increased human mortality during and after events (Levenson et al., 2017). Individuals and communities within the state of Oklahoma are susceptible to these risks – having a large fire frequency and robust livestock industry. Preparation for these events is, therefore, imperative as prepared communities are found to be more resilient (Spencer, 2011).

The Cooperative Extension System has been given a role in assisting with disaster planning. The roles Extension personnel play in disasters are numerous and can be

diverse in nature. However, these roles are recognized by national, regional, and state governments. One specific role Extension has been given by FEMA is identified in ESF-11, which states Extension will assist with livestock related disasters (FEMA, 2016). Extension is encouraged to partner with emergency management to create community plans that include strategies for livestock potentially affected (Eighmy et al., 2012; Smith, Black, & Williams, 2012). Materials created through these partnerships can strengthen response in disaster situations. Therefore, partnerships and preparedness level should be evaluated to determine presence and strength.

Community Capitals Framework

To explore partnerships and overall preparedness of a community, current resources and relationships must be inventoried and a theoretical framework must be applied to evaluate resiliency. A recent framework, used for analyzing community resiliency, has been applied to community disaster research (Koch et al., 2017; Kerr, Sanders, Moulton, & Gaffney, 2018). This framework, known as the Community Capitals Framework (CCF), was developed by Flora and Flora (2013) to assess community assets by analyzing community functions through the identification of “capitals” (Flora & Flora, 2013). There are seven capitals: natural, cultural, human, social, political, financial, and built (Flora & Flora, 2013; Koch et al., 2017; Emery & Flora, 2006). Each individual capital is believed to add specific value and quality to a community, revealing a community’s assets (Koch et al., 2017). The interconnection and interaction of these capitals can impact the community’s status (Pretty, 1998; Flora & Flora, 2013). Communities with strong interactions between capitals, are said to have healthy ecosystems, vital economies, and greater social well-being (Flora & Flora, 2013).

Therefore, identification and measurement of capitals can help with assessment of a community's current status, allowing for strategic planning for future community improvements (Jacobs, 2011a).

Community Capitals Framework was created specifically for rural communities (Flora and Flora, 2013). Therefore, a common understanding of the definition of rural and what comprises a community is imperative to understanding CCF. Rural is defined as nonmetropolitan counties, or “counties that lie outside a standard metropolitan area and do not include a city of 50,000 or more inhabitants” (Flora & Flora, 2013, pg. 25). This definition is inclusive of any areas meeting the criterion, not excluding areas not having large agricultural areas (Flora & Flora, 2013). Community is defined as “a place or location in which groups of people interact for mutual support” (Flora & Flora, 2013, pg. 25). This can be small towns, or areas, where people commonly interact with one another as a group.

The foundational assumption of CCF is that these communities have capital that can be utilized. Capital are resources that are transactional or can be invested to create new resources (Flora & Flora, 2013). Capital, also referred to as assets, can come in seven different forms, each providing differing resources (Flora & Flora, 2013; Jacobs, 2011a; Beauliéu, 2014). For successful growth and development of a community, all seven capitals must be present and represented individually (Flora & Flora, 2013). Additionally, intersection of all seven capitals reveals community sustainability – with strong interactions deeming the community as sustainable (Flora & Flora, 2013). Due to the influence of capitals on communities, researchers have begun to use CCF to analyze community development and susceptibility (Flora & Flora, 2013; Koch et al., 2017;

Emery & Flora, 2006; Jacobs, 2011a; Duffy, Kline, Swanson, Best, & McKinnon, 2017). Application of CCF to communities includes identification of capital representation, observation of capital flow, exploration of interactions, and evaluation of overall impact (Emery & Flora, 2009). Analysis of these factors, in turn, identifies areas in which investments can be made, allowing for a community to be strengthened (Jacobs, 2011a). Identification of these areas is one reason this framework is used in disaster research, as investment into areas can allow for stronger recovery (Koch et al., 2017).

The seven capitals identified within CCF all provide a unique property to the community. However, each capital can be influenced or altered due to the strength or presence of others. Additionally, the presence and representation of these capitals can be influenced by disasters (Stofferahn, 2012) and how a community responds to a disaster (Koch et al., 2017; Stofferahn, 2012; Smith & Boruff, 2011). One capital often affected by disasters is natural capital (Stofferahn, 2012). Natural capital refers to the natural environmental assets present within a community (Emery & Flora, 2009). This includes the weather, geographic location, and presence of natural resources (Flora & Flora, 2013; Emery & Flora, 2009). Human activities can influence natural capital. For example, land use, water practices, presence of confined-animal feeding operations, biodiversity, and climate change can alter natural capital representation (Flora & Flora, 2013; Jacobs, 2011b). An area's natural characteristics such as wildlife habitats and fertile soil can also add richness to a community (Jacobs, 2011b). Destruction of these resources can also weaken this capital, which can occur during disasters (Koch et al., 2017; Stofferahn, 2012). In some instances, natural capital has been found to be interconnected with

cultural capital (Pretty, 1998). Natural capital can influence community values and therefore, shape some of the cultural capital connected to a place (Pretty, 1998).

Cultural capital is comprised of how individuals, within the community, view the world (Flora & Flora, 2013). These views are said to provide each community with a “distinctive character” (Jacobs, 2011c, p. 1). Numerous factors alter a community’s cultural capital. For instance, an individual’s involvement with family and social institutions can drastically impact cultural capital (Flora & Flora, 2013). A family’s imparted legacy can also have a large impact on cultural capital, as individuals may have different ideas and frames of the world due to how they were raised (Flora & Flora, 2013). Other aspects may also affect cultural capital, such as identity, traditions, race, ethnicity, gender, spirituality, history, occupations, and class found within communities (Flora & Flora, 2013; Jacob, 2011c). In reference to disasters, this capital has been identified as important to recovery efforts as it influences the viewpoint of affected individuals (Stofferahn, 2012).

Human capital is quite different, focusing on an individual’s abilities rather than their views (Flora & Flora, 2013). An individual’s abilities, as well as their capacity to attain and develop resources, are defined as their human capital (Flora & Flora, 2013). The strength of this capital is determined by the individual’s aptitude to enhance their current resources and gain access to outside resources (Emery & Flora, 2009). Those who are able to do this well, are said to have strong human capital (Emery & Flora, 2009). Numerous factors can influence human capital, including health, education, and leadership abilities (Flora & Flora, 2013). For example, someone with a college degree would have higher human capital than an individual in grade school, simply due to their

level of education. Investments in human capital can easily be made to increase its strength (Flora & Flora, 2013). For example, increasing accessibility to healthcare for community members can result in better individual health, which in turn allows individuals to create more resources resulting in stronger human capital. Important forms of human capital have been identified by researchers, with education and training considered most important (Becker, 2002; Flora & Flora, 2013). Researchers have also recognized human capital can be tied to other capitals and these interactions have been identified as necessary elements in disaster recovery (Jacobs, 2011d; Stofferahn, 2012). An example of human capital interaction can be seen when an individual with leadership ability (human capital) works in a position allowing them to have stronger social capital.

Social capital is identified through the presence and strength of relationships and connections between individuals within a community (Flora & Flora, 2013). Three key elements of social capital are identified as networks, trust, and access to resources (Schneider, 2004). In particular, social networks are imperative to community success (Freuchete, 2011). Networks can be formed both internally and externally and can provide strength for community development (Flora & Flora, 2013). Researchers have recognized the benefit of these connections particularly with social and economic development (Flora & Flora, 2013).

Associations are important to social capital; however, they are not limited to the community. Instead, associations with outside organizations are encouraged, as they can strengthen capital (Flora & Flora, 2013). To reach optimal strength with these associations, relationships must be of quality, not merely existing (Freuchte, 2011). Therefore, sheer number of associations is not as pivotal (Freuchte, 2011).

Relationship formation determines the type of social capital present. The relationships forming social capital are referred to as either bonding or bridging (Flora & Flora, 2013). Bonding social capital, the connection of those who have similar backgrounds, (Flora & Flora, 2013, pg. 125) is found when a bond between individuals is built around some basic social characteristic such as class or kinship (Flora & Flora, 2013). For example, a relationship built between individuals after working on a neighborhood community project together qualifies as bonding social capital. In contrast, bridging social capital connects individuals to groups that are more diverse in nature. This may include individuals or groups from different communities or with varying backgrounds (Flora & Flora, 2013). Bridging social capital, therefore, is not as emotionally charged as bonding social capital (Flora & Flora, 2013). Instead, most bridging connections are only used for single-purposes (Flora & Flora, 2013). For example, a local community group who joins a regional program to help improve community health.

The presence of social capital has been thoroughly documented in disaster research, with both bonding and bridging capital identified post disaster (Smith & Boruff, 2011). It is important to recognize these two types of social capital are not always mutually exclusive though, as bonding and bridging can reinforce each other (Flora & Flora, 2013). Reinforcement can allow community actions to become more effective (Flora & Flora, 2013). Alternatively, when individual's work independently and are solely self-reliant, community efforts for change can be hindered due to a lack of social capital (Flora & Flora, 2013). Communities without strong social capital are also more likely to experience health and financial burdens (Flora & Flora, 2013).

An entire framework has been created for social capital to evaluate the presence of bonding and bridging as they relate to change and community strength (Lin, Cook, & Burt, 2001). This alternative framework, called the Social Capital Theory, has connected social capital to numerous community development areas, including economic development (Flora & Flora, 2013).

A community's political capital is comprised of their access to resources and power (Flora & Flora, 2013). Power is the ability of a community to distribute "both public and private resources within the community" (Flora & Flora, 2013, p. 169). Power can be presented in many forms, and its utilization can influence community structures and functions (Jacobs, 2011g; Flora & Flora, 2013). Jacobs (2011g) shared power is "having leverage to get things done" within a community (pg.1). Power presence is a valuable, key component in political capital (Flora & Flora, 2013). However, researchers have yet to discover a way to measure its presence and its distribution (Flora & Flora, 2013).

Connections with powerful individuals, organizations, and resources increases a community's political capital which is not exclusive to those with political roles in the community (Emery & Flora, 2006). Instead, political capital can occur both on an individual level or within groups (Jacobs, 2011g). Those with political capital have the ability to influence decision-making distribution and the creation of rules and regulations (Flora & Flora, 2013).

Political capital as a whole, can affect the community's atmosphere, both between groups and individuals. A community with strong political capital is identified by inclusive decision making, strong presence of individuals and organizations in rule

creation, and an overall ability to have power and access to resources within the community. This may not exist if certain individuals or groups are not heard (Jacobs, 2011g). Communities with disheartened individuals who feel their voice is not heard may lack political capital (Jacobs, 2011g). Exclusivity in community decision making might also be a sign of weakness for this capital (Jacobs, 2011g). Recognizing the strength of political capital within a community can be difficult since sub-groups of communities are often present within one specific area. Therefore, evaluation of political capital can be explored within sub-groups or within communities at large.

Political capital's interactions with other capitals have been identified as factors in expedited disaster response (Stofferahn, 2012). Additionally, dominance of other capitals has been found to influence political capital (Flora & Flora, 2013). For instance, researchers have linked political capital and social capital as affectors of one another (Jacobs, 2011g; Flora & Flora, 2013). Flora and Flora (2013) found this in rural communities with high bonding social capital. When bonding was high, alternative views on rules and regulations were discouraged, while accepting the community's status quo was encouraged (Flora & Flora, 2013).

Financial capital is quite different than other capitals. It is defined as the financial resources a community uses for capacity building (Emery & Flora, 2006). Unlike other capitals, financial capital is liquid in nature and can easily be converted into monetary instruments and assets (Flora & Flora, 2013). Financial capital is the easiest capital to measure (Jacobs, 2011e). Identification of financial capital looks at a community's overall private and public investments and does not look at money consumed (Flora & Flora, 2013; Jacobs, 2011e). Investments come in numerous forms, but as a whole, they

are used for community development and services (Flora & Flora, 2013). Financial capital is available from numerous sources including: bonds, loans, grants, stocks, savings, foundations, and gifts (Flora & Flora, 2013; Jacobs, 2011e; Beaulieu, 2014). Combining all of these areas provides researchers with a complete representation of financial capital within a community.

Like other capitals, presence and strength of financial capital can be linked to other capital types. These connections can positively impact communities. For example, a city's increased sales tax for building new community resources can affect four other capitals - political, social, human, and natural capital (Jacobs, 2011e). Moreover, communities rely on financial capital for continuous stability and vibrancy (Beaulieu, 2014). Little community development can occur without its presence; therefore, it is recognized as one of the most impactful capitals (Jacobs, 2011e). Additionally, in disaster research, financial capital has been identified as an important factor for community restoration (Stofferahn, 2012).

Built capital includes the physical structures present within a community. These can include: housing, banks, roads, airports, businesses, police and fire-protection facilities, and other infrastructures found within the community (Flora & Flora, 2006; Beaulieu, 2014). By definition, built capital is any installation that is permanent, physical, enables network communication and provides access to support (Flora & Flora, 2013). Built capital is divided into two areas, access and consumption (Flora & Flora, 2013). Access is the availability of built capital to individuals and groups, while consumption looks at whether resources can be shared (Flora & Flora, 2016). The presence of this

capital is what provides communities with basic services, facilities, and structures that are often expected (Jacobs, 2011f).

Built capital considered exclusive, can be denied to specific individuals or groups, such as water and electricity (Flora & Flora, 2013). Inclusive resources consist of public goods, such as parks and buildings (Flora & Flora, 2013). Consumption is quite different from access, as it defines whether the good or service is available to be shared (Flora & Flora, 2013). A good or service is determined to be either joint or rival in consumption. Television stations, radios, and roads are all examples of joint consumption items because numerous people can use these goods simultaneously, without denying access to others. Rival consumption items cannot be used by others simultaneously (Flora & Flora, 2013). Most tangible items fit into this category. For example, a tool being used to build a house can only be used by one builder at a time.

Built capital is interconnected with other capitals and is most effective when it is paired with at least one other capital (Jacobs, 2011f). One key interaction is with cultural capital (Flora & Flora, 2013). Built capital and cultural capital are strongly dependent on each other as a community's culture can influence views on the type, presence, and quality of built capital (Flora & Flora, 2013). It is important to recognize, overall, the presence of built capital is imperative to the productivity and well-being of a community (Flora et al., 2004). Additionally, recognizing built capital is highly affected in times of disaster is vital, as this loss can affect community well-being (Stofferahn, 2012). Built capital can also impact individual well-being, by improving physical and mental health of individuals, by allowing them to use built capital in their community life (Beaulieu, 2014).

Interaction of each capital has been discussed in detail above. However, it is notable some communities may have inadequate supplies of each capital. Some capitals are also interconnected (Pretty, 1998; Flora & Flora, 2013), however, very little work has been published on the strength of interconnections and the success of capital specific investment (Pigg, Gasteyer, Martin, Apaliya, & Keating, 2013). Identifying where interconnections are lacking between capitals, can provide key points for resource investments to occur. Investment in human, social, and financial capital can help raise other capital presence (Emery & Flora, 2006). Research has shown investments, particularly in social capital, can result in a phenomenon called “spiraling up” (Emery & Flora, 2006). This phenomenon is found when investment in any one capital increases the strength of others (Emery & Flora, 2006). Researchers suggest investigation into spiraling-up should occur within community development (Emery & Flora, 2006).

CCF Research

Analysis of the capitals mentioned above is used in disaster research to explore the community’s assets and resiliency. The use of Community Capitals Framework (CCF) as a theoretical framework is relatively new, however, it had been utilized in disaster, agriculture, and Extension research literature. Specific to disasters, CCF has been used to explore recovery efforts and analyze community resiliency (Koch et al. 2017; Stofferahn, 2012; Kais & Islam, 2016; Smith & Boruff, 2011). Researchers have also identified which capitals have created a “spiraling-up” affect during recovery efforts, thus, empowering communities (Emery & Flora, 2006). Agricultural research with CCF has focused on community-based agriculture and agritourism (Duffy et al. 2017; Flora & Bregendahl, 2012). These studies have analyzed capital representation and

the effects of capital presence on community success and impact. Extension has used CCF for three key things – a model for material creation, an evaluation tool for programming, and a guide for future development. As of yet, the Community Capitals Framework has not been used for livestock disaster research within Extension, specifically. However, it's uses in disasters, agriculture, and Extension make it a viable framework for Extension livestock disaster research.

CCF Research: Disasters

Specific to disaster, CCF has been utilized extensively for disaster recovery and resiliency analysis (Koch et al. 2017; Stofferahn, 2012; Kais & Islam, 2016; Smith & Boruff, 2011). Publications have focused on exploring both the presence and strength of individual capitals. Additionally, researchers have evaluated similarity between capitals, to determine if connections between specific capitals exist.

A case study evaluated by Stofferahn (2012) explored the recovery efforts in a small town in North Dakota. The town was hit by an EF 4 tornado in 2007, however their recovery from the disaster was quick and efficient. Due to this rapid recovery, Stofferahn (2012) sought to identify characteristics, in the form of capitals, that enhanced recovery time. Researchers used an ethnographic research method to explore each CCF capital individually to determine roles in the recovery process and identify key capitals contributing to the “spiraling up” process previously defined by Emery and Flora (2006) (Stofferahn, 2012). Interviews were conducted with twenty-two community members identified as “knowledgeable about the recovery” (Stofferahn, 2012, p 584). Respondents were asked to identify and discuss community recovery specific to a given capital, with each capital being clearly defined before participants could respond. Additionally,

newspaper articles, government documents, and pictures were analyzed to identify if capitals had been revealed in these documents. Stofferahn (2012) identified two capitals spiraling down post tornado – built and natural. When exploring how the community recovered, cultural capital was recognized as the key mobilizing capital (Stofferahn, 2012). Specifically, the community’s work ethic and heritage were credited with heavily influencing the community’s response to the natural disaster (Stofferahn, 2012). The cultural capital facilitated the restoration of other capitals as well, including social, human, built, natural, and financial (Stofferahn, 2012). Other capitals were also identified in the spiraling up process, with both human and social capital being listed as necessary elements during recovery (Stofferahn, 2012). Even with three capitals identified as spiraling-up, it is important to recognize all seven capitals were identified in the recovery process (Stofferahn, 2012). Interconnections between capitals were also found (Stofferahn, 2012). For example, human, social, cultural, and political capitals were all credited in the mobilization of financial capital which aided in the restoration of built and natural capital lost from the tornado (Stofferahn, 2012).

Smith and Boruff (2011) explored another disaster, a flood in Western Australia, to identify capitals present during a long-term recovery process. In March 1999, Cyclone Elaine hit the Australian coast and flooded over half of residential homes and almost all businesses (Smith & Boruff, 2011). Similar to Stofferahn, researchers conducted interviews and reviewed historical reports from government, fire and emergency services, news, and media outlets to explore capital presence. Twenty-one individuals were interviewed and asked to tell about their experiences during the flood. Smith and Boruff (2011) evaluated the results, exploring when the community entered each phase of

recovery, and if capitals were present. During the first week post-disaster, strong bonding and bridging relationships (social capital) were identified (Smith & Boruff, 2011). These robust social relationships were continuously identified throughout the recovery process, even in later years (Smith & Boruff, 2011). Political capital and human capital were also found within local leadership and emphasized by respondents (Smith & Boruff, 2011).

CCF Research: Agriculture

Within agriculture, CCF research has focused on program impact on communities. In 2012, the CCF was used to examine community-supported agriculture (CSA), a system in which consumers connect directly with farmers, receiving a specified amount of food directly from that producer's harvest (Flora & Bregendahl, 2012). For this study, a survey was distributed to three collaborative CSAs. This survey allowed both producers and members (consumers) who purchased products to provide their level of agreement about their experiences with CSA participation for multiple, specific benefit items. Survey results were analyzed and placed into one of six community capitals, as built and financial capital were combined for analysis since only two items were present to measure built capital.

Producers reported natural capital was the greatest benefit (Flora & Bregendahl, 2012). Social and cultural capital were also highly ranked (Flora & Bregendahl, 2012). Producers listed human, political, and financial/built capital, however these capitals were not listed to as high a degree as the other capitals (Flora & Bregendahl, 2012). Member reports were different, with financial/built capital being ranked as the greatest experience from their participation in the CSA (Flora & Bregendahl, 2012). Natural capital ranked as

the second highest benefit by members, followed in ranking order by human, social, cultural, and political capitals (Flora & Bregendahl, 2012).

Retention rate of both producers and members was also evaluated. Type and amount of capitals reported beneficial by participants were found to correlate with retention rate (Flora & Bregendahl, 2012). Members with long-term participation also identified diverse beneficial capitals, however political capital was deemed the major product from their membership (Flora & Bregendahl, 2012).

Follow-up telephone interviews also occurred with open-ended questions allowing for explanation about why they participated in CSAs. Producers referenced numerous capitals when interviewed, though financial capital was the most cited, referenced by 76% of producers (Flora & Bregendahl, 2012). Social, cultural, human, and natural capital were also mentioned (Flora & Bregendahl, 2012).

An exploration of Cuban agritourism by Duffy et al. (2017) also used CCF. Duffy et al. (2017) sought to identify the impact of tourism on local communities by looking at a Cuban organipónico, an urban, organic cooperative farm. Farm workers and local residents were interviewed to discuss the relationship between the farm, community, and tourism. Themes were identified in responses and grouped into corresponding capitals.

Natural capital was found in the use of the land for agricultural purposes, as a direct source of produce for community, and for educational purposes, as an educational center was built to provide information on environment stability and recharge (Duffy et al., 2017). Additionally, natural capital was identified to include: enhanced biodiversity, improvement of soil quality, and water conservation (Duffy et al., 2017).

The presence of cultural capital was found in the co-op member's dedication to the farm and in their care for one another (Duffy et al., 2017). The organipónico's placement in an urban/sub-urban area also added to the cultural capital as community members emphasized the importance of agriculture in these environments (Duffy et al., 2017). The community also valued agricultural education on farming techniques and skills, which also emerged as cultural capital (Duffy et al., 2017).

Human capital was identified both with employees who worked on the farm and with educational partnerships between the farm and local schools (Duffy et al., 2017). Social capital was identified within the community and found to be increasing due to the presence of the farm within the community (Duffy et al., 2017). The farm created a sense of family with those involved in the cooperative, thus, increasing social capital amongst individuals (Duffy et al., 2017). Additionally, members credited the farm with the occurrence of more social gatherings (Duffy et al., 2017). The need for fresh food provided by the farm also attributed to social capital, as this led to community vendors being able to trade with other local institutions (Duffy et al., 2017).

Political capital was also important in this project. Community members, participating in the program, reported empowerment to participate in farm decision-making (Duffy et al., 2017). Additionally, working on the farm was found to empower women and older adults in the community (Duffy et al., 2017). The farm provided almost two hundred jobs, which along with money procured by the farm, attributed to financial capital within this community (Duffy et al., 2017). Built capital was found in improved infrastructure development, such as better irrigation systems and laboratories (Duffy et al., 2017). The built infrastructure was also accredited with strengthening the pull of

agritourism (Duffy et al., 2017). However, human, social, political, and financial capitals were identified as the key capitals impacting tourism (Duffy et al., 2017). There was interaction between these key capitals and all four helped to strengthen additional capitals (Duffy et al., 2017). Tourism was said to be creating a “spiraling-up” effect, increasing natural, human, political, financial, and built capital (Duffy et al., 2017; Emory & Flora, 2006).

CCF Research: Extension

Extension has used CCF as a source for material creation, program evaluation, and future development planning (Fritz, Boren, Trudeau, & Wheeler, 2007; Goreham, Tweeten, Taylor, & Fier, 2009; Nathaniel & Kinsey, 2013; Mattos, 2015; Ramos, 2016; Bhattacharyya, Templin, Messer, & Chazdon, 2017; Vettern & Flage, 2018).

Additionally, researchers have recognized and encouraged the CCF be applied to Extension programing, revealing its functionality in numerous capacities (Goreham et al., 2009; Mattos, 2015; Ramos, 2016; Bhattacharyya et al., 2017). North Dakota Extension has a strong presence in the literature for creation of materials based on CCF, particularly for programs in rural communities. Goreham, Tweeten, Taylor, and Fier (2009) created a program titled Beginning Again North Dakota (C) which sought to improve economic development in rural communities. The goals of the program were to improve quality of life, promote growth for local economies, and increase overall environmental well-being. The program was supported by the North Dakota Legislature and was presented as an effort to increase community strength (Goreham et al., 2009). The BAND program created numerous materials to assisted with CCF assessment. These materials included a guide to establish leadership teams, improve local development organizational awareness,

assist with committee job descriptions, and evaluate capital presence through material collection (Goreham et al., 2009). This program also encouraged communities to create a strategic plan that promoted a community development project, which would be nearly complete when utilizing the BAND program (Goreham et al., 2009).

Another North Dakota study sought to explore performance levels of a 4-H Youth and Families with Promise (YFP) program (Vettern & Flage, 2018). A mapping technique called Ripple Effect Mapping, was used to evaluate program outcomes and served as a guide for a focus group exploring intended and unintended impacts of the program (Vettern & Flage, 2018). Participants were paired within a focus group for interviews, in which inquiry-based questions were asked (Vettern & Flage, 2018). Questions focused on program success and positive qualities found within them (Vettern & Flage, 2018). Results were mapped in a computer-based program allowing researchers to see “ripples”, or areas in the community affected by the program, based on participants’ narratives (Vettern & Flage, 2018). These maps were then analyzed using CCF to determine capital affects (Vettern & Flage, 2018). Analysis revealed all seven capitals were present, with human, social, cultural, and political capitals having the greatest expansions (Vettern & Flage, 2018). Interestingly, the analysis also showed all seven capitals expanded in unintended areas, as well as in intended areas (Vettern & Flage, 2018).

Extension has also utilized CCF when developing evaluation materials, which are tools of the trade used in programming. Nathaniel and Kinsey (2013) presented CCF as a way to map 4-H program impact and determine positive youth development success. Using each individual capital as a point on the map, Nathaniel and Kinsey (2013) shared

these maps would create a visual representation of relationship formation and overall results of programming. The suggested mapping system evaluates activity purpose, effect on participants' attitudes, behaviors, and actions; as well as overall benefits and community impacts (Nathaniel & Kinsey, 2013). Similarly, Fritz et al. (2007) used the CCF in combination with community survival indicators to create a guide for those in Extension, or those making rural community partnership decisions, to use when making programming decisions. A panel of graduate students in leadership education were tasked with combining CCF and the community survival indicators into tables, showing how these two frameworks combined and provided application ideas (Fritz et al., 2007). The researchers also provided examples for each combination in the table (Fritz et al., 2007). Validation of results was sought at the Association for Leadership Educators' Conference, where seventeen participants reviewed and edited materials, making any necessary additions (Fritz et al., 2007). Upon completion, authors considered the tool created to be an appropriate resource for Extension to use CCF in evaluation of communities needing assistance (Fritz et al., 2007). Other programs have also recognized the use of CCF as a community development model and have encouraged its use for growth and inclusion within communities (Mattos, 2015; Ramos, 2016; Bhattacharyya et al., 2017).

CCF Research: Extension and Disasters

The use of CCF in Extension disaster research is relatively new. Little research has been published showing its application in disaster Extension work. However, EDEN presentations on CCF application and other publications are becoming more frequent (Kerr et al., 2018; Koch & Mueller, 2017; Mueller & Koch, 2016). A recent article by

Kerr et al. (2018) referenced CCF as a framework used by a recovery team in Washington state. The team was responding to wildfires and mudslides that occurred in Washington between 2014 and 2015 (Kerr et al., 2018). After a mudslide in 2014, Snohomish County Extension partnered with Emergency Management to create a recovery team to provide expertise in diverse areas to increase recovery capabilities (Kerr et al., 2018). This team consisted of personnel, faculty, staff, specialists, associates, and students from the following areas: Extension, 4-H, youth development, economic development, communication, livestock, metropolitan center for applied research and Extension, digital initiatives, and governmental studies and services (Kerr et al., 2018). This group was tasked with the creation of a disaster program to help with Extension efforts in the future (Kerr et al., 2018). The program, called the Extension Disaster Capacity Program, was based on CCF and is expected to increase future recovery contributions of the university (Kerr et al., 2018).

This program is not the first of its kind. In 2017, researchers from North Dakota State University, University of Nebraska-Lincoln, Oklahoma State University, Kansas State University and South Dakota State University came together to create a disaster recovery plan using the CCF (Koch et al., 2017). Using BAND materials as a guide, this group used three case studies of pre- and post-disaster capitals to provide leaders with guides for assessment, preparation, and recovery, detailing how to inventory and leverage community capitals (Koch et al., 2017). Materials created showed examples of successful recovery from a drought, a tornado, and a flood (Koch et al., 2017).

Koch et al.'s (2017) plan had two key components, inventorying and leveraging. In the inventory phase, communities were instructed to first organize a leadership team.

This team would decide the function of the group (including goals) determine who will serve as decision makers, make sure those within the team are able to have influence in the community, and prepare for financial decisions by budgeting. After creation of the team, the plan calls for collection, organization, and prioritization of community assets (Koch et al., 2017). These three steps allow the leadership team to determine which capitals are present in the community and which capitals to focus on when planning recovery goals (Koch et al., 2017). Once assets have been prioritized, the team will shift to the second component, leveraging those assets. This will be done through the creation of capital specific recovery goals used to enhance the proposed focal capitals (Koch et al., 2017). These goals will be discussed and then implemented into an active plan which specifies goals, objectives, actions, deadlines, responsible parties, and resources needed (Koch et al., 2017). Evaluation and celebration of this plan are the final steps (Koch et al., 2017). As a whole, this plan allowed community planners to have a tangible guide on how to apply CCF to local community recovery plans to increase resiliency post disaster (Koch et al., 2017).

CCF Research: Livestock Disasters

Little to no research has been done specifically applying CCF to livestock related disasters. However, publications have explored CCF's application in disaster recovery situations through Extension. Research in this area is relatively new, however frequency is increasing (EDEN 2016; EDEN 2017; Kerr et al., 2018). This increased interest, as well as the presence of CCF in agriculture, disaster, and Extension literature, indicate CCF would be a viable framework for livestock disaster Extension research. Therefore, CCF was used as the theoretical framework for this study.

Community Capitals Framework allows for assessment of capital and the evaluation of a rural community's resiliency status, which could include livestock preparedness, specifically. Additionally, the application of CCF to livestock related disasters may reveal capital areas where investments might be made to assist with future planning and increase spiraling up. Community Capitals Framework can also provide details on current social capital presence, which can reveal relationship status of individuals involved with livestock during wildfire response and planning. Since Extension is given a role in disaster planning and encouraged to work with emergency management during the process, detailed information on social capital between these two partners may be beneficial. Community Capitals Framework can also provide information on human and built capital status. Knowing whether human capital exists in individuals responsible for wildfire preparation for livestock, may reveal areas where investments might be made in education or knowledge. Built capital is also imperative when evaluating livestock related disasters, as physical structures are often used for housing animals.

Political, financial, natural, and cultural capitals might also be present in rural communities where livestock have experienced wildfires. Political power from those involved in co-ops or working within livestock organizations may be present. Financial capital may also be found. For example, charitable organizations, government assistance, or local investors may be an area where financial capital is identified. Natural capital is affected substantially by wildfire, causing forage disturbance that might have been used for grazing livestock. Cultural capital such as rural communities' agricultural or religious ties may also be identified.

All seven capitals may be present in rural communities where livestock are raised and may be challenged by wildfires. However, no research in this area is available. Therefore, this study used CCF to explore partnerships and capital presence, gathering an overall preparedness assessment of Oklahoma rural communities where wildfires have affected livestock.

Chapter Summary

This chapter explored the history of wildfires, the effects they cause, and Oklahoma communities and livestock industries specifically impacted. The role of Extension in disaster assistance was also discussed, revealing Extension has a defined role in disaster preparedness and an encouraged partnership with emergency management. A theoretical framework used in disaster research was also provided. This framework, called the Community Capitals Framework (CCF), has been used in disaster, Extension, and agricultural research. However, this framework has yet to be applied to communities facing wildfires that affect livestock. The CCF was identified as a viable framework for utilization in this area, as all seven capitals may be found in rural communities with wildfires affecting livestock. Also, per this study's objective, the CCF allows for partnerships to be explored and preparedness levels in rural communities to be recognized. Using the CCF will provide knowledge in capital areas that need investment, to help reduce livestock related losses attributed to wildfires in the future.

CHAPTER III

METHODOLOGY

The purpose of this project is to evaluate partnerships between Extension Educators and Emergency Management with regard to large animal disaster preparedness prior to recent wildfires in the state of Oklahoma. Using the Community Capitals Framework (CCF) as a guide, a qualitative approach was taken, and county Extension Educators and Emergency Managers in Oklahoma were interviewed. All data collecting protocols were approved by the Oklahoma State Institutional Review Board (AG-18-26).

Population and Participants

A criterion was created to determine counties eligible for interviews. The criterion was set to include rural counties exposed to at least one major wildfire within the last three years in which 40,000 acres or more were burned. A county was considered rural if it met the definition set by Flora and Flora (2013) used for CCF; specific areas must have individual's interacting within the community for mutual support, have less than 50,000 inhabitants, and lie outside of metropolitan areas (Flora & Flora, 2013). The burned acreage limit of 40,000 acres or more was added to meet the National Interagency Fire Center's definition of a significant

wildfire (NIFC, 2017). To ensure communities had been impacted recently, only wildfires from 2016 to 2018 were considered. Additionally, FEMA status was considered, with all wildfires meeting criteria applying for a Fire Management Assistance Declaration. All of these parameters were set to ensure wildfire exposure had been recent and significant so the current state of preparedness for livestock related disasters in the state of Oklahoma would be reflected.

A list of Oklahoma counties who experienced a wildfire between 2016 and 2018 that was over 40,000 acres in size was provided by the Oklahoma Forestry Service. These counties were evaluated to ensure they met the rural community criteria of Flora and Flora (2013). Extension Educators and Emergency Managers in all counties meeting criteria were contacted for potential one-on-one interviews. Contact was initiated through e-mail and phone calls. Five counties met criteria, ten individuals were contacted, and eight individuals agreed to participate.

Instrumentation

A series of seven interview questions were developed, with ten follow-up questions. Follow-up questions were only asked if the individual indicated the question was relevant to them when answering one of the seven interview questions. For example, if an individual said they did not play a role in emergency preparedness, they would not be asked what that role entailed. All questions were designed to identify current status of counties and evaluate needs for disaster preparedness respectively. Questions to evaluate relationships with stakeholders were also included. Questions were also framed to be reflective in nature, asking interviewees to share preparedness status before previous

wildfires. Interview questions were analyzed by researchers in the fields of Agricultural Education and Extension, Sociology, Fire and Emergency Management, and Animal Science for relevance to the field. Finally, all questions were reviewed by a regional coordinator for the Oklahoma Department of Emergency Management to ensure questions were applicable to those participating.

All questions were created using CCF as a theoretical framework, with the goal of identifying the community's capital presence from given responses. Questions were structured to identify key research questions. Research questions included:

1. What do Emergency Managers and Extension Educators know about livestock disaster preparedness and response?
2. What role do Emergency Managers and Extension Educators play in emergency management planning for livestock disaster response?
3. What resources (both physical and social) have Emergency Managers and Extension Educators utilized in the past for livestock disaster planning and response?
4. What informal and formal networks exist between Emergency Management and Extension Educators before and after disasters?

Interview Questions

Interview questions were framed so individuals would reflect on previous wildfires and focus on preparedness. Before interview questions were asked, the following statement was read:

Though there are many stages to a disaster, this study's goal is to focus on preparedness and the following questions will reflect this. As you hear each

question, please think back to a time before recent wildfires and answer each question accordingly.

The following questions were then provided to respondents:

Table 1

Interview questions

| Interview Question Number | |
|---------------------------|--|
| 1 | In general, what does disaster preparedness consist of for livestock related disasters? |
| 2 | What role do you play in planning for livestock response during disasters? |
| Follow up 2.1 | What does that role entail? |
| Follow up 2.2 | Does your role require any formal planning? |
| 3 | Have you received any formal or informal training in livestock disaster preparedness or response? |
| Follow up 3.1 | Are you aware of any trainings available? |
| Follow up 3.2 | What training do you think you need? |
| 4 | What physical resources, such as facilities, equipment, etc., have been or currently are available for livestock disaster planning and response? |
| Follow Up 4.1 | How do you know about these resources? |
| Follow Up 4.2 | Who provided these resources? |
| Follow Up 4.3 | Are there resources that should be available? |
| 5 | What social resources, such as friends, community members, etc., have been or currently are available to livestock disaster planning and response? Are they still available? |
| Follow up 5.1 | Are there organizations or individuals you interact with when it comes to disaster preparedness? |

- 6 When planning for livestock disaster response, do you interact with any stakeholders (i.e. community members, government employees)?
- 7 Do you personally interact with your county's Emergency Manger/Extension Educator?
- Follow up 7.1 Where do these interactions typically take place?
- Follow up 7.2 Did these interactions take place before the recent fires?
-

Data Collection

Data collection occurred via phone interviews with all interviews digitally recorded through the internet platform Zoom. All interviews were conducted by the same moderator who followed a guide developed prior to interviewing.

Interviews were conducted with county Extension Educators and county Emergency Managers in counties identified within the research criteria. A total of eight interviews were conducted (n = 8) between June 26, 2018 and July 24, 2018, and both Extension Educators (n = 4) and Emergency Managers (n = 4), were evenly represented. Three counties had both the Extension Educators and Emergency Managers interviewed, while two counties had only one interview conducted, either with the Extension Educator or the Emergency Manager exclusively.

During the interview process, the moderator would prompt individuals to respond if they were unresponsive. The interviewer did this by repeating the question or by allowing silence to serve as a probe, as these are common probing techniques used in interviews. If the respondent was confused by the question or forgot what was asked, the question was then repeated. All interview recordings were transcribed for analysis.

Transcriptions were created manually by the principal investigator and occurred over a series of days. Transcriptions were then checked for accuracy with the entire recording being listened to again while the transcription was read. All transcribed data were then separated by question for individual response analysis.

Data Analysis

Once transcriptions were created, all responses were placed together in one document so individual responses could be compared. Responses of Emergency Managers and Extension Educators were also compared. Prior to comparisons, all transcripts were coded by each community capital. The definitions from Flora and Flora (2013) serving as the coding strategy to identify categories of community capital. If a capital was referenced by a respondent, then a point, either positive or negative depending on the response, was assigned to that response within the capital category. Category totals were then calculated, determining presence of that particular capital. This coding practice was adapted from previous CCF agricultural research by Duffy et al. (2017).

Multiple capitals may have been calculated in a single response. Additionally, some responses may have included more than one of the same capital. For example, multiple social groups may have been listed when identifying social capital such as Oklahoma Emergency Management and the Red Cross. However, if the same group was mentioned multiple times, it was only counted once for all of that individual's responses. For example, if Oklahoma Emergency Management was named as a social resource in the interviewee's response to question number one, it would be given one point. But, if

they were referenced again in question number seven, they would not be counted a second time, as they had already been identified as a social resource. This was true unless, however, it was being referenced as a different capital type, in which case a point in a different category would be given.

Groups with similar definitions identified in responses were all counted individually. For example, farmers, ranchers, and land owners were all counted individually, even if they were referenced together. This was done to reduce interpreter bias by not assuming respondent groupings of individuals indicated those individuals represented similar populations.

Any capital clearly identified as a loss through respondents' answers were recorded with a negative value. For example, a response identifying loss in built capital, such as roads, would receive a negative one. Lack of responses or inability to identify needs were recorded as zero. Summation of capital category values were recorded.

In order to determine frequency of capital category identification amongst all interviewees, percentages of responses were calculated. Emergency Managers and Extension Educators' responses were also evaluated separately to identify frequency between individual groups. Percentages were calculated by counting the number of individuals who identified an item within that capital category and dividing that number by the total number of respondents ($n = 8$). Negative values reported during coding were also considered a capital category response when evaluating frequency. Previous CCF agricultural research by Flora and Bregendahl (2012) utilized frequency calculations in

research reporting and therefore, served as a guide for this incorporated methodological element.

Similar responses, or word choices, occurring more than three times were identified as a theme, similar responses were grouped into these themes and reported as such. For example, if a large list of religious organizations was identified, this would be identified as a theme and reported in a grouping. Additionally, themes found throughout the entirety of the interviews were reported as emerging themes.

CHAPTER IV

FINDINGS

This chapter presents the findings of eight interviews with Emergency Managers and Extension Educators in the state of Oklahoma. The purpose of this study was to determine partnerships between Emergency Managers and Extension Educators in regard to livestock related disaster planning for wildfires. To achieve this purpose, interview questions focused on 1) determining Emergency Managers and Extension Educators' understanding and definitions of livestock disaster preparedness and response, 2) determining what roles Emergency Managers and Extension Educators play in emergency management planning for livestock disaster response, 3) determining what physical and social resources Emergency Managers and Extension Educators utilized in the past for livestock disaster planning and response and what is still available, and 4) determining whether informal and formal networks exist between Emergency Management and Extension Educators before and after disasters. All responses are provided as the individual stated their response, with no assumptions made on the meaning of particular phrases. This was done to avoid researcher bias in reporting. All results are reported in order of the research questions listed in previous chapters.

Demographics

A total of eight individuals (n = 8) were interviewed. Four individuals stated their job title was Emergency Manager (EM) (n = 4). The remaining four interviewees stated their job title was Extension Educator (EXT) (n = 4). Six males (n = 6) and two females (n = 2) were interviewed. Ages, years in the current position, and years in the current field all varied. All demographic information is recorded in Table 1.

Table 1:
Demographics of interviewees.

| Interviewee Number | Demographics | | | | |
|--------------------|--------------|-----|----------------------------|---------------------------|----------------|
| | Gender | Age | Job Title | Years in Current Position | Years in Field |
| 1 | M | 62 | Emergency Manager Director | 16 m | 10 yr |
| 2 | F | 53 | Emergency Manager Director | 1 yr | 1 yr |
| 3 | M | 57 | Extension Educator | 19 yr | 22 yr |
| 4 | M | 45 | Emergency Manager | 13 yr | 13 yr |
| 5 | F | 46 | Extension Educator | 10 yr | 25 yr |
| 6 | M | 59 | Extension Educator | 5 yr | 5 yr |

| | | | | | |
|---|---|----|-----------------------|------|-------|
| 7 | M | 28 | Emergency Manager | 2 yr | 2 yr |
| 8 | M | 57 | Extension Educator | 5 yr | 34 yr |

Interview Results

To avoid researcher bias in interpretation, all responses were reported identically as they were given by the interviewee. No assumptions to the meaning of specific phrases are reported in our results. Additionally, lack of elaboration on the meaning of a phrase, statement, or word choice is due to the respondent’s answer lacking clarifying information. Results from the interviews were grouped by question type. Results from questions 1 and 2, including follow-ups, were grouped into general disaster preparedness definitions and roles. Question 3, with follow-ups, is the livestock disaster preparedness training group. Question 4, with follow-ups, is the livestock disaster preparedness physical resources group. Question 5, with follow-ups, and question 6 were grouped into livestock disaster preparedness social resources. Question 7, with follow-ups, were reported in Interactions between Extension Educators and Emergency Management.

Other results include capital frequency and overall capital category counts in the capital references section and emerging theme reports in the additional themes section.

General Disaster Preparedness Definitions and Roles

To begin the interview, respondents were asked to provide an answer to the question, “In general, what does disaster preparedness consist of for livestock related disasters?”. Seven respondents identified planning (n = 7; EM = 4, EXT = 3) and one

respondent identified training (n = 1; EXT = 1). Of the seven respondents mentioning planning (n = 7), four individuals said built capital should be established (n = 4), three individuals said planning with farmers, ranchers, and producers should occur (n = 3), two interviewees said food or water reserves should be considered by livestock owners (n = 2), and one respondent indicated human capital must be available for animal treatment (n = 1).

When asked what role they played in planning for livestock response prior to disasters, four individuals identified themselves as having a role (n = 4; EM = 1, EX = 3). Four respondents said they did not have a role (n = 4; EM = 3, EXT = 1). Of the individuals identifying roles, all four said their role involved helping producers plan (n = 3; EX = 3), building relationships with livestock producers and other agencies (n = 2; EX = 2), and working with Extension (n = 1; EM = 1). Two additional EMs, who said they had no role, identified themselves as being involved in contacting support (n = 1; EM = 1) and advising individuals who are planning for livestock response in disasters (n = 1; EM = 1). One of these EMs identified other organizations as primary planners (n = 1; EM = 1), including the Oklahoma Department of Agriculture, Volunteer Organizations Active in Disasters, and Oklahoma State University Extension. These two additional EMs were asked follow-up question 2.2.

A follow-up question was asked to the four respondents who identified roles in planning. This question asked them to elaborate on what their role entailed. Respondents identified their role as building relationships and planning (n = 2; EXT = 2), planning and conducting meetings (n = 1; EXT = 1), no pre-planning (n = 1; EXT = 1), and coordination (n = 1; EM = 1).

An additional follow-up question was presented to the four respondents identifying themselves as having roles, plus the additional two EMs who indicated they had no role, but actually identified other “roles” for themselves. The question asked respondents to share if their role required formal planning. Four individuals said their role required formal planning (n = 4; EM = 3, EXT = 1) and two said it did not (n = 2; EXT = 2). One of the three EMs who said they have a formal role, shared it is not at the “top of the list” at the present time (n = 1; EM = 1). Only one EXT indicated their role required formal planning (n = 1; EXT = 1). Another EXT, who said they did not have a formal role, did, however, share that formal planning may be done, but it is not necessarily required (n = 1; EXT = 1).

Livestock Disaster Preparedness Training

Three of the eight respondents (n = 3; EM = 2, EXT = 1) said they received formal or informal training in livestock disaster preparedness or response. However, one of these individuals described the training as “very little”. Two of the individuals (n = 2; EM = 1, EXT = 1) said this training occurred through table top exercises. Elaboration on these exercises revealed the table top training contained only a small amount of information on livestock in disasters specifically, or the exercises were about disease related issues. Five respondents said they had not received training, formal or informal, in livestock disaster preparedness or response (n = 5; EM = 2, EXT = 3). However, two of these individuals (n = 2; EM = 1, EXT = 1) mentioned “boots on the ground” experience or previous farming and ranching experience, which qualifies as informal training. Another individual (n = 1; EXT = 1) who said they had no training, mentioned a personal

interest and attendance at national seminars on disaster relief. This individual clarified again, they did not have any training.

When asked a follow-up question to determine if they knew of any trainings available for livestock related disaster preparedness or response, two individuals were aware of trainings (n = 2; EM = 2) and six individuals said they were unaware of any trainings (n = 6; EM = 2, EXT = 4). Of those who were unaware of any available trainings, two individuals elaborated that trainings were only for disease related issues with livestock (n = 1; EM = 1) or did not occur frequently (n = 1; EM = 1). Another EM (n = 1) said they were unaware of any trainings, but they knew “some stuff” was available through the Extension Office and Oklahoma State University.

Five individuals shared there were trainings they needed (n = 5; EM = 1, EXT = 4) while three respondents did not identify any training needs (n = 3; EM = 3). Of those who felt they needed training, three interviewees mentioned communication training (n = 3) however, all three specified different needs within communication. These trainings included: training on how to communicate with people in need, such as farmers, ranchers, and veterinarians, (n = 1; EM = 1), training on lines of communication and specific contact resources within particular entities (n = 1; EXT = 1), and communication system set-ups, uses, and how to gather donations (n = 1; EXT = 1). Beyond communication needs, grief training on how to mentally and emotionally help those whose animals were victim to wildfires was requested (n = 1; EXT = 1). Another EXT (n = 1; EXT = 1) requested training on the functions and organizational structure of emergency management.

Two EMS, who did not identify training needs, offered alternatives to training (n = 2; EM = 2). These individuals suggested planning and collaboration are of greater concern at this time. One EM (n = 1; EM = 1) felt planning was lacking and shared there was no formalized plan available at this time. They identified the Oklahoma Department of Agriculture as the organization responsible for these plans, but said creation of the plan should be a coordinated effort. The other EM (n = 1; EM = 1), felt counties and partners previously involved with disasters should collaborate to identify what has worked, what has not worked, how plans changed throughout, and what unexpected events occurred during the disaster. These respondents felt this would be more beneficial than standardized training. Only one individual, an EM, said they had no idea what training they needed (n = 1; EM = 1).

Livestock Disaster Preparedness Physical Resources

Interviewees were asked what physical resources, such as facilities, equipment, etc. have been or are currently available for livestock disaster planning and response. Seven individuals (n = 7; EM = 4, EXT = 3) identified a total of thirteen unique physical resources. Fairgrounds were identified by three individuals (n = 3; EM = 1, EXT = 2). Other identified holding areas such as a fair barn, a large sale barn, and a rodeo facility, all of which were noted only once. Trucks and trailers were identified by two individuals (n = 2; EM = 1, EXT = 1). Equipment was also mentioned twice, however the type of equipment was not specified (n = 2; EM = 1, EXT = 1). Both of these references specified this equipment was provided by neighbors, community businesses, cattlemen, or Voluntary Organizations Active in Disasters. An animal control facility and an animal response trailer were identified once, both by EMs. One EM also identified the Fire

Department. An Extension Educator identified two other physical resources including an Extension Office and phone lines. The one individual who did not identify resources (n = 1; EM = 1) said their job was only to deal with human resources and therefore, they did not state any physical resources available for livestock disaster planning and response.

The seven individuals (n = 7) who identified physical resources have been or currently are available for livestock disaster planning and response were then asked a follow-up question to determine how they knew about these resources. Social interactions were identified by six respondents (n = 6; EM = 3, EXT = 3). Two respondents (n = 2; EM = 2) referenced personal knowledge and experience in their awareness of physical resources being available. Two respondents (n = 2; EM = 1, EXT = 1) also referenced cultural reasons for identification. These cultural reasons, or how an individual in the community views the world, included the essence of a “tight knit” community in which “neighbors help neighbors”.

An additional follow-up question related to who provided the resources was presented. Respondents identified Emergency Management (n = 3; EM = 1; EXT = 2), the county (n = 2; EM = 2), the local phone company (n = 1; EXT = 1), personal contacts with local businesses and cattlemen (n = 1; EM = 1), the Red Cross and a senator (n = 1; EXT = 1) specifically.

When asked if there were any physical resources that should be available, all four EMs listed none (n = 4; EM = 4) while all four EXTs listed resources (n = 4; EXT = 4). Of the four EXTs sharing resource needs, only three listed physical resources (n = 3; EXT = 3). These needs included phone hotlines (n = 2; EXT = 2) and a euthanasia

response unit (n = 1; EXT = 1). The fourth EXT stated communication as a physical resource need, however, this is not deemed a physical resource, or built capital within CCF. Though not asked to report limitations, two individuals (n = 2; EM = 1, EXT = 1), listed limitations on attaining resources. These limitations included lack of storage, finances, and accessibility.

Livestock Disaster Preparedness Social Resources

When asked what social resources have been or remain available for livestock disaster planning and response, all eight (n = 8; EM = 4, EXT = 4) interviewees identified resources. Twenty-two social resources were identified in total. Due to reoccurrence in responses, these resources were grouped into themes for reporting. Numerous agricultural related social resources were listed by interviewees (n = 2; EM = 1, EXT = 1) including the Oklahoma Cattlemen's Association, co-op managers, farmers, ranchers, and the overall agricultural community. Additionally, a list of religious organizations was given by one EXT respondent (n = 1; EXT = 1). These organizations included community churches, Oklahoma Baptist Disaster Relief Fund, Catholic Relief, Fellowship of Christian Farmers, and overall religious organizations. Friends (n = 2; EXT = 2), local leadership (n = 1; EXT = 1), firefighters (n = 1; EXT = 1), bankers (n = 1; EXT = 1), local Extension and Oklahoma Emergency Management (n = 1; EM = 1), local people and businesses (n = 1; EM = 1), neighbors (n = 1; EM = 1), and the county commissioner (n = 1; EM = 1) were also individually identified.

A follow-up question was presented asking for respondents to identify organizations or individual resources in livestock disaster planning and response. Seven

interviewees (n = 7; EM = 3, EXT = 4) identified organizations or individuals and one did not identify any (n = 1; EM = 1). Of the seven interviewees who identified organizations, one EM (n = 1; EM = 1) referenced feedlots, Extension, the Oklahoma Cattlemen's Association, Natural Resources Conservation Service, and other government offices. Another EM (n = 1; EM = 1) identified Oklahoma State University, National FFA, 4-H, local landowners, and ranchers as resources. The third EM (n = 1; EM = 1) did not elaborate with whom specifically these interactions occurred. Extension Educators listed the following sources: the Natural Resources Conservation Service (n = 1; EXT = 1), the Farm Service Agency, (n = 1; EXT = 1), the Oklahoma Cattlemen's Association (n = 1; EXT = 1), co-ops (n = 1; EXT = 1), and farming leadership (n = 1; EXT = 1). One EXT (n = 1; EXT = 1) did not specify who their interactions occurred with and clarified that interactions did not occur before recent wildfires. In total, 15 organizations or individuals were identified as resources.

When asked to identify stakeholders they might interact with during planning, only six individuals reported interactions (n = 6; EM = 3, EXT = 3). Of these six, two respondents (n = 2; EM = 1, EXT = 1) did not list interactions during planning, but rather during response phases. These responses, therefore, were considered invalid and will not be reported. Of the four remaining respondents stating they had interactions with individuals, the EM reported the commissioner as a stakeholder in which interactions occurred (n = 1; EM = 1). Extension Educators listed farmers (n = 1; EXT = 1), ranchers (n = 1; EXT = 1), producers (n = 1; EXT = 1), community leaders (n = 1; EXT = 1), prominent members of the community who are involved in industry (n = 1; EXT = 1), Emergency Managers, (n = 1; EXT = 1) and sale barns (n = 1; EXT = 1) as stakeholders

with which interactions occurred. Two individuals said they did not interact with stakeholders in planning (n = 2; EM = 1, EXT = 1), specifying lack of involvement in planning (n = 1; EXT = 1) and being newly established in their job (n = 1; EM = 1) as to why these interactions were not occurring.

Interactions between Extension and Emergency Management

Personal interactions between the EM and EXT were reported by all individuals (n = 8). However, two individuals reported these interactions as limited (n = 2; EM = 2). Additionally, two respondents (n = 2; EM = 1, EXT = 1) indicated these interactions did not include any livestock related disaster planning.

These interactions were reported as formal or informal in nature. Three individuals reported formal interactions (n = 3; EM = 1, EXT = 2), two reported informal interactions (n = 2; EM = 2), and two individuals reported both formal and informal interactions (n = 2; EM = 1, EXT = 1). One individual did not specify (n = 1). Formal interactions were reported as taking place on the phone, in face-to-face visits, scheduled and non-scheduled meetings, in work spaces with close proximity to each other, and in their personal offices. A few informal areas were also identified as places of interaction including fairs, other areas “around town”, and local restaurants. The one individual, an EXT, whose interaction was not specifically formal or informal reported the county Emergency Manager was “across the hall”.

When asked if these interactions took place before recent fires, five individuals reported yes (n = 5; EM = 3, EXT = 2). One EXT who reported “yes”, clarified the

interactions had been limited (n = 1; EXT = 1). Three individuals (n = 3; EM = 1, EXT = 2) reported no interactions occurred before recent fires.

Capital References

All seven capitals were identified throughout responses to interview questions. Capital frequency, number of EMs who referenced those capitals, number of EXTs who referenced those capitals, and the total number of references are listed in Table 2.

Table 2:
Community Capital references.

| Capital Type | Capital frequency | # of EMs who referenced (n = 4) | # of EXTs who referenced (n = 4) | # of references |
|--------------|-------------------|---------------------------------|----------------------------------|-----------------|
| Social | 100% | 4 | 4 | 87* |
| Built | 100% | 4 | 4 | 42 |
| Human | 87.5% | 3 | 4 | 9 |
| Cultural | 62.50% | 1 | 4 | 5 |
| Political | 37.5% | 2 | 2 | 2 |
| Natural | 25% | 1 | 0 | 1 |
| Financial | 12.50% | 0 | 1 | 1 |

*Note. *bonding social capital = 47 references, bridging social capital = 39 references; unidentified social capital = 1 reference*

These references were not always positive as some references received negative values since these capitals were reported as lost or lacking. This occurred when individuals mentioned something needed to be rebuilt, closure of an infrastructure, or if an interviewee indicated a specific need. A total of 13 negative values were assigned in analysis. Five negative values were recorded for human capital, four for built capital, two for social capital, and one negative value for both natural and financial capitals.

Additional Themes Identified

One theme that emerged, included the use of community members as a resource. Numerous individuals recognized friends, neighbors, and local individuals as main resources when planning and responding to livestock related disasters. These individuals were often credited with providing equipment and helping hands in times of need. These relationships identified a type of cultural capital connected to the social nature found within these communities.

Another theme identified was the utilization of commissioners, those in local leadership, and even state Senators when planning and preparing for livestock related disaster response. These individuals were said to have connections that were utilized during responses. Those individuals having leadership roles within livestock industries were also referenced. These leader connections revealed both social and political capitals found within communities.

Finally, the use of agricultural groups as resources was an emerging theme, with the utilization of both local and outside livestock industry members listed in planning for disasters and as resources during response.

Limitations

Though this study evaluated preparedness, it was done so in a reflective manner, post-disaster. This may have confounded responses to include more than just information during the preparedness phase of disasters. However, this method was done specifically to identify differences in relationship quality and interactions between EMs and EXTs due to the wildfires. To fairly evaluate relationship changes, post-disaster data collection is required. Additionally, qualitative disaster research is often conducted after occurrence of an event (Phillips, 2014). Community Capital Framework (CCF) utilization in disaster research has also been conducted predominantly post-disaster (Koch et al. 2017; Stofferahn, 2012; Kais & Islam, 2016; Smith & Boruff, 2011).

The interviewing instrument was not pilot tested because we did not find a group with similar demographics to our survey respondents. However, the instrument was analyzed by numerous experts in their respective fields. These experts included faculty members from the departments of Agricultural Education, Communication and Leadership, Fire and Emergency Management, Sociology, and Animal and Food Sciences at Oklahoma State University. All faculty members were researchers in their respective fields and each provided consultation to ensure the instrument was appropriate. Appropriateness of the questions for Extension Educators was evaluated by an Agricultural Education, Communication and Leadership faculty member. Similarly, the validity for Emergency Managers and overall disaster research was evaluated by a Fire and Emergency Management faculty member. This was then confirmed by a regional coordinator for the Oklahoma Department of Emergency Management. The questions for livestock related disasters specifically were evaluated by an Animal and Food Sciences

faculty member. Finally, the application of CCF within the questions was evaluated by a faculty member in the Sociology Department.

The lack of published research in this specific area was a limitation to this study. Little research has been published specifically on livestock related disasters and no research has been done using the CCF as an applied framework to this research. Additionally, CCF utilization is relatively new to disaster research. Increased publication in these research areas may shed additional light on findings identified in this study.

CHAPTER V

CONCLUSIONS

This chapter contains a discussion of the key findings and conclusions of this study. Within the discussion, recommendations are made for future research and ideas for current application are provided. The purpose of this study was to determine current partnerships between Emergency Management and Extension Educators in regard to livestock related disaster preparedness for wildfires in the state of Oklahoma. The following research questions helped explore this purpose: 1) what do Emergency Managers and Extension Educators know about livestock disaster preparedness and response, 2) what role do Emergency Managers and Extension Educators play in emergency management planning for livestock disaster response, 3) what resources (both physical and social) have Emergency Managers and Extension Educators utilized in the past for livestock disaster planning and response, and 4) what informal and formal networks exist between Emergency Management and Extension Educators before and after disasters?

DISCUSSION

General Disaster Preparedness Definitions and Roles

Though most interviewees identified planning as a part of livestock related disaster preparedness (n = 7), only four individuals said they played a role in planning processes (n = 4; EM = 1, EXT = 3). This reveals a lack of identified roles in livestock disaster planning by EMs and EXTs within their respective counties. This was confirmed when interviewees were asked about formal planning. Only one EXT (n = 1) and three EMs (n = 3) said their role required formal planning. Of these, one EM shared due to other activities, livestock related disaster planning was not a top priority at this time. This reveals that although seven interviewees felt planning was needed for preparedness, less than half felt they had a role in planning for livestock related disasters specifically. Additionally, most EXTs did not state their role required formal planning (n = 1; EXT = 1).

However, both of these groups, EMs and EXTs, have been given a role in disaster preparedness planning (FEMA, 2017; FEMA, 2016). This lack of identification in disaster planning roles is not uncommon. Previous research conducted by Eighmy et al. (2012) found only 53% of County Extension Offices in North Dakota actually had a defined role in the emergency management plan and Extension staff was only on the Emergency Management Board in 47% of North Dakota counties (Eighmy et al., 2012). This may suggest clearer definitions of disaster preparedness roles need to be provided. Also, due to the consistent turn-over of County Extension Educators, a written plan, including resources, should be required. Additionally, the collaborative nature that is

sought in planning should be encouraged between EMs and EXTs (Eighmy et al. 2012; Smith, Black, & Williams, 2012).

Livestock Disaster Preparedness Training

Emergency Management and EXT reported trainings for livestock related disasters were scarce. Only three individuals said they had received formal or informal training, indicating a lack of training in this particular area. Similar results were found by Eighmy et al. (2012) who evaluated material and training needs for Extension personnel. In their study, Eighmy et al. (2012) identified a total of seventeen specific topic areas where educational material was needed in regard to livestock and crops in disasters. Subsequently, materials were created to address these specific needs followed by training of Extension staff on how to use these materials. A survey distributed post-training revealed Extension staff found the trainings met their needs and they now knew where to find resources in the future (Eighmy et al., 2012). Similarly, curriculum development may be warranted for specific training on livestock affected by natural disasters in the state of Oklahoma. Some curriculum has already been developed by other organizations and is currently available on-line. Trainings are available through multiple organizations, including the Extension Disaster Education Network (EDEN), the Federal Emergency Management Agency (FEMA), the United States Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS), and the state medical reserve corps. Directions should be provided to individuals regarding where to find these trainings, that provide valuable pre-disaster information. The Extension Disaster Education Network (EDEN) alone has 12 resources listed specifically for EMs and 68 resources listed for EXTs. Many other organizations have numerous training resources available.

It is important to recognize, though, some individuals who reported no training, actually mentioned informal training in their responses. This may indicate that individuals undervalue their informal training experiences, which may be explained by the psychological phenomenon known as the Dunning-Kruger affect, which occurs when one's self-assessment of their personal abilities and skills does not accurately reflect their skill level (Kruger & Dunning, 1999). The Dunning-Kruger affect found individuals who were competent, typically under assessed their abilities, while incompetent individuals often over assessed their ability (Kruger & Dunning, 1999). In this study, those who have informal training may be competent individuals who are underestimating their personal ability. However, further research is needed to explore whether knowledge and skill level are truly under assessed or if there are other factors causing individuals to feel their informal training is insufficient.

Individuals who previously participated in formal training said these trainings occurred through tabletop discussions. However, these discussions were said to have little information presented concerning livestock. Additionally, these talks were often geared specifically toward the spread of disease. Lack of available training was also found when EMs and EXTs were asked if they knew of any trainings available. Only two EMs knew of trainings available at the current time. Training limitations were also expressed, which included lack of frequency and lack of natural disaster inclusion in these trainings. All four EXTs did not know of any available trainings. This may suggest that livestock disaster training is warranted, specifically for natural disasters. However, as previously mentioned, numerous trainings are available on-line and individual's may be unaware of

these trainings. Additionally, training method preference and its effect on participation in these trainings could be a factor.

One EM and four EXTs shared trainings they feel are needed. Interestingly, none of the trainings requested addressed livestock needs. This is unlike the study reported by Eighmy et al. (2012) in which seventeen livestock related training areas were identified. Instead, requested trainings included communication, response structure, and grief counseling training. These trainings are more closely related to human resources and disaster response rather than animal specific training. The all-hazard approach utilized in emergency management training may be what is occurring. The all-hazards approach is the integration of all disaster types when planning for disaster to include a full spectrum of emergencies and disasters that might occur (Centers for Medicare & Medicaid Services, 2017). Other states have also recognized this alternative focus on human resources (Downey et al., 2018). In Mississippi, nine focus groups with stakeholders involved with natural disasters revealed it would be beneficial for Extension Agents to have volunteer and donation management training (Downey et al., 2018). Similar needs were identified in this study, as respondents who requested communication training mentioned donation management. Additionally, a request was made to learn how to communicate training to those in need, which is a part of volunteer training. Therefore, trainings similar to those made by Mississippi Extension may be beneficial to Oklahoma and should be made available. These trainings may already be available through state agencies, such as the Oklahoma Medical Reserve Corps. If this is the case, better communication about these trainings is needed.

Training on response structure was also requested. These structures are what the Federal Emergency Management Agency (FEMA) has called the National Incident Management System (NIMS) and the Incident Command System (ICS) (FEMA, 2019a). A need for Extension to understand these systems was recognized in research done by Smith, Black, and Williams (2012), who shared EXT needed to understand these systems in order to reach the greatest potential with Emergency Management collaboration. Additionally, Smith et al. (2012) shared trainings in these areas are currently being developed by those in the EDEN Network. This was confirmed through personal communication with the Agricultural and Natural Resource TTX committee chair (K. M. Hiney, personal communication, June 14, 2019). Similar training is also offered through the Federal Emergency Management Agency (FEMA, 2019b) and may be a resource that should be provided to EXT, specifically.

Two EMs said they do not believe training is the issue. Both of these individuals identified other areas where investments might be more valuable. One identified this to be planning, saying there is no specific plan available at this time. The other EM suggested collaboration between communities would be beneficial. These two ideas have been researched and recognized as areas where investment should be made. Planning is considered a primary piece of disaster preparedness (Spencer, 2011; FEMA, 2018b) and both EMs and EXTs are given a role in it according to ESF-11 (FEMA, 2015). Similarly, collaboration and coordination of stakeholders have been consistently recognized (Eighmy et al., 2012; Smith et al., 2012; Vermont Emergency Management, 2015; Porr, Brown, and Splan, 2016). Therefore, research confirms that investment in both of these areas is important.

Livestock Disaster Preparedness Physical Resources

Identification of physical resources resulted in an exploration of current built capital presence. Seven individuals were able to identify thirteen physical resources. Only one EXT did not identify physical resources. Physical resources included: holding facilities for animals, transportation vehicles, equipment, phone lines, and response team trailers. Two buildings were also identified, the fire department and the Extension Office. Therefore, most individuals knew of at least some form of physical resource that could be utilized for livestock related disasters. Identification of these resources is important in disaster planning (Spencer, 2011). Additionally, EMs and EXTs ability to identify these sources revealed built capital for livestock related disasters is present in their communities and could be utilized in disaster planning. However, past research using the Community Capitals Framework (CCF) in disasters, found this particular capital often spirals down (Stofferahn, 2012). Therefore, if a wildfire were to occur in their area, this capital may be reduced. Plans with multiple resources should, therefore, be in place to increase community capacity during disasters (Kapucu, Hawkins, & Rivera, 2014). The overall community resilience is increased when these resources are in place and their location is known (Flora & Flora, 2013). If supplies and facilities are available, but individuals are unaware of their existence, they are of little value in times of disaster. When listing physical resources, EMs and EXTs listed different resources available. Increased collaboration between these two individuals within a county could, therefore, increase awareness of the resources available. Resource mapping may also be a potential planning tool used to connect the presence, function, and location of these resources to the people who may need them.

When asked how they knew about these resources, six interviewees said they knew of them from social interactions. Personal knowledge and experience in that geographical area was also referenced. Therefore, most interviewees knew of physical resources because of social connections. Social connections increase a community's social capital and are a known benefit to a community's social and economic development (Flora & Flora, 2013). Additionally, connections and social capital presence is imperative to community success (Freuchete, 2011). Social capital can also interact with other capital (Flora & Flora, 2013). Since respondents said they knew of built capital (physical resources) through this social capital (social connections), an interaction between built and social capital within these communities may be occurring. Built capital is known to be interconnected with other capital (Jacobs, 2011f). Little is known about the strength of interactions and the overall interconnectedness of capitals (Pigg et al., 2013). However, research looking at investment in social capital within communities has found other capitals can be increased (Emery & Flora, 2006). This is a phenomenon known as "spiraling – up" (Emery & Flora, 2006). Since a relationship was explained by interviewees between social capital and built capital, an investment in social capital may result in a spiral up of these resources. However, more research is needed to identify how, or if, spiraling up might occur within disaster preparedness.

When asked if any physical resources were needed, there was a strong distinction between EMs and EXTs. All four EM respondents reported they needed no physical resources. This might suggest EXT have a higher awareness of physical needs for livestock related disasters. This may be due to their understanding of livestock needs. Emergency Mangers may believe they are not needed or that resources needed are

already in place. Additionally, due to the connective nature of Emergency Management and previous training provided to EMs in disasters, they may have greater understanding of who to contact in order to gain access to physical resources. However, all four EXT specified needs. Understanding why these distinctions are present is unknown at this time.

Another finding worth noting is that two respondents shared limitations to physical resource access. These limitations included lack of storage, finances, and accessibility. These limitations should be considered in any future research planning focusing on physical resources for livestock related disasters.

Livestock Disaster Preparedness Social Resources

All eight interviewees were able to identify social resources who participate in livestock disaster planning or response. Seven interviewees listed organizations they interact with. When asked to identify specific interactions with stakeholders during planning, six interviewees reported connections. This reveals that EMs and EXTs have a list of social relationships, with more than half of them utilizing stakeholder interactions for planning purposes. These social relationships indicate a healthy presence of social capital within these communities. Both bridging and bonding social capitals were identified in the responses which indicates EMs and EXTs have strong relationships, both internally and externally. These relationships could be influenced by the animal agricultural in these communities as previous research has shown those involved in particular community agriculture practices have high social capital (Flora & Bregendahl, 2012; Duffy et al., 2017). Co-ops, for example, were mentioned numerous times in the

interviews. Previous research identified social capital as being a product of co-op involvement (Flora & Bregendahl, 2012). Investigation of cultural capital in these communities and how they affect livestock disaster planning is warranted. Additionally, though most did not feel they had an active role in formal planning, all respondents were aware of these social resources. Exploration into how these contacts are utilized should occur.

Interactions between Extension and Emergency Management

Interactions were reported between EMs and EXTs by all interviewees. Both formal and informal interactions were identified. These interactions may be occurring on a professional level, as well as on a personal level. Due to this nature, bonding social capital may be stronger amongst these individuals versus bridging social capital (Flora & Flora, 2013). Bonding social capital is found when people have similar backgrounds and these relationships are more emotionally charged (Flora & Flora, 2013). This is in contrast to the single-purpose nature of bridging social capital relationships (Flora & Flora, 2013). However, no conclusions on bonding capital strength can be made from this study as no further questions were included do to the methodology of the study. Potential use of the social network analysis framework may be justified to explore these relationships in the future, exploring professional versus personal interaction in these roles (Tichy, Tushman, & Fombrun, 1979).

When asked if these interactions occurred before recent wildfires, five interviewees said “yes”. One of the five who said, “yes” mentioned before the fire these interactions were limited. This response coupled with three respondents stating

interactions did not occur previously, indicates interaction frequency increased post-disaster. This, coupled with past research on capitals post disaster, could indicate disaster occurrence may increase strength of social relationships between these two particular stakeholders Previous researchers found one community had robust social relationships the week after a flood and these relationships remained even years later (Smith and Boruff, 2011). This cannot be concluded with the current study, though, as an assessment of capital presence pre- and post- disaster would be needed. Therefore, future exploration of capitals pre- and post-disaster is justified.

Capital References

All seven capitals were identified in responses, however frequency of each capital differed. These results are in agreement with studies utilizing CCF in disasters (Stofferahn, 2012), Extension (Vetter & Flage, 2018), and agriculture (Duffy et al., 2017; Flora & Bregendahl, 2012). Social and built capitals were identified most frequently, as they were referenced by all eight interviewees. This was expected since multiple interview questions focused specifically on social and physical resources. Social capital has also been identified as having a strong presence in past disasters (Stofferahn, 2012; Smith & Boruff, 2011) and in agricultural (Duffy et al., 2017; Flora & Bregendahl, 2012) research. Both bonding and bridging social capitals were identified throughout the interviews, with no substantial difference in social capital type. As previously mentioned, built capital in disaster research has traditionally been found to spiral down, however, it was found to have a strong presence in our study (Stofferahn, 2012). This may be attributed to disaster research using CCF in the past being focused mostly on recovery efforts rather than preparedness.

Human capital had the third greatest frequency, with references from seven interviewees. In frequency order, cultural, political, natural, and financial capital all ranked lower in occurrence than human capital. Though frequency of identification provides a picture of current capital presence, comparing EM reporting's of these capitals versus EXT reporting's can shed more light on the current state of preparedness. Only one EM referenced cultural capital compared to all four EXTs making references to this capital. Additionally, political capital was referenced by only one EM, but political capital was mentioned by two EXTs. In contrast, financial capital was not referenced at all by EMs, but was referenced by one EXT. Similarly, natural capital was not referenced by EXTs, but was referenced by EMs. This indicates that EMs and EXTs identify different capital presence when talking about disaster preparedness. Cultural, political, financial, and natural capital were mentioned significantly less than other capitals. This could have occurred for numerous reasons including a lack of capital presence within the community (Flora & Flora, 2013), lack of identification, or because of how the questions were framed. Due to the methodology of this study, respondents could provide lengthy or short responses. This could have also impacted the amount capitals were listed. Additionally, questions were specifically focused on social and physical resources. However, questions were open-ended allowing for all capital types to be identified with no restrictions placed on respondents' answers.

There were emerging themes identified in the interviewee process. These included: referencing community members, leaders, politicians, and agricultural groups as resources. These were noted by the researcher throughout the interview process. Exploration into the depth of these themes should occur. The social networking analysis

should be considered for use as a theoretical framework for future research, as it could better explain the social relationships identified (Tichy et al., 1979). Further research into the cultural capital within these areas is also justified.

CONCLUSIONS

Though planning was referenced by the majority of respondents in the population surveyed, few EMs and EXTs currently plan for livestock related disasters. Additionally, few respondents feel they have been given a formal role. This suggests specific roles in livestock related disaster preparedness may need to be clarified and participation in those roles should be encouraged. This should be done at the state level. Also, training of EMs and EXTs in livestock related disaster response is lacking. Based on our findings, there appears to be a shortage of livestock specific natural disaster training in Oklahoma. Additionally, there is a lack of awareness of potential training availability. Several trainings are, however, available. Therefore, better communication techniques should be employed to promote state livestock disaster trainings. Informal training may also need to be presented as a valid training option, as those with informal training did not recognize it as such. Communication and grief counseling training in livestock related disasters should be provided. Response structure understanding was also requested. Sources for these trainings should be given to all individuals responsible for disaster planning and collaboration should be encouraged at these events.

Physical resources are currently available. Knowledge of these resources is predominantly received from social connections and relationships. Investment in social relationships, therefore, may result in an increase in physical resource identification for

livestock related disasters. Additionally, because EMs and EXTs reported different physical resources, collaborative conversations between these groups could allow for greater identification of needed resources. Storage, finances, and accessibility should be considered when discussing physical resources. Also, numerous physical resource options should be made known during preparedness planning, even though built capital was determined to be high, as rapid spiraling down of built capital identified in other disaster research suggests this necessity (Stofferahn, 2012).

Current social resources were identified by EMs and EXTs. These social resources include individuals, organizations, and stakeholders. This indicates a healthy level of social capital in these communities. With both bonding and bridging social capital being identified, these communities appear to have strong relationships within and outside of the community. An analysis of these rural community's cultural dynamics may also be of value. Additionally, further research into how these relationships are being used specifically for planning should occur.

Interactions between EMs and EXTs appear to be present. However, these relationships were not reported to occur specifically for livestock disaster planning purposes. Rather, these relationships appeared to be a mix of formal and informal interactions. Therefore, the quality of these relationships should be explored in more depth. These relationships were reported to increase post disaster. Assessment of these specific relationships pre- and post-disaster may be justified for future studies. The longevity of these relationships should also be evaluated.

High social and built capital presence was identified in this study. While all seven capitals were identified, the frequency of human, cultural, natural, financial, and political capitals were substantially lower. Further investigation into how individuals report capitals or what type of capitals they feel are important specifically for livestock related disasters should be explored.

REFERENCES

- American Horse Council Foundation. (2018). *Economic Impact of the Horse Industry*. Washington, DC: American Horse Council Foundation.
- American Veterinary Medical Association. (2012). *United States Pet Ownership and Demographic Source Book*.
- Beaulieu, L. J. (2014). *Promoting community vitality & sustainability: The community capitals framework* [Fact sheet]. Retrieved from <https://www.pcrd.purdue.edu/files/media/Community-Capitals-Framework-Writeup-Oct-2014.pdf>
- Bhattacharyya, R., Templin, E., Messer, C., & Chazdon, S. (2017). Participatory evaluation and learning: A case example involving ripple effects mapping of a tourism assessment program. *Journal of Extension*, 55(2). Retrieved from <https://www.joe.org/joe/2017april/a3.php>

- Black, L. (2012). Disaster Preparedness and the Cooperative Extension Service. *Journal of Extension*, 50(3). Retrieved from <https://www.joe.org/joe/2012june/comm1.php#.W0-ah5rt0EA.mendeley>
- Centers for Medicare & Medicaid Services. (2017). *Survey and certification group frequently asked questions: Emergency preparedness regulation*. Retrieved from <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertEmergPrep/Downloads/FAQ-Round-Four-Definitions.pdf>
- Crimmins, M. A. (2006). Synoptic climatology extreme fire-weather conditions across the southwest United States. *International Journal of Climatology*, 26(8), 1001-1016. doi: 10.1002/joc.1300
- Covey, T. & Kuhns, R. (2015). Livestock forage disaster program payments increase in 2014. *United States Department of Agriculture, Economic Research Service*. Retrieved from <https://www.ers.usda.gov/amber-waves/2015/januaryfebruary/livestock-forage-disaster-program-payments-increase-in-2014/>
- Department of Agricultural Economics Oklahoma State University. (1989). *Economic Analysis of Selected Horse Production Systems in Oklahoma* (OAES Research Report P-905). Retrieved from Oklahoma State University.
- Beaulieu, L. J. (2014). *Promoting community vitality & sustainability: The community capitals framework* [Fact sheet]. Retrieved from

<https://www.pcrd.purdue.edu/files/media/Community-Capitals-Framework-Writeup-Oct-2014.pdf>

Emery, M., & Flora, C. (2006). Spiraling-up: Mapping community transformation with community capitals framework. *Community Development Society*, 37(1), 19-35. doi: 10.1080/15575330609490152

Eighmy, M. A., Hall, T. E., Sahr, E., Gebeke, D., & Hvidsten, M. (2012). The Extension Service and Rural/Frontier Disaster Planning, Response, and Recovery. *Journal of Extension*, 50(4). Retrieved from <https://www.joe.org/joe/2012august/a10.php#.W0-SqG9ndIU.mendeley>

Extension Disaster Education Network. (2018). EDEN's History. Retrieved from <https://eden.lsu.edu/engage/introduction-to-eden-delegate-toolkit/edens-history/>

Extension Disaster Education Network. (2018b). EDEN's Mission and Vision. Retrieved from <https://eden.lsu.edu/engage/introduction-to-eden-delegate-toolkit/edens-mission-and-vision/>

Evet, R. R., Mohrle, C. R., Hall, B. L., Brown, T. J., & Stephens, S. L. (2008). The effect of monsoonal atmospheric moisture on lightning fire ignitions in southwestern North America. *Agricultural and Forest Meteorology*, 148(10), 1478-1487.

Extension. (2010). Top states for number of meat goats. *eXtension*. Retrieved from <http://articles.extension.org/pages/26267/top-states-for-number-of-meat-goats>

Department of Homeland Security. (n.d.). *Natural Disasters*. Retrieved from <https://www.dhs.gov/natural-disasters>

Diaz, J. M. (2012). *Economic impacts of wildfire*. (SFE-2012-7). Retrieved from North Carolina State University, Southern Fire Exchange website:

https://fireadaptednetwork.org/wp-content/uploads/2014/03/economic_costs_of_wildfires.pdf

Downey, L. H., Buys, D., Fountain, B., Ball, T., Hilbun, A. H., & Threadgill, P. (2018). Assisting After Disaster: A Volunteer Management and Donations Management Training. *Journal of Extension*, 56(3). Retrieved from

<https://joe.org/joe/2018june/tt2.php#.W0-caskJfOE.mendeley>

Duffy, L. N., Kline, C., Swanson, J. R., Best, M., & McKinnon, H. (2017). Community development through agroecotourism in Cuba: An application of the community capitals framework. *Journal of Ecotourism*, 16(3), 203-221. doi:

10.1080/14724049.2016.1218498

Federal Emergency Management Agency. (2019). *National incident management system*.

Archives of Federal Emergency Management Agency, Washington, D. C.

Federal Emergency Management Agency. (2019b). *Welcome to national preparedness*.

Archives of Federal Emergency Management Agency Emergency Management Institute, Emmitsburg, MD.

Federal Emergency Management Agency. (2018a). About the Agency. Retrieved from

<https://www.fema.gov/about-agency>

Federal Emergency Management Agency. (2018b). National Preparedness Goal. Retrieved

August 17, 2018, from <https://www.fema.gov/national-preparedness-goal>

Federal Emergency Management Agency. (2017). *Livestock in Disasters: State and Federal Disaster Preparedness*. Archives of Federal Emergency Management Agency Emergency Management Institute, Emmitsburg, MD.

Federal Emergency Management Agency. (2016). *Emergency Support Function -#11: Agriculture and Natural Resources Annex*. Archives of Federal Emergency Management Agency, Washington, D. C.

Federal Emergency Management Agency. (2015). *IS-10.A: Animals in Disasters: Awareness and Preparedness*. . Archives of Federal Emergency Management Agency Emergency Management Institute, Emmitsburg, MD.

Federal Emergency Management Agency. (2013). *IS-111.A: Livestock in Disasters*. Archives of Federal Emergency Management Agency Emergency Management Institute, Emmitsburg, MD.

Federal Emergency Management Agency. (2010). *Developing and Maintaining Emergency Operations Plans: Comprehensive Preparedness Guide 101*. Archives of Federal Emergency Management Agency, Washington, D. C.

Flora, C., Flora, J., and Fey, S. (2004). *Rural communities: Legacy and change (2nd ed)*. Boulder, Colorado: Westview Press.

Flora, C. B., & Flora, J. L. (2013). *Rural communities: Legacy and change (4th ed)*. Boulder, Colorado: Westview Press.

- Flora, C. B., & Bregendahl, C. (2012). Collaborative community-supported agriculture: Balancing community capitals for producers and consumers. *International Journal of Sociology of Agriculture & Food*, 19(3), 329-346. Retrieved from <https://blogs.adams.edu/grace-young/files/2017/02/Collaborative-Community-Agriculture-Community-Capitals-Framework.pdf>
- Fritz, S. M., Boren, A. E., Trudeau, D., & Wheeler, D. W. (2007). Low resources in a high stakes game: Identifying viable rural community partners. *Journal of Extension*, 45(4). Retrieved from <https://www.joe.org/joe/2007august/rb2.php>
- Freuchte, K. (2011). *Community capitals: Social capital* [Fact sheet]. Retrieved from https://openprairie.sdstate.edu/cgi/viewcontent.cgi?article=1520&context=extension_extra
- Gary, G., Allred, S., & LoGiudice, E. (2014). An Extension Education Program to Help Local Governments with Flood Adaptation. *Journal of Extension*, 52(4). Retrieved from https://www.joe.org/joe/2014august/pdf/JOE_v52_4iw6.pdf
- Gillett N.P., Weaver A.J., Zwiers F.W., & Flannigan M.D. 2004. Detecting the effect of climate change on Canadian forest fires. *Geophysical Research Letters*, 31(18), 211. doi:10.1029/2004GL020876
- Goreham, G. A., Tweeten, K., Taylor, C. E., & Fier, B. (2009). *Beginning again North Dakota: An asset-based development program for rural communities using a community capitals framework*. Retrieved from <https://www.ag.ndsu.edu/publications/farm-economics-management/beginning-again->

north-dakota-an-asset-based-development-program-for-rural-communities-using-a-community-capitals-framework-1

Gorte, Ross. (2013). The rising cost of wildfire protection. *Headwaters Economics*, p. 1-15.

Retrieved from <http://pagosaspringscdc.org/wp-content/uploads/2013/07/Rising-Costs-of-Wildfire-Protection-Headwaters.pdf>

Hays, R. (2018). As smoke clears, Derrell Peel calculates \$26.4M in wildfire damage is NW

OK cattle operations. *Oklahoma Farm Report*. Retrieved from

http://www.oklahomafarmreport.com/wire/news/2018/05/00223_BeefBuzzDerrellPeelWildfireEstimates05082018_104332.php#.WxBkJC-ZOfU

Heyerdahl, E. K., Morgan, P., & Riser, J. P. (2008). Multi-season climate synchronized

historical fires in dry forests (1650-1900), northern Rockies, U.S.A. *Ecology* 89(3), 705-716.

Jacobs, C. (2011a). *Measuring success in communities: Understanding the community*

capitals framework [Fact sheet]. Retrieved from

http://pascalobservatory.org/sites/default/files/capitalsextension_extra.pdf

Jacobs, C. (2011b). *Community capitals: Natural capital* [Fact sheet]. Retrieved from

https://openprairie.sdstate.edu/extension_extra/518/?utm_source=openprairie.sdstate.edu%2Fextension_extra%2F518&utm_medium=PDF&utm_campaign=PDFCoverPages

ges

Jacobs, C. (2011c). *Community capitals: Cultural capital* [Fact sheet]. Retrieved from https://openprairie.sdstate.edu/cgi/viewcontent.cgi?article=1518&context=extension_extra

Jacobs, C. (2011d). *Community capitals: Human capital* [Fact sheet]. Retrieved from https://openprairie.sdstate.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1519&context=extension_extra

Jacobs, C. (2011e). *Community capitals: Financial capital* [Fact sheet]. Retrieved from https://openprairie.sdstate.edu/cgi/viewcontent.cgi?article=1523&context=extension_extra

Jacobs, C. (2011f). *Community capitals: Built capital* [Fact sheet]. Retrieved from https://openprairie.sdstate.edu/cgi/viewcontent.cgi?article=1522&context=extension_extra

Jacobs, C. (2011g). *Community capitals: Political capital* [Fact sheet]. Retrieved from https://openprairie.sdstate.edu/cgi/viewcontent.cgi?article=1521&context=extension_extra

Johnston, F. H., Henderson, S. B., Chen, Y., Randerson, J. T., Marlier, M., Defries, R. S., Kinney, P., Bowman, D. M., ... Brauer, M. (2012). Estimated global mortality attributable to smoke from landscape fires. *Environmental health perspectives, 120*(5), 695-701.

- Kais, S. M., & Islam, M. S. (2016). Community capitals as community resilience to climate change: Conceptual connections. *International Journal of Environmental Research and Public Health*, 13(12). doi: 10.3390/ijerph13121211
- Kapucu, N., Hawkins, C. V., & Rivera, F. I. (2014). Disaster preparedness and resilience for rural communities. *Risk, Hazards, and Crisis in Public Policy* 4(4). doi: 10.1002/rhc3.12043
- Kerr, S., Sanders, C., Moulton, C., & Gaffney, M. (2018). The role of extension in a university's response to a natural disaster. *Journal of Extension*, 56(4), 1-10. Retrieved from https://joe.org/joe/2018august/pdf/JOE_v56_4a5.pdf
- Koch, B. (1999). Extension disaster education network helps CES prepare, Communicate. *Journal of Extension*, 37(4). Retrieved from <https://www.joe.org/joe/1999august/iw1.php>
- Koch, B., & Mueller, A. (2017, September). Successful disaster recovery using the community capitals framework. *Extension disaster education network annual meeting*. Symposium conducted at the meeting of Extension Disaster Education Network, Moline, IL.
- Koch, B., Mueller, A., Bethke, D., Gill, D., Goreham, G. A., Jedd, T., Klenow, D., Mantonua, K., Norr, K., Paul, B. K., Redlin, M., & Wall, N. (2017). *Successful disaster recovery using the community capitals framework*. Retrieved from <https://www.ag.ndsu.edu/publications/disasters/successful-disaster-recovery-using-the-community-capitals-framework/de1864.pdf>

- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology* 77(6), 1121-1134. doi: 10.1037/0022-3514.77.6.1121
- Levenson, E., Andone, D., & Burnside T. (2017, March 7). Wildfires burn more than 1 million acres, taking 7 lives. *CNN*. Retrieved from <https://www.cnn.com/2017/03/07/us/wildfires-texas-deaths/>
- Lin, N., Cook, K., & Burt, R. S. (2001). *Social capital: Theory and research*. New Brunswick, New Jersey: Transaction Publishers.
- MacLachlan, M. Ramos, S., Hungerford, A., and Edwards, S. (2018). Federal natural disaster assistance programs for livestock producers, 2008-16. *United States Department of Agriculture, Economic Research Service* (EIB-187). Retrieved from <https://www.ers.usda.gov/webdocs/publications/86990/eib-187.pdf?v=43130>
- Mattos, D. (2015). *Community capitals framework as a measure for community development* [Fact sheet]. Retrieved from <https://www.agecon.unl.edu/cornhusker-economics/2015/community-capitals-framework>
- Mueller, A., & Koch, B. (2016, October). Successful disaster recovery using the community capitals framework. *Extension disaster education network annual meeting*. Symposium conducted at the meeting of Extension Disaster Education Network, Ithaca, NY.

Nathaniel, K., & Kinsey, S. (2013). Contributions of youth engagement to the development of social capital through community mapping. *Journal of Extension*, 51(1). Retrieved from <https://www.joe.org/joe/2013february/tt7.php>

National Interagency Coordination Center (2017b). *2017 Wildland fire summary and statistics annual report*. Retrieved from https://www.predictiveservices.nifc.gov/intelligence/2017_statssumm/intro_summary17.pdf

National Interagency Coordination Center (2016b). *2016 Wildland fire summary and statistics annual report*. Retrieved from https://www.predictiveservices.nifc.gov/intelligence/2016_Statssumm/intro_summary16.pdf

National Interagency Fire Center. (2017). *National Report of Wildland Fires and Acres Burned by State*. Retrieved from https://www.predictiveservices.nifc.gov/intelligence/2017_statssumm/fires_acres17.pdf.

National Interagency Fire Center. (2016). *National Report of Wildland Fires and Acres Burned by State*. Retrieved from https://www.predictiveservices.nifc.gov/intelligence/2016_Statssumm/intro_summary16.pdf

National Institute of Food and Agriculture. (n.d. a). Cooperative Extension History. Retrieved August 17, 2018, from <https://nifa.usda.gov/cooperative-extension-history>

National Institute of Food and Agriculture. (n.d. b). Cooperative Extension System.

Retrieved August 17, 2018, from <https://nifa.usda.gov/cooperative-extension-system>

National Institute of Food and Agriculture. (n.d. c). Extension Disaster Education Network.

Retrieved from <https://nifa.usda.gov/extension-disaster-education-network>

National Interagency Fire Center (2017). *Federal firefighting costs: Suppression only*.

Retrieved from https://www.nifc.gov/fireInfo/fireInfo_documents/SuppCosts.pdf

Oklahoma Department of Agriculture, Food and Forestry. (2018). *Oklahoma agricultural statistics*. Retrieved from

https://www.nass.usda.gov/Statistics_by_State/Oklahoma/Publications/Annual_Statistical_Bulletin/ok-bulletin-2018.pdf

Oklahoma Department of Agriculture, Food and Forestry. (2017). *Oklahoma agricultural statistics 2017: Pocket facts*. Retrieved from

https://www.nass.usda.gov/Statistics_by_State/Oklahoma/Publications/Annual_Statistical_Bulletin/ok-pocket-facts-2017.pdf

Oklahoma Forestry Services. (n.d.). Oklahoma fire situation reports. Retrieved from

<http://www.forestry.ok.gov/situation-reports>

Palliser, J. (2012). Wildfires. *Science Scope*, 36(2), 10-12. Retrieved from [https://search-](https://search-proquest-)

[com.argo.library.okstate.edu/docview/1093892851/fulltextPDF/5F45FB51E60943F1PQ/1?accountid=4117](https://search-proquest-com.argo.library.okstate.edu/docview/1093892851/fulltextPDF/5F45FB51E60943F1PQ/1?accountid=4117)

- Peck, D. (2005). Foot and mouth outbreak: Lessons for mental health services. *Advances in Psychiatric Treatment, 11*(4), 270-276. doi:10.1192/apt.11.4.270
- Peck, D. F., Grant, S., McArthur, W., & Godden, D. (2002). Psychological impact of foot-and-mouth disease on farmers. *Journal of Mental Health, 11*(5), 523-531. doi:10.1080/09638230020023877
- Pigg, K., Gasteyer, S., Martin, K., Apaliya, G., & Keating, K. (2013). The community capitals framework: An empirical examination of internal relationships. *Community Development, 44*(4), 492-502. doi: 10.1080/15575330.2013.814698
- Phillips, B. D. (2014). *Qualitative disaster research*. New York: Oxford University Press.
- Porr, C. A. S., Brown, J. A., & Splan, R. K. (2011). Development and Assessment of an Emergency Responder Horse Handling Training Program in Virginia. *Journal of Extension, 49*(4). Retrieved from <https://www.joe.org/joe/2011august/iw4.php#.W3cEdyeejuM.mendeley>
- Porr, C. A. S., Shultz, A. M., Gimenez, R., & Splan, R. K. (2016). Collaboration Between Extension and Industry: Coordination and Assessment of Technical Large Animal Emergency Rescue Training. *Journal of Extension, 54*(1). Retrieved from <https://www.joe.org/joe/2016february/rb4.php#.W0-hBm2htuM.mendeley>
- Powell, P., Smith, M., & Black, L. (2009). Involving youth in community emergency preparedness: Impacts of a multistate initiative. *Journal of Youth Development 4*(4). Retrieved from <https://jyd.pitt.edu/ojs/jyd/article/view/238>

Pretty, J. N. (1998). *The living land: Agriculture, food and community regeneration in rural Europe*. London: Earthscan Publications Ltd.

Purdue Agriculture. (n.d.). Extension Disaster Education Network. Retrieved from <https://ag.purdue.edu/extension/eden/Pages/default.aspx>

Ramos, A. (2016). Welcoming immigrants: An opportunity to strengthen rural communities. *Journal of Extension*, 54(3). Retrieved from <https://www.joe.org/joe/2016june/comm1.php>

Reid, A. M., Fuhlendorf, S. D., and Weir, J. R. (2010). Weather variables affecting Oklahoma wildfires. *Rangeland Ecology and Management*, 63(5), 599-603. doi: 10.2111/REM-D-09-00132.1

Reid, C. E., Brauer, M., Johnston, F. H., Jerrett, M., Balmes, J. R., & Elliott, C. T. (2016). Critical Review of Health Impacts of Wildfire Smoke Exposure. *Environmental health perspectives*, 124(9), 1334-43.

Rowntree, J. E., Raven, M. R., Schwihof, J. P., Buskirk, D. D., & Coyln, J.W. (2012). Extension facilitated scenario planning to direct a preferred agriculture future. *Journal of Extension*, 50(3). Retrieved from https://www.joe.org/joe/2012june/pdf/JOE_v50_3tt8.pdf

Stotts, D. (2017). March 7 wildfire impacts in Oklahoma exceed \$16 million. *Oklahoma State University, Division of Agricultural Sciences and Natural Resources*. Retrieved from <http://www.dasnr.okstate.edu/Members/donald-stotts-40okstate.edu/march-7-wildfire-impacts-in-oklahoma-exceed-16-million>

- Schneider, J. (2004). The role of social capital in building healthy communities. Retrieved from Annie E. Casey Foundation website: <https://www.aecf.org/resources/the-role-of-social-capital-in-building-healthy-communities/>
- Schwartz, N. (2007, October 25). Fires' long-term impact on environment. *CBS News*. Retrieved from <https://www.cbsnews.com/news/fires-long-term-impact-on-environment/>
- Smith, H., & Boruff, B. (2011). *Recovery from the storm: Resilience and the role of community capital in long-term disaster recovery in regional western Australia*. Retrieved from http://soac.fbe.unsw.edu.au/2011/papers/SOAC2011_0212_final.pdf
- Smith, H. G., Sheridan, G. J., Lane, P. N., Nyman, P., & Haydon, S. (2011). Wildfire effects on water quality in forest catchments: A review with implications for water supply. *Journal of Hydrology*, 396(1-2), 170-192. doi: 10.1016/j.jhydrol.2010.10.043
- Smith, J., Black, L., & Williams, L. (2012). Emergency Exercise Participation and Evaluation. *Journal of Extension*, 50(3). Retrieved from <https://www.joe.org/joe/2012june/comm2.php#.W0-fJKZB3CQ.mendeley>
- Spencer, K., (2011). *Rural Assistance Center, Community Emergency Response Team*. Retrieved from: http://www.raonline.org/info_guides/preparedness/faq.php#difference
- Stofferahn, C. W. (2012). Community capitals and disaster recovery: Northwood ND recovers from an EF 4 tornado. *Community Development*, 43(5), 581-598. doi: 10.1080/15575330.2012.732591

- Telg, R., Irani, T., Place, N., DeGroat, A. R., Ladewig, H., Kistler, M., & Barnett, R. (2008). Disaster preparedness and professional and personal challenges of county extension faculty during the 2004 Florida hurricane season. *Journal of Extension* 46(3). Retrieved from <https://www.joe.org/joe/2008june/a6.php>
- Texas A&M AgriLife Extension. (2018). Disaster Education Network. Retrieved from <http://texashelp.tamu.edu>
- Thompson, K. (2015). For pet's sake, save yourself: Motivating emergency and disaster preparedness through relations of animal guardianship. *Australian Journal of Emergency Management*, 30(2), 43-46. Retrieved from <https://ajem.infoservices.com.au/items/AJEM-30-02-09#sthash.N4vEPAtU.dpuf>
- Thompson, K. & Every, D. (2016, December). All creatures great and small: Improving disaster resilience through pets. *Natural Hazards Observer*, XL(8). Retrieved from <https://hazards.colorado.edu/article/all-creatures-great-and-small-improving-disaster-resilience-through-pets>
- Tichy, N. M., Tushman, M. L., & Fombrun, C. (1979). Social network analysis for organizations. *Academy of Management: The Academy of Management Review* 4(4), 507-519.
- United States Department of Agriculture, Economic Research Service. (2018). *Ag and food sectors and the economy*. Retrieved from <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy/>

United States Department of Agriculture, Economic Research Service. (2018b). *2018 Farm sector income forecast*. Retrieved from <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/>

United States Department of Agriculture, Economic Research Service. (2017). *Farm income and wealth statistics: Cash receipts by state*. Retrieved from https://data.ers.usda.gov/reports.aspx?ID=17843#P648a35464af94c4299587d02e4a2966c_2_17iT0R0x36

United States Department of Agriculture, Economic Research Service. (2017b). *Charts and maps about your state: Get to know farms in Oklahoma*. Retrieved from <https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/charts-and-maps-about-your-state/>

United States Forest Service. (n.d.) *Wildland fire*. Retrieved from <https://www.fs.fed.us/managing-land/fire>

University of Illinois Extension. (2018). *Disaster Resources*. Retrieved from <https://extension.illinois.edu/disaster/>

Vermont Emergency Mangement. (2015). *State Support Functions Summary*. Retrieved from <http://vem.vermont.gov/sites/demhs/files/pdfs/plans/state/Appendix-III-SSF-RSFsummary.pdf>

- Vetter, R. & Flage, L. (2018). Assessing results of 4-H mentoring with Native American first-generation 4-h youths. *Journal of Extension*, 56(3). Retrieved from <https://www.joe.org/joe/2018june/a8.php>
- Weir, J. R., Reid, A. M., & Fuhlendorf, S. D. (2017). Wildfires in Oklahoma [Fact sheet]. Retrieved from <https://www.ok.gov/conservation/documents/WildfiresinOklahoma.pdf>
- Westerling, A. L., Hidalgo, H. G., & Swetnam, T. W. (2006). Warming and earlier spring increases western U.S. forest wildfire activity. *Science*, 313(5789), 940-943. doi: 10.1126/science.1128834

APPENDICES

List of Definitions and Acronyms

Beginning Again North Dakota (BAND): a program created by North Dakota Extension that sought to improve quality of life, promote economic development, and increase environmental well-being (Goreham, Tweeten, Taylor, and Fier, 2009)

Community Capitals Framework (CCF): a framework created by Flora and Flora to access community assets by analyzing community functions through the identification of capitals (Flora and Flora, 2013)

Community Supported Agriculture (CSA): a system where consumers and farmers interact directly to receive specified amounts of food directly from the producer's farm (Flora & Bragendahl, 2012)

Cooperative Extension System (CES): a component of the Land-Grant University system that serves as a non-credit educational network that delivers research and educational programs to the general public

Emergency Manager (EM): an individual appointed by city, state, or national government who is responsible for local management of emergency situations, including before, during, and after an incident

Emergency Support Function #11 (ESF-11): an emergency support function created by the Federal Emergency Management Agency that deals specifically with Agriculture and Natural Resources (FEMA, 2016)

Extension Disaster Education Network (EDEN): a multi-state collaboration by the Cooperative Extension System to increase disaster services to citizens (EDEN, 2018)

Extension Educator (EXT): an individual appointed by the Land-grant University that works within a community to provide educational programming and research-based materials to the general public

Federal Emergency Management Agency (FEMA): a national government agency involved with emergency management

Incident Command System (ICS): a response structure used by the Federal Emergency Management Agency

Livestock Forage Disaster Program (LFP): a program within the United States Department of Agriculture that provides funding to land owners that have land compromised by drought or wildfires

National Incident Management Systems (NIMS): a response structure used by the Federal Emergency Management Agency

National Institute of Food and Agriculture (NIFA): a branch of the United States Department of Agriculture

National Interagency Coordination Center (NICC): a national government center that records wildfire records and oversees interagency coordination

National Interagency Fire Center (NIFC): a center housing the National Interagency Coordination Center

Oklahoma Department of Agriculture, Food and Forestry (ODAFF): the state government agency involved with agriculture, food, and forestry

United States Department of Agriculture (USDA): a national government agency involved with emergency management

United States Department of Agriculture Economic Research Service (USDA ERS): a part of the United States Department of Agriculture that provides economic information

United States Forest Service (USFS): a national government agency involved with forestry and wildfires

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Recruitment Materials and Scripts

Hello Extension Educators/Emergency Managers,

My name is Brittani Kirkland and I am a Master's student at Oklahoma State University in the department of Animal Sciences. Oklahoma State is a land grant institution and as such, research is one of the main objectives of the university. I participate in many of these research projects and I am required to write a thesis on one project to complete my graduate program. For my thesis, I will be conducting a needs assessment for Oklahoma State Extension regarding preparedness for disasters that affect large animals. The purpose of this study is to evaluate partnerships between Extension educators and Emergency Management in regards to large animal disaster preparedness for recent wildfires in the state of Oklahoma. Our findings could be used to provide community stakeholders with materials to assist them in future large animal disaster preparedness planning through educational materials, trainings, and other resources.

We are requesting your participation in this study. If you choose to participate, you will be asked to complete a phone interview or video teleconference, using the online provider Zoom, with the researcher in which demographic and large animal disaster preparedness questions will be presented. The interview will take no longer than one hour. Participation in this project is voluntary and we anticipate no unusual risks to you for participating. Compensation will not be provided for participation. This project has received Institutional Review Board approval # AG-18-26.

If you would like to discuss your participation in the study and/or request information about the results of the study, you may contact Brittani Kirkland, 210 4-H, Oklahoma State University, Stillwater, OK 74078, 352-258-0173 or brittani.kirkland@okstate.edu.

If you choose to participate in this study, please reply to this email with your name, phone number, and email and I will be in contact with you to set up an appointment.

Thank you for your help!

Brittani Kirkland



Approved:
Protocol #: AG-18-26

Phone Call Recruitment

Call – if answer

PI: Hello Insert name of Extension Educator/Emergency Manager. This is Brittani Kirkland from Oklahoma State University, how are you doing?

Let them answer

PI: Good. I am a graduate student at Oklahoma State University in the department of Animal Sciences and I am currently conducting a needs assessment for Oklahoma State Extension regarding preparedness for wildfires that affect large animals and I wanted to request your participation in this study. Would it be okay if I shared a few more details about the project with you and how you can participate?

Let them answer

Yes – then read following

PI:

The purpose of this study is to evaluate partnerships between Extension educators and Emergency Management in regards to large animal disaster preparedness for recent wildfires in the state of Oklahoma. Our findings could be used to provide community stakeholders with materials to assist them in future large animal disaster preparedness planning through educational materials, trainings, and other resources.

We are requesting your participation in this study. If you choose to participate, you will be asked to complete a phone interview or video teleconference, using the online provider Zoom, with myself in which demographic and large animal disaster preparedness questions will be presented. The interview will take no longer than one hour and participation in this project is voluntary. We anticipate no unusual risks to you for participating.

Compensation will not be provided for participation. The project has received Institutional Review Board approval.

Do you have any questions for me about the project or your participation in the study?

We are looking to conduct the interviews in the next month. Would you be interested in participating?

If Yes-

PI: Great, I really appreciate your willingness to participate. What time and date would be best for you? – Again, it will only take one hour.

Arrange time with participant that will be open for both the PI and the participant.



Approved:
Protocol #: AG-18-26

PI: Thank you for your time today and I look forward to talking with you again on (Date and time arranged). If you have any questions between now and then, you may contact me at 352-258-0173 or brittani.kirkland@okstate.edu.

If No-

PI: Okay, thank you so much for your time and I hope you have a great day. If you have any questions at all please feel free to contact me at 352-258-0173 or brittani.kirkland@okstate.edu.

No – then read following

PI: Okay, thank you so much for your time and I hope you have a great day. If you have any questions at all please feel free to contact me at 352-258-0173 or brittani.kirkland@okstate.edu.



Approved:
Protocol #: AG-18-26



EXPERIMENTAL SCRIPT: MODIFIED PARTICIPANT INFORMATION FORM

Study: Oklahoma Wildfires: Examining Extension Partnerships in Large Animal Disaster Preparedness

IRB Protocol #

This experiment script provides a guide for the Principal Investigator when running this research study. Due to the nature of this study, verbal consent and all data collected will be verbal and will be audio/video recorded.

Study Script

PI: "Hello, you are invited to be in a research study of large animal disaster preparedness needs in the state of Oklahoma. You were selected as a possible participant because you are an Extension Educator or Emergency Manager that was involved in recent wildfire response and recovery in Oklahoma.

We ask that you listen to the following information about this project and ask any questions you may have before agreeing to be in the study. Your participation is entirely voluntary.

This study is being conducted by myself, Brittani Kirkland, a graduate student in the Department of Animal Science at Oklahoma State University. I am working under the direction of Dr. Kris Hiney, a faculty member at Oklahoma State University in the Department of Animal Science.

The purpose of this study is to evaluate partnerships between Extension educators and Emergency Management in regards to large animal disaster preparedness for recent wildfires in the state of Oklahoma.

If you agree to be in this study, we would ask you to:

- Participate in one video interview through an online video chat provider.
- Answer interview questions that will consist of inquiries about your personal experience(s) and knowledge regarding large animal response in disaster preparedness planning.
- Be video recorded during the interview.

There are no known risks associated with this project, which are greater than those ordinarily encountered in daily life. There are also no direct benefits to you that have been



Approved: 05/17/2018
Protocol #: AG-18-26

identified from your participation. You will not receive payment for participating. This study may help the researchers learn more about Extension and Emergency management needs in Oklahoma and may help future individuals and communities be better prepared for livestock related disasters.

Do you have any questions at this time?

Participant: *Any questions they may have.*

PI: Because of the nature of the data, I cannot guarantee your data will be confidential and it may be possible that others will know what you have reported. The researchers will make every effort to ensure that information about you remains confidential, but cannot guarantee total confidentiality. Your information, including your name and county, will be assigned a code number/pseudonym. The list connecting your information to this code will be kept in a locked file. When the study is completed and the data have been analyzed, this list will be destroyed. Your name will not be used in any report. Your identity will not be revealed in any publications, presentations, or reports resulting from this research study. However, it may be possible for someone to recognize your particular response.

Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time. The alternative is to not participate. You can skip any questions that make you uncomfortable and can stop the interview at any time.

The Institutional Review Board (IRB) for the protection of human research participants at Oklahoma State University has reviewed and approved this study. If you have questions about the research study itself, please contact the Principal Investigator, myself at 352-258-0173 or Brittani.kirkland@okstate.edu. If you have questions about your rights as a research volunteer or would simply like to speak with someone other than the research team about concerns regarding this study, please contact the IRB at (405) 744-3377 or irb@okstate.edu. All reports or correspondence will be kept confidential.

This contact information will be given to you through email for you to keep for your records.

Do you have any questions at this time?

Participant: *Any questions they may have.*

PI: If you would still like to participate in this study, I will now read a few statements of consent, please respond with yes or no.

I give consent to be videotaped during this study.

Participant: Yes/No

PI: I give consent to be audio recorded during this study.



Approved: 05/17/2018
Protocol #: AG-18-26

Participant: Yes/No

PI: Read Video Consent Form. Continue with script if the participant agrees to video and audio consent.

PI: I give consent for my data to be used for future research studies.

Participant: Yes/No

PI: Now, we will have a final statement of consent. I will reiterate at this time that participation is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time, even in the middle of our interview.

By agreeing to participate in this study, you are stating that you are over 18 years of age and that you volunteer to participate in this research.

If you agree to participate in this research, please say I agree to continue.

Participant: I agree/I do not agree.

If they do not agree to continue:

PI: Thank you for your time and consideration today. We appreciate your willingness to hear more about our project. At this time your information will be removed from all our documentation and your confidentiality will not be at risk at all. All video recordings will also be deleted. Again, thank you for your time and I hope you have a nice day.

If they agree to continue:

PI: Thank you for your willingness to participate. To minimize distractions at this time, we ask that you please silence your cellphones now.

We will now begin by collecting some demographic information.

1. Are you male or female?
2. How old are you?
3. What is your current job title?
4. How long have you been in your current position?
5. How long have you been working in this field?

Now we will begin our interview. – Interview Questions Separate



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Interview Questions

Framing (to be read before the interview questions):

Though there are many stages to disaster, this study's goal is to focus on preparedness and the following questions will reflect this. As you hear each question, please think back to before recent wildfires and answer each question accordingly.

1. In general, what does disaster preparedness consist of for livestock related disasters?
2. What role do you play in planning for livestock response in disasters?
Follow up question:
 1. What does that role entail?
 2. Does your role require any formal planning?
3. Have you received any formal or informal training in livestock disaster preparedness or response?
Follow up question:
 1. Are you aware of any trainings available?
 2. What training do you think you need?
4. What physical resources, such as facilities, equipment, etc., have been or currently are available for livestock disaster planning and response?
Follow up question:
 1. How do you know about these resources?
 2. Who provided these resources?
 3. Are there resources that should be available?
5. What social resources, such as friends, community members, etc, have been or currently are available livestock disaster planning and response and are they still available?
Follow up question:
 1. Are there any organizations or individuals that you interact with?
6. When planning for livestock disaster response, do you interact with any stakeholders (i.e. community members, government employees)?
7. Do you personally interact with your counties Emergency Manger/Extension Educator?
Follow up question:
 1. Where do these interactions typically take place?
 2. Did these interactions take place before the recent fires?



Oklahoma State University Institutional Review Board

Date: 05/17/2018
Application Number: AG-18-26
Proposal Title: Oklahoma Wildfires: Examining Extension Partnerships in Large Animal Disaster Preparedness

Principal Investigator: Brittani Kirkland
Co-Investigator(s):
Faculty Adviser: Kris Hiney
Project Coordinator:
Research Assistant(s):

Processed as: Exempt

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 223 Scott Hall (phone: 405-744-3377, irb@okstate.edu).

Sincerely,

A handwritten signature in black ink, appearing to read 'Hugh Crethar'.

Hugh Crethar, Chair Institutional Review Board



Oklahoma State University Institutional Review Board

Date: 05/24/2018
Application Number: AG-18-26
Proposal Title: Oklahoma Wildfires: Examining Extension Partnerships in Large Animal Disaster Preparedness

Principal Investigator: Brittani Kirkland
Co-Investigator(s):
Faculty Adviser: Kris Hiney
Project Coordinator:
Research Assistant(s):

Status Recommended by Reviewer(s): Approved

Approval Date: 05/17/2018

Expiration Date:

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed.

Modifications Approved:

Modifications Approved: add follow up questions to interview and reword some questions

The IRB office **MUST** be notified when a project is complete or you are no longer affiliated with Oklahoma State University.

All approved projects are subject to monitoring by the IRB.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are attached. These are the versions that must be used during the study.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hugh Crethar'.

Hugh Crethar, Chair
Institutional Review Board



Oklahoma State University Institutional Review Board

Date: 06/04/2018
Application Number: AG-18-26
Proposal Title: Oklahoma Wildfires: Examining Extension Partnerships in Large Animal Disaster Preparedness

Principal Investigator: Brittani Kirkland
Co-Investigator(s):
Faculty Adviser: Kris Hiney
Project Coordinator:
Research Assistant(s):

Status Recommended by Reviewer(s): Approved

Approval Date: 05/17/2018

Expiration Date:

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed.

Modifications Approved:

Modifications Approved: Add phone interviews into recruitment tool as a method of data collection. Also, add that follow up phone calls be made to those who agree to participate so that appointment times can be confirmed.

The IRB office MUST be notified when a project is complete or you are no longer affiliated with Oklahoma State University.

All approved projects are subject to monitoring by the IRB.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are attached. These are the versions that must be used during the study.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hugh Crethar'.

Hugh Crethar, Chair
Institutional Review Board



Oklahoma State University Institutional Review Board

Date: 06/18/2018
Application Number: AG-18-26
Proposal Title: Oklahoma Wildfires: Examining Extension Partnerships in Large Animal Disaster Preparedness

Principal Investigator: Brittani Kirkland
Co-Investigator(s):
Faculty Adviser: Kris Hiney
Project Coordinator:
Research Assistant(s):

Status Recommended by Reviewer(s): Approved

Approval Date: 05/17/2018

Expiration Date:

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed.

Modifications Approved:
Modifications Approved: add phone call recruitment

The IRB office **MUST** be notified when a project is complete or you are no longer affiliated with Oklahoma State University.

All approved projects are subject to monitoring by the IRB.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are attached. These are the versions that must be used during the study.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hugh Crethar'.

Hugh Crethar, Chair
Institutional Review Board

VITA

Brittani Kirkland

Candidate for the Degree of

Master of Science

Thesis: BRITTANI KIRKLAND

Major Field: Animal Science

Biographical:

Originally from north central Florida, Brittani became interested in animal science and agriculture education at an early age. Her interest in agricultural education continued to grow while a student at the University of Florida. In 2017, Brittani began her graduate work at Oklahoma State University where she has served as a graduate teaching assistant. She has assisted with numerous animal science classes and has also worked to create state equine Extension programming. Brittani has a passion for STEM education and strives to incorporate STEM disciplines in her animal agriculture classes. Brittani has an interest in livestock disaster and biosecurity education. She also has an interest in undergraduate perceptions of equine. Brittani plans to pursue a career in Extension Education, where she wants to continue educating individuals about agricultural practices and animal science.

Education:

Completed the requirements for the Master of Science in Animal Science at Oklahoma State University, Stillwater, Oklahoma in July, 2019.

Completed the requirements for the Bachelor of Science in Animal Science at University of Florida, Gainesville, Florida in 2015.

Professional Memberships:

Equine Science Society

North American Colleges and Teachers of Agriculture