

RESOLUTION
22-201
To Adopt Hazard Mitigation Plan

Pittsburg County
Board of County Commissioners
115 E. Carl Albert Parkway, Room 100
McAlester, OK 74501

WHEREAS, Pittsburg County, with assistance from the Hazard Mitigation Planning Team, has gathered information and prepared the Pittsburg County Hazard Mitigation Plan; and

WHEREAS, the Pittsburg County Hazard Mitigation Plan has been prepared in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, Pittsburg County is a local unit of government that has afforded the citizens an opportunity to comment and provide input in the Plan and the actions in the Plan; and

WHEREAS, Pittsburg County has reviewed the plan and affirms that the Plan will be updated no less than every five years;

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners, Pittsburg County, that Pittsburg County adopts the Pittsburg County Hazard Mitigation Plan as this jurisdiction's Natural Hazard Mitigation Plan.

ADOPTED this 7th day of March, 2022 at a regular meeting of the Pittsburg County Board of County Commissioners.

BOARD OF COUNTY COMMISSIONERS
PITTSBURG COUNTY, OKLAHOMA

ATTEST:

CHAIRMAN _____

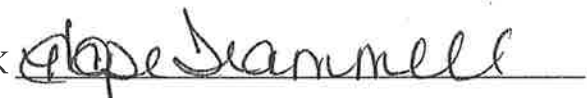
VICE-CHAIRMAN

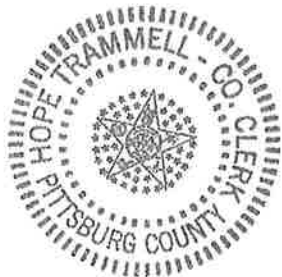


MEMBER



COUNTY CLERK







**Pittsburg County
Multi-Jurisdictional
Hazard Mitigation Plan
2021**

Table of Contents

CHAPTER ONE: INTRODUCTION	34
1.1 INTRODUCTION	34
1.2 PURPOSE	34
1.3 AUTHORITY	35
1.4 OVERVIEW OF PLANNING AREA	35
1.5 DEMOGRAPHICS	37
1.6 PARTICIPATING JURISDICTIONS	38
1.7 CRITICAL FACILITIES	39
1.8 POINTS OF CONTACT	39
CHAPTER TWO: PLANNING PROCESS	40
2.1 PLANNING PROCESS OVERVIEW	40
2.2 PLANNING COMMITTEE	41
2.3 STAKEHOLDERS	44
2.4 PUBLIC INVOLVEMENT	46
2.5 LITERATURE, RESOURCES, AND PLANS REVIEWED	46
2.6 MONITOR	48
2.7 EVALUATE	49
2.8 UPDATE	49
2.9 CONTINUED PUBLIC INVOLVEMENT	50
CHAPTER THREE: HAZARD IDENTIFICATION AND ASSESSMENT	51
3.1 LIST OF IDENTIFIED HAZARDS	51
3.2 DISASTER HISTORY	52
3.3 HAZARD PROBABILITY AND VULNERABILITY RATING	52
3.4 PROFILED HAZARDS	55
3.4.1 TORNADO/HIGH WIND	55
3.4.2 FLOOD	76
3.4.3 WINTER STORM	91
3.4.4 WILDFIRE	104
3.4.5 LIGHTNING	125
3.4.6 HAIL	139
3.4.7 EXTREME HEAT	161
3.4.8 HAZARDOUS MATERIALS (FIXED SITE/TRANSPORTATION)	172
3.4.9 DROUGHT	174
3.4.10 DAM FAILURE	184
3.4.11 EARTHQUAKE	195
CHAPTER FOUR: CAPABILITY ASSESSMENT	199

4.1 CAPABILITY ASSESSMENT	199
4.1.1 OPPORTUNITIES FOR PUBLIC EDUCATION AND OUTREACH.....	216
4.1.2 SCHOOL DISTRICT CAPABILITY ASSESSMENT	216
4.1.3 NFIP PARTICIPATION	230
4.1.4 CAPABILITIES CONCLUSION.....	231
4.2 CHANGES IN JURISDICTIONAL DEVELOPMENT	232
<u>CHAPTER FIVE: ACTION PLAN</u>	<u>234</u>
5.1 MITIGATION GOALS	234
5.2 INTEGRATION OF DATA, GOALS, AND ACTION ITEMS	234
5.3 CHANGES IN JURISDICTIONAL PRIORITIES	236
5.4 ACTION ITEMS PRIORITIZED	236
5.5 STATUS OF PREVIOUS MITIGATION ACTION ITEMS	237
5.6 ACTION ITEMS	252
5.7 CONCLUSION	276
<u>APPENDIX A: CRITICAL FACILITIES</u>	<u>277</u>
<u>APPENDIX B: FLOOD DEPTH MAPS</u>	<u>292</u>

**PLACEHOLDER FOR
PITTSBURG COUNTY
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Pittsburg County Intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CITY OF HAILEYVILLE
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), The City of Haileyville intends to formally adopt The Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CITY OF HARTSHORNE
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the City of Hartshorne intends to formally adopt The Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CITY OF KREBS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), The City of Krebs intends to formally adopt The Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CITY OF MCALESTER
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed "approvable pending adoption" by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), The City of McAlester intends to formally adopt The Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF ALDERSON
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Alderson intends to formally adopt The Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF ASHLAND
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Ashland intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF CANADIAN
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Canadian intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF CARLTON LANDING
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Carlton Landing intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF CROWDER
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and Federal Emergency Management Agency (FEMA), the Town of Crowder intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF INDIANOLA
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Indianola intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF KIOWA
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Kiowa intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF PITTSBURG
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Pittsburg intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF QUINTON
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Quinton intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TOWN OF SAVANNA
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), the Town of Savanna intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approvable.

**PLACEHOLDER FOR
MCALESTER PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), McAlester Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
QUINTON PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Quinton Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CROWDER PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Crowder Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLAVEHOLDER FOR
HAILEYVILLE PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and Federal Emergency Management Agency (FEMA), Haileyville Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
FRINK-CHAMBERS PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Frink-Chambers Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
TANNEHILL PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Tannehill Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
KREBS PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Krebs Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
HAYWOOD PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and Federal Emergency Management Agency (FEMA), Haywood Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
SAVANNA PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Savanna Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CANADIAN PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Canadian Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide and adoption resolution for approval.

**PLACEHOLDER FOR
PITTSBURG PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Pittsburg Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
HARTSHORNE PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Hartshorne Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
INDIANOLA PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Indianola Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
KIOWA PUBLIC SCHOOLS
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Kiowa Public Schools intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

**PLACEHOLDER FOR
CARLTON LANDING ACADEMY
ADOPTION RESOLUTION**

Once the plan has been reviewed and deemed “approvable pending adoption” by the State of Oklahoma and the Federal Emergency Management Agency (FEMA), Carlton Landing Academy intends to formally adopt the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan and provide an adoption resolution for approval.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Making people and businesses as safe as possible from a variety of natural and man-made hazards is a primary function of government. The potential of violent weather, natural and man-made hazards in Oklahoma subjects the lives and property to many risks. The Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan is a comprehensive effort to identify potential hazards and develop sound strategies to mitigate their impacts with the goal of saving lives and property.

This plan is a strategic planning guide developed in fulfillment of the Hazard Mitigation Grant Program requirements of the Federal Emergency Management Agency (FEMA) according to Section 322 of the Stafford Disaster Relief and Emergency Assistance Act. Funding for the development of the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan was provided by grants from the Federal Emergency Management Agency (FEMA) through the Oklahoma Department of Emergency Management (OEM). A 75% FEMA grant, with a 25% local share, either cash or in-kind was provided in 2017.

1.2 Purpose

The purpose of this plan is to:

- Assess the ongoing mitigation activities within Pittsburg County.
- Identify and assess the hazards that pose a threat to residents and property.
- Evaluate additional mitigation measures that should be undertaken.
- Outline a strategy for implementation of mitigation projects.
- Develop a strategy for the adoption, maintenance, upkeep, and revision of the plan.

The object of the plan is to provide guidance for the next five years. It will ensure that Pittsburg County will implement activities that are most effective and appropriate for mitigating the identified hazards.

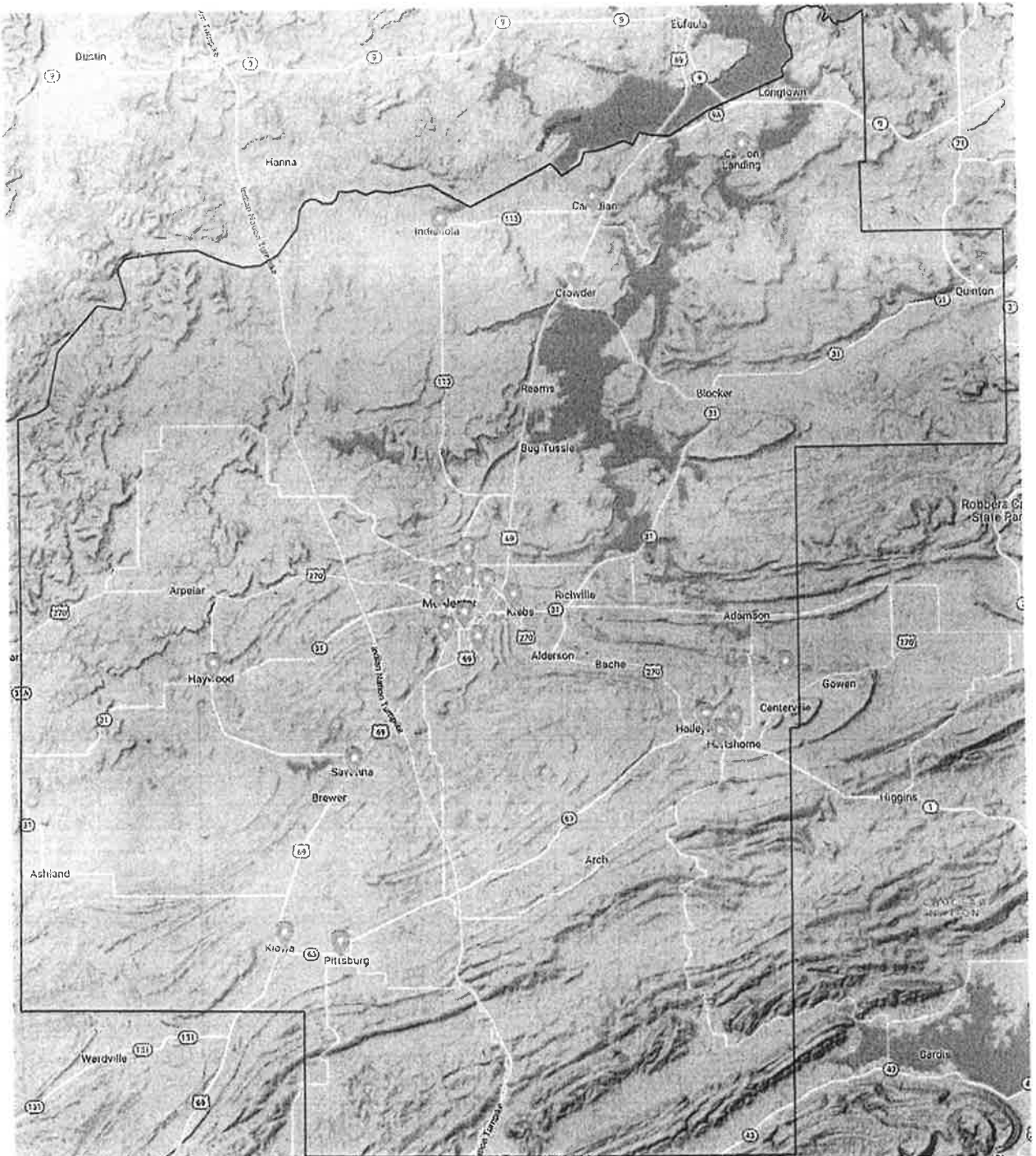
1.3 Authority

The Robert T. Stafford Relief and Emergency Assistance Act (Stafford Act), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for state, tribal, and local governments to undertake risk-based approaches to reducing natural hazard risks through mitigation planning. Specifically, the Stafford Act requires state, tribal, and local governments to develop and adopt FEMA-approved hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance. This plan was written in accordance with all plan requirements per Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5165, and Title 44 Code of Federal Regulations (CFR) Part 201.

1.4 Overview of Planning Area

Pittsburg County is one of 77 counties in Oklahoma. Located in southeast-central Oklahoma, Pittsburg County encompasses 1,378 miles of total land area with water covering 72 miles. Bordering counties include McIntosh on the north, Haskell on the northeast, Latimer on the east, Pushmataha to the southeast, Atoka to the south, Coal on the southwest, and Hughes on the west. The City of McAlester serves as the county seat. Figure 1-1 shows the population of the towns and cities within Pittsburg County. Many residents in Pittsburg County live in rural areas and communities outside the incorporated towns. These areas and communities are included in this plan under the umbrella of Pittsburg County. A map of the Planning Area is located below.

Figure 1-1
Map of the Planning Area



1.5 Demographics

Demographics are the use of population characteristics (age and income distribution and trends, mobility, educational attainment, home ownership and employment status, for instant) for purpose of social studies.

The population in 2010 was 45,837. In 2016 the estimated population was 44,173. This reflects a decrease in population of 3.6% citizens in Pittsburg County.

Figure 1-2 below depicts demographics for individual jurisdictions within the county.

Figure 1-2 Pittsburg County Census Figures 2010 – 2016			
AREA	CENSUS 2010	ESTIMATE 2016	% CHANGE
Town of Alderson	304	287	-5.6%
Town of Ashland	66	62	-6.1%
Town of Canadian	220	204	-7.3%
Town of Crowder	430	407	-5.3%
Town of Indianola	162	153	-5.6%
Town of Kiowa	731	683	-6.6%
Town of Pittsburg	207	196	-5.3%
Town of Quinton	1051	996	-5.2%
Town of Savanna	686	648	-5.5%
City of Haileyville	813	769	-5.4%
City of Hartshorne	2125	1987	-6.5%
City of Krebs	2053	1945	-5.3%
City of McAlester	18383	18206	-1.0%
Town of Carlton Landing	0	0	0

1.6 Participating Jurisdictions

Table 1-2 lists all jurisdictions participating in the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan. In addition, all rural areas and unincorporated communities in Pittsburg County are also included in this plan. The Term Planning Area refers to all participating jurisdictions.

Figure 1-3 Participating Jurisdictions	
City/Town	School District
Town of Alderson	McAlester Public Schools
Town of Ashland	Quinton Public Schools
Town of Canadian	Crowder Public Schools
Town of Carlton Landing	Haileyville Public Schools
Town of Crowder	Frink-Chambers Public Schools
Town of Indianola	Tannehill Public Schools
Town of Kiowa	Krebs Public Schools
Town of Pittsburg	Haywood Public Schools
Town of Quinton	Savanna Public Schools
Town of Savanna	Canadian Public Schools
City of Haileyville	Pittsburg Public Schools
City of Hartshorne	Hartshorne Public Schools
City of Krebs	Indianola Public Schools
City of McAlester	Kiowa Public Schools
Pittsburg County	Carlton Landing Academy

1.7 Critical Facilities

Critical Facilities are defined by different organizations and agencies, but are usually classified as those facilities that, if put out of operation by any cause, would have a broadly adverse impact on the community as a whole. The tables located in the appendix provide a list of critical facilities as determined by Pittsburg County Officials, the Planning Committee, and the Pittsburg County Local Emergency Planning Committee.

1.8 Points of Contact

Figure 1-4 Points of Contact	
Primary	Secondary
Kevin Enloe 918-423-5655 Macalesterpittscom1@gmail.com	Lois Lupardus 918-423-5655 Mcalester.pittscom2@gmail.com

CHAPTER TWO: PLANNING PROCESS

2.1 Planning Process Overview

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and/or man-made hazards. The primary purpose of hazard mitigation planning is to identify community policies, actions, and tools for implementation over the long term, resulting in a reduction of risk and potential for future losses community wide. This is accomplished by using a systematic process of learning about the hazards that can affect the community, setting clear goals, identifying appropriate actions, following through with an effective mitigation strategy, and keeping the plan current.

Pittsburg County and the participating jurisdictions began the planning process on February 1, 2018 and concluded three years after the start date. Throughout the three years, the Planning Committee held several meetings and kept in contact by phone and email to coordinate the process.

Step one was to organize the planning process and resources. In February 2018, the Pittsburg County Emergency Manager facilitated communications with all jurisdictions within the Planning Area to give the jurisdictions a chance to be incorporated in the plan. All jurisdictions within the Planning Area accepted the invitation and expressed their intent to participate in the planning process. Each jurisdiction also delegated a representative to the Planning Committee. The Planning Committee cultivated a planning schedule to include incorporating discussions into the County Commissioner's meetings every month and compiled a list of stakeholders from surrounding jurisdictions, state, regional, and tribal agencies. During this planning process, an effort was made to consult the public for feedback on threats, hazards, historical events, and possible mitigation activities. The Planning Committee defined the public as citizens residing within the jurisdiction, employees who work within the jurisdiction, and anyone who has a stake in the jurisdiction's well-being.

Step two was assessing the risks. The Pittsburg County Planning Committee researched all the past hazards that impacted the Planning Area, then calculated the possibility of future events. This step was accomplished by pulling historical data from the National Climatic Data Center and previous disaster documentation. The Planning Committee then reviewed all data and calculated the greatest impacts and vulnerabilities within the Planning Area.

Step three was to develop a mitigation strategy. Looking at the hazard risk assessment, the Planning Committee examined possible mitigation actions to minimize or eliminate the effects of hazards/threats.

All jurisdictions were asked to develop their own lists to discuss to determine the best options and how they would be implemented. During this step, a rough draft of the plan was developed and reviewed by the Planning Committee, the County Commissioners, each jurisdiction, and the public.

Step four was to adopt and implement the plan. Once the draft was completed, it was submitted to the state of Oklahoma and the Federal Emergency Management Agency (FEMA) for approval. After the plan approval, each jurisdiction will adopt the plan, and the implementation process will begin.

2.2 Planning Committee

The Pittsburg County Planning Committee was formed by thirty appointed representatives to guide the preparation of the Plan. These representatives were appointed from each jurisdiction within the Planning area and were approved as members of the Planning Committee by the County Commissioners.

The representatives from each jurisdiction provided local history, reviewed hazard data, addressed and analyzed cost versus health/safety issues, suggested action items, and made recommendations to the Plan. After gathering data, the committee discussed these items in the open meetings, approved the Plan, and recommended the Plan's approval to the County Commissioners.

In 2018, the committee held six open meetings on February 1, February 8, February 15, March 1, March 8, and March 15. These meetings were posted in the newspaper and at local government offices. The committee invited the public and other stakeholders to join and provide feedback.

The Planning Committee was overseen by the Pittsburg County Commissioners, who required a representative of the committee to attend monthly meetings to report on the Plan's progress. The committee unanimously appointed the Pittsburg County Director of Emergency Management.

**Figure 2-1
Planning Committee**

Name	Title	Jurisdiction Represented	Contribution to Plan
<i>Kevin Enloe*</i>	Director, Pittsburg County Emergency Management	Pittsburg County	Provided County hazard info. /mitigation actions Provided County mitigation actions
<i>Lois Lupardus</i>	Deputy Director, Pittsburg County Emergency Management	Pittsburg County	Provided Pittsburg County weather history, descriptions, locations, extent, probability of future events, vulnerability and impacts.
<i>Gary Brooks</i>	Pittsburg County LEPC Chairman	Pittsburg County Town of Crowder	Provided Pittsburg County weather history, descriptions, locations, extent, probability of future events, vulnerability and impacts. Provided existing institutions, plans and ordinances
<i>Sandra Crenshaw</i>	1 st Deputy, Board of County Commissioners	Pittsburg County	The Pittsburg County Commissioner's Office provided county property information. This information was utilized for determining vulnerability of assets.
<i>Richard Howry*</i>	Pittsburg County Floodplain Manager	Pittsburg County	Provided information on flood prone areas
<i>Cliff Pitner*</i>	McAlester Floodplain Manager Public Works	City of McAlester	Provided City hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with city limits / mitigation actions
<i>Jarrod Wood</i>	City Employee	City of McAlester	Provided City hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with city limits / mitigation actions
<i>Terry Sensibaugh</i>	Public Works	City of Haileyville	Provided town hazard information and mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with town limits / mitigation actions
<i>Vess Neill*</i>	Resident Designee	Town of Canadian	Provided town hazard information and mitigation actions. Provided building infrastructure, vulnerability info. Identify hazards with town limits / mitigation actions <small>*Vess Neill was chosen by appointed officials to represent the jurisdiction based on his knowledge and understanding of the jurisdiction.</small>
<i>Chuck Courts</i>	Mayor	Town of Alderson	Provided town hazard information and mitigation actions. Provided building infrastructure, vulnerability info.
<i>Virginia Horn</i>	Former Mayor	Town of Ashland	Provided town hazard information and mitigation actions. Provided building infrastructure, vulnerability info.
<i>Gerald Grubbs</i>	Mayor	Town of Indianola	Provided town hazard information and mitigation actions. Provided building infrastructure, vulnerability info.

Allen Miller	Mayor	Town of Quinton	Provided town hazard information and mitigation actions. Provided building infrastructure, vulnerability info.
Jeremy Pierce*	Police Chief	City of Hartshorne	Provided city hazard info/ mitigation actions Identify hazards within city limits/mitigation actions
Lisa Brown	City Clerk	City of Hartshorne	Provided city hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with city limits / mitigation actions
Ed Klink*	Mayor of Krebs	City of Krebs	Provided city hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards within city limits / mitigation actions
Kevin Mick	Public Works	City of Krebs	Identify hazards within city limits / mitigation actions
Chip Kilburn	Project Manager, Town of Carlton Landing Representative for Carlton Landing Academy	Town of Carlton Landing Carlton Landing Academy	Provided city hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with city limits / mitigation actions
Gary Brooks	Project Coordinator	Town of Crowder	Provided town hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with town limits / mitigation actions
Deanna Sexton	Emergency Management Director	Town of Kiowa	Provided town hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with town limits / mitigation actions
Sandy Cross	Town Clerk	Town of Pittsburg	Provided town hazard info. /mitigation actions Provided building infrastructure, vulnerability info. Identify hazards with town limits / mitigation actions
Donald Capps	Former Fire Chief of the Savanna Fire Department	Town of Savanna	Provided building infrastructure, vulnerability info
KC Buck	Director of Maintenance	McAlester Public Schools	Assisted in providing hazards, threats, and mitigation measures
Stacey Henderson	Superintendent	Quinton Public Schools	Assisted in providing hazards, threats, and mitigation measures
Robert Florenzano	Superintendent	Crowder Public Schools	Provided school hazard info. /mitigation actions Provided building infrastructure, vulnerability info.
Roger Hemphill	Superintendent	Haileyville Public Schools	Assisted in providing hazards, threats, and mitigation measures
Richard Peckio	Superintendent	Frink-Chambers Public Schools	Assisted in providing hazards, threats, and mitigation measures
John Wilcox	Superintendent	Tannehill Public Schools	Assisted in providing hazards, threats, and mitigation measures
Patrick Turner	Superintendent	Krebs Public Schools	Assisted in providing hazards, threats, and mitigation measures
Bud Rattan	Superintendent	Haywood Public School	Assisted in providing hazards, threats, and mitigation measures

<i>Gary Reeder</i>	Superintendent	Savanna Public School	Assisted in providing hazards, threats, and mitigation measures
<i>Mike Broyles</i>	Superintendent	Canadian Public School	Assisted in providing hazards, threats, and mitigation measures
<i>Debbie Rice</i>	Employee Designee	Pittsburg Public School	Assisted in providing hazards, threats, and mitigation measures
<i>Jason Lindley</i>	Superintendent	Hartshorne Public School	Assisted in providing hazards, threats, and mitigation measures
<i>Adam Newman</i>	Superintendent	Indianola Public School	Assisted in providing hazards, threats, and mitigation measures
<i>Rick Pool</i>	Superintendent	Kiowa Public School	Assisted in providing hazards, threats, and mitigation measures

* Primary Jurisdictional POC

2.3 Stakeholders

There are many public agencies, private organizations, and businesses that contend with natural hazards. The Planning Committee contacted these entities either in person, via email, or by phone to collect information on the hazards and determine how their programs could best support the participating jurisdictions' mitigation programs. While the individual community members aren't listed, they are considered valued stakeholders of the Plan and were invited to participate in the planning process. The organizations and agencies contacted are identified in Figure 2-2.

**Figure 2-2
Stakeholders**

Name	Title	Agency Represented	How Agency Was Invited	Contribution To Plan
<i>Rene Beezley</i>	Volunteer Services Specialist	Red Cross	Email, Phone	The ARC provides response and recovery information which is needed to assess the mitigation strategies in the hazard mitigation plan.
<i>Michelle Fields</i>	County Assessor	Pittsburg County Assessor's Office	Direct, Phone	The Pittsburg County Assessor's Office provided types and numbers for residential, business, and county property information. This information was utilized for determining vulnerability of assets.
<i>Angela Evans</i>	Director	McAlester Campus, Kiamichi Technology Center	Email, phone, direct	Assisted in providing hazards, threats, and mitigation measures
<i>Frank Phillips</i>	External Affairs Manager	Public Service Company	Email, direct	Assisted in providing hazards, threats, and mitigation measures
<i>Todd Minshall</i>	Marketing and Public Relations Director	Kiamichi Electric	Email, direct	Assisted in providing hazards, threats, and mitigation measures
<i>Kristal Kuhn</i>	Southeast Area Coordinator	Oklahoma Office of Emergency Management	Email, phone	Provided assistance identifying hazards and available resources
<i>Paige Nutter</i>	Hazard Mitigation Coordinator	Choctaw Nation Office of Emergency Management	Email, phone, direct	Provided assistance with hazard data and action items.

2.4 Public Involvement

In 2018, the Planning Team invited the public to observe and participate in six Planning Team meetings. Invitations and details about the meetings were posted on the Pittsburg County Emergency Management Facebook page and in accordance with the Oklahoma Meeting Law. During these meetings, the public was offered the chance to review and comment on drafts of the plan.

Time was allocated in each meeting to explain the Plan, gain information about the Planning Area and previous weather occurrences, and ideas about future mitigation activities, along with time left for open comments and questions.

In addition, a social media campaign was created to encourage feedback from the public regarding hazards and potential action items.

Feedback received from the public proved valuable in the development of the draft plan. Comments and open discussions led to addressing and prioritizing mitigation actions and historical events. A draft copy of the Plan was prepared and made available to public review prior to Plan Submission to the State of Oklahoma and FEMA.

2.5 Literature, Resources, and Plans Reviewed

During the planning process, the Pittsburg County Hazard Planning Committee reviewed various plans and studies regarding the hazards, disaster history, and potential impact areas. Members of the Planning Committee reviewed the data from the sources listed below and utilized them in the plan's development.

**Figure 2-4
Literature, Resources, and Plans Reviewed**

Plan or Resource	Information Used
<i>Local Health Risk Assessment for Disaster Related Community Preparedness and Resiliency, June 2014</i>	Plan contains much of the same information required of a local HMP. Information was reviewed and integrated into the capability assessment, risk assessment, and mitigation strategy.
<i>State of Oklahoma Hazard Mitigation Plan, 2019</i>	Hazard definitions, previous occurrence data, disaster history and state goals
<i>Pittsburg County Emergency Operations Plan, July 2017</i>	Capability Assessment
<i>School Emergency Action Plans</i>	Storm shelter plans, emergency actions
<i>Local Records</i>	Evacuation Routes, High risk areas, vulnerable populations
<i>U.S. Army Corps of Engineers Emergency Plan</i>	Information was reviewed and integrated into the capability assessment, risk assessment, and mitigation strategy.
<i>City of Madill City Lake Dam Emergency Plan</i>	Information was reviewed and integrated into the capability assessment, risk assessment, and mitigation strategy.
<i>Choctaw Nation of Oklahoma Multi-Hazard Mitigation Plan 2020</i>	Reviewed for hazard data and mitigation strategies
<i>Pittsburg County Hazard Mitigation Plan 2012</i>	Reviewed for hazard data and mitigation strategies, risk assessment, historic data.
<i>Bryan County Mitigation Plan, 2017</i>	Reviewed for hazard data and mitigation strategies
<i>National Climatic Data Center</i>	The NCDC provided valuable historical weather data for each weather-related hazard.
<i>State National Floodplain Insurance Program</i>	The NFIP provides flood risk data for the county and flood insurance rate maps. It also provides guidance for the communities' floodplain manager for participation and compliance in the NFIP.
<i>National Oceanic and Atmospheric Administration (NOAA)</i>	NOAA provides weather information for the State, County, and Community as well as past historical events, and extent maps for extreme weather events.
<i>Oklahoma Climatological Survey</i>	The OCS provides weather information for the State, County, and Community as well as past historical events, safety and mitigation ideas, and extent maps for extreme weather events.

<i>Oklahoma Geological Survey</i>	The OGS provides earthquake data, geological information, and extent mapping.
<i>Chickasaw Nation Hazard Mitigation Plan 2016</i>	Reviewed for hazard data and mitigation strategies
<i>U.S. Census Bureau Population Data, dated 3/10/2010</i>	Population, homeowner, poverty, education, and age data for Marshall County.
<i>Marshall County Hazard Mitigation Plan, 2018</i>	Reviewed for hazard data and mitigation strategies

2.6 Monitor

Each jurisdictional representative is in charge of monitoring and reporting the mitigation actions' progress and goals taking place within their respective jurisdictions. They will also report implementation processes that worked well, any difficulties encountered, how coordination efforts were proceeding, which strategies should be revisited, and any changes in jurisdictional plans and policies. They will report this information to the Pittsburg County Director of Emergency Management at the end of each quarter. The Director will then update the County Commissioners.

The County Commissioners will monitor the Planning Committee's progress throughout these reports to ensure the Planning Committee is setting clear, actionable, and manageable goals for each mitigation strategy.

2.7 Evaluate

During the five-year approval period, the Plan will be evaluated on an annual schedule. The Pittsburg County Emergency Management Director will arrange a meeting for the Planning Committee to evaluate the risk assessment to ensure the hazard information and the vulnerabilities and impacts initially addressed are still valid for the participating communities. The Planning Committee will also evaluate the goals and mitigation strategy to ensure they continue to address each participating jurisdictions' priorities.

The Planning Committee's evaluation of the Plan will be submitted to the County Commissioners for review, comments, and questions.

2.8 Update

The Planning Committee will update the Pittsburg County Multi-Jurisdictional Hazard Mitigation Plan under the direction of the County Commissioners according to the following schedule:

- **Review and Update**—The Planning Committee will begin the update 18 months prior to plan expiration. During this time, they will host at least two public meetings for the public to give comments and suggestions and ask questions. The Planning Committee will take the Commissioners and the public's feedback over the previous years and incorporate it into the Plan as appropriate.
- **Submit for Review**—The Plan will be submitted by the Pittsburg County Emergency Management Director to the State of Oklahoma and FEMA for approval.
- **Adoption**—Once the Plan has been completed by the Planning Committee, the Pittsburg County Emergency Management Director will present the Plan to the County Commissioners for approval and final adoption. The representatives on the Planning Committee for each jurisdiction within the Planning Area will have a period of two weeks to have the adoption letter appropriately signed for their jurisdiction. The adoption letters will then be turned in to the Pittsburg County Emergency Management Director, who will integrate them into the plan.
- **Distribution**—The Pittsburg County Emergency Management Director is responsible for distributing the final copy of the Plan to each jurisdiction within the Planning Area over a period of two weeks from when the Plan is finalized. The Plan will also be available by request to any member of the public from the Pittsburg County Office of Emergency Management.

2.9 Continued Public Involvement

The Planning Committee will involve the public in the continual updating of the Hazard Mitigation Plan. Public participation is an essential part of the planning process. Public input or the lack thereof can be instrumental in the success or failure of the Plan. A social media campaign will be utilized annually two weeks prior to the Planning Team's evaluation of the Plan to collect survey data on the public's hazard concerns, priorities, and preferred upcoming mitigation projects. The information collected will be used to drive the jurisdiction's mitigation priorities and be used for the next update. The Pittsburg County Emergency Management Director will be responsible for this campaign.

There will be at least two public meetings posted on the Pittsburg County Emergency Management Facebook page in the updating period. These meetings will provide the public with a forum where Pittsburg County residents can express their concerns, opinions, or ideas about the Plan.

CHAPTER THREE: HAZARD IDENTIFICATION AND ASSESSMENT

3.1 List of Identified Hazards

In this section, an effort was made to identify possible natural and man-made hazards that have affected or have the potential to affect the Planning Area. During the development of the current plan, the Planning Committee, with help from the public, identified hazards specific to the Planning Area and are listed in Figure 3-1. Some hazards, such as expansive soils, landslides, and sink holes have been excluded from the plan. After looking at the hazards and data, the Planning Committee believed the hazards did not occur often enough or with enough severity to be included.

The Planning Committee also thought it would be more useful to consider tornado and high wind in the same hazard profile. While the hazards are different, they often have the same effects on the Planning Area and similar mitigation actions are used.

Figure 3-1 Pittsburg County Hazards	
Hazard	Jurisdictions Affected
Tornado/High Winds	All Jurisdictions
Flood	All jurisdictions with a higher probability near waterways and lakes.
Winter Storm	All Jurisdictions
Wildfire	All Jurisdictions
Lightning	All Jurisdictions
Hail	All Jurisdictions
Extreme Heat	All Jurisdictions
HAZMAT	All jurisdictions with special attention to areas around major roadways and railways.
Drought	All Jurisdictions
Earthquake	All Jurisdictions
Dam Failure	Pittsburg Co, McAlester, Pittsburg, McAlester PS, Pittsburg PS

3.2 Disaster History

The Planning Area has experienced several significant federally declared disasters between 2009 and 2021 as listed in Figure 3-2.

Figure 3-2 2010-2020 Disaster History		
Disaster #	Declaration Date	Incident Type
DR1876	02/25/2010	Severe Winter Storm
DR1988	5/27/2011	Severe Storms and Flooding
DR4117	5/20/2013	Severe Storms and Tornadoes
DR4222	05/26/2015	Severe Storms, Tornadoes, Straight-line Winds and Flooding
DR4256	02/10/2016	Severe Winter Storms and Flooding
DR4315	05/26/2017	Severe Storms, Tornadoes and Flooding
DR4324	07/25/2017	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
DR4438	06/01/2019	Severe Storms, Straight Line Winds, Tornadoes, Flooding
DR4453	06/12/2019	Severe Storms, Tornado, Straight Line Winds, Flooding

3.3 Hazard Probability and Vulnerability Rating

The regulations in 44 CFR 201.7 provides guidelines for hazard analysis to include a process for assessing and evaluating hazards. This promotes a common base for performing the analysis by defining the criteria and establishing a rating and scoring system. Figure 3-3 shows the results of a hazard analysis for the Planning Area, which includes a qualification of the history probability. Vulnerability and maximum threat for each event were also examined during the analysis in prioritizing hazards.

**Figure 3-3
Hazard Probability and Vulnerability Rating**

The probability rating in the hazards below is based on the following criteria:

High	=	Event probable in next year
Medium	=	Event probable in next 3 years
Low	=	Event probable in next 5 years
Very Low	=	Event probable in next 10 years

Based on history and using the previously mentioned probability statements, probability was quantified as follows:

High	=	Event has 1 in 1 year chance	76-100%
Medium	=	Event has 1 in 3 years chance	50-75%
Low	=	Event has 1 in 5 years chance	26-49%
Very Low	=	Event has 1 in 10 years chance	1-25%

Which result in the following ranges of probability:

High	=	Greater than 75%
Medium	=	Greater than 50%, but less than or equal to 75%
Low	=	Greater than 25%, but less than or equal to 49%
Very Low	=	25% or less

Vulnerability is defined by the number of people and value of property in jeopardy determine vulnerability:

High	=	Greater than 10% of population or property
Medium	=	1%-10% of population or property
Low	=	Less than 1 % of population or property

Maximum threat is the worst-case scenario of a hazard:

High	=	Greater than 25% of town is impacted
Medium	=	5%-25% of town is impacted
Low	=	Less than 5% of town is impacted

**Figure 3-4
Pittsburg County Hazard Prioritization**

Priority #	Hazard	History # of Events 2010-2020	Vulnerability	Max. Threat	Probability	Overall Rating
1	Tornado/High Wind	81	High	High	High	High
2	Flood	47	High	High	High	High
3	Winter Storm	12	High	High	High	High
4	Wildfire	900	High	Med	High	High
5	Lightning	0	Medium	Medium	High	Medium
	Hail	70	Medium	Medium	High	Medium
6	Extreme Heat	21	High	High	High	High
7	Hazardous Materials (Transportation/ Fixed Site)	Please see Tier II Reports	Low	High	High	Medium
8	Drought	25	High	High	Medium	High
9	Earthquake	295	Medium	Low	High	Medium
10	Dam Failure	0	Medium	Medium	Low	Medium

3.4 Profiled Hazards

3.4.1 Tornado/High Wind

Description

Tornadoes are traditionally defined as a violently rotating column of air that reaches from the bottom of a cumulonimbus cloud to the ground. Tornadoes are most often located in severe thunderstorms, but not all severe thunderstorms will contain tornadoes. A tornado may be on the ground for only a few seconds, or last for hours at a time. Tornadoes can appear in a variety of shapes and sizes ranging from thin ropelike circulations to large funnel shapes greater than one mile in width. However, a tornado's size is not necessarily related to its wind speed. The strongest tornadoes can have wind speeds in excess of more than 200mph. Spring is sometimes referred to as 'tornado season' in Oklahoma because it is the peak season for tornadoes, but they can form during any season when the necessary atmospheric conditions of wind shear, lift, instability, and moisture are present.

Wind is defined as the motion of air relative to the earth's surface. Extreme windstorm events are associated with cyclones, severe thunderstorms, and accompanying phenomena such as tornadoes and downbursts. Winds vary from zero at ground level to 200 mph in the upper atmospheric jet stream at 6 to 8 miles above the earth's surface.

High winds can result from thunderstorms, strong cold front passages, or gradient winds between high and low pressure. Damaging winds are often called "straight-line" winds to differentiate the damage they cause from tornado damage. Downdraft winds are a small-scale column of air that rapidly sinks toward the ground, usually accompanied by precipitation as in a shower or thunderstorm. A downburst is the result of a strong downdraft associated with a thunderstorm that causes damaging winds near the ground.

Location

The entire Planning Area is threatened by tornado and high wind events, though homes and/or temporary living spaces not equipped for storms are considered to be especially vulnerable locations, such as manufactured homes.

Previous Occurrences

There were 8 tornado events and 73 high wind events reported within the Planning Area between 2010 and 2020. Previous Occurrence data from the National Oceanic and Atmospheric (NOAA) website is split into two tables below.

Figure 3-5 Tornado Previous Occurrences From the NOAA National Centers for Environmental Information https://www.nedc.noaa.gov/stormevents		
Date	Jurisdiction	Narrative
04/14/2011	Pittsburg County	A tornado snapped or uprooted a number of large trees. Maximum estimated wind in the tornado based on this damage was about 105 mph.
04/14/2011	Pittsburg County	This is the third of three segments of this tornado, which developed in northeastern Atoka County and moved across northwestern Pushmataha County. In Pittsburg County, this tornado snapped or uprooted a number of trees. Maximum estimated wind in the tornado based on this tree damage was about 105 mph.
04/24/2011	Pittsburg County	A tornado blew down large tree limbs, damaged the roof of a permanent home, and blew the roof off of a barn. Maximum estimated wind in the tornado based on this damage was about 80 mph.
06/23/2014	Haileyville	A landspout tornado developed northeast of Haileyville. This tornado was witnessed by several people as it moved southeast. It produced no known damage.
05/10/2015	McAlester	A tornado destroyed a barn, rolled a horse trailer, blew down a grain silo, and uprooted trees. Based on this damage, estimated maximum wind in the tornado was 90 to 100 mph.
05/18/2017	Ashland	This tornado developed north of Ashland and moved east-northeast, snapping or uprooting numerous trees, damaging an outbuilding, damaging a home, and snapping power poles. Based on this damage, maximum estimated wind in the tornado was 95 to 105 mph.
05/18/2017	Pittsburg County	This tornado snapped or uprooted numerous trees and blew down power lines. Based on this damage, maximum estimated wind in the tornado was 100 to 110 mph.

04/30/2019	Pittsburg County	This tornado developed from a remnant mesocyclone that had a history of producing a strong tornado in Bryan and Atoka Counties. The circulation in the storm strengthened southwest of Haileyville, just east of the S Bache Road and south of Ray Road, where this tornado developed. It moved north-northeast significantly damaging several homes, destroying barns and outbuildings, and snapping or uprooting trees from Ray Road to Crawley Road. The tornado then moved through open country for a couple miles and turned northeast as it moved across S Smallwood Lane, where it snapped many trees and destroyed outbuildings. It continued to produced significant tree damage along Highway 63 as it approached Haileyville. Many homes and businesses were damaged in town, some were destroyed, as it continued northeast to Lone Oak Road W on the northeast side of town, where the tornado began to move east. Homes were damaged, many trees were snapped, an electrical substation was damaged, and power poles were snapped before it dissipated near Price Road, south of Shelton Road. This tornado was observed by multiple people. Based on this damage, maximum estimated wind in the tornado was 110 to 120 mph.
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Figure 3-6 High Wind Previous Occurrences From the NOAA National Centers for Environmental Information https://www.ncdc.noaa.gov/stormevents		
Date	Jurisdiction	Narrative
05/10/2010	Pittsburg County	Strong thunderstorm wind blew down several trees.
06/14/2010	McAlester	Strong thunderstorm winds resulted in damage to two barns southwest of McAlester on Highway 31. Several trees and power lines were also damaged in this area with power outages in parts of McAlester.
04/10/2011	Pittsburg County	A large outdoor smoker was tossed and damaged by strong thunderstorm winds.
04/14/2011	Savanna	Emergency management reported a few power poles were blown down by strong thunderstorm wind and some outbuildings received minor damage.
04/22/2011	McAlester	The ASOS unit at KMLC measured 70 mph thunderstorm wind gusts.
05/24/2011	Ashland	Strong thunderstorm wind gusts blew down trees.

07/24/2011	McAlester	Power lines were blown down and several outbuildings were blown over by strong thunderstorm winds.
07/24/2011	Ashland	The Oklahoma Mesonet station near Stuart measured 59 mph thunderstorm wind gusts.
10/22/2011	Pittsburg County	Strong thunderstorm wind blew down large tree limbs.
05/29/2012	McAlester	Strong thunderstorm wind damaged a gas station canopy at the Phillips 66 on Highway 69 and Comanche Avenue.
05/29/2012	McAlester	The Oklahoma Mesonet station west of McAlester measured 71 mph thunderstorm wind gusts.
05/29/2012	McAlester	The ASOS unit at the McAlester Municipal Airport measured 69 mph thunderstorm wind gusts.
06/12/2012	Pittsburg County	The Oklahoma Mesonet station southeast of Stuart measured 61 mph thunderstorm wind gusts.
06/12/2012	McAlester	Strong thunderstorm wind blew down trees and large tree limbs.
07/26/2012	McAlester	Strong thunderstorm wind blew down several large tree limbs.
07/26/2012	McAlester	Strong thunderstorm wind blew down power lines.
08/07/2012	Quinton	Strong thunderstorm wind blew down several trees and large tree limbs.
08/08/2012	Pittsburg County	Strong thunderstorm wind blew down large tree limbs.
08/08/2012	McAlester	Strong thunderstorm wind blew down power lines on Highway 270.
08/08/2012	McAlester	Strong thunderstorm wind blew down trees and large tree limbs.
08/08/2012	McAlester	Strong thunderstorm wind destroyed a metal carport.
08/08/2012	Pittsburg	Strong thunderstorm wind snapped large tree limbs.
09/26/2012	Crowder	A storm chaser estimated thunderstorm winds to 80 mph.
09/26/2012	McAlester	A storm spotter measured thunderstorm wind gusts to 73 mph. Large tree limbs were also reported blown down.
10/13/2012	Kiowa	Strong thunderstorm wind blew down large tree limbs.
12/19/2012	Savanna	Strong thunderstorm wind blew down large tree limbs.

05/15/2013	Pittsburg County	Strong thunderstorm wind blew down several power poles, flipped over a storage building and blew another into a line of trees, and flipped over a pontoon boat.
05/31/2013	Pittsburg County	Numerous large trees were blown down by strong thunderstorm wind, a few of which fell onto homes.
05/31/2013	Quinton	Strong thunderstorm wind damaged a marina dock in far northeast Pittsburg County.
07/14/2013	Pittsburg County	Strong thunderstorm wind snapped large tree limbs.
07/14/2013	McAlester	Strong thunderstorm wind snapped large tree limbs.
07/24/2013	Pittsburg County	Strong thunderstorm wind blew portions of a roof off of a porch in Longtown.
10/10/2014	McAlester	The ASOS unit at the McAlester Regional Airport measured 58 mph thunderstorm wind gusts.
05/09/2015	Quinton	The roof of a nursing home was damaged by strong thunderstorm wind.
05/10/2015	McAlester	Strong thunderstorm wind snapped large tree limbs.
05/25/2015	Haileyville	Strong thunderstorm wind snapped large tree limbs.
06/26/2015	Pittsburg County	Thunderstorm wind gusts were estimated to 60 mph.
07/03/2015	Canadian	Strong thunderstorm wind blew down power lines.
11/05/2015	Pittsburg County	Strong thunderstorm wind blew down large tree limbs.
04/29/2016	Kiowa	Strong thunderstorm wind destroyed outbuildings and uprooted trees.
04/29/2016	Pittsburg	Strong thunderstorm wind uprooted trees.
04/29/2016	Pittsburg County	Strong thunderstorm wind damaged outbuildings and snapped the trunks of a few trees.
07/14/2016	Canadian	Strong thunderstorm wind destroyed an awning and blew shingles off the roofs of homes.
07/14/2016	McAlester	Strong thunderstorm wind blew down a large tree.
07/14/2016	Haileyville	A storm spotter estimated thunderstorm winds to 60 mph.
09/17/2016	Pittsburg	Strong thunderstorm wind damaged the roof of a school.
04/29/2017	Quinton	Thunderstorm wind gusts were estimated to 60 mph.

05/18/2017	Ashland	Strong thunderstorm wind snapped large tree limbs.
05/18/2017	Pittsburg County	Strong thunderstorm wind snapped large tree limbs.
05/18/2017	Pittsburg County	Strong thunderstorm wind blew down several trees.
05/18/2017	Pittsburg County	Strong thunderstorm wind blew down a large tree onto the Indian Nation Turnpike, resulting in southbound traffic being diverted.
06/30/2017	McAlester	Strong thunderstorm wind blew down a large tree onto a travel trailer at the Valley Inn RV Park.
08/17/2017	McAlester	Strong thunderstorm wind snapped large tree limbs and power poles.
12/04/2017	McAlester	Strong thunderstorm wind blew down a tree in town.
06/24/2018	Pittsburg County	Strong thunderstorm wind blew down large tree limbs.
06/24/2018	Canadian	Strong thunderstorm wind blew down a tree.
06/24/2018	McAlester	Strong thunderstorm wind snapped large tree limbs.
06/24/2018	McAlester	The ASOS at the McAlester Regional Airport measured 60 mph thunderstorm wind gusts.
04/30/2019	Quinton	Strong thunderstorm wind snapped large tree limbs.
05/18/2019	McAlester	Strong thunderstorm wind damaged homes and businesses, blew down trees, and snapped power poles.
06/19/2019	Pittsburg County	The Oklahoma Mesonet station southeast of Stuart measured 61 mph thunderstorm wind gusts.
08/20/2019	McAlester	Strong thunderstorm wind damaged several store fronts as well as the roofs of multiple homes and businesses.
05/08/2020	Pittsburg County	The Oklahoma Mesonet station near Stuart measured 61 mph thunderstorm wind gusts.
05/08/2020	McAlester	The McAlester Regional Airport ASOS measured thunderstorm wind gusts to 64 mph.
05/08/2020	McAlester	Strong thunderstorm wind snapped large tree limbs in McAlester.
05/08/2020	Pittsburg County	Strong thunderstorm wind blew down power lines across Highway 270.
05/08/2020	Haileyville	Strong thunderstorm wind blew down power lines.

05/08/2020	Pittsburg County	Strong thunderstorm wind snapped large tree limbs.
05/08/2020	Pittsburg County	Strong thunderstorm wind blew down multiple trees in and around Rattan.
07/11/2020	Quinton	Strong thunderstorm wind snapped large tree limbs.
07/11/2020	McAlester	The ASOS at the McAlester Regional Airport measured 60 mph thunderstorm wind gusts.
09/01/2020	Pittsburg County	Thunderstorm wind gusts were estimated to 60 mph.
11/24/2020	McAlester	Strong thunderstorm wind destroyed a metal awning.

Probability of Future Events

The probability of future events is high in the Planning Area.

Extent

Tornado intensity is rated using the Enhanced Fujita Scale. The scale is described below and is based on wind speed and type of damage done. The Planning Area has the ability to experience EF0-EF5 tornados, but the Planning Area would start to see the strain on their resources and public with an EF1.

Figure 3-7

Figure 3-7						
FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Damage from high winds account for half of all severe reports in the United States and are more common than damage sustained from tornadoes. Wind speeds around 50 mph have the ability to start producing substantial damage. With winds at this speed and higher, damage to roofs, siding, fences, and windows are common.

The extent of winds is generally measured by the Beaufort Wind Scale shown below. The Planning Area and its participating jurisdictions use this scale when considering high wind severity. The Planning Area has experienced and will continue to experience Beaufort Numbers 0-12. The Planning team considers high winds of 8 or higher to be a threat to all jurisdictions and the public.

Figure 3-8

Beaufort Wind Chart – Estimating Winds Speeds

Beaufort Number	MPH		Terminology	Description
	Range	Average		
0	0	0	Calm	Calm. Smoke rises vertically.
1	1-3	2	Light air	Wind motion visible in smoke.
2	4-7	6	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	11	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	15	Moderate breeze	Dust and loose paper is raised. Small branches begin to move.
5	19-24	22	Fresh breeze	Smaller trees sway.
6	25-31	27	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	35	Near gale	Whole trees in motion. Some difficulty when walking into the wind.
8	39-46	42	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	50	Severe gale	Light structure damage.
10	55-63	60	Storm	Trees uprooted. Considerable structural damage.
11	64-73	70	Violent storm	Widespread structural damage.
12	74-95	90	Hurricane	Considerable and widespread damage to structures.



Webpage: <http://www.weather.gov/hwx>

Twitter: @nwsiwx

Facebook: NWSNorthernIndiana



Impact and Vulnerability

While the Planning Area frequently experiences tornadoes and high winds, there have been no injuries or fatalities up to this point. Tornadoes and high winds are very unpredictable and are considered a high threat for the entire Planning Area.

The impact of the tornado hazard occurs with the culmination of several sub-hazards such as high winds, hail, lightning, and flooding. This can result in the direct loss of homes, businesses, and lives and indirectly cause the loss of income, medical care, and the ability for the government to respond to the disaster. Possible impacts to first responders include airborne debris, downed power lines in response areas, water flooding roadways, injuries, and fatalities.

Possible environmental impacts of tornadoes and high winds stem from human activities. Tornadoes have the potential to damage waste storage/treatment facilities, chemical plants, pipelines, or oil fields. All have the possibility of polluting soil and water areas creating costly cleanup and possible relocation of people and businesses. All future developments will be considered at-risk due to historical events and the unpredictability of tornadoes.

In the event of a tornado or high winds, services to the public could be delayed, leading to a lack of confidence in the local jurisdictions' ability to govern. In the event facilities or access to facilities is compromised, the local jurisdictions' Continuity of Operations Plan needs to be activated. This would insure minimal disruption to public services. At this time, only Pittsburg County and the City of McAlester have a Continuity of Operations Plan to enact. All other participating jurisdictions do not have a plan, and this is considered a vulnerability.

A large concern for Pittsburg County and the City of McAlester includes a lack of public storm shelters. Both jurisdictions hold several outdoor and large-scale events that bring in spectators and participants from other states. An example of this would be the Expo center. It's located in the county but leased to the City of McAlester. It hosts rodeos, craft fairs, and school competitions. Without access to a storm shelter, the participants and spectators are left to shelter in place. The county has identified two separate locations to input shelters: near the Pittsburg County EOC and at the Expo Center.

Another large concern is the fishing tournaments held on Lake Eufala. Portions of the lake are located in the Town of Crowder, Town of Canadian, and the County. When the participants are on the lake and away from the shore, they can't hear the closest tornado sirens. Additionally, some participants come from out of state and aren't familiar with the jurisdictions' hazards. All affected jurisdictions have identified a need for additional sirens and education about how to keep apprised of the weather. A table outlining each jurisdiction's specific impacts and vulnerabilities is located below.

Table 3-9 Tornado/High Wind Vulnerabilities		
Jurisdiction	Vulnerabilities	Impacts
Pittsburg County	The jurisdiction has a lack of public storm shelters in the area.	Not having enough public storm shelters leaves the public vulnerable to the effects of this hazard, especially those who are attending activities, like at the Expo. People caught out in the elements without proper shelter can experience severe injury or death.
	The County has several areas where storm sirens can't be heard, especially near the lake.	These areas are mostly rural where signal is spotty. Storm sirens may be the only warning some of the citizens in these areas get before a tornado strikes. Additionally, the lake hosts several fishing tournaments and other events with participants from outside the jurisdiction and state. These individuals are less likely to understand the threat risk in the area and be caught unaware.

	<p>The County has identified several educational needs to lessen the effects of this hazard. Education for this hazard would include hazard education for visitors to the lake, a social media campaign to advise on how to protect citizen's homes and families, and public shelter information when the county is able to install them.</p>	<p>A lack of education can hinder the public's ability to form a plan and delay reaction times in disaster situations that could endanger lives and property.</p>
	<p>There are several critical facilities within the jurisdiction that are lacking generators, including the County Courthouse, several fire departments, and others.</p>	<p>Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.</p>
<p>Town of Alderson</p>	<p>The Town of Alderson does not have a public shelter.</p>	<p>In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.</p>
	<p>The Alderson Fire Department lacks a generator.</p>	<p>Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.</p>
<p>Town of Ashland</p>	<p>The Town of Ashland doesn't have a public shelter.</p>	<p>In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.</p>

	The Ashland Fire Department lacks a generator.	Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.
Town of Canadian	The Town of Canadian doesn't have a public shelter.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	The Town of Canadian lacks generators at the Town Hall, Lift Station, and several others identified critical facilities.	Tornado and high wind events can take out utilities and render the community without power. If this were to happen, the jurisdiction would not be able to handle a large-scale weather event.
	The Town of Canadian has an area where existing storm sirens cannot be heard.	Storm sirens may be the only warning some of the citizens in this area get before a tornado or high wind event strikes.
	The jurisdiction has identified a lack of education for the public on how to lessen the impacts of this disaster on homes and the public.	Without proper protections, any size of tornado could cause injuries or be fatal to the public and destroy structures.
Carlton Landing	This jurisdiction doesn't have a public shelter.	In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.

	<p>The Carlton Landing Fire Department and one of their lift stations lack generators.</p>	<p>Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.</p>
	<p>The jurisdiction does not have any storm sirens. They have identified a need for at least one.</p>	<p>Sometimes storm sirens the only form of notification for the public. Without this warning, the public could get caught out in the weather and suffer severe injury or death.</p>
<p>Town of Crowder</p>	<p>This jurisdiction doesn't have a public shelter.</p>	<p>In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.</p>
	<p>The Crowder Fire Department and Senior Citizen Center lack generators.</p>	<p>Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.</p>
	<p>The Town of Crowder needs additional storm sirens to cover the area.</p>	<p>Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.</p>

	The town of Crowder has identified a need to get more education to the public so they can lessen the impacts of this hazard.	Without proper protections, any size of tornado could cause injuries or be fatal to the public and destroy structures.
Town of Indianola	This jurisdiction doesn't have a public shelter.	In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	The Indianola Fire Department lacks a generator.	Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.
Town of Kiowa	This jurisdiction does not have a public shelter.	In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	The jurisdiction has a few storm sirens that need to be replaced. There are also a few areas lacking coverage that need to be addressed.	Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.
Town of Pittsburg	This jurisdiction does not have a public shelter.	In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.

	<p>All of the identified critical facilities for the Town of Pittsburg lack generators.</p>	<p>Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.</p>
	<p>The Town of Pittsburg needs to replace an old siren and purchase an additional one to ensure the public can hear the warnings.</p>	<p>Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.</p>
<p>Town of Quinton</p>	<p>This jurisdiction does not have a public shelter.</p>	<p>In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.</p>
	<p>Quinton's town hall and fire department lack generators.</p>	<p>Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.</p>
<p>Town of Savanna</p>	<p>This jurisdiction does not have a public shelter.</p>	<p>In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.</p>

	All but two of Savanna's identified critical facilities lack generators.	Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.
City of Haileyville	None of this jurisdiction's critical facilities have generators.	In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	The jurisdiction has a few storm sirens that are in need of being replaced. There are also two areas lacking coverage that need to be addressed.	Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.
City of Hartshorne	This jurisdiction does not have a public shelter.	In the event of a tornado or high wind event, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	The City Hall does not have a generator.	Tornado and high wind events can take out power lines and render the community without power. It is essential for this critical facility to be fully functional during a weather event such as this so that vital services to the public are not delayed.

	The jurisdiction has a storm siren that needs to be replaced. There are also two areas lacking coverage that need to be addressed.	Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.
City of Krebs	This jurisdiction doesn't have a public shelter. One of the main annual festivals is hosted here with a large amount of out of town participation.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	The jurisdiction has a few storm sirens in need of being replaced.	Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.
City of McAlester	This jurisdiction doesn't have a public shelter and has a large amount of public events where participants may be from out of town and have nowhere else to go.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves the public vulnerable to injury or death.
	There are several fire departments, lift stations, and other critical facilities without generators to keep them going in the event of a tornado.	Tornado and high wind events can take out power lines and render the community without power. It is essential for critical facilities to be fully functional during a weather event such as this so that vital services to the public are not delayed.
	The City of McAlester needs to replace a siren and add a few more to increase coverage of warnings.	Storm sirens may be the only warning some of the citizens in this area get before a tornado strikes. Without proper warning, the public could easily be injured or killed while trying to seek shelter.
McAlester Public Schools	No shelters. Has to shelter in place, will need multiple to keep from bussing from place to place.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.

	The school district does not have an emergency generator.	Should a tornado occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
Quinton Public Schools	While the school district does have a storm shelter, it's not big enough to house the entire school during an incident.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.
	The school district does not have an emergency generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
Crowder Public Schools	The sports complex does not have a shelter. If a tornado were to occur during a game, there wouldn't be a place for the kids, staff, or family members to go.	In the event of a tornado, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.
	The school district does not have an emergency generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
Haileyville Public Schools	The school district has a storm shelter, but doesn't have adequate space for the population.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.
	The school district does not have an emergency generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
Frink-Chambers Public Schools	The school district doesn't have a storm shelter and has to shelter in place.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.

	The school district does not have an emergency generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
Tannehill Public Schools	The school district does not have an emergency generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
	The school district does not have any storm sirens in the area.	In case other warning systems fail, the school district needs adequate warning time to secure students. If the school wasn't warned in time, they wouldn't be able to seek shelter.
Krebs Public Schools	The school district doesn't have adequate storm shelters for students.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.
Haywood Public Schools	The shelter that's currently in place is an old WPA shelter. It is no longer suitable for the school's needs.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.
Savanna Public Schools	While the school does educate students on the hazard during drills, they don't believe they adequately cover the other aspects of the hazard, such as at home safety.	Education is extremely important. If students aren't adequately educated about these hazards, they might underestimate the impacts and receive preventable injuries or losses.
Canadian Public Schools	The school doesn't have a generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.

Pittsburg Public Schools	The school district does not have any storm sirens in the area.	In case other warning systems fail, the school district needs adequate warning time to secure students. If the school wasn't warned in time, they wouldn't be able to seek shelter.
	The school district believes in the power of education and wants to start teaching students about mitigation actions at an early age.	A lack of education can lead to injury and the loss of lives and homes. The school district believes starting education early on the risks and ways to lessen the hazard would benefit the whole community.
	The school district would like to increase the durability of their windows to withstand higher wind speeds.	In case other warning systems fail, the school district needs adequate warning time to secure students. If the school wasn't warned in time, they wouldn't be able to seek shelter.
Hartshorne Public Schools	At the moment, the school has to put kids on busses to reach the shelter which increases their vulnerability.	In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.
	The school district does not have an emergency generator.	Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.
Indianola Public Schools	The school district does not have a storm siren nearby.	In case other warning systems fail, the school district needs adequate warning time to secure students. If the school wasn't warned in time, they wouldn't be able to seek shelter.

<p>Kiowa Public Schools</p>	<p>While the school does educate students on the hazard during drills, they don't believe they adequately cover the other aspects of the hazard, such as at home safety.</p>	<p>Education is extremely important. If students aren't adequately educated about these hazards, they might underestimate the impacts and receive preventable injuries or losses.</p>
<p>Carlton Landing Academy</p>	<p>The school district does not have a storm shelter. The kids and teachers must shelter in place.</p>	<p>In the event of a tornado or high winds, having a place to seek shelter is crucial. If not, it leaves kids vulnerable to injury or death.</p>
	<p>The school district does not have a storm siren.</p>	<p>In case other warning systems fail, the school district needs adequate warning time to secure students. If the school wasn't warned in time, they wouldn't be able to seek shelter.</p>
	<p>The school district does not have an emergency generator.</p>	<p>Should a tornado or high wind event occur during school hours, the buildings need to be functional to safely accommodate kids until the event is over.</p>

3.4.2 Flood

Description

Flooding is a natural event that occurs around rivers and streams. This event can affect homes and land closest to the rivers and streams. The Planning Area experiences both riverine and flash flooding. Riverine flooding is responsible for 70% of flooding in the Planning Area due to the numerous bodies of water. The other 30% is attributed to flash flooding scattered throughout the Area. County roads and bridges experience the most substantial damage from flood events.

Riverine flooding is usually a gradual process, with several hours to several days of warning time. This type of event usually remains in flood for a longer period than flash or urban flooding, and often causes more damage due to the length of time structures are inundated, the velocity and depth of water, and floating debris.

Flash flooding in the Planning Area is associated with the large convective thunderstorms that frequent the region and can drop between one and five inches of rain in the space of an hour. When the soil is already saturated, rainfall from such storms can converge in creeks and streams suddenly, with little warning.

Location

The entire Planning Area is at risk for flooding, with the areas around the waterways being more susceptible to riverine flooding. The Planning Area most often experiences riverine flooding along Brushy Creek, Gaines Creek, Deer Creek and Coal Creek. There are 22,992 housing units in the Planning Area. Less than 1% (59) are in the floodplain.

Flood Depths maps have been included to illustrate the areas of flooding in the Planning Area. These maps are located in Appendix B.

Figures 3-10, 3-11, and 3-12 include roads that frequently flood and are organized by county district. As they are all county roads, they are fixed and maintained on a district-by-district basis.

Figure 3-10
District One Frequently Flooded Roads

Roads	Latitude	Longitude
McNally Road	35.22358	-95.58106
	35.15442	-95.56013
James Thomas Road	35.14561	-95.52558
	35.17463	-95.52566
Dozer Mountain Road	35.22429	-95.48601
	35.20014	-95.52837
Ezekial Road	34.92519	-95.52663
	34.93163	-95.52692
Nale Road	35.13687	-95.68197
	35.13055	-95.71885
L.M. Collier Road	34.85503	-95.54703
	34.8694	-95.54711
Etchison Road	35.11724	-95.40122
	35.12812	-95.37474
Pryor Lane	35.14596	-95.46539
	35.14592	-95.46374
Nitzel Road	35.24515	-95.52816
	35.24777	-95.50929
King Road	35.18364	-95.62226
	95.18297	-95.62605
Buffalo Mountain Road	34.98533	-95.61263
	34.98206	-95.5242
Nolen Road	34.9243	-95.56024
	34.92929	-95.56024
Buds Point Road	35.09723	-95.63554
	35.11455	-95.62057
Hartshorne Lake Road	34.82319	-95.56673
	34.82042	-95.54962
Kiamichi VoTech	34.92413	-95.74582
11 th St- Hartshorne (between Pennsylvania and Modoc)	34.83955	-95.55662
	34.8444	-95.55447
9 th St- Hartshorne (between Pennsylvania and Modoc)	34.84069	-95.56019
	34.84544	-95.55809
Kali-Inla St., Hartshorne (Between 8 th St to 11 th St)	34.84394	-95.56088
	34.84234	-95.5555
South 8 th St- Hartshorne (From Lehigh to the end of Lehigh)	34.84508	-95.56043
	34.845	-95.56045
10 th St- Hartshorne From Pennsylvania to Modoc	34.84494	-95.55626
	34.84007	-95.55842
Carbon Street- Hartshorne (From 7 th St to 9 th St)	34.84347	-95.56293
	34.84244	-95.55948
Modoc ST- Hartshorne (From 5 th St to 10 th ST)	34.84267	-95.56718
	34.84008	-95.55851

South 6 th St- Hartshorne (From LeHigh to the end of 6 th Street)	34.84605 34.83748	-95.56405 -95.5678
Comanche St – Hartshorne (From 5 th St to 8 th St	34.84151 34.84004	-95.56772 -95.56273
7 th St – Hartshorne (From Pennsylvania Ave to Barnhill	34.84656 34.83769	-95.56168 -95.56556
Wichita St.- Hartshorne (From 5 th St to 6 th St)	34.83956 34.83912	-95.56855 -95.56713
15 th Street- Hartshorne (From Lehigh to Kali Inla ST)	34.84119 34.84019	-95.54771 -95.54815
City Canal- Hartshorne (From Modoc to 7 th ST)	34.83955 34.84162	-95.55668 -95.56372
Comanche St – Hartshorne (from 5 th St to 8 th St)	34.84151 34.84005	-95.56771 -95.56274
Osage St- Hartshorne (from 11 th St to 15 th St)	34.84528 34.84315	-95.55401 -95.54693
14 th St -Hartshorne (from Pawnee to Pennsylvania)	34.84437 34.84301	-95.54835 -95.54894
15 th St – Hartshorne (From Carbon to Pawnee)	34.83925 34.84384	-95.54859 -95.54653

**Figure 3-11
District Two Frequently Flooded Roads**

Road	Latitude	Latitude
Shuman Road	34.92756	-95.80249
	34.88375	-95.82453
East High Hill Road	34.86951	-95.73642
	34.87458	-95.59863

**Figure 3-12
District Three Frequently Flooded Roads**

Roads	Altitude	Altitude
Nale Road	35.13055	-95.71885
	35.13106	-95.77177
Rockford Road	35.00018	-95.89533
	35.00001	-95.94215
Sunset Road	35.10175	-95.84276
	35.10161	-95.878
Lone Oak Road	35.14514	-95.77207
	35.14518	-95.86005
East Clearlake Road	35.08711	-95.87756
	35.08725	-95.92988
Pecan Road	35.1598	-95.83368
	35.17484	-95.83597
Bald Mountain Road	35.14516	-95.86014
	35.11612	-95.77203
East Flowery Mounds Road	35.01441	-95.68349
	35.01441	-95.67476
West Flowery Mounds Road	35.01441	-95.68365
	35.00004	-95.71744
Krebs Lake Road	34.92804	-95.71005
	35.02891	-95.68365
Medicine Creek Road	35.17401	-95.80721
	35.07593	-95.80427
Hawk Loop	35.11608	-95.78949
	35.10166	-95.80697
High Water Road	34.9122	-95.94783
	34.91264	-95.94338
Hugh Low Road	35.08727	-95.98316
	35.04382	-95.98319
Four Corners Road	35.0869	-95.04172
	35.05826	-95.93056
Sunshine Road	35.04364	-95.86893
	35.03722	-95.90403
South Mt. Homa Road	35.04371	-95.89519
	35.05826	-95.89742
Thain Road	35.00858	-95.80249
	35.01654	-95.80437
Yellow Bull Road	35.16814	-95.73632
	35.11269	-95.73655
Ulan Road	35.00023	-95.8619
	35.11601	-95.88628
McAlester Lake Road	34.98821	-95.82501
	35.05025	-95.84221
Double Springs Road	34.94184	-95.01858
	34.8695	-96.01865
Ragan Road	35.11617	-95.88656
	35.05844	-95.94824

Carl Albert Road	35.02623	-95.71042
	35.02894	-95.67637

Previous Occurrences

One of the largest floods in the Planning Area's history occurred in 2015. It shut down numerous roads and bridges. This flood significantly disrupted one of the Planning Area's biggest economic drivers of tourism. Lake Eufaula was virtually inaccessible due to flooding of roads and recreation sites. Occurrence data from the National Oceanic and Atmospheric Administration (NOAA) Website is located below.

Figure 3-13 Flood Previous Occurrences From the NOAA National Centers for Environmental Information https://www.ncdc.noaa.gov/stormevents		
Date	Jurisdiction	Narrative
07/07/2010	Kiowa	Heavy rainfall flooded streets in town and some roadways outside of town.
07/07/2010	Kiowa	Heavy rain flooded streets in town and several rural roads were under water. A house in Kiowa was flooded.
07/08/2010	Quinton	Thunderstorms developed along a slow moving cold front that pushed into the region. Thunderstorms moving repeatedly over the same areas resulted in flash flooding across portions of eastern Oklahoma.
09/09/2010	Indianola	The Pittsburg County Sheriff's Office reported Highway 113 between Canadian and Indianola flooded, as well as Highway 69 in the Canadian area. Numerous other roads in the northern portion of the county were closed due to flooding. Some of those roads, along with tin horns and even a bridge, were washed out.
04/25/2011	Pittsburg County	Periods of showers and thunderstorms resulted in widespread heavy rainfall on the 25th with a frontal boundary extending through eastern Oklahoma and an upper level disturbance approaching the region. These showers and thunderstorms only compounded the already serious flood situation across much of the area. Severe thunderstorms also produced large hail and damaging wind gusts. Many roads in and around town were flooded.
03/20/2012	McAlester	Strong to severe thunderstorms developed along a cold front that pushed into the region during the midday hours of the 19th. The thunderstorms evolved into a line as they pushed eastward and produced damaging wind, large hail

		and a brief tornado over eastern Oklahoma. The slow moving nature of the complex also resulted in widespread flash flooding across the region. Several rural roads were flooded.
03/20/2012	Pittsburg County	Strong to severe thunderstorms developed along a cold front that pushed into the region during the midday hours of the 19th. The thunderstorms evolved into a line as they pushed eastward and produced damaging wind, large hail and a brief tornado over eastern Oklahoma. The slow moving nature of the complex also resulted in widespread flash flooding across the region. Several roads were flooded and closed from McAlester to the south and southeast toward Haileyville and Hartshorne.
09/26/2012	Pittsburg County	Scattered thunderstorms developed near an outflow boundary across east-central Oklahoma during the early afternoon hours of the 26th. These storms drifted south and east during the afternoon. Several of the storms became supercellular, producing large hail, damaging wind, and some flash flooding. Widespread flooding was reported in Crowder.
06/08/2014	Pittsburg County	Widespread thunderstorms moved through southeastern Oklahoma late on the 7th into the morning hours of the 8th. Heavy rainfall resulted in Highway 31 was closed due to high water. Some flash flooding in Pittsburg County.
06/08/2014	Pittsburg County	Widespread thunderstorms moved through southeastern Oklahoma late on the 7th into the morning hours of the 8th. Heavy rainfall resulted in some flash flooding in Pittsburg County. Highway 63 was closed due to high water.
07/31/2014	McAlester	Locally heavy rainfall resulted in several streets becoming flooded in McAlester.
07/31/2014	Pittsburg County	Portions of Highway 31 were closed due to flooding.
04/13/2015	Pittsburg County	Highway 63 was closed due to high water between Bache Road and Haileyville.
04/13/2015	Pittsburg County	High Hill Road was washed out between Alderson and Bache roads.
04/13/2015	Pittsburg County	Highway 31 was closed between Steven Taylor Industrial Park and Haywood, on the southwest side of McAlester.

04/13/2015	Pittsburg County	The Z bridge was completely submerged on Double Springs Road.
04/13/2015	McAlester Muni	Portions of Shuman Road were flooded.
05/09/2015	Pittsburg County	Several roads were severely flooded and impassable.
05/10/2015	Pittsburg County	Highway 270 near the Indian Nation Turnpike was flooded and impassable.
05/17/2015	Pittsburg County	Highway 31 was closed from the Indian Nations Turnpike, west to Haywood due to flooding.
05/20/2015	Haileyville	Highway 63 near Haileyville was closed due to high water.
05/24/2015	Pittsburg County	Several roads were flooded across Pittsburg County. Portions of Highway 270 near Alderson and Highway 69 near Savanna were flooded.
05/24/2015	Pittsburg County	Numerous roads were closed throughout Pittsburg County due to high water. Highway 31 was closed from the Highway 270 junction to Haywood and to Highway 31A. Highway 63 was closed from Haileyville to Kiowa. Highway 270 was closed from west of Indian Nations Turnpike to Arpelar. Highway 69B was closed from McAelster north to Highway 113.
06/18/2015	Pittsburg County	Portions of a county road were washed out.
11/27/2015	Pittsburg County	Portions of Highway 31 were closed due to high water southwest of McAlester.
11/27/2015	Pittsburg County	Portions of Highway 63 were closed between Haileyville and Kiowa.
12/27/2015	Pittsburg County	Portions of Highway 63 were closed northeast of Blanco due to flooding.
12/27/2015	Pittsburg County	Portions of Highway 31 southwest of McAlester were closed due to flooding.
12/27/2015	Pittsburg County	Roads were flooded around Scipio. A man drove a truck into flood waters covering Ragan Road and was drown.
12/27/2015	Pittsburg County	Portions of US 270 east of Arpelar were closed due to flooding.
12/28/2015	Pittsburg County	Portions of Highway 31 southwest of McAlester were closed due to flooding.
12/28/2015	Pittsburg County	Portions of Highway 270 east of the Indian Nation Turnpike to Arpelar were closed due to flooding.

12/28/2015	Pittsburg County	Portions of Highway 270 east of the Indian Nation Turnpike to Arpelar were closed due to flooding.
04/29/2017	Pittsburg County	Numerous roads were flooded and closed.
05/20/2017	Krebs	Severe flooding was reported in Krebs with several roads under water and flood waters threatening homes.
05/20/2017	Pittsburg County	Portions of Highway 63 were flooded and closed from Bache Road to Haileyville.
05/20/2017	Pittsburg County	Portions of Highway 270 were flooded and closed west of the Indian Nation Turnpike.
08/14/2017	Krebs	Portions of some roads were flooded near Krebs, including Highway 270. A swift water rescue was conducted on Krebs Lake Road.
12/26/2018	Pittsburg County	Portions of Highway 31 and Highway 63 were closed due to high water.
09/26/2019	Pittsburg County	Portions of several roads in and around Scipio were flooded.
01/10/2020	McAlester	Multiple vehicles were driven into flood water, where they were stranded.
01/10/2020	Ashland	Portions of several roads were flooded across southwestern Pittsburg County, as a result of three to five inches of rain that fell across the area. A 58 year-old man drove his pickup truck into deep flood water flowing over S Harper Valley Road, where it became inoperable. He exited the vehicle, was swept downstream by the rapidly flowing water, and was drowned.
05/15/2020	McAlester	Multiple roads were flooded and closed in and around McAlester.
05/27/2020	Haileyville	Portions of several roads were flooded in and around Hartshorne.
09/01/2020	McAlester	A vehicle was driven into flood water near Electric Avenue and Main Street, where it stalled. Portions of several roads in McAlester were closed.
09/01/2020	McAlester	Portions of Highway 31 were flooded and closed between Haywood and McAlester.

Probability of Future Events

The probability of flood events occurring is high in the Planning Area.

Extent

The Planning Area uses Flood Depth Maps to determine the extent of flooding. Flood Depths maps have been included to illustrate the Extent of flooding in the Planning Area. These maps are located in Appendix B. There are several locations as outlined in the maps that have the ability to reach up to five feet, but if a flood were to happen, any depth over six inches would put a strain on the Planning Area.

Impact and Vulnerability

The impact of this hazard occurs during times of inundation. Roads become impassible, homes and businesses inaccessible, and response to emergencies limited or impossible. Roads, like the ones listed in Figures 3-10, 3-11, 3-12, create a danger to the public and first responders, as well as a financial and time hardship.

In the event of heavy flooding, services to the public could be delayed, leading to a lack of confidence in the local jurisdictions' Continuity of Operations needs to be activated. This would insure minimal disruption to public services. At the completion of the Plan, only Pittsburg County and the City of McAlester have this capability. All other participating jurisdictions have defined this as a deficiency.

Possible environmental impacts to the Planning Area include deposition of sediment and debris, infectious disease transference through flood water to people and animals, destruction of plants, and disruption of the natural balance of the ecosystem, chemicals, and other hazardous substances may result in water contamination.

Pittsburg County and all participating jurisdictions are vulnerable to flooding events. A large concern for the Planning area is the northern section of Lake Eufala where a potential loss of structure could occur. There are many homes along the lake shore that are extremely susceptible to flooding. This could impact approximately 30% of the county.

In 2015, the Planning Area experienced two major floods that impacted roads, bridges, and the economy. The majority of this impact was to county roads and state highways near waterways. While all schools within the planning area faced issues with reaching students on the bus route, Quinton Public Schools, Crowder Public Schools, and Kiowa Public Schools suffered property damage from the floods. Additional issues that all jurisdictions within the planning area face are individuals driving through flooded roadways. When flooding begins to occur, county commissioners try to block off inundated roads as they're reported. These commissioners have a limited supply of barricades and employees to

do the job. As such, not all flooded roads get barricades. A mitigation activity that has been identified to educate the public on the dangers of driving through flooded areas and to purchase more barricades to keep the public safe.

Figure 3-14 outlines each jurisdiction’s impacts and vulnerabilities.

Figure 3-14 Flood Vulnerabilities		
Jurisdiction	Vulnerabilities Needs Narration	Impacts Needs Narration
Pittsburg County	Several county roads have been washed out by heavy rains and flooded waterways. Others flood frequently to the point of being closed until the water has dried up because they are too low.	Flooded roadways pose a danger to travelers. Although the county has tried to purchase barricades and signs, they don't have enough for the amount of roads affected and sometimes travelers ignore these warnings. It also poses an inconvenience to bus routes and citizens who live in the area.
Town of Alderson	The jurisdiction has identified a lack of education for citizens as a vulnerability.	A lack of education can make citizens unnecessarily vulnerable to this hazard.
Town of Ashland	The jurisdiction has identified a lack of education for citizens as a vulnerability.	A lack of education can make citizens unnecessarily vulnerable to this hazard.
Town of Canadian	The Town of Canadian has several roads that flood or have been washed out.	Flooded roadways pose a danger to travelers. It also poses an inconvenience to bus routes and citizens who live in the area.
	The ditches and culverts in this jurisdiction aren't large enough to handle the current intake.	When the intake is higher than the system can handle, the roads flood. Flooded roadways pose a danger to travelers.. It also poses an inconvenience to bus routes and citizens who live in the area.
	Several roads have been washed out by heavy rains and flooded waterways. Others flood frequently to the point of being closed until the water has dried up because they are too low.	Flooded roadways pose a danger to travelers. It also poses an inconvenience to bus routes and citizens who live in the area.