



# Tribal Hazard Mitigation Plan



**Cherokee Nation Emergency Management  
March 2016**

**PLAN ADOPTION**

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# Cherokee Nation Hazard Mitigation Plan

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## LIST OF ACRONYMS

BIA – Bureau of Indian Affairs

CFR – Code of Federal Regulations

CIP – Capital Improvement Plan

CN – Cherokee Nation

CNEM – Cherokee Nation Emergency Management

COTTA – Community Organization Training and Technical Assistance

DOT – Department of Transportation

EOP – Emergency Operations Plan

EPA – Environmental Protection Agency

FEMA – Federal Emergency Management Agency

FMA – Flood Mitigation Assistance

HMP – Hazard Mitigation Plan

HMPG – Hazard Mitigation Planning Grant

IRMP – Integrated Resources Management Plan

ITEMC – Inter-Tribal Emergency Management Coalition

MCS – Mesoscale Convective System. A complex of thunderstorms which becomes organized on a scale larger than the individual thunderstorms, and normally persists for several hours or more

NCDC – National Climatological Data Center

NOAA – National Oceanic and Atmospheric Administration

NWA- National Weather Association

PDM – Pre-Disaster Mitigation

PNP – Private Non-Profit

SRL – Severe Repetitive Loss

TEMPT – Tribal Emergency Management Planning Team

TJSA – Tribal Jurisdictional Service Area

USDA – United States Department of Agriculture

## EXECUTIVE SUMMARY

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Disaster response and recovery is very costly. By undertaking hazard mitigation activities that will reduce the impact of future disasters – Cherokee Nation can reduce these costs and minimize the impact of potentially disastrous events. Hazard mitigation aims to prevent disasters and encourages the development of disaster resilience.

Cherokee Nation Emergency Management is the lead agency for the hazard mitigation program for the Cherokee Nation, a key component of which is the *Cherokee Nation 2015-2020 Hazard Mitigation Plan*. The purpose of this plan is to identify the tribe's major hazards, assess the risk and vulnerability of those hazards, and take steps to reduce the vulnerability using the technical and program resources of Cherokee Nation and its emergency management partners. Ultimately, the Plan strives to help protect the health, safety, property, and economy of Cherokee Nation from the effects of natural hazards.

Beginning in October of 2008 when Cherokee Nation undertook the daunting task of developing their first hazard mitigation plan the goal of the Hazard Mitigation plan has been to:

The vision of the Cherokee Nation is "Homes, Health and Hope". The Cherokee Nation mission: The Cherokee Nation is committed to protecting our inherent sovereignty, preserving and promoting Cherokee culture, language and values and improving the quality of life for the next seven generations of Cherokee citizens."

The Cherokee Nation 2015-2020 Hazard Mitigation Plan is organized to follow the federal planning requirements found in 44 Code of Federal Regulations (CFR) Parts 201.4 and 201.5, and the guidance provided by the FEMA Tribal Hazard Mitigation Planning Guide. To address the objectives outlined in the guidance, the plan contains four sections that provide an introduction, the risk assessment, a mitigation strategy, and a plan maintenance strategy.

## PLAN CONTENTS

The Cherokee Nation Hazard Mitigation Plan is divided into six sections to address each of FEMA's tribal mitigation plan requirements. In addition to the seven sections, the plan includes an executive summary, a purpose statement and eleven appendices. The seven sections are as follows:

SECTION 1: INTRODUCTION provides an overview of each section of the plan and their purported purpose. Also, includes Federal assurances for grant funding.

SECTION 2: TRIBAL PROFILE brief profile of the Cherokee Nation's physical, social, economic, and political characteristics.

SECTION 3: PLANNING PROCESS description of the process and methods used to update and develop the current plan.

SECTION 4: RISK ASSESSMENT profiles a range of potential natural hazards that could pose a threat to the Cherokee Nation. This section assesses Cherokee Nation's vulnerabilities to potential hazards based on a variety of considerations, identifies the tribe's assets, and attempts to quantify losses of tribal assets.

SECTION 5: MITIGATION STRATEGY defines Cherokee Nation's goals, current efforts, and a future action plan for mitigating the impacts of each hazard. This section also discusses the implementation plan for mitigation actions and the tribe's capabilities and potential funding for implementing mitigation projects.

SECTION 6: MAINTENANCE PROCEDURES describes the planning process in terms of its technical, political, and public engagement components. This section sets the course for plan monitoring, evaluating, and updating; measuring progress of mitigation actions, and continued engagement of stakeholders.

The Appendices contain the completed hazard ranking worksheet used to rank each hazard that has the potential to impact Cherokee Nation, listings of past hazard occurrences that have occurred within the boundaries of the Cherokee Nation, and a list of Steering Committee members and copies of all meeting sign-in sheets.

## SECTION 1: INTRODUCTION

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### CHEROKEE NATION

### HAZARD MITIGATION PLAN

2016

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#### PURPOSE OF THE PLAN

The Cherokee Nation 2015-2020 Multi-Hazard Mitigation Plan was developed consistent with the state hazard mitigation planning requirements outlined in the Code of Federal Regulation (44CFR Part 201.4 and 201.5). This plan evaluates the tribe's potential exposure to natural hazards and identifies appropriate mitigation strategies.

Completion of this plan will assist Cherokee Nation emergency management personnel in identifying areas of risk, assessing the magnitude of the risk, and developing strategies for reducing this risk. Through this process, Cherokee Nation can address issues related to incompatible land uses; the identification and protection of critical facilities; and the reduction of costs associated with natural disaster relief and rescue efforts. Completion and approval of this plan makes Cherokee Nation eligible to apply for future disaster relief and mitigation project funds to implement some of the recommended mitigation strategies.

#### DISASTER MITIGATION ACT OF 2000

The Disaster Mitigation Act of 2000 (DMA 2K) provided the impetus at the federal level for multi-hazard mitigation planning. DMA 2K was signed into law in October of 2000 as an attempt to stem the losses from disasters, reduce future public and private expenditures, and speed up response and recovery from disasters. The following is a summary of the party of DMA 2K that pertain to tribal government.

- Establishes a new requirement for tribal government to prepare a multi-hazard mitigation plan in order to be eligible for Federal Emergency Management Agency (FEMA) assistance through the Hazard Mitigation Assistance Program.
- Establishes a requirement that natural hazards be addressed in the risk assessment/vulnerability analysis part of the multi-hazard mitigation plan. Addressing man-made/technological hazards is encouraged, but not required.
- Authorizes a percentage of hazard Mitigation Assistance Program funds to state after a federal disaster is declared to be used for development of state, local, and tribal multi-hazard mitigation plans.

- Established a deadline by which tribal governments are to prepare and adopt their respective plans in order to be eligible for the FEMA Hazard Mitigation Assistance Program.

## PLANNING VISION

This plan establishes three major visions in fulfilling the requirements established through DMA 2K:

**Reduce Hazard Risks and Impacts-** This multi-hazard mitigation plan assessed vulnerability of life and property from potential natural hazards and prioritized corresponding mitigation strategies to reduce the risk and impact from the hazard.

**Build on Existing Efforts** – Cherokee Nation, Oklahoma, and county and local entities have engaged in mitigation and response planning efforts over the year. The intent of this plan is to maximize these efforts by inventorying, coordinating, and building on these efforts where possible, and developing new strategies from existing emergency response plans and other relevant efforts.

**Share Information and Raise Awareness** – Public engagement methods used in the preparation of this plan sought input from a diverse range of stakeholders including the public, and various public, private, and non-profit sector representatives. Mitigation strategies identified in this plan address public information, communication, and outreach in a universal manner regardless of hazard type, and within a hazard-specific context, as applicable.

## ASSURANCES

Cherokee Nation complies with A-87 and OMB A133 Single Audit Requirements. CFR 44 part 13, clearly states that tribes are subject to A-87 cost principles and to OMB A133 Single Audit requirements.

The Cherokee Nation Accounting Department has received the Comprehensive Annual Financial Report (CAFR) award consistently since 1984. The award has been received the past 25 years as Certificate of Achievement for Excellence in Financial Reporting issued by the Governmental Financial Officer of the United States. It is the highest standard in governmental accounting and financial reporting.

Cherokee Nation has demonstrated its capability and will continue to comply with all applicable state and federal statutes and regulations relating to FEMA -1678-DR-OK, Project #20.

### **Following are the requirements and assurances for the above referenced FEMA grant:**

Financial Reports: Reports are submitted quarterly to Oklahoma Department of Emergency Management. Reporting dates are April 30, July 30, September 30 and January 30. Final financial reports are due 90 days after the close of the grant.



Performance Reports: The Nation has submitted quarterly performance reports detailing financial and overall progress of the referenced grant to the Oklahoma Department of Emergency Management.

Budget: Budget requirements are found in Emergency Management and Assistance Regulations 44 CFR Part 13. The Nation understands that transfer of funds between total direct cost categories in the approved budget, on non-construction grants, shall receive prior approval of FEMA when such transfers exceed ten percent of the total budget. Written approval must be received for any budget revision which would result in the need for additional funds.

Audit Requirements: The Nation agrees to comply with the audit requirements of OMB Circular No. A-133, OMB Circular A-87, and OMB Circular A-102.

The following are hereby incorporated into this agreement by reference:

- 44 CFR, Emergency Management and Assistance Regulations
- Part 10-Environmental Considerations
- Part 13-Uniform administrative requirements for grants and cooperative agreements to state and local governments
- Part 7-Nondiscrimination in Federally-Assisted Programs (FEMA)
- Part 17-Government wide debarment and suspension (no procurement) and government wide requirements for drug-free workplace (grants)
- Part 18-new restrictions on lobbying
- Subchapter B-Insurance and Hazard Mitigation
- Subchapter C-Fire Prevention and control
- Subchapter D-Disaster Assistance
- Subchapter E-Preparedness
- 31 CFR 205.6-funding techniques
- P.L. 101-336-The Americans with Disabilities Act
- OMB Circular A-102-Uniform Administrative Requirements for grants and Cooperative Agreements with State and Local Governments
- OMB Circular A-87- Cost Principles for State and Local Governments
- OMB Circular A-133, Audits of States, Local Governments and Non-Profits Organizations.

Cherokee Nation has identified limited resources that may be committed to the completion of these projects and appropriate funding through tribal enterprises, as well as, various grants and in kind contributions. Cherokee Nation has, over the last 20 years, grown and expanded. Responsible personnel will be utilized in the implementation of this plan and the strategies identified within.

Amendments Requirements: The Nation will amend this plan whenever necessary to reflect changes in Tribal or Federal laws and statutes as required in 44 CFR 13.11(d).

**General Compliance Assurance Statement**

Because of inherent limitations in any grant management program, errors may occur; however, as referenced throughout this plan, it is Cherokee Nation's intent to comply with all administrative requirements outlined in 44 CFR Parts 13 and 206 in their entirety and to monitor all sub-grant supported activities to ensure compliance with 44 CFR Parts 13 and 206 in their entirety.

Development of the Cherokee Nation 2015-2020 Multi-Hazard Mitigation Plan began in September 2015 and will be approved by the Cherokee Tribal Council after pending approval from FEMA. The plan was updated using the DRAFT Tribal Multi-Hazard Mitigation Planning guidance released by FEMA in July 2008 and the Cherokee Nation's previously approved Hazard Mitigation plan from 2010. The Steering Committee comprised of inter-tribal departments, emergency management personnel, and external organizations, guided the plan development process over a five month timeframe beginning in September 2015.

**REVIEW AND INCORPORATION OF EXISTING INFORMATION**

Through the process of developing the Cherokee Nation Hazard Mitigation Plan, previous plans, studies, reports, and technical information were reviewed then entered into this plan where applicable. The following includes a list of some of the primary documents that were reviews and incorporated into this plan.

- Cherokee Nation Hazard Mitigation Plan, 2010
- State of Oklahoma Hazard Mitigation Plan, 2014
- Cherokee County, Oklahoma 2013 All Hazards Mitigation Plan
- Cherokee Nation Emergency Operation Plan, 2014
- Cherokee Nation Laws, Policies and Procedures

## **SECTION 2: TRIBAL PROFILE**

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The tribal profile of the Cherokee Nation 2015-2020 Multi-Hazard Mitigation Plan provides information about Cherokee Nation's history, general physical characteristics, demographics, and land cover and land use. Data obtained from: Cherokee Nation Geo-data, tribal website, County offices, etc.

### **PHYSICAL CHARACTERISTICS**

The Cherokee Nation is located in northeastern Oklahoma, approximately fifty minutes northeast of Tulsa and forty five minutes west of Fayetteville, Arkansas. It consists of fourteen counties, covering approximately 7,700 square mile, eight of which fall lay entirely within the Tribal Jurisdiction Service Area (TJSA) these counties are Nowata, Craig, Rogers, Mayes, Delaware, Cherokee, Adair, and Sequoyah. The remaining six counties fall only partially within our boundaries and include Washington, Ottawa, Tulsa, Wagoner, Muskogee, and McIntosh. The total number of registered tribal citizens living within the boundaries of the TJSA is approximately 130, 859. Tribal citizens make up roughly 25% of the total population of 510,574 people who reside within the fourteen county areas.

### **HISTORICAL BACKGROUND**

The Cherokee Nation is a federally recognized tribe with a tripartite form of government. Cherokee Nation, located in northeastern Oklahoma, has more than 280,847 tribal citizens. Cherokee Nation Tribal Jurisdictional Service Area (TJSA) covers approximately 7,700 square miles. Our government headquarters are located south of the City Of Tahlequah, the historical capitol of the Cherokee Nation.

Our tripartite form of government includes a judicial, executive and legislative branch. The Judicial Branch includes the District Court and the Supreme Court. The Legislative Branch is composed of 17 Tribal Council Members who are elected to four-year terms. Fifteen of these Council Members represent the seventeen Cherokee districts within the TJSA. Two Council Members represent those Cherokee citizens who live outside the TJSA. The Executive Branch is vested in the Office of the Principal Chief. The Principal Chief is responsible for executing the laws of the Cherokee Nation and administering the daily operations of all programs and

enterprises of the Tribe. The Deputy Chief is empowered to act in the absence of the Principal Chief. The Principal Chief and Deputy Chief are elected to four-year terms by a popular vote of registered Cherokee voters.

The Cherokee Nation is a distinct culture with its own geography, language, social organization, spiritual beliefs and practices. There are seven (7) Cherokee clans including: Bird, Paint, Wild Potato, Wolf, Blue, Deer and Long Hair. The Cherokee language is not only spoken, but also written using a unique syllabary with 84 characters developed by Sequoyah and continues to be spoken fluently across generations. On the campuses of Tsalagi Tsunadeloquasdo (Cherokee School) only our native tongue is spoken. Many Cherokees continue to engage in traditional Cherokee practices, stomp dances and prayer ceremonies. There are many places of cultural significance within our TJSA.

Cherokee culture thrived for thousands of years in what is now the southeastern United States prior to European contact. In the 1800's, gold was discovered in Georgia and a period of Indian removals began to make way for more white settlement. In 1838, thousands of Cherokee men, women and children were rounded up and marched 1,000 miles to Indian Territory which later became Oklahoma. This devastating event in our history is known as the Trail of Tears.

Thousands died in the internment camps, on the trail from exposure and disease, and after arrival from the effects of the many traumas they suffered. After relocation the Cherokee soon rebuilt a democratic form of government along with churches, schools, newspapers and businesses. After the Civil War, what remained of Cherokee tribal land was divided into individual allotments, which were given to Cherokees listed in the census compiled by the Dawes Commission in the late 1890s. Descendants of those original Dawes enrollees make up today's Cherokee Nation tribal citizenship.

In 1990, the Cherokee Nation became one of six tribes to enter into a self-governance agreement with the federal government. This historic agreement authorized the Tribe to assume responsibility for Bureau of Indian Affairs (BIA) funds that had previously been spent on its behalf by the agency, area, and central BIA office levels. The Cherokee Nation is one of the tribes referred to as the Five Civilized Tribes. According to the 2000 U.S. Census, our tribe has the most people or responses of the 562 federally recognized Native American Tribes in the United States.

The history of the Cherokee Nation impacts our current tribal jurisdiction and boundaries. The division of land into individual allotments, appointment of trustees, and the gradual selling of traditional family land created a unique issue for the Cherokee Nation. Tribal lands are spread across the fourteen counties in a checkerboard jurisdiction. Traditional stomp grounds, historically significant sites, and the ever expanding growth of tribal businesses places Cherokee lands and businesses over the entirety of the TJSA. This disparate layout of tribal lands makes working relationships with other agencies of the utmost importance.

## **DEMOGRAPHICS**

In order to plan for potential hazards, it is important to gain an understanding of the population and housing characteristics for the community.

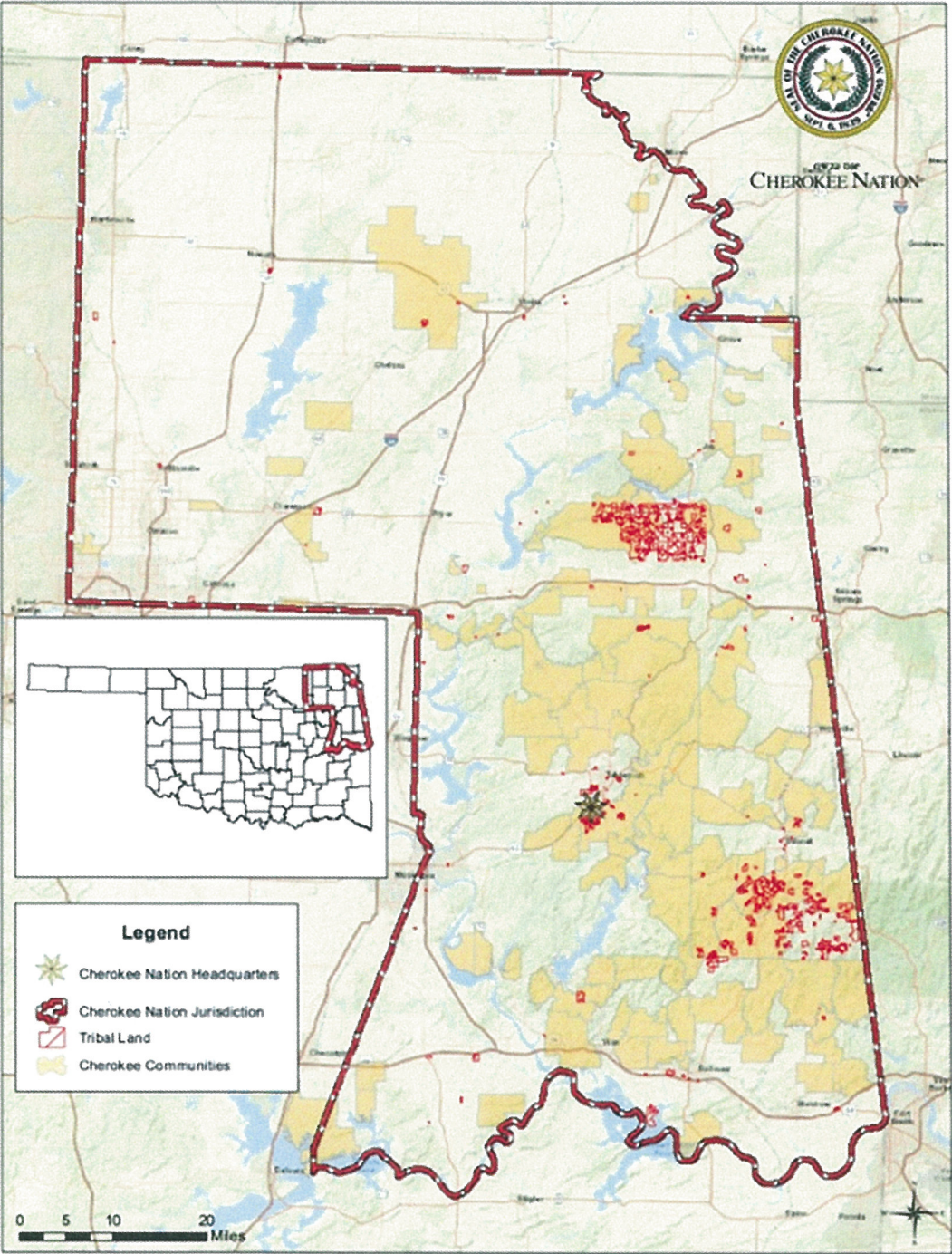
### **Population/Enrollment**

As of November, 2015 Cherokee Nation had 324, 436 total enrolled tribal members, of which roughly 130,859 live within the TJSA.

### **Land Use**

Within the TJSA lands constitute of residential, agricultural, commercial, industrial, transportation, communication, outdoor recreation, woodlands/natural areas, and water used for the betterment of tribal members and the public as a whole.

# Jurisdictional Boundaries Map



## SECTION 3: PLANNING PROCESS

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The planning process for the Cherokee Nation Hazard Mitigation Plan followed the Tribal Mitigation Guidance provided by Federal Emergency Management Agency (FEMA). The Cherokee Nation Marshal Service/Emergency Management was tasked with obtaining authorization for and coordinating the drafting of the updated Cherokee Nation Hazard Mitigation Plan. This included following the administrative processes for Resolutions. In order to compile the necessary plan data in a timely fashion, using a five-phase process, a steering committee was called upon to assist.

Development of the plan was structured along a five-phase planning process:

**Phase I**: Pre-planning and re-establish Steering Committee

**Phase II**: Review, identify and assess risks

**Phase III**: Update mitigation action plan

**Phase IV**: Review and update policies and procedures for plan

**Phase V**: Document the planning process and plan adoption

Phase I involved conversations and meetings aimed at establishing a Steering Committee and outlining the planning process and responsibilities of the Steering Committee.

Phase II was comprised of five meetings with the Steering Committee to identify and update natural hazards and assess potential risks to the Cherokee Nation. Community surveys were conducted for community input to hazards and risks.

Phase III involved updating mitigation action strategies to address identified risks.

Phase IV involved identifying current departmental plans, policies that affect hazard mitigation plan

Phase V involved documenting the planning process, developed a complete draft of the plan, and plan adoption.

### **Public Involvement**

During the Cherokee National Holiday, over 100,000 Cherokee citizens gather to celebrate the signing of the Cherokee constitution. Cherokee Nation Emergency Management conducted a survey at three locations in Tahlequah, Oklahoma over three days during the September 4-6, 2015 Cherokee National Holiday. Cherokee citizens from the 14 counties of the Cherokee Nation participated in the survey. CNEM also attended community meetings and surveyed Cherokee citizens for input throughout the 17 districts of the Cherokee Nation.

### **Communication**

Steering committee meetings were by invitation to the departments of the Cherokee Nation and external partnering agencies. Members of the Emergency management planning team, Inter-tribal Emergency Management Committee and Oklahoma Emergency Management were contacted via email and team meetings.

## Steering Committee

The first meeting for the plan process was October 2015. The committee was comprised of Cherokee Nation departments: Emergency Management, Environmental Services, Geographic Information Systems, Community Service Roads, Marshal Service, Financial Resources, and Facilities Management. Cherokee Nation Health Services involved were Mental Health, Public Health and W. W. Hastings Hospital and Cherokee Nation clinics staff. Representatives from the Cherokee Nation's various departments provided information for the plan and process.

The team met five times beginning October 20, 2015 and ending January 21, 2016 in the Tribal Services conference room located in the Tribal Complex in Tahlequah, Oklahoma. This team will continue to meet monthly on the 3<sup>rd</sup> Thursday of each month to review and evaluate the performance of this plan and assist in development of an incident support team. Updated loss information will be received annually from the tribe's Risk Management office. The identified hazards and mitigation actions will be reviewed during the post-disaster evaluation of each disaster resulting in death or property losses in excess of \$100,000.00.

Meeting Dates
October 20
November 5
November 19
December 3
January 21

October 20, 2015 the Tribal Emergency Management Planning Team (TEMPT) met to review the existing hazard mitigation plan. In this meeting reviewed the plan and it was discussed that each department needed to review and evaluate their internal work plan to see if the existing hazard mitigation plan was relevant to their needs.

The three meetings held in November and December the TEMPT met to review the Hazards of concern and the Tribal migration actions. Decisions were made to keep or eliminate mitigation efforts. Each department had input in identifying their hazards. TEMPT reached a consensus on the top hazards of concern for the Cherokee Nation and means for mitigating these threats. Tribal mitigation actions were reviewed and updated or eliminated.

January 21, 2015 the TEMPT met to discuss the process  
The Cherokee Nation Hazard Mitigation Plan was reviewed and amended with updated and more accurate information during the planning cycle. Goals were reviewed as well and were updated but were not changed because they remained valid.

Discovery meetings were held to review other critical plans such as;

- Cherokee Nation Emergency Communications Plan
- Cherokee Nation THIRA
- Cherokee Nation EOP
- Cherokee Nation COOP

These meetings insured the updated plan reflected the risks and proposed solutions to create resiliency in the Cherokee Nation.



Efforts were made to include tribal and non-tribal members of the public. Community meetings were held in District 1, Cherokee County; District 2, Cherokee County; District 4, Muskogee County; District 10, Delaware County; District 12, Nowata County; District 14, Rogers County; and District 15, Mayes County. Our target audience was the tribal public, meaning tribal employees and tribal members; and the general public, meaning all Native Americans in the community with other tribal affiliations and non-native Americans living in the communities. All residents living in the districts were invited. Citizens were invited by local radio and newspaper. Surveys were completed by several participants. Positive feedback was received regarding the need for the development of a tribal hazard mitigation plan.



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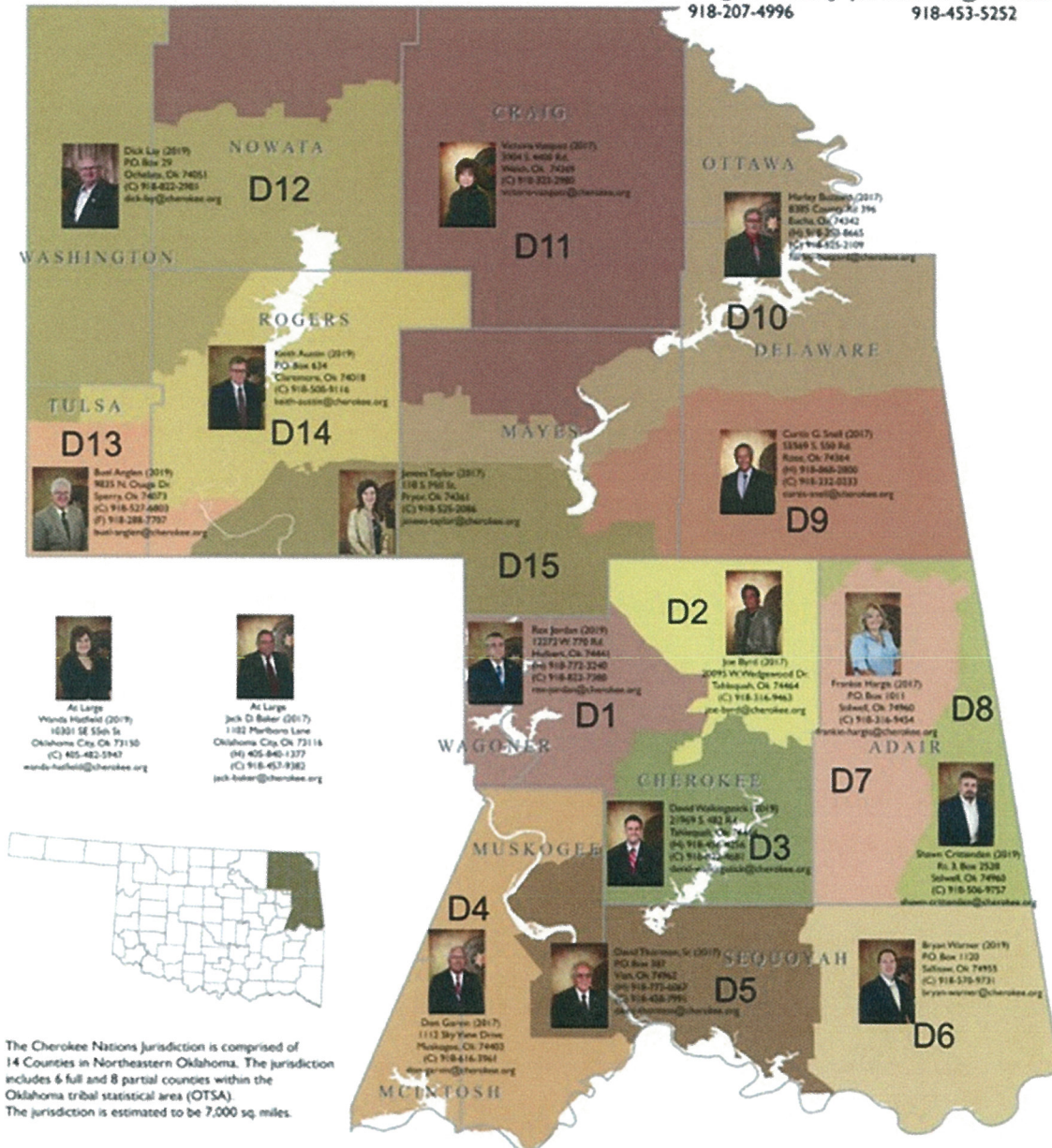


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## TRIBAL COUNCIL 2015 - 2019



The Cherokee Nations jurisdiction is comprised of 14 Counties in Northeastern Oklahoma. The jurisdiction includes 6 full and 8 partial counties within the Oklahoma tribal statistical area (OTSA). The jurisdiction is estimated to be 7,000 sq miles.

Concern was expressed regarding the lack of tornado sirens outside city limits of the county seat, lack of funding, communications, and trained personnel. Some of the county emergency managers provided copies of their respective hazard mitigation goals and action items from their approved or expired plans. There was much discussion about the possibility of partnering on Hazard Mitigation projects to best leverage local resources and capitalize on receipt of federal/state funding. The concern expressed repeatedly was the lack of severe weather advanced warning systems for rural areas. It was also noted that many of these counties do not have a current Hazard Mitigation Plan due to no emergency management turnover and lack of funding for full time staff.

Respective FEMA training was attended by Cherokee Nation Emergency Management staff on the application process, the planning process and how to write a plan.

There was only one external academia institution that participated in the planning process. OU Climatology was involved in the beginning of the process. Although information was exchanged, none of the information was incorporated into this plan. The Cherokee Nation Marshal is an instructor at the Northeastern State University and was invited to review and comment on the Plan document.

The PNP (Private Non-Profit) that participated was the ITEMC (Inter-tribal Emergency Management Coalition) member tribes and the Red Cross. These organizations offered structure, assisted with direction, and resources. ITEMC monthly meetings were attended by CN Emergency management personnel in various tribal locations throughout Northeastern Oklahoma. Continued attendance by Emergency management

Follow-up meetings will be held with both the tribal and non-tribal (county) emergency management communities during the administrative review process after receiving FEMA approval of plan but before plan is adopted. Once FEMA has approved the CHEROKEE NATION HAZARD MITIGATION PLAN, the respective Legislative Submittal packet will be submitted to the Principal Chief's office for approval and forwarding to Resources Committee. The respective sponsoring Tribal Council members will address the Resources Committee regarding the proposed adoption of the CHEROKEE NATION HAZARD MITIGATION PLAN. Once approved by the Resources Committee, the Resolution will be brought forth to full Tribal Council. A detailed summary of the Legislative Submittal Process can be found in Appendix A, Article 2. A copy of the final and signed legislation will be placed Appendix A, Article 3.

The Cherokee Nation Emergency Management Department continued meetings with the established Steering Committee to oversee updates for the Hazard Mitigation plan. Committee members consisted of volunteers from selected Cherokee Nation departments. Regional planning commissions, local community officials and organizations will continue to be consulted. The committee had representatives from across Cherokee Nation Government and tribal enterprises representing a variety of stakeholders. Areas represented include: Facilities Management, Marshal Service, Emergency Medical Services, Health Services, WW Hastings Hospital, Information Systems, Geo Data, Community Services, Administration, Financial Resources, Public Health, Natural Resources, Environmental Programs, Communications, Risk

Management, Emergency Management, and Roads. The team meets monthly on the 3<sup>rd</sup> Thursday of each month.

The Steering Committee is responsible for providing input, guiding the planning process, and reviewing and commenting on each section of the plan. Under the direction of Cherokee Nation Emergency Management the Steering Committee facilitated meetings, collected and distributed information for the meetings, and drafted the plan. Each committee member listed below provided information on their department, potential sources, in-kind match sources, reviewed hazard information and provided input on mitigation actions and goals for the plan period. The draft plan was also posted online before final adoption for the review.

### Committee Members

Emergency Management	Jeremie Fisher/Scott Craig
Public Health	Shane Dominck
GIS	David Justice
Roads	Philip Manes
Marshal Service	Suzanne Drywater
Financial Resources	Laura Garrett
Environmental Programs	Tom Elkins
Mental Health	Eddie Melton, Henrietta
Health Services	Ginger Glory
Material Assets	John Walls
Health Quality Management	Ginger Glory
Emergency Medical Services	Tracey Glory
Planning Analyst II	Candice McCollum

In addition, the below agencies participated by providing technical assistance via phone conversation or email:

- Oklahoma Emergency Management Area Coordinator
- Red Cross Tribal Liaison
- State Tribal Liaison
- Northeastern State University Emergency Management
- Cherokee County Local Emergency Planning Committee (LEPC)
- State Health Department
- ITEM C

## SECTION 4: RISK ASSESSMENT

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### Methodology and Tools

The Cherokee Nation Technical Advisory Planning Team identified natural hazards that affect the Cherokee Nation Tribal Jurisdictional Service Area (TJSA). An effort was made to identify and describe past and possible hazard occurrences to which Cherokee Nation citizens, property, and tribally owned or operated facilities, and culturally significant sites were most vulnerable.

The entire Cherokee Nation TJSA is considered one unit in our Hazard Mitigation Plan with identification of hazards, methods, strategies and needs applied uniformly throughout the TJSA.

Each natural hazard has its own characteristics such as, time of year, geographic area of probable occurrence, severity, and risk level. Although natural hazards may be individually identified and categorized, many are interrelated, and a natural hazard event may involve multiple hazards. For example, severe thunderstorms may spawn high winds, lightning, hailstorms, tornados, and flooding.

According to National Climatological Data Center (NCDC) records, between 01/01/1950 and 08/31/09 there were 7,927 severe weather events reported in the Cherokee Nation TJSA. NCDC Storm Event database can be found at <http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>. The following is a breakdown of specific events.

0	Dam Failure
130	Drought
0	Earthquake
103	Extreme Temperatures
670	Flood/Flash Flood events
6,111	Severe Storms – Hail/Lightning/High Winds
490	Tornados
32	Wildfires
381	Winter Storms (Snow/Ice)
10	Other Events Not Listed Above

Probability is defined as: High - one or more event occurring every year  
Medium - one event occurring every three years  
Low - one event occurring every five years  
Unlikely - one event occurring every ten years

### **Hazards of Concern ID**

Based upon an extensive process using input from the public, research of past Disaster, previous tribal Hazard Mitigation Plan, risk assessments compiled by Oklahoma Climatological Survey and Cherokee Nation's capability for mitigation; the threat posed by the following 7 hazards (and their components) were considered significant enough to warrant formal risk assessments in this plan.

- 1) Severe Storms/High Winds/Tornados
- 2) Winter/Ice Storm
- 3) Flood/Flash flooding/Dam failure
- 4) Extreme Temperatures
- 5) Drought
- 6) Wildfire
- 7) Earthquake

### **HAZARDS PROFILES AND VULNERABILITY ASSESSMENT:**

#### **SEVERE STORMS/HIGH WINDS/TORNADOES (high)**

##### **Description**

Colliding warm and cold air masses meeting can result in very strong storm fronts; storms can occur as a single event or multiple events can occur simultaneously. For example, a storm that is moving in with pea sized hail can quickly turn into a tornado warning. Due to the unique location of the TJSA in the middle of the continental United States tornados, severe storms and high winds are problematic within the boundaries of the Cherokee Nation.

For purposes of classification, the following NOAA National Weather Service descriptions of storm related elements are as follows:














Severe local storm – A convective storm that usually covers a relatively small geographic area, or moves in a narrow path, and is sufficiently intense to threaten life and/or property; examples include severe thunderstorms with large hail, damaging wind, or tornadoes. Although cloud-to-ground lightning is not part of the criteria for severe local storms, it is acknowledged to be highly dangerous and a leading cause of deaths, injuries, and damage from thunderstorms. A thunderstorm need not be severe to generate frequent cloud-to-ground lightning. Additionally, excessive localized convective rains are not classified as severe storms but often are the product of severe local storms. Such rainfall may result in related phenomena (flash floods) that threaten life and property.

Severe thunderstorm - A thunderstorm that produces a tornado, winds of at least 58 mph (50knots), and/or hail at least 1" in diameter. Structural wind damage may imply the occurrence of a severe thunderstorm. The TJSA has experienced severe thunderstorms every year. The severity of these storms varies however lightning, high winds, and hail are highly likely and have occurred 53 times from 2010-2015.

Derecho - A widespread and usually fast-moving windstorm associated with convection. Derechos include any family of downburst clusters produced by an extra tropical MCS, and can produce damaging straight-line winds over areas hundreds of miles long and more than 100 miles across.

High wind - Sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. While high winds are commonly associated with severe thunderstorms, hurricanes, or tornados, they may also occur as a result of differences in air pressure, such as when a cold front passes across the area. These high winds do not have to accompany a storm to be dangerous. High winds, whether accompanied by a storm or not, can cause death, injury, and crop or property damages. The TJSA can experience the entire Beaufort Scale and has experienced straight-line wind over 70mph on 3 occasions from 2010-2015.

# Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.



Tornado - A violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena. The TJSA can experience the entire F Scale when it comes to tornadoes.

**F-Scale Converted to EF-Scale**

F Scale	Wind Speed	EF-Scale	Wind Speed
F0	45-78	EF0	65-85
F1	79-117	EF1	86-109
F2	118-161	EF2	110-137
F3	162-209	EF3	138-167
F4	210-261	EF4	168-199
F5	262-317	EF5	200-234

Wind speeds in mph, 3-second gust

Although, Oklahoma is situated within the heart of tornado alley the majority of the tornadoes that have occurred within the boundaries of the TJSA within the last two years have been EF1 or lower on the Enhanced Fujita Tornado Scale. Historically, tornados that were categorized as F4 on the previous Fujita Tornado scale have hit areas of the Cherokee Nation. The earliest such event was in May of 1920 when a F4 touched down near Peggs, OK. Over one hundred people suffered injuries and seventy one were left dead due to the storm. The most recent large scale storm occurred in May of 1973 in Muskogee, OK that left five dead and twenty five injured.

Beyond tornados other threats associated with thunderstorms include lightning, hail and high winds within the last two years the TJSA has had 146 thunderstorm wind warnings, 1 lightning advisory, 4 high wind advisories, and 46 instances of hail warnings. The TJSA was also hit with

27 confirmed tornados within the same time period. Based on this information from the NOAA the biggest threats to Cherokee Nation are severe storms and straight line winds.

Thunderstorms affect relatively small geographic areas compared to other atmospheric hazards. According to the NOAA, the average lightning/thunderstorm system is approximately 15 miles in diameter, covers 75 square miles, and lasts less than 30 minutes at a single location. However, weather-monitoring reports indicate that coherent lightning/thunderstorm systems can travel intact for distances in excess of 600 miles. While storm cells may be localized the area for derechos occurrences is specific to northeastern Oklahoma and northwestern Arkansas the possibility of high winds within the boundaries of the TJSA are widespread. Ultimately, lightning and thunderstorms can occur anywhere throughout the planning area. Area coverage of individual lightning and thunderstorms is highly variable. Therefore, there is no specifically defined geographic hazard area for this hazard.

Severe storms can occur anywhere within the Cherokee Nation TJSA. When these events occur, they can cause serious damage to buildings, automobiles and most commonly, farmers' crops.

### **Location and Extent of Hazard**

The Cherokee Nation TJSA has structures that would reach a critical level if impacted by severe storms, high winds, or a tornado. These structures include our Indian hospitals and Indian clinics. Most of our citizens rely on these for their medical, dental, optometry and pharmaceutical needs and if these entities are disrupted an individual could reach a life threatening situation if they are unable to receive attention in a timely manner. These casinos are a major source of income for the Cherokee Nation. Another area of impact would be damage to the businesses, hospitality and tourism centers that are located throughout the TJSA including centers where services are provided to tribal citizens such as housing assistance and food. In an effort to better serve our citizens these structures are often widespread, therefore, the entire Cherokee Nation TJSA is vulnerable to severe storms and high winds by any source.

### **Impact**

Lightning strikes to electronic and computer equipment within the Cherokee Nation TJSA can cause damage and shut down businesses and other critical facilities, such as health clinics and

administrative buildings; it also affects emergency operations such as law enforcement and ambulance services. The risk of electrical fires, electricity loss, and equipment damage are a prominent threat. Tribal buildings and vehicles damage by hail and wind storms have caused expensive repairs and temporary loss of use. Additional funds could be required for repairs to busted windshields, body damage, roof shingles and repairs to Tribal Citizens' homes.

A tornado event can have a serious economic impact and potential for loss of life for any community within the Cherokee Nation TJSA. Wind damage is extensive in the northern areas of the TJSA straight line winds have damaged crops and residential roofing. Businesses and enterprises that are damaged or destroyed can cause a reduction of income which is used to maintain facilities and provide services to tribal members. Damage to any of the Tribe's facilities can cause a disruption of services and jobs for Tribal citizens plus the cost of repairs or replacement of damaged structures. While our hospital meets safety standards; many of our clinics do not have lightning rods, or backup generators large enough for the entire facility or adequate safe rooms for the staff that mans the clinics.

### **Past Hazard Events**

Within the last five years the TJSA has had 5,440 storms, 3,160 instances of lightning, 2,798 occurrences of hail, and 129 episodes of thunderstorm wind. The TJSA was also hit with 27 confirmed tornados within the same time period. Cherokee Nation has tribal land, facilities, critical facilities, and businesses in all counties listed with statistical data.

### **SUMMARY:**

The largest vulnerability is the potential for loss of human life. Anyone outdoors during a severe storm is exposed to several factors that put their life and limb at risk. Technology is very vulnerable to lightning strikes. Critical facilities, businesses and sub-offices are located throughout the TJSA. These buildings are dependent on computer networks for daily operations and some for temperature control. Cherokee Nation vehicles and businesses have sustained windshield and body damages due to hail storms. High wind has also caused damage to tribal vehicles by flying debris and Head Start storage buildings were blown over, scattering and

destroying contents. Doors, roofs, and shutters on tribal buildings, tribal housing, and residential homes have been repaired or replaced due to damage caused by high winds.

Cherokee Nation's disaster program provides limited home repair for roofs, well houses and windows of Tribal Citizens' homes damaged by severe storms. TJSA can experience the entire F-Scale of damaging tornadoes and likewise the entire Beaufort Scale of damaging wind speeds. These are the realities faced living in Oklahoma.

### **WINTER/ICE STORM (high)**

#### **Description**

A winter storm can range from moderate snow over a few hours to blizzard conditions with high winds, freezing rain or sleet, heavy snowfall with blinding wind-driven snow and extremely cold temperatures that lasts several days. A winter storm is one that drops 4 or more inches of snow during a 12-hour period, or 6 or more inches during a 24-hour span. An ice storm occurs when damaging accumulations of ice form from falling rain that freezes on impact. Significant ice storms are those with ice accumulations of ¼ inch or greater. A winter storm can range from a moderate snow fall over a few hours to blizzard conditions with possibly blinding, wind-driven snow lasting several days. Many winter depressions give rise to exceptionally heavy rain and widespread flooding. Conditions worsen if the precipitation falls in the form of snow, because it occupies seven to ten times more space than the same quantity of rain. The aftermath of a winter storm can impact a community or region for weeks, and even months.

Ice storm- An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater.

#### **Location and Extent of Hazard**

A winter storm can happen and pose a threat anywhere within the Cherokee Nation TJSA. The Cherokee Nation TJSA consists of large rural areas with many tribal members living miles from

the nearest town. Any tribal clinic, hospital, critical facility, business and citizens located throughout the TJSA can be affected by the effects of a winter storm. Cherokee Nation government and business are affected by snow when accumulation is over 6 inches. Maintenance and ground crews begin clearing roads, sidewalks and parking lots for the safety of citizens and employees. Significant accumulations of ice pull down trees and utility lines resulting in loss of power, communications and emergency access. Roadways and sidewalks become slick and become dangerous with .10 inch of ice. All winter storms make driving and walking extremely hazardous. The aftermath of a winter storm can impact a community or region for days, weeks, and even months. Storm effects such as extreme cold, flooding, and snow accumulation can cause hazardous conditions and hidden problems for people in the affected area. People can become stranded on the road or trapped at home, without utilities or a means to get heat, food, and water. Residents, travelers and livestock may become isolated or stranded without adequate food, and water. Winter storms are considered deceptive killers as they can indirectly cause transportation accidents, injury, and death resulting from exhaustion/overexertion, hypothermia, frostbite, and asphyxiation. House fires occur more frequently in the winter due to lack of proper safety precautions.

### **Impact**

The Cherokee Nation TJSA has businesses and enterprises that generate income for Cherokee Nation programs and services. The economic impact from a casino shutting down for one hour due to an event is significant and can also cause a loss in program services to tribal citizens. Additionally, this size of loss can result in a decrease or elimination in sponsorship, donations, and community projects to non-tribal entities, schools and agencies.

### **Past Hazard Events**

Between 2010 and 2015, the TJSA had 138 winter storm occurrences, and 13 ice storms. These storms did not result in death, but previous ice storms that impacted the TJSA caused residents to be trapped in their home without food, water, electricity and medications. Two major winter storms within the TJSA in 2002 and 2007 respectively downed power lines and left large portions of the TJSA without electricity for several days and for weeks in some areas. Many rural water systems and water treatment plants were inoperative due to the power outages.

Debris made roads impassable impeding emergency services. The Cherokee Nation TJSA experiences winter weather several times a year. The Cherokee Nation has tribal land, facilities, and citizens in all counties listed with statistical data so the probability is high for winter weather.

#### **SUMMARY:**

Cherokee Nation TJSA has critical facilities, health clinics, hospitals, governmental offices, hospitality and gaming centers, and businesses that are vulnerable to a winter weather event. Tribal communities which are also located throughout the whole TJSA are vulnerable to winter weather events. Roadways could be blocked with downed trees and power lines, thereby trapping elderly and handicapped in their homes without food, heat, medication, or a means to get dialysis or medical treatment. Cherokee Nation governmental offices, clinics and a high income generating business were shut down due to no electricity caused by winter weather. Tribal insurance claims indicate roofs and awning were damaged by falling tree limbs, fencing was destroyed and loss of income was some of the effects of these events.

#### **FLOOD/FLASH FLOODING/DAM FAILURE (high)**

##### **Description**

A flood is described as a general and temporary condition of partial or complete inundation of normally dry land area from an overflow of inland or tidal waters, or unusual and rapid accumulation or runoff of surface waters from any source, or mudflow, or collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels. Floods often happen when bodies of water overflow or tides rise due to heavy rainfall or thawing snow. You don't have to live near water to be at risk for flooding. A flash flood, which can strike anywhere without warning, occurs when a large volume of rain falls within a short time.

There are three major types of floods experienced by the Cherokee Nation and are typical if the ground is not already saturated:

Flood - Any high flow, overflow, or inundation by water which causes or threatens damage.

Flash flood - A rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level; begins within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). However, the actual time threshold may vary in different parts of the country. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood.

Flood Stage - An established gage height for a given location above which a rise in water surface level begins to create a hazard to lives, property, or commerce. The issuance of flood (or in some cases flash flood) warnings is linked to flood stage. Not necessarily the same as bank full stage.

Flood crest - Maximum height of a flood wave as it passes a certain location.

Urban flooding - Flooding of streets, underpasses, low lying areas, or storm drains. This type of flooding is mainly an inconvenience and is generally not life threatening.

Dam - In hydrologic terms, any artificial barrier which impounds or diverts water. The dam is generally hydrologically significant if it is: 1. 25 feet or more in height from the natural bed of the stream and has storage of at least 15 acre-feet. 2. Or has an impounding capacity of 50 acre-feet or more and is at least six feet above the natural bed of the stream.

Dam Failure- In hydrologic terms, catastrophic event characterized by the sudden, rapid, and uncontrolled release of impounded water.

### **Location and Extent of Hazard**

Cherokee Nation has many areas that are susceptible to flooding. Flooding occurs in low lying areas adjacent to the Illinois River, Lake Hudson, Arkansas River, North Canadian River, Deep Fork River, Verdigris River, Arkansas Navigational System, Baron Fork Creek, Pole Cat Creek, etc. All counties within the Cherokee Nation TJSAs experience flooding. Flooding occurs along

the rural hilly roads, making them impassable for residents and emergency vehicles. During times of heavy rain many towns and cities are very susceptible to street and intersection flooding. There are also creeks within city limits that overflow their banks causing residents to be evacuated. There are varying extents for flooding due to the Cherokee Nation TJSA range from 2 hours of constant rainfall to accumulations of 5 or more inches in low lying areas. When this happens the events can be considered severe.

Throughout Cherokee Nation there are 292 total dams within the TJSA, with 124 being privately owned. Of the 292 dams there are 152 dams with a capacity of 72 ac-ft or greater. The Cherokee Nation has tribal members, communities, schools, and critical facilities located downstream from many of these dams. Tribal population has grown, residential and commercial development has occurred both upstream and downstream from dams.

### **Past Hazard Events**

According to the NCDC there were 45 events of flooding and 173 episodes of flash flooding within the TJSA within the last five years. Recently the Illinois River crested at a new high of 30.27' surpassing the previous recorded flood height of 28'. Tribal homes were flooded and many families were evacuated. Due to the varying rainfall that the TJSA receives a flood could happen at any time within the Cherokee Nation. Also, power outages related to floods may disrupt water treatment and supply plants thereby increasing the risk of water-borne diseases, but may also affect proper functioning of health facilities. The Cherokee Nation TJSA has many flood occurrences in its history. The Town Branch Creek in Tahlequah and Lake Hudson at Salina and Locust Grove have experienced flooding which caused evacuation of citizens living in low lying areas. There are cities, towns, communities, critical tribal government buildings, tribal businesses, and tribal citizens located in the inundation zone of many older dams within Cherokee Nation. In the event of dam failure, tribal properties, cultural sites and tribal members would sustain severe damage or be destroyed and loss of life could occur. While there are high hazard dams within the Cherokee Nation TJSA there is no history of dam failure thereby making dam failure rate low as a risk to the tribe. If a dam or levee did suffer damage or failure the impact would be devastating to communities, cultural sites, critical infrastructure, and citizens in the immediate area.



**SUMMARY:**

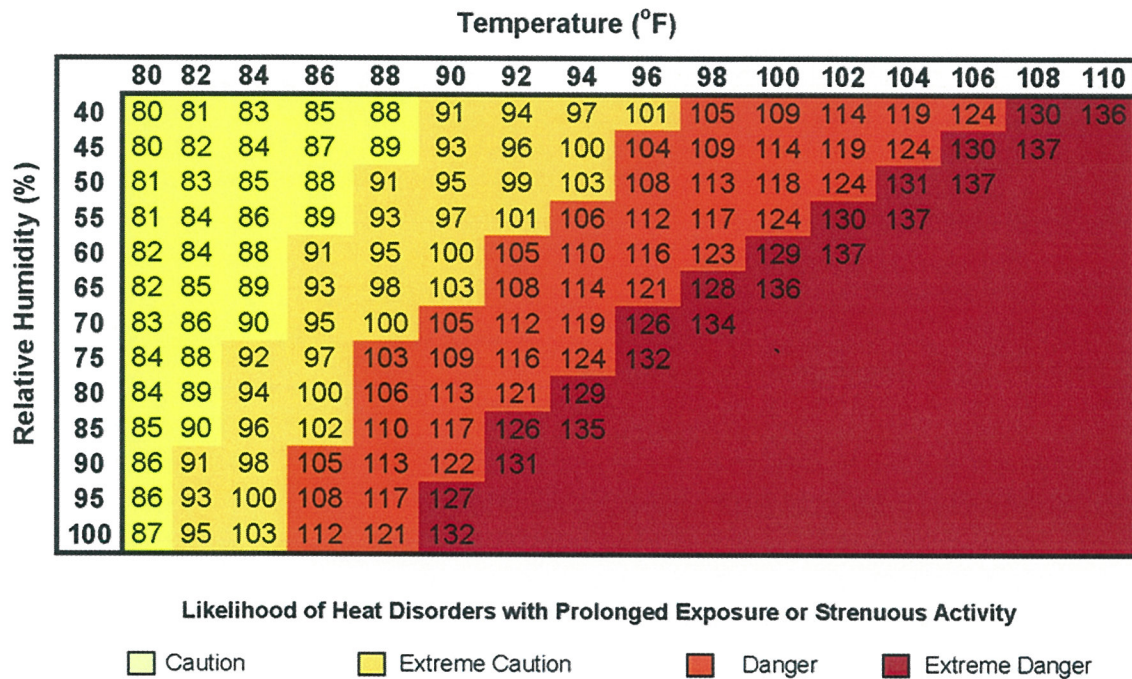
The Cherokee Nation has buildings and property in low lying areas and flood inundation zones throughout the TJSA. Tribal casinos, health clinics, head starts and government buildings are vulnerable to flooding. Tribal citizens require assistance due to repetitive flooding of their homes. Cherokee Nation TJSA has 152 dams with capacity of 72 ac-ft or greater. According to the Oklahoma Conservation Commission several of the older flood control dams were built as Work Project Administration improvements. They were designed to have a 50-year life span which has come and gone. Tribal agencies/facilities located in high hazard flood zones include medical clinics, dental clinics, optometry clinics, food distribution warehouses, head start centers, culturally significant sites, and tribal tag agencies are vulnerable to flooding and dam failure.

## EXTREME TEMPERATURES (high)

### Description

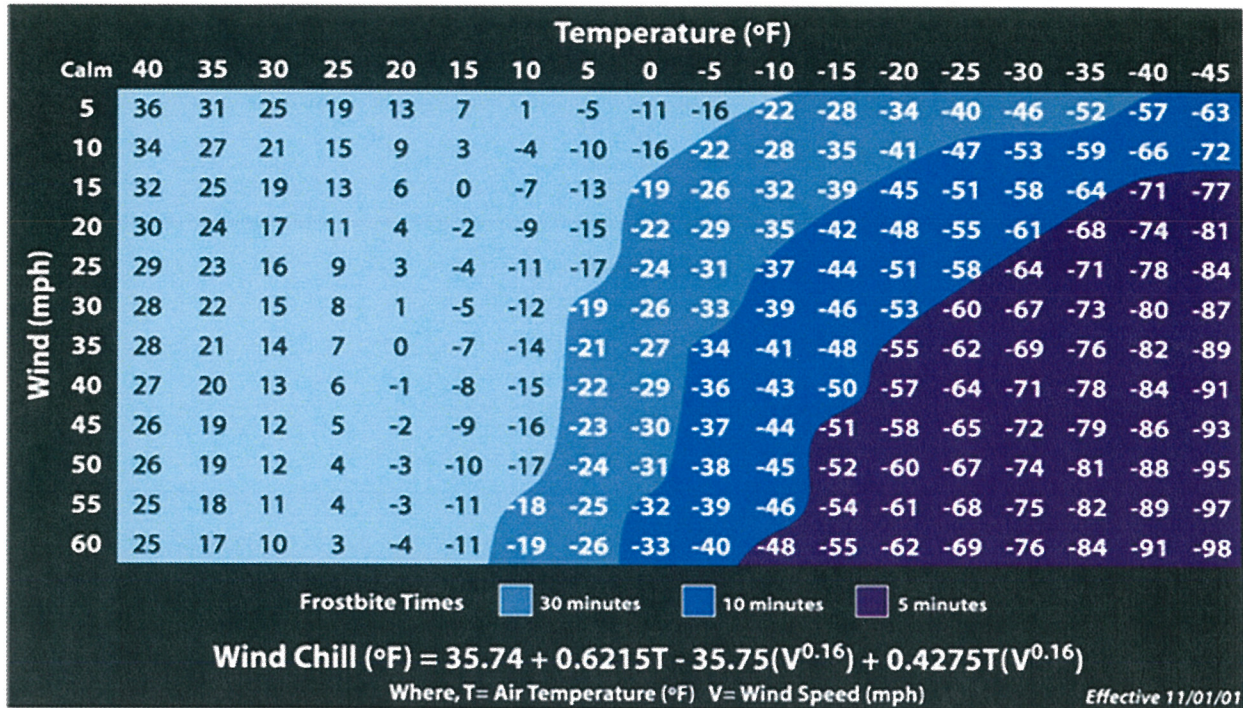
An extreme temperature condition is defined as a situation wherein the citizens and property of the Cherokee Nation TJSA are threatened by the effects of an extreme temperature condition resulting from extreme heat or extreme cold weather. Extreme temperatures are calculated based on temperature, humidity and wind. Due to climate change the incidents of extreme weather are increasing within the TJSA.

Extreme Heat - 10 degrees above average temperature combined with high humidity + consecutive days in a row



TJSA can experience the entire scale of extreme heat with temperatures of 105 degrees and humidity hovering around 60%.

Extreme Cold - 10 degrees below average temperature + consecutive days in a row or record setting temperature several degrees below zero for just one day



TJSA can experience this entire scale of extreme cold risk.

### Location and Extent of Hazard

The entire Cherokee Nation TJSA experiences extreme temperatures. There are communities, critical facilities, health clinics, government offices, businesses, elderly/disabled housing sites and early childhood centers located throughout the Cherokee Nation TJSA. The annual average temperature in the Cherokee Nation TJSA is 60 degrees. Record high temperatures of over 105 degrees have been recorded in all counties of the Cherokee Nation TJSA. Three counties in the northern portion of the TJSA have experienced record temperatures of -25 degrees. Extremely cold temperatures have caused major damages to Cherokee Nation buildings. Temperatures that cause adverse reaction to human, animals and mechanical devices can be defined as extreme. TJSA has experienced temperatures of extreme heat 105 and extreme cold -25 we can be expecting these temperatures to be exceeded and records shattered.

## **Impact**

Extreme temperatures can have a serious economic impact on any community within the Cherokee Nation TJSA. In times of extreme heat the increased demand for water and electricity may result in shortages of resources. Freezing cold weather can cause pipes to burst in tribal buildings and residential housing resulting in thousands of dollars' worth of damage. Changes in temperature also impact both our tribal elders and the very young. Elders on a fixed income identified the temperature change as one of the hazards that impact them the most; some going as far as not using heat or cooling units due to lack of money.

## **Past Hazard Events**

According to the National Centers for Environmental Information (NCEI) there were variances from the average temperate for each month over the past five years. There were 15 occasions the temperature has been labeled as excessive and caused heat casualties and one death 2010-2015. The data shows a warning effect of plus four degrees in several counties of the TJSA while other counties have experienced a temperature reduction of two degrees. Cherokee Nation's critical facilities and other buildings have been damaged 3 times when pipes burst due to excessively cold temperatures. There have been 11 occurrences where excessive cold temperatures provoked the need to open warming stations to prevent frostbite injuries. The Cherokee Nation TJSA has a high probability of future extreme weather events. The Cherokee Nation has tribal land, facilities, government offices, critical infrastructure and citizens in all counties listed with statistical data.

## **SUMMARY:**

Cherokee Nation has businesses, property and citizens that can be adversely affected by extreme weather. The cost of heating or cooling building during times of extreme temperature can be costly to businesses and tribal citizens. These times can also overwork the heating and cooling systems thereby costing the Tribe expensive repairs to HVAC units. Tribal citizens are venerable to extreme temperatures. Providing protection and treatment to citizens with extreme exposure can be costly. The Tribe provides air conditioners, fans, wood for wood burning stoves and various heating equipment to affected low income citizens. The hospitals, clinics and ambulance services can be overloaded with victims of extreme temperatures. TJSA has

experienced temperatures of extreme heat 105 and extreme cold -25 we can be expecting these temperatures to be exceeded and records shattered.

## **DROUGHT (high)**

### **Description**

A drought is a period of time when there is not enough precipitation to support agricultural, urban, human, or environmental water needs. A drought usually refers to an extended period of below-normal rainfall, but can also be caused by drying bores or lakes, or anything that reduces the amount of liquid water available. Drought is usually difficult to recognize at the onset.

Drought analysis is more subjective than that for floods, because droughts do not occur suddenly.

A drought evolves over time and is spread over a large geographical area. Drought severity depends on its duration, intensity, geographic extent, and the regional water supply demands of human activities and vegetation. This multi-dimensional nature event makes it difficult to define a drought and to perform comprehensive risk assessments. Some secondary hazards associated with drought are locusts and grasshoppers which can cause severe crop damage.

### **Palmers Drought Severity Index**

	< -4.0	Extreme Drought
	-3.99 to -3.0	Severe Drought
	-2.99 to -2.0	Moderate Drought
	-1.99 to -1.0	Mild Drought
	-0.99 to -0.5	Incipient Drought
	-0.49 to 0.49	Near Normal
	0.5 to 0.99	Incipient Moist Spell
	1.0 to 1.99	Moist Spell
	2.0 to 2.99	Unusual Moist Spell
	3.0 to 3.99	Very Moist Spell
	> 4.0	Extreme Moist Spell

### **Drought based on Reservoir Levels**

-10'	Extreme Drought
-8'	Severe Drought
-6'	Moderate Drought
-4'	Mild Drought
-2'	Incipient Drought
(+/-) 0'	Near Normal

The TJSA has experienced these scales of extreme drought in the last 5 years and can expect to again in the future.

### **Location and Extent of Hazard**

Cherokee Nation TJSA has experienced an average of two drought events per year. All areas of the Cherokee Nation TJSA have seasonal crops such as peaches, strawberries, blueberries, blackberries, vegetables, etc. Cherokee Nation owns over 24,000 acres of agricultural lands which are used for grazing, hay and crops. Plants used for cultural purposes are also affected by drought, as is our forest lands. A drought can happen anywhere within the Cherokee Nation TJSA and can have serious health, social, economic and political impacts with far-reaching consequences. Water is the most essential commodities for human survival, second only to breathable air. When there is a drought, conditions can become difficult or dangerous very quickly. The consequences of drought may include water rationing, hunger/famine, thirst, disease, wildfires, social conflict/war, migration/relocation, loss of recreational and cultural activities/areas and loss of income. Drought also has a significant effect on our cultural grounds and traditional activities. The loss of natural foliage and herbs used for traditional and medicinal practices can impact tribal citizens that depend on its many uses.

Agriculture within the Cherokee Nation TJSA feels the impact of drought, especially in non-irrigated areas such as dry-land farms and rangelands. Drought can affect crops which could result in loss of income and loss of food. Each district has seasonal crop festivals which some tribal citizens depend on for income. Some of the seasonal crops include strawberries, peaches, huckleberries, blueberries, blackberries, grapes and a wide range of vegetables. The most commonly used indicator of drought is the Palmer Drought Severity Index. The Palmer Index is a soil moisture algorithm calibrated for relatively homogeneous regions. Based on precipitation and temperature, the Palmer Index can be applied to any area where sufficient data is available. Cherokee Nation can expect to experience the entire scale.

### **Impact**

The lack of fresh water is damaging to livestock, crops and the public. During the summer months, temperatures in the Cherokee Nation TJSA can easily reach over 100 degrees Fahrenheit. Often these high temperatures will persist for weeks. Drought conditions increase fire hazards and reduces water supply. Low water levels do result in loss of income generated

from lake and river users such as floating, fishing, camping, canoe building, rafting, etc. Heat and drought also effect local workforce capabilities. Workers exposed to these elements must be monitored for heat exhaustion and heat stroke.

Other problem associated with drought and heat is stale water. Areas of stale water are known to produce deadly bacteria and mosquito infestation which is a major contributor to West Nile Virus. Many tribal citizens living in rural areas rely on their gardens and wild plants for food and other cultural uses. These losses can negatively impact tribal citizen's health and economic resources.

### **Past Hazard Events**

According to NCDC there were 246 reports of drought within the Cherokee Nation TJSA over the past five years. The Cherokee Nation TJSA has experienced drought events every year. With these events, there were injuries, millions of dollars in property and crop damages recorded. The Cherokee Nation has tribal land, tribal structures and tribal citizens in all counties listed with statistical data. Drought conditions have improved over the past two years with 2012 and 2013 hitting Northeast Oklahoma the hardest, but still exist in many areas of the TJSA; the period of drought affected agriculture, natural resources, cultural activities and fruit harvests. Historical data and the climatic location indicate a high probability of experiencing some level of drought conditions annually anywhere within the Cherokee Nation TJSA.

### **SUMMARY:**

Cherokee Nation's two golf courses are heavy water users and are also negatively impacted. Water related activities of residential users and tourist might be restricted. Droughts also cause power shortages as much of the Tribe's power comes from hydroelectric plants. The lack of water results in less power/electric being supplied and an increase in price. Cherokee Nation's clinics, enterprises and government buildings are heavy electricity users and can be affected, usually by having to purchase more expensive replacement power.

During droughts, crops do not mature, wildlife and livestock are undernourished, land values decrease and unemployment increases. Tribal citizens affected will turn to the Cherokee Nation for assistance during times of drought. However, Cherokee Nation and Federal assistance covers

only a small portion of the economic losses. The average yearly loss to drought in the US is \$6 - \$8 million and the total losses attributed to the 1987-89 droughts were between \$39 and \$40 billion.

The risk of serious environmental damage, particularly through vegetation loss and soil erosion, has long term implications for the sustainability of agricultural industries. Water quality suffers, and toxic algae outbreaks may occur; plants and animals are also threatened. Bushfires and dust storms often increase during dry times. Traditional and medicinal plant may become extinct.

Drought episodes can last from a few months to several years. Those that last a few months can elevate wildfire danger and impact municipal water use. Seasonal droughts can occur at any time of the year, and those that occur with crop production cycles can cause billions of dollars of damage to the farm and agricultural economy. Multi-season and multi-year episodes can severely impact large reservoirs, stream flow and groundwater.

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## **WILD FIRES (high)**

### **Description**

A wildfire is known as an uncontrolled fire often occurring in wild land areas, but which can also consume houses or agricultural resources. Weather conditions can directly contribute to the occurrence of wildfires such as through lightning strikes, or indirectly such as by an extended dry spell or drought that contributes to the availability of fuel.

### **Location and Extent of Hazard**

Tribal hospitality, tourism and gaming facilities, clinics, critical facilities, businesses, head start, tribal housing and sub-offices located in rural areas are susceptible to a wildfire event. The Cherokee Nation has tribal land in all counties listed with statistical data and can experience all ranges of the Keetch-Byram Drought Index. Wildfire is a serious and growing hazard over much of the Cherokee Nation, posing a great threat to life and property, particularly when it moves from forest or rangeland into developed areas. Wildfires can happen anywhere within the Cherokee Nation TJSA. The Cherokee Nation is concerned with both wild land urban interface areas as well as rural areas. The Cherokee Nation TJSA has critical facilities within both areas of concern. Future mapping project will create a more accurate hazard analysis.

### **Impact**

The impact of a wildfire could have serious economic effect to the Cherokee Nation and its tribal members. Cherokee Nation is located in the area known as Green Country. Tribal businesses and tribal members depend on the tourist visits to the many area lakes, rivers and streams. Loss of income and loss of land use could take years for recovery.

### **Past Hazard Events**

According to the NCDRC, over the past five, there were twelve reports of wildfire events within the Cherokee Nation TJSA. Wildfire has destroyed homes, buildings, farm lands and forests causing \$10,590,000 in damages over the past twenty five years. The Cherokee Nation TJSA experiences unfavorable conditions on a yearly basis, making the probability of a wildfire event high.

### **SUMMARY:**

Cherokee Nation has hundreds of thousands of acres of land throughout the TJSA. In addition to critical facilities, businesses, gaming, clinics and tribal housing, the lands are used for grazing, crops, forestry, hay fields and tourism. All areas within the TJSA are vulnerable to wildfire.

## **EARTHQUAKE (medium)**

### **Description**

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth, huge plates that form the Earth's surface move slowly over, under and past each other. Sometimes the movement is gradual, but other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet, however, some earthquakes occur in the middle of plates. Earthquakes strike suddenly and without warning.

<b>Magnitude</b>	<b>Mercalli</b>	<b>Description</b>	<b>Earthquake Effects</b>
<b>2</b>	<b>I</b>	<b>Instrumental</b>	<b>Not felt except by a very few under especially favorable conditions.</b>
	<b>II</b>	<b>Feeble</b>	<b>Felt only by a few persons at rest, especially on upper floors of buildings.</b>
<b>3</b>	<b>III</b>	<b>Slight</b>	<b>Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.</b>
	<b>IV</b>	<b>Moderate</b>	<b>Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.</b>
<b>4</b>	<b>V</b>	<b>Rather Strong</b>	<b>Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.</b>
<b>5</b>	<b>VI</b>	<b>Strong</b>	<b>Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.</b>

	VII	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6	VIII	Destructive	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
7	IX	Ruinous	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
	X	Disastrous	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
8	XI	Very Disastrous	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
	XII	Catastrophic	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

The TJSA can expect to experience 6 in magnitude over the next 5 years because the ever increasing occurrences in the state of Oklahoma.

### **Location and Extent of Hazard**

The Northern and Northwestern portion of Cherokee Nation TJSA is located on a branch of the New Madrid fault line. Critical facilities such as health clinics, government offices, large gaming facilities, hotels, tourism venues, and tribal citizens are located in the Northern portion of TJSA. Cherokee Nation TJSA has experienced up to IV on the Modified Mercalli Intensity Scale on 7 occasions. Although there were no collapse losses reported, the structural integrity of at least one multi-million dollar government facility was affected.

### **Impact**

The impact of an earthquake event within the Cherokee Nation TJSA depends on the extent of the event. During earthquake events, buildings collapse leaving people without shelter, roads become impassable, pipelines break releasing oils and gasses, bridges fail impeding traffic, etc. Affected tribal businesses and citizens could have loss of income and structure failures.

### **Past Hazard Events**

There has been an increase in earthquake activity in central Oklahoma with over 100 events occurring within the past five years, seven of which were felt within the Cherokee Nation TJSA. Some buildings with hazardous materials required evacuation and the structural integrity of at least one critical facility was affected. Although an earthquake can happen anywhere within the Cherokee Nation TJSA, the probability of a future event is low. According to NCDC earthquake related tremors have been felt at least 7 times within our TJSA.

### **SUMMARY:**

Cherokee Nation structures were not built to comply with earthquake-resistant building codes. A large-magnitude earthquake near one of the towns or cities could cause structural failure, financial losses and possibly loss of life. The building codes used to construct commercial structures and residential housing do not include any earthquake resistant codes. Due to the low level threat of this event, these codes are not yet enacted in this part of the country. Of special concern are the design and construction of the Tribe's critical facilities such as hospitals, health clinics, casinos, tribal facilities, oil and gas pipelines, communication facilities/towers, electrical lines/plants, water supply and sewage treatment facilities. The TJSA can expect to experience 6 in magnitude over the next 5 years because the ever increasing occurrences in the state of Oklahoma.

## SECTION 5: MITIGATION STRATEGIES

---

At the beginning of this process, Cherokee Nation Emergency Management (CNEM) met with the respective County Emergency Managers and requested a copy of each County's Hazard Mitigation Plan. The information obtained from review of the current and expired county plans and/or conversations with respective officials for the area in which a plan was absent emphasized the importance of providing the tribe with a plan to reduce or eliminate loss of life and property damage from natural hazards.

This plan successfully identifies the natural hazards that exist within our jurisdictional borders. Input was sought for tribal members as well as non-tribal members to identify the main concerns of the citizens residing within our jurisdictional boundaries. We have successfully provided actions based on risk assessment findings to mitigate the identified hazards' impact upon communities within our TJSA.

The most important roles that this plan has achieved, once adopted by resolution, are; becoming regulatory requirements in further planning efforts and contributing to the preservation of Cherokee cultural heritage by protecting tribal citizens, communities, and sacred culturally significant sites. The goal of this plan is to provide for the long-term protection of employees, tribal citizens, clients, the public, assets of our tribe, and to minimize injury, loss of life, and damage resulting from any type of natural hazard.

### **Previous completed projects:**

- Tree Trimming (funded by General Fund) implemented as planned
- NOAA Weather radios (funded by THSG) implemented as planned
- Public education (funded by THSG and Gen fund) implemented as planned

All projects were reviewed and considered if still needed then those deemed necessary were included in the current tribal Hazard Mitigation Plan.

## **IDENTIFICATION AND ANALYSIS OF TRIBAL MITIGATION ACTIONS**

Several hazard mitigation actions were identified and analyzed that would benefit the Cherokee Nation Tribal Jurisdictional Service Area (TJSA). Input from Cherokee Nation's Hazard Mitigation Technical Advisory Planning Committee and community meetings with the tribal public and non-tribal public; as well as interaction with other tribal emergency managers and county emergency managers was integrated in this document. Final decision was based on social impact, technical feasibility, administrative capabilities, political, legal effects, economic, and environmental issues (S.T.A.P.L.E.E. Method).

Many Cherokee Nation tribal government departments and entities will work together to achieve these action items. Some departments will author and conduct while others will concentrate on distribution of information. Some of the programs included: Community Services, Natural Resources, Environmental Programs, Tribal Services, Human Services, Information Systems, Communications, Marshal Services, Attorney General, Risk Management, Emergency Medical Services, Environmental Health, Education Services, Cherokee Nation Entertainment (CNE), Cherokee First, et.al.

Mitigation Action: ***INCREASE PUBLIC AWARENESS AND EDUCATION CAMPAIGNS  
IN CHEROKEE NATION COMMUNITIES***

Identified Hazards: Dam Failure, Drought, Earthquake, and Extreme Temperatures, Flooding/Flash Flooding, Hail/Lightning/High Winds, Tornadoes, Wildfire, and Winter Storms - Snow/Ice

Action/Comments: Create and implement public awareness campaigns for each hazard identified, methods for preventing damages resulting from hazardous conditions, and developing Community Preparedness Plans. Encourage tribal citizens to get involved in educating their community; establish trained community strike teams; create and distribute informative brochures/flyers, design and update web pages, develop and administer school training activities and functions; host and/or conduct workshops; assist community members in creating family disaster plans; create trainings and distribute emergency supply kits; develop partnerships with different types of media; i.e. newspaper, website, community, meetings, and radio to assist in

spreading the message of how to mitigate hazards and the actions individuals and communities can take.

Implementation Team: Community Services, Natural Resources, Environmental Programs, Tribal Services, Human Services, Information Systems, Communications, Cherokee First, Emergency Management, CNE, Education Services

Time Frame: 18 months from funding date

Administer: Cherokee Nation Emergency Management

Mitigation Action: ***ADVANCE WARNING DEVICES***

Identified Hazards: Dam Failure, Tornados, and Winter Storms - Snow/Ice

Actions/Comments: Obtain and install outdoor audible or visual warning devices throughout our TJSA. Provide advance notification to the occupants of critical facilities, permanent structures and outdoor events which are located within TJSA. Install weather observation cameras around critical facilities with monitors and viewing screens in EM office, Marshal Office, and community type Safe Rooms located at tribal facilities. This will allow observance of weather from safe shelter as well as provide shelter.

Implementation Team: Human Services, Tribal Services, GeoData, Community Services, Planning & Development, Tribal Facilities

Time Frame: 18 months from date of funding

Administer: Cherokee Nation Emergency Management

Mitigation Action: ***INDOOR WARNING ABILITY***

Identified Hazards: Dam Failure, Extreme Temperature, Flooding/Flash Flooding, Tornados, Wildfire, and Winter Storms - Snow/Ice

Actions/Comments: Emergency Early Warning tool, such as Blackboard or another mass communications tool, which will warn tribal employees and citizens of danger in their immediate area.

Implementation Team: Human Services, Tribal Services, Community Services, Tribal Facilities, GEO Data, Marshal Service

Time Frame: 12 months from date of funding

Administer: Cherokee Nation Emergency Management

Mitigation Action: **BACK-UP DEVICE FOR ELECTRICAL EQUIPMENT AND/OR DATA**

Identified Hazards: Dam Failure, Earthquake, and Extreme Temperature, Flooding/Flash Flooding, Hail/Lightning/High Winds, Tornados, Wildfire, and Winter Storms - Snow/Ice

Actions/Comments: Obtain and install back-up generators in all critical facilities for use during power outages caused by natural hazards. The generators would ensure the integrity of all critical tribal information i.e., tribal citizenship, medical records, natural resources, financial resources, business records; and ensure the continuation of critical functions and activities.

Implementation Team: Information Systems, Cherokee Nation Historical Society, Tribal Facilities, Health Facilities, CNE, GeoData

Time Frame: 24 months from date of funding

Administer: Cherokee Nation Emergency Management

Mitigation Action: **DIGITAL MAPPING**

Identified Hazards: Winter Storms - Snow/Ice Tornado, Flooding, Extreme Heat, Hail/Lightning/High Winds, Wildfire, Drought, Dam Failure, and Earthquake

Actions/Comments: Develop a tool or acquire software for digital mapping. Digitize current land maps; identify and generate flood maps.

Implementation Team: GeoData, Roads, Environmental Programs

Time Frame: 24 months from funding date

Administer: Cherokee Nation Emergency Management

Mitigation Action: **MONITORING SYSTEM/DATA BASE/MAPS**

Identified Hazards: Winter Storms - Snow/Ice, Extreme Temperatures, Flooding/Flash Flooding, Tornado, and Wildfire

Actions/Comments: Monitor elderly, chronically ill and special needs of the tribal population for life safety issues regarding approaching hazards.

Implementation Team: Information Systems, Human Services, Health Services, Comprehensive Care, Home Health, PACE, GeoData

Time Frame: 6-12 months from funding date

Administer: Cherokee Nation Emergency Management



Mitigation Action: **COMMUNITY STORM SHELTERS AND SAFE ROOMS**

Identified Hazards: Tornado

Actions/Comments: Install storm shelters on tribal housing additions, critical facilities, and educational institutes; educate the potential occupants on the use and location of the shelters to help reduce the loss of life during severe weather. Provide GPS coordinates to local law enforcement officials.

Implementation Team: Quality Assurance, Marshal Service, Risk Management, Community Services, GeoData, Communications, Cultural Resources, Planning & Development

Time Frame: 36 months from funding date

Administer: Cherokee Nation Emergency Management

Mitigation Action: **FLOOD REDUCTION OF WATERWAYS, CREEKS AND STREAMS**

Identified Hazard(s): Flooding

Actions/Comments: Implementation of a major clean up of area creeks, streams and waterways. Implementation of a digital mapping project. Subsequent long-term monitoring of all waterways to ensure that problematic build up of debris and brush does not reoccur.

Implementation Team: Natural Resources, Environmental Programs, Quality Assurance, GeoData, Career Services

Time Frame: Undetermined

Administer: Cherokee Nation Emergency Management

Mitigation Action: **PROPERTY ACQUISITION**

Identified Hazard(s): Flooding, Flash Flooding

Actions/Comments: TJSA have experienced flooding incidents in which homes were flooded more than once in five years. The TJSA currently has homes and tribal housing subject to repetitive loss flooding incidents, most of which have been severe. Develop and implement a “buy out” ordinance for the areas that have been affected by flooding disasters.

Implementation Team: Justice, Attorney General, Environmental, GeoData, Risk Management, Realty, Emergency Management, Community Services, Communications, Marshal Service, Planning & Development

Time Frame: Undetermined

Administer: Cherokee Nation Emergency Management

Mitigation Action: ***ELEVATE/RELOCATE***

Identified Hazard(s): Flooding and Flash Flooding

Actions/Comments: Assist tribal citizens with elevating existing home structures that are in risk of receiving damage or being destroyed from a flooding event or complete removal from flood zone area. Cost of elevation may outweigh expected losses to the home. Elevated structures can be more vulnerable to earthquakes unless additional bracing is used.

Implementation Team: Housing Rehab, Community Services, Communications, Realty, Justice, GeoData, Environmental Programs, Quality Assurance, Risk Management, Housing Services

Time Frame: 36 months from funding date

Administer: Cherokee Nation Emergency Management

Mitigation Action: ***DRAINAGE CONDUITS***

Identified Hazard(s): Flooding and Flash Flooding

Actions/Comments: Identify and upgrade the size of culverts in tribal communities to prevent repetitive flooding during and following heavy rain; may involve installing or re-routing capacity of a storm drainage system that may involve detention and retention ponds, drainage easements, creeks or streams.

Implement: Community Services, Roads, Housing, GeoData, Quality Assurance

Time Frame: 18 months from funding date

Administer: Cherokee Nation Emergency Management

Mitigation Action: **PROVIDE COOLING/WARMING STATIONS**

Identified Hazards: Extreme Temperatures and Winter Storms-Snow/Ice

Actions/Comments: Installation of public misting systems outdoors, outdoor water fountains in public gathering areas and air conditioned/heated rooms indoors will protect tribal citizens from the dangers associated with extreme temperature events.

Implementation Team: Planning & Development, Construction, Grounds Maintenance, Quality Assurance, Environmental Health, Human Services

Time Frame: 18 months from funding

Administer: Cherokee Nation Emergency Management

Mitigation Action: **INSTALLATION OF DRY HYDRANTS IN FIRE PRONE AREAS**

Identified Hazards: Droughts and Wildfires

Actions/Comments: Install in fire prone areas throughout TJSA.

Implementation Team: Natural Resources, Community Services, Environmental Programs, Quality Assurance

Time Frame: Undetermined

Administer: Cherokee Nation Emergency Management

Mitigation Action: **WATER RESERVOIRS**

Identified Hazards: Drought

Actions/Comments: Build reservoirs in the TJSA to contain rain and run-off water for agriculture use with cattle, other farm animals and irrigation needs. Develop a “Wetland Oasis” area for tribal citizens to use for recreational/fitness purposes such as a walking/running track, picnic area, fishing dock, etc.; as well as maintain a water supply and serve as a wildlife refuge.

Implementation Team: Environmental Programs, Community Services, GeoData, Natural Resources, Construction Management

Time Frame: 24 months from funding

Administer: Cherokee Nation Emergency Management

Mitigation Action: **XERISCAPE**

Identified Hazards: Drought

Actions/Comments: Establish, and monitor Xeriscape projects within tribal communities. Educate tribal citizens on Xeriscape, vegetation which requires less hydration than normal vegetation.

Implementation Team: Community Services, GeoData, Grounds Maintenance, Natural Resources, Communications

Time Frame: 30 months from funding

Administer: Cherokee Nation Emergency Management

Mitigation Action: **RIPARIAN ZONE REESTABLISHMENT**

Identified Hazards: Drought and Flooding

Actions/Comments: Establish a program of planting vegetation along the creeks and river beds affected by riparian zoning.

Implementation Team: Natural Resources, Community Services, Environmental Programs, GeoData, Environmental Programs

Time Frame: 12 months from funding date

Administer: Cherokee Nation Emergency Management

Mitigation Actions: **FIRE BREAKS**

Identified Hazards: Wildfires

Actions/Comments: Install fire breaks to impede the progress of wildfires around critical facilities

Implementation Team: Natural Resources, Tribal Facilities and Grounds Maintenance, Construction, Quality Assurance

Time Frame: 24 months after funding date

Administer: Cherokee Nation Emergency Management

Mitigation Action: **SUPPRESSION / LIGHTNING RODS**

Identified Hazard(s): Hail/Lightning/High Winds

Actions/Comments: Provide, THORGuard, lightning prediction and warning systems throughout the TJSA. Install lightning rods on critical facilities.

Implement: Housing Rehab, Construction, Community Services, Quality Assurance, Tribal Facilities

Time Frame: 12 months from funding date

Administer: Cherokee Nation Emergency Management

## **TRIBAL CAPABILITIES**

Due to the restructuring of the Cherokee Nation and the newly formed Cherokee Nation Emergency Management there have been numerous changes and an appointment of a Emergency Management staff. Previously this was an added duty to an already overloaded department. Now Cherokee Nation Emergency Management is a stand-a-lone department whose sole focus is to prepare for, protect from, and mitigate against disasters. By doing this the plan has been reviewed and underwent no major changes but will face more scrutiny in the future as it must be actionable and projects will be worked diligently until completion. The process is morphing into a smooth ongoing process.

Once our Hazard Mitigation Plan is approved and adopted, the tribe will apply for State and Federal Hazard Mitigation Project Grant funds. This includes but is not limited to: FEMA, Homeland Security, Flood Mitigation Assistance, Department of Justice, USDA, Department of Agriculture, EPA, BIA, DOT, PDM and Community Development Block Grants. Pre-disaster and post-disaster funding discussions have been held with our Community Services Group to ensure the availability of funds to meet the in-kind match requirement for federally funded mitigation projects such as: Building or retro-fitting an existing areas for community tornado shelters. The volunteer labor of community members would also be documented and counted towards the 25% in-kind match.

The Cherokee Nation does not at this time have a budget to fund Hazard Mitigation projects. However internal resources may be utilized to develop legislative acts, building codes, etc. The Nation has a strong ability to document in-kind match for grants requiring said match. In-kind can be in the form of key personnel, donated training room space, donated conference room

space, computer equipment, vehicles, donated goods and services from tribal enterprises, etc.

The Tribe does not have legislation prohibiting building in flood prone areas; however; our internal administrative process prohibits said development. Also, tribal citizens are required to have flood insurance to be eligible for tribal housing/housing rehabilitation services.

In addition, it is the practice for our Marshal Service and CHRs to conduct wellness checks on the elderly and homebound to ensure their needs are met pre-and post disaster. CN also has trained incident management team members as well as professional level staff such as carpenters to surgeons; we have in excess of 800 vehicles in our fleet which 40 passenger buses to water trucks; we also have heavy equipment and skilled operators located throughout our TJSA.

The CNEM department is the designated office for preparedness, response, recovery and mitigation functions for the tribe. Additionally, CNEM is responsible for grant applications, administrating and financial reporting thereof. We train personnel, citizens and local government officials and coordinate activities which complement our disaster management capabilities.

### **Possible Funding Sources**

#### **Hazard Mitigation Grant Program (HMGP)**

The HMGP was created in 1988 by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended. This program is activated during Presidential Disaster Declarations to assist in identifying mitigation projects, and funding these projects on a 75% Federal / 25% non-Federal cost share basis. **Note:** Grantee, the 25% cost share is absorbed by the applicant/Sub-grantee, 12.5% applicant share and 12.5% state or sub-applicant share.

Possible projects include: updating plans, implementing the measures identified in all-hazard mitigation plans, developing tribal legislation, or adopting ordinances.

### **Pre-Disaster Mitigation (PDM) Program**

FEMA has long been promoting disaster resistant construction and retrofit of facilities that are vulnerable to hazards in order to reduce potential damages due to a hazard event. The goal is to reduce loss of life, human suffering, economic disruption, and disaster costs to the Federal taxpayer. This has been, and continues to be, accomplished through a variety of programs and grant funds.

### **Flood Mitigation Assistance (FMA) program**

The Flood Mitigation Assistance program is a State or Tribal administered cost-share program through which States or Tribes can receive grants for flood mitigation planning; flood mitigation projects; and FMA technical assistance. It is a Federal grant program, similar to the Hazard Mitigation Grant Program; however, FMA provides assistance to States and Tribes for flood mitigation planning and activities to fund cost-effective measures that reduce or eliminate the long-term risk of damage to buildings, manufactured home, and other NFIP-insurable structures, and it is not disaster dependent.

### **Red Cross**

The Red Cross has provided scholarships to trainings and conferences for the Cherokee Nation in the past and continues to be a strong contributing partner. They have grants available to fund storm shelters, weather radios, and trainings that can aid in the tribal hazard mitigation strategy.

### **Cherokee Nation Emergency Management General Fund**

The Cherokee Nation Emergency Management is given a yearly fund to pay for the salary of the emergency management staff and fund small projects that can work to eliminate hazards or mitigate against them.

## **SECTION 6: PLAN MAINTENANCE PROCEDURES**

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### **PLAN MAINTENANCE PROCESS**

Cherokee Nation Hazard Mitigation Plan (HMP) is required to be updated, submitted to FEMA for approval and adopted by Cherokee Nation Tribal Council within a five-year cycle.

Responsibility for plan maintenance and coordinating the implementation of mitigation measures is the responsibility of the Cherokee Nation Emergency Management (CNEM) office. CNEM will be responsible for annual progress reports to CNEM Policy Committee and for the five-year plan update to be submitted to FEMA for approval and adoption by Cherokee Nation Tribal Council.

There have been no changes made to the methodology of plan development. However, with the development of the new Emergency Management Department and the hiring of the Emergency Manager the planning process is under review.

CNEM will monitor the HMP and report quarterly to the Cherokee Nation Emergency Management Team. The CNEM Team will recommend ways to increase participation and coordination with tribal departments, tribal citizens and other jurisdictions and agencies.

Annual reviews conducted by the CNEM Team will identify progress made on the implementation of mitigations measures and projects. Annual reviews will also assess the impacts of disasters in the Cherokee Nation TJSA to determine whether the HMP should be revised based on the new information. Implementation problems (technical, political, legal and financial) will be identified and recommendations will be made. Project evaluations will occur at appropriate project specific intervals or when the HMP is updated. The annual review shall occur during the third quarter of the tribal fiscal year and an annual progress report made to CNEM Policy Committee within 30 days of the close of the tribe's fiscal year.

The process of updating the HMP will include a review of the hazard assessments, vulnerability assessments, potential losses, tribal capability, funding sources and potential new mitigation measures by the CNEM Team. The progress and effectiveness of mitigations actions will be



examined and revised if necessary. The updated HMP process will begin the beginning of the fourth year and will be submitted to FEMA for re-approval within six months of the plan expiration date before being sent to Cherokee Nation Tribal Council for adoption.

Cherokee Nation Emergency Management will monitor progress on the implementation of mitigations actions and report to the CNEM Team during monthly team meetings.

All short-term mitigations actions will be monitored by CNEM on an ongoing basis until implementation is complete. Active long-term mitigation actions will be monitored on an ongoing basis or at least annually as needed. Long-term actions planned for the future will be reviewed annually by the CNEM Team during the third quarter of the tribal fiscal year.

A Project Officer or Specialist will be assigned to monitor each action throughout its life cycle. The assigned Project Officer will be responsible for grant program reporting (if required by funding agency), identifying accomplishments, problems, budget status and other activities affecting the project. Agency-specific final grant closeout documents will also be prepared by the assigned Project Officer at the conclusion of the performance period and submitted to the funding agency accordingly. Records will be maintained for three years after final closeout.

The system for reviewing and evaluating progress on achieving goals and implementing activities and projects in the mitigation strategy will be based on a checklist of all objectives, actions and progress of the mitigations action. This checklist will be developed by the CNEM Team and reviewed annually by CNEM Policy Committee. Modification to a project will be made as deemed necessary.

## **PLAN INTEGRATION**

The adoption of the Hazard Mitigation Plan will enable formal integration with the Capital Improvement Plan (CIP), the Integrated Resources Management Plan (IRMP) and others like the Land Consolidation Plan. The CN Hazard Mitigation Plan (CNHMP) is in keeping with our Declaration of Designed Purpose and compliments Cherokee Nation's vision and mission. The CNHMP will directly enhance one of our tribe's desired outcomes regarding community. The Nation has made a commitment to focus programs toward helping communities help themselves

and helping communities work together. The CNHMP will be a valuable planning tool to this end.

To date, there have been few opportunities to integrate FEMA's mitigation programs and initiatives. Members of CNEM have attended various trainings and lectures on hazard mitigation at the Emergency Management Institution and at various conferences. The information obtained from these conferences/lectures was brought back to the Nation and integrated into respective programs by policy and procedural updates. In the future, CNEM will integrate information into other ongoing planning efforts on an annual basis as recognized by the department head. CNEM was awarded a Hazard Mitigation Planning Grant. CN has received reimbursement under the Public Assistance program. We have attended regional and national conferences for Hazard Mitigation and Public Assistance. Cherokee Nation Emergency Management is part of the Management Resources Group, as is the Office of Planning & Development. The Management Resources Group will be tasked future planning efforts and with continuing to integrate mitigation programs and activities throughout all the Cherokee Nation.

### **Existing Plans / Programs**

There are various tribal entities, departments and other organizational programs which are discussed in the Tribal Hazard Mitigation Plan, and which coordinate or interact with the Hazard Mitigation Plan. Below is a list of the current Tribal Plans:

1. Cherokee Nation Emergency Operations Plan (EOP)
2. Capital Improvement Plan
3. CN Integrated Resources Management Plan
4. Forest Management Plan
5. Tribal Pandemic Flu Plan
6. Tribal Influenza Plan

With each plan listed above the HMP will be incorporated by the following process:

- Committee chairperson will contact each plan representative regarding potential strategies for implementation

- Plan representative will review potential strategies for incorporation into their document as approved by their respective planning committee during their update process
- As the strategies are revised the committee chairperson will continue to update planning representatives

**Other programs are:**

**Federal Emergency Management Agency (FEMA)**

The Federal Emergency Management Agency (FEMA) was established by Congress in 1979 to consolidate the emergency planning and response functions of several Federal agencies under one director. The FEMA mission is: “Reduce the loss of life and property and protect our institution from all hazards by leading and supporting the Nation in a comprehensive, risk-based emergency management program of mitigation, preparedness, response and recovery.”

Cherokee Nation mirrors parts or all of FEMA’s mission and will participate in various programs such as: PDM, FMA, and SRL.

**Continued Public Involvement**

During annual update and five year update we will continue to invite the public to participate by means of flyers, email, tribal newspaper, and tribal radio show.

GWY:9 D3P  
CHEROKEE NATION®



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# Cherokee Nation Hazard Mitigation Plan

## Appendices

## Appendices

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# Appendix A

Committee: <u>Resources</u>	Author: <u>Tamara Copeland</u>
Date: <u>10-02-08</u> Committee Date: <u>10-13-08</u>	Sponsor: <u>Councilors Curtis Snell and Cara Cowan Watts</u>

RESOLUTION NO. 90-08

## COUNCIL OF THE CHEROKEE NATION

### A RESOLUTION AUTHORIZING THE SUBMISSION OF A NATURAL HAZARD MITIGATION PLANNING GRANT APPLICATION

**WHEREAS**, the Cherokee Nation since time immemorial has exercised the sovereign rights of self-government in behalf of the Cherokee people;

**WHEREAS**, the Cherokee Nation is a federally recognized Indian Nation with a historic and continual government to government relationship with the United States of America;

**WHEREAS**, Cherokee Nation Emergency Management will apply to the Federal Emergency Management Agency (FEMA) through Oklahoma Department of Emergency Management for a Natural Hazard Mitigation Planning Grant in the amount of \$247,020.00;


**WHEREAS**, Cherokee Nation Emergency Management will work with communities to develop a Natural Hazards Mitigation Plan upon receipt of said grant funds;

**WHEREAS**, if funded, the Cherokee Nation Emergency Management will receive \$185,265.00 from Federal Emergency Management Agency through Oklahoma Department of Emergency Management with a local in-kind match of \$61,755 to develop the Natural Hazards Mitigation Plan.


**BE IT RESOLVED BY THE CHEROKEE NATION**, that the Council hereby authorizes the submission of a grant application to the United States Federal Emergency Management Agency (FEMA) through the Oklahoma Department of Emergency Management for a Natural Hazard Mitigation Planning Grant, and that the Principal Chief, or his designee, shall be authorized to conduct negotiations and execute all official documents in this regard.

### CERTIFICATION


The foregoing resolution was adopted by the Council of the Cherokee Nation at a duly called meeting on the 10<sup>th</sup> day of November, 2008, having 17 members present, constituting a quorum, by the vote of 17 yea; 0 nay; 0 abstaining.

  
Meredith A. Frailey, Speaker  
Council of the Cherokee Nation

ATTEST:

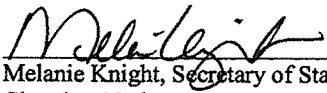
  
Don Garvin, Secretary  
Council of the Cherokee Nation

Approved and signed by the Principal Chief this 14th day of November, 2008.



Chadwick Smith, Principal Chief  
Cherokee Nation

**ATTEST:**



Melanie Knight, Secretary of State  
Cherokee Nation

## Appendix B: Article 2 – Legislative Submittal Process

The legislative submittal process, the following steps should be taken when submitting proposed legislative acts or resolutions:

1. Prepare your proposed legislative package and ensure it is **complete** and in the proper legislative format, pursuant to CNCA Title 25 § 21 and § 27 (an act or resolution attached).
2. Fill out the Administrative Clearance/Routing form, obtain the proper signatures (up to Group Leader), and attach to your legislative package.
3. If Strategic Budget Committee (SBC) approval is required, attach a copy of the signed, approved grant clearance form to your legislative package.
4. If the source of match needs to be identified, please obtain the Controller's approval/signature on the Administrative Clearance/Routing form.
5. Contact a Councilmember(s) to sponsor your resolution or legislative act – Council will not accept legislation without a council sponsor. Sponsor has usually been the Chair of the anticipated committee your resolution or act will be assigned to.
6. Submit to Government Resources an original hard copy of your completed legislative package (unstapled) and an electronic copy of the resolution or act (by e-mail preferably).

Upon completion of these steps, Government Resources will date/stamp your legislative package, review the completed package, and submit for the Principal Chief's approval. Upon the Chief's approval, Government Resources will then submit to the Tribal Council for assignment to the appropriate committee.

The legislative forms and routing process memo are posted on the intraserver for your convenience. However, you may contact Lita Maupin at ext. 5309 or [lmaupin@cherokee.org](mailto:lmaupin@cherokee.org) should you have any questions or require further information.



**Appendix C:**

Cherokee Nation  
Hazard Mitigation  
Community Input Survey

1. What is your age:
  - 18 to 24
  - 25 to 34
  - 35 to 44
  - 45 to 54
  - 55 to 64
  - 65 to 74
  - 75 or older
  
2. Sex:
  - Male
  - Female
  
3. County of Residence: \_\_\_\_\_
  
4. Town: \_\_\_\_\_
  
5. Community (Woodall, Cherry Tree, White Oak, etc): \_\_\_\_\_
  
6. Tribe:
  - Cherokee (reside within 14 county jurisdiction)
  - Cherokee (reside outside 14 county jurisdiction)
  - United Keetoowah Band
  - Other: \_\_\_\_\_
  
7. Is there a (check all that apply) within 7 miles of where you live?
  - Community building
  - Senior Citizens center
  - School
  - Volunteer Fire Department
  - None of the above

8. Do you have internet access at home?

- Yes
- Yes, through my phone
- No

9. Please select the level of impact the following events had on you and your family during the last 7 years:

Ice Storm	Not Impacted	Minor	Average	Severe
Tornado				
Severe storms				
Hail				
Flooding or flash floods				
Wildfire				
Excessive heat/Excessive Cold				
Earthquake				
Lightning				
Dam Failure				

10. If you were impacted by more than one of the above events which affected your life the most? **Choose one**

- Ice Storm
- Tornado
- Severe storms/strong winds
- Hail
- Flooding/Flash flooding
- Wildfire
- Earthquake
- Excessive heat/Excessive cold
- Lightning
- Dam failure

11. Did the event impact your (Check all that apply) ?

- Home
- Business
- Land
- Livestock
- Crops
- Was not impacted

12. How long did the event last?

- Was not impacted
- Less than 1 day
- 1-3 days
- 4-6 days
- 7-10 days
- More than two weeks
- Do not remember

13. Did you have access to items that you needed during the event? (Such as blankets, heat source, candles or flashlights, food, drinking water, etc).

- Yes
- No

14. Does your community or town provide a community shelter in times of harsh weather? (A place for community members to gather during times of extreme heat or extreme cold).

- Yes
- No
- Unsure
- Other

15. Please rank the following list from least to greatest importance for you and your community (1 being the most important and 10 being the least important)

	Rank
Community Storm Shelters	
Generators for community areas in case of power loss	
Tree clearing along utility lines	
Lightning rods	
Volunteer Community Emergency Response Teams	
Tornado Sirens	
Improved drainage and flood prevention	
Fire breaks (structures used to prevent the spread of fire)	
Better community notice of burn bans	
Notification of road conditions	

Appendix D: County Emergency Managers/Community Meeting

5.99 buffet



Community Meeting with County EM's

Hazard Mitigation Information Sign-In  
 Tuesday, November 3, 2009 @ 10:00 am  
 West Siloam Springs CN Casino  
 Please Print



NAME	County or Jurisdiction	EMAIL	Cell Phone
1 Tamara Copeland	Cherokee Nation	tamara-copeland@cherokee.org	918-822-2764
2 Jimmy Moore	City of Muskogee	jmoore@muskogeeonline.org	918-684-6295
3 Jeff Smith	MUSKOGEE COUNTY	JSMITH@READYMUSKOGEE.COM	918-682-2551
4 Cheis Koathley	Seminole Co	CheisK@pross.net	918-774-4632
5 MIKE MCCOOL	TULSA/TUL. CO.	mmccool@cityoftulsa.org	918-530-2084
6 Robert Rott	Del Co / owner	delawareem@phaser.com	918-253-8085
7 Steve Pankin	DEM	Steve_Pankin@dem.org	405-590-0109
8 GRAY A Dutton	Tahlequah Cherokee Co	ead@cityoftahlequah.co	931-1803
9 Cindy Witherspoon	Tulsa & Rogers (?)	Cindy.witherspoon@cpem.com	918-384-7666
10 Dwayne Fain	Cherokee Nation	dfain@cherokee.org	918-822-2783
11 M.O. Blasjacket	Craig Co.	c.c.c.m.@junct.com	918-244-1452
12 Delbert Bowles	City of Vinita	freechief@cityofvinita.com	918-944-0526
13 Sue Ann Keener	CNEM	juan.keener@cherokee.org	918-316-7417
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15			



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**Office of the Chief**

**Bill John Baker**  
*Principal Chief*  
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**S. Joe Crittenden**  
*Deputy Principal Chief*  
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Thursday, January 21, 2016

**Tribal Emergency Management Planning Team**

1. Welcome and Introductions
2. State of Emergency Management Address
3. Planning Update
  - a. Hazard Mitigation Plan Discussion  
(Projected Finish Jan. 26<sup>th</sup>)
  - b. Chewey Community Preparedness Plan Discussion  
(Feb 15<sup>th</sup> @Chewey Community Center 7pm-8:30pm)
4. Conferences and Trainings
  - a. ITEMC (June 7<sup>th</sup>-9<sup>th</sup> Durant, OK)
  - b. Tornado Summit (March 1-2, OKC)
  - c. NIMS 300 and 400 (TBD)
5. Incident Support Team Discussion
6. Flood Response
7. New Business
8. ICS certificates needed for team training files by February Meeting
9. Next Meeting February 18<sup>th</sup> 2pm-3:30pm

Tribal Emergency Management Planning Team

1-21-16

- | Name:                               | Phone:                | Email:   |
|-------------------------------------|-----------------------|--|
| 1. <u>Jeremie Fisher</u>            | <u>(918) 871-9581</u> | <u>jeremie.fisher@cherokee.org</u>                                 |
| 2. <u>Henrietta Dressedfulwater</u> | <u>(918) 772-7841</u> | <u>henrietta-oliver@cherokee.org</u>                               |
| 3. <u>Laura Barrett</u>             | <u>(918) 316-2707</u> | <u>lbarrett@cherokee.org</u>                                       |
| 4. <u>Shane Dominick</u>            | <u>918 453 5221</u>   | <u>shane-dominick@cherokee.org</u>                                 |
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| 6. <u>Ginger Glory</u>              | <u>918-822-2596</u>   | <u>ginger-glory@cherokee.org</u>                                   |
| 7. <u>Rhonda Cochran</u>            | <u>918-822-2529</u>   | <u>rhonda-cochran@cherokee.org</u>                                 |
| 8. <u>Aaron Brown</u>               | <u>918-458-4480</u>   | <u>aaron-brown2@cherokee.org</u>                                   |
| 9. <u>Philip Manes</u>              | <u>918 722 8460</u>   | <u>philip-manes@cherokee.org</u>                                   |
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| 12. <u>Cindy Witherspoon</u>        | <u>918 316 4407</u>   | <u>tribal.</u>   |

Tribal Emergency Management Planning Team

- |     | Name:          | Phone:   | Email:    |
|-----|----------------|----------|-----------|
| 1.  | Lillian Pratt  | X 4138   | -chu.org  |
| 2.  | Tracy Bluebird | 316-7239 | Chero.org |
| 3.  | _____          | _____    | _____     |
| 4.  | _____          | _____    | _____     |
| 5.  | _____          | _____    | _____     |
| 6.  | _____          | _____    | _____     |
| 7.  | _____          | _____    | _____     |
| 8.  | _____          | _____    | _____     |
| 9.  | _____          | _____    | _____     |
| 10. | _____          | _____    | _____     |
| 11. | _____          | _____    | _____     |
| 12. | _____          | _____    | _____     |



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**Tribal Emergency Management Planning Team**  
**03/24/2016**

- I. Welcome and Introductions
- II. FEMA Site Inspection (April 18th-20<sup>th</sup>)
- III. Emergency Management Policy Project
- IV. ***Emergency Support Functions and EOC Operation***  
vs.  
***Incident Management Team***
- V. Hazard Mitigation plan and projects
- VI. Training and Exercise planning
- VII. New Concerns and or Updates.....
- VIII. Next meeting 04/21/2016 1400-1530





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**Tribal Emergency Management Planning Team**  
**03/24/2016**

- I. Welcome and Introductions
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- VIII. Next meeting 04/21/2016 1400-1530

Appendix E: Palmer Classification Scale














Palmer Classifications	
4.0 or more	extremely wet
3.0 to 3.99	very wet
2.0 to 2.99	moderately wet
1.0 to 1.99	slightly wet
0.5 to 0.99	incipient wet spell
0.49 to -0.49	near normal
-0.5 to -0.99	incipient dry spell
-1.0 to -1.99	mild drought
-2.0 to -2.99	moderate drought
-3.0 to -3.99	severe drought
-4.0 or less	extreme drought

## Appendix F: Flood Zones Classification

Flood Zones Classification		
Zone A		The 100-year or Base Floodplain. There are six types of A zones:
	A	The base floodplain mapped by approximate methods, i.e., BFEs are not determined. This is often called an unnumbered A zone or an approximate A zone.
	A1-30	These are known as numbered A zones (e.g., A7 or A14). This is the base floodplain where the firm shows a BFE (old format).
	AE	The base floodplain where base flood elevations are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.
	AO	The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
	AH	Shallow flooding base floodplain. BFE's are provided.
	A99	Area to be protected from base flood by levees or Federal flood protection systems under construction. BFEs are not determined.
	AR	The base floodplain that results from the de-certification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection
Zone V and VE	V	The coastal area subject to velocity hazard (wave action) where BFEs are not determined on the FIRM.
	VE	The coastal area subject to velocity hazard (wave action) where BFEs are provided on the FIRM.
Zone B and Zone X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and the 500-year floods. B zones are also used to designate base floodplains or lesser hazards, such as areas protected by levees from the 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.	
Zone C and Zone X (unshaded)	Area of minimal flood hazard, usually depiction FIRMs as exceeding the 500-year flood level. Zone C may have ponding and local drainage problems that do not warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood.	
Zone D	Area of undetermined but possible flood hazards.	
Source: Understanding Your Risks, identifying hazards and estimating losses, FEMA 386-2		

Appendix G: Beaufort Scale

## Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Appendix H: Fujita Scale

## Fujita Scale

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel reinforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 mph	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies

## Appendix I: Enhanced Fujita Scale

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	Wind Speed (mph)	Potential Damage
EF0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.
source: <a href="http://en.wikipedia.org/wiki/Enhanced_Fujita_Scale">http://en.wikipedia.org/wiki/Enhanced_Fujita_Scale</a>		

## Appendix J: Sperry-Piltz Ice Accumulation Index

**The Sperry-Piltz Ice Accumulation Index, or "SPIA Index" – Revised September, 2009**

ICE DAMAGE INDEX	RADIAL ICE AMOUNT (inches)	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
<b>0</b>	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
<b>1</b>	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
<b>2</b>	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
<b>3</b>	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
<b>4</b>	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
<b>5</b>	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

## CHEROKEE NATION RESPONSE TEAM PLAN

- I. **AUTHORITY:**

Cherokee Nation Policy and Procedures establishes Mental Health Crisis Services. It authorizes the Cherokee Nation Crisis Response Team (CRT) to provide crisis counseling services including outreach, referrals, psycho-education, and short term psychological first aid to survivors of major human-made or natural disasters.
- II. **PURPOSE:**

The Cherokee Nation Crisis Response Team Plan will be maintained as an annex to the Cherokee Nation Emergency Management Plan (CNEMP). The purpose of the disaster behavioral health response plan is to provide guidance to mitigate the adverse effects of disaster-related trauma by promoting and restoring psychological well-being and daily life functioning of affected individuals and communities.

Each individual and community within the fourteen (14) counties of the Cherokee Nation is unique in responding to the stress and sudden precipitous losses associated with a disaster event, whether natural or human-generated. The Plan encompasses the psychological, social, behavioral, and educational-related supports required to facilitate recovery. It provides a framework for the following activities:

  - a. All hazards planning for disaster events.
  - b. Responding to the immediate impact of a disaster event, and assisting Cherokee Nation citizens and other community members to recover from the impact of a disaster over the long term.
- III. **SITUATIONS AND ASSUMPTIONS:**
  - A. Use of chemical, biological, radiological, nuclear, or explosive weapons of mass destruction may lead to widespread fear and distress. The behavioral health needs that may result from such events would quickly overwhelm the local response system, thus requiring mutual aid, state and/or federal assistance.
  - B. All people involved in a disaster are affected by it in some way, from those disaster survivors, (including their family members and friends), to emergency response workers (e.g., fire fighters, police officers, emergency management, health and medical workers), and the public at large. Disaster survivors, including emergency responders, and others who are affected by disaster events, may experience varying levels of stress and anxiety. They may also display other physical and psychological symptoms that could adversely affect their ability to respond, perform and function.
  - C. Each person's response to a disaster is unique, based on individual factors, such as his/her trauma history, health status, culture beliefs, social support systems, and personal resiliency. Reactions to the event can be cognitive, emotional, physical, behavioral, social, (check throughout) and spiritual, and may not manifest for several weeks, months, and even years following the incident.
  - D. Research suggests that the majority of people, following a disaster, is resilient and will return to pre-event psychological functioning within a relatively short time. Outreach,



early psychological first aid and referrals can assist disaster survivors to meet new challenges, and offers support in their recovery process to return them to pre-disaster performance and functioning levels.

- E. Cherokee Nation citizens and community members will require information on how to recognize and cope with the short and/or long term risk of sustained stress caused by a disaster or arising from its effect. An informed public will be better able to respond and cope with the stresses associated with a disaster.
- F. People with special needs, especially those with pre-existing mental illnesses and substance abuse disorders, older individuals, children and adolescents or people with disabilities, may be more prone to experience severe stress.
- G. Resources may not be available to deploy based on nature of event or hazards (e.g., biological event). Response of disaster behavioral health response teams may differ based on the nature of the disaster. There may be some situations (such as biological events) where responders may be hesitant.
- H. The CRT will not enter an impacted areas until their safety can be reasonably assured within the local emergency management system/incident command system.
- I. The CRT will triage, assess, provide early psychological first aid and make referrals, consistent with the level of training.
- J. Current standards of care, including the individual's right to confidentiality and individual's right to refuse services, will be observed and practiced.
- K. The CRT will adhere to the requirements of Oklahoma Tribal Statutes regarding mandatory reporting of suspected abuse of children, persons with disabilities, and the frail elderly.

#### IV. CONCEPT OF OPERATIONS:

##### A. GENERAL:

1. CRT members may be requested to activate in response to a disaster or state or federally declared emergency. Activation is normally at the request of The Tribal Government through the Emergency Director or CRT Coordinators.
2. Local provisions and plans must be made for the following:
  - a. Inclusion of a Cherokee Nation CRT consultant as a part of the CNEMP or community medical system to ensure coordinated behavioral health response and recovery efforts.
  - b. Triage of individuals who have been impacted by the disaster for behavioral health needs.
  - c. Medical intervention for people exhibiting profound behavioral health symptoms, including transportation and hospitalization.
  - d. Development of incident reports to track the number and types of

- contacts made by the CRT.
- e. Establishment of stress management/debriefing for first responders and caregivers.

B. BEHAVIORAL HEALTH SERVICES:

1. Appropriate disaster behavioral health services must be made available for responders, survivors and other community members during emergency response and recovery operations, including triage, assessment, early psychological first aid and referral.
2. Cherokee Nation CRT will be activated upon notification by Tribal Government through the Emergency Management Director or Cherokee Nation CRT Coordinators. These teams will function within the Cherokee Nation Emergency Management or Community system/Incident Command System.

C. CRT SUPPORT FOR EMERGENCY REESPONDERS:

CRT will coordinate disaster behavioral health services to all Cherokee Nation emergency responders. Cherokee Nation CRT teams are available upon request, on a 24-hour basis, regardless of disaster declaration. Teams will be activated upon request through the CN Emergency Management Director or Crisis Team coordinators.

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES:

A. ORGANIZATION:

1. Cherokee Nation Emergency Management functions as the Tribal disaster coordinating entity.
  - a. Cherokee Nation Emergency Management has primary responsibility for assessment and provision of coordinated emergency behavioral health services during Tribal or community emergencies or disasters, in coordination with the Cherokee Nation CRT coordinators.
  - b. In the event that the CRT response becomes overwhelmed or can no longer maintain the level of response required by the event, the emergency management director will request additional disaster behavioral health resources through the state department of mental health.
2. The Cherokee Nation Emergency Management functions as the CRT coordinating agency.
  - a. Upon receipt of official notification of an actual or potential emergency situation, it is the responsibility of Emergency Management Director with consultation of the CRT coordinator to receive and evaluate all requests for disaster behavioral health assistance and to disseminate such

notification to CRT and voluntary organizations for assessment and action.

B. ASSIGNMENT OF RESPONSIBILITIES:

1. General: The CRT is responsible for the following:
  - a. Designating and training CRT members in compliance with training standards established for disaster behavioral health response teams.
  - b. Ensuring that disaster behavioral health standard operating procedures are developed and maintained.
  - c. Maintaining current emergency notification procedures.
  - d. Ensure that positive identification (and proof of licensure, if required) and contact information is obtained from all CRT members.
  - e. Provide the provisions of disaster behavioral health services for disaster survivors, emergency workers, and others suffering psychological trauma due to the emergency situation.

VI. DIRECTION AND CONTROL:

- A. The CRT is responsible for the direction and control of team members during emergency situations.

VII. DISASTER CRISIS RESPONSE TEAMS:

A. TEAM COMPOSITION AND STAFFING:

1. At a minimum, a team will include one licensed mental health professional and/or work under the direct control of a licensed mental health professional. CRT teams will be led by an individual with past experience in disaster response.
2. CRT may designate specialized strike teams (e.g., teams trained to deal with older individuals, shelter populations, children, people with disabilities, responders, etc.).

B. TEAM TRAINING:

1. CRT will identify disaster individual team member competencies, and will establish minimum training requirements for team members.

2. CRT will be responsible for assuring that disaster behavioral health response team members are appropriately trained.

C. TEAM DEPLOYMENT:

1. Cherokee Nation CRT will be deployed by the Cherokee Nation Emergency Management Director or CRT coordinator.
2. All requests for deployment will include the expected date/time of arrival and the name, title, location and telephone number of the local contact person.

VIII. ADMINISTRATION AND SUPPORT:

A. REPORTING:

1. The CRT team will provide daily incident action plans and situation reports through the Cherokee Nation emergency management system/Incident Command system.
2. Expense reports for deployed teams will be reported to the Cherokee Nation Emergency Management Director.

B. MAINTENANCE AND PRESERVATION OF RECORDS:

1. CRT incident logs generated during an emergency will be completed by CRT members and will be collected and preserved.
2. CLINICAL RECORDS. Individual clinical records will not be developed or maintained by the CRT during a disaster.

C. AFTER ACTION REVIEW/REPORTS:

The CRT will conduct an after action review of behavioral health response activities as soon as possible after an exercise or disaster event, based on FCC protocols. The purpose of this review is to identify both successful operational procedures and identify and implement needed improvements.

D. EXERCISES:

It is highly recommended that disaster behavioral health be built into all scenarios, and all local drill, tabletop exercises, functional exercises, and full-scale exercises should include CRT participation. CRT team members should participate in the planning process for exercises where possible and appropriate. Additional drills and exercises may be conducted for the purpose of developing and testing abilities to make behavioral health response to various types of emergencies more effective.

IX. PLAN DEVELOPMENT AND MAINTENANCE.

- A. The Tribal Government is the approving authority for the plan.
- B. The Cherokee Nation Emergency Management Director is responsible for development, maintenance and distribution. The Cherokee Nation Emergency Management Director is responsible for conducting annual reviews, coordinating all review and revision efforts, and incorporating information learned from exercises and actual events into this plan.