



# **KAW NATION**

## **MULIT-HAZARD MITIGATION PLAN 2022**

**Prepared for:**

**Kaw Nation Tribal Council**

**Prepared by:**

**Kaw Nation Emergency Management Mitigation Planning Team**

**Kaw Nation**

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## Acknowledgements

Completion of a Hazard Mitigation Plan is not an easy task. Many people contributed considerable time to ensure the completion of this plan, providing information, insight, and data. The Kaw Nation would like to extend its thanks to those involved in bringing this plan to completion. The dedication of all the Planning Team members will help enhance and ensure the resilience of the Kaw Nation, and we are grateful for your contributions to this effort.

## Executive Summary

The Disaster Mitigation Act (DMA; Public Law 106-390) is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and the requirements for the national post-disaster hazard mitigation grant program were established.

In recognition of tribal sovereignty and the government-to-government relationship that currently exists between FEMA and Indian Tribal Governments, FEMA amended 44 CFR 201 at 72 Fed. Reg. 61720 on October 31, 2007, and provided further amendments on September 16, 2009, amending 74 Fed. Reg. 47471 to consolidate and clarify the requirements for Indian Tribal Governments. These amendments established protocol for Tribal Hazard Mitigation Plans to be separate from State and Local Mitigation Plans. It also finalized the Mitigation Planning Guidelines, which became effective March 2010. It is under those guidelines which the Kaw Nation's 2022 Tribal Hazard Mitigation Plan was developed.

The DMA encourages tribes, states, and local authorities to work together on pre-disaster planning, and it promotes sustainability as a strategy for disaster resistance. "Sustainable hazard mitigation" includes the sound management of natural resources, local economic and social resiliency, and the recognition that hazards, and mitigation must be understood in the largest possible social and economic context. The enhanced planning network called for by the DMA helps local government's articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk reduction projects.

Embracing this initiative as a continuation of proactive planning as well as FEMA's "whole community approach," the Kaw Nation (hereafter "Nation" or Kaw Nation) has developed this 2022 Kaw Nation Tribal Hazard Mitigation Plan to reduce loss of life and property resulting from disasters. While it is impossible to predict exactly when and where disasters will occur, or the extent to which they will impact the Nation, with careful planning and collaboration among the various tribal departments, members, and communities, and the surrounding public jurisdictions, agencies, private nonprofit organizations, stakeholders, and local citizens, it is possible to minimize losses that can occur from disasters. This has been and will continue to be the driving force behind this Plan development.

Development of the Kaw Nation's Tribal Hazard Mitigation Plan was completed in coordination with the Kaw Nation's Planning Team. Each member of the Nation's planning team was instrumental in providing ideas, concepts, historical data and information, discussions, and support.

## Kaw Nation Background

Today the Kaw Nation serves 3776 Tribal Citizens with 792 citizens living within our tribal jurisdiction. Below is an abbreviated tribal biography of the Nation.

### History

The Kaw Nation (formerly known as the Kanza, Kansa, or Kansas) is a federally recognized Indian Tribe headquartered in Kaw City, Kay County, Oklahoma, in the north-central part of northern Oklahoma adjacent to the State of Kansas. The Nation's Council House is located near Kaw Lake, a major Oklahoma recreational site. There are over 3,000 Tribal Citizens listed on the Tribal roll of the Kaw Nation of which approximately 20% reside on or near the original Kanza Reservation in Oklahoma. According to data from the 2020 Census Bureau, there are 5,248 Indian people living in Kay County. The Kaw Nation's jurisdictional service area consists of approximately 95% of Kay County east of Interstate 35. **(Because the Kaw Nation's Tribal Jurisdictional Service Area encompasses 95% of Kay County, data collected and used is Kay-County specific)**

The Kaw Tribe is in north central Oklahoma bordering Kansas, a federally recognized Native American Tribe officially known as the Kaw Nation. The Tribe consists of nearly 3,776 enrolled Tribal Citizens living as close as Oklahoma and Kansas and as far away as Canada. The Tribe has a substantial economic and service base and administers many programs and facilities near and around its headquarters in Kaw City, Oklahoma.

The only significant job market growth since 1990 in Kay County has been the addition of Tribal Casinos and Tribal enterprises. Oklahoma Indian gaming is the state's second largest industry. It is also the largest gaming revenue in the country after California. Revenues from Indian gaming and casino construction in 2017 was \$7.2 billion.

Much of Kay County is rural with most of the County's land used for agriculture. Outside of the Tribal Casinos and Tribal enterprises, there has been no significant growth since 1990 in any part of the county, including Newkirk, the County Seat. While Kaw Nation economic development efforts have had some success and the current economy is more diverse than in past decades, employment development efforts have not been able to keep pace with declines resulting in population losses. The general decline in oil and gas sectors continues, and with the closing of Conoco Carbon Fibers and the merger of Conoco and Phillips, this trend is expected to continue for the next five to ten years. The impact of this declining population trend will ultimately have an impact upon the Kaw Nation Multi-Hazard Mitigation Planning Process.

The historical base of Kaw Nation's economy has been supplied by Federal Grants, Investments, and Enterprises.

### Jurisdictional Profile

Kaw Nation is in the North Central area of Oklahoma. The Jurisdictional service area is bordered by Grant County to the West, the State of Kansas on the North, Osage County on the East, and Noble County on the South. A portion of the Southeastern corner of Kay County is bounded by the Arkansas River. The general drainage pattern is from northwest to southeast. Other major rivers found partly in Kay County are the Salt Fork River of the Arkansas and Chikaskia Rivers. Largest lakes in the County are Kaw Reservoir and Lake Ponca. According to the 2020 Census Bureau Quick-facts, Kay County has a total

area of about 920 square miles of which 97.2% is land and 2.8% is water. The jurisdictional service area covers approximately 95% in Kay County.

Kay County, located in North-Central Oklahoma along the Kansas boundary, consists of “Rolling Red Prairies” and “Bluestem Hills.” These grasslands cover large portions of the County, except for narrow strips along streams and some upland areas adjacent to the stream bottoms. In the eastern part of the county, which contains Kaw Lake, streams have cut relatively deep drainage-ways forming steep slopes and exposed ledges of limestone. In central Kay County the landscape is more gentle rolling prairies with long gentle slopes. In the western part of the County the landscape is level prairies. The range elevation throughout Kay County is small, from the highest part of the county at about 1,310 feet above sea level in the extreme northeast corner to an area near the Blackwell – Tonkawa airport at an elevation of about 1,059 feet to the Arkansas River bottom at the southeastern corner of the County at about 891 feet.

Interstate 35 runs north and south across the western portion of Kay County. The Cities of Blackwell and Tonkawa are located on Interstate 35 and Ponca City is connected by a divided four lane portion of U.S. 60 to Interstate 35. Kay County has two public airports. Ponca City Municipal Airport, which is located 2 miles northwest of Ponca City, has a lighted main runway length of 7,201 feet. Blackwell-Tonkawa Municipal Airport, which is located 5 miles southwest of Blackwell, has a lighted main runway length of 3,501 feet. Kay County has about 1,443 miles of County roads under maintenance.

## Tribal Government

Kaw Nation is a federally recognized Indian Tribe, organized pursuant to the Oklahoma Indian Welfare Act of 1936, Ch. 831, 49 Stat. 1967, codified in 25 U.S.C.501 et seq., and operating under a constitution adopted by the Nation and approved by Interior on August 4, 1990.

Under the Ratified Constitution – August 2011, the Tribe has two legislative bodies; a seven-citizen Tribal Council and a General Council composed of all adult Tribal Citizens. The Tribal Council is empowered to act by majority vote.

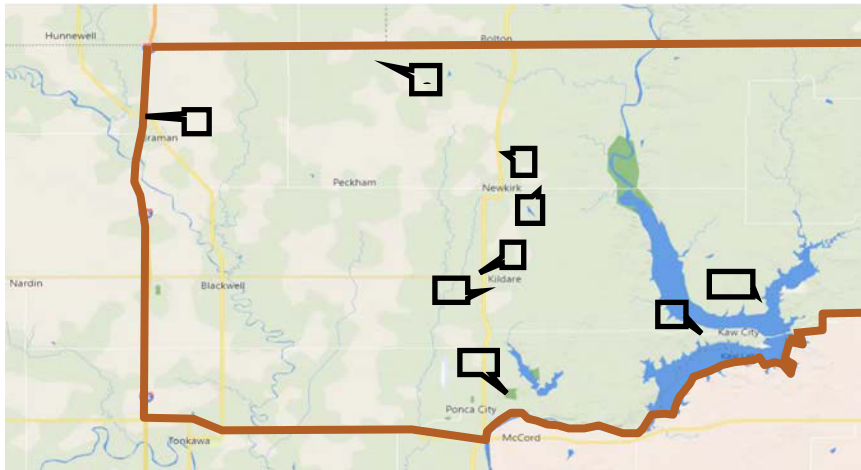
The constitution also provides for a judicial branch, composed of a Supreme Court consisting of three justices, and such inferior courts as may be established by tribal law. The constitution provides that justices of the Kaw Supreme Court and judges of the inferior courts are selected by the Tribal Council and confirmed by the General Council. At the time the Tribe’s constitution was approved, the Kaw Nation did not have an operating court system, and judicial power was then vested in the Interior Department, Bureau of Indian Affairs (BIA) Court of Indian Offenses. The Kaw Nation’s court system was established in 1991.

Per a ruling from the United States Supreme Court, the decision in *McGirt v. Oklahoma* and the rise of concern to legal actions by Tribal courts, ruled that the State of Oklahoma has no legal authority to prosecute Native Americans for crimes committed within an Indian reservation. The result has been that most felony cases with Native American defendants will be prosecuted by either the U.S. attorney or the tribal prosecutor, or both. This means tribal judges and juries, as prescribed by tribal law, will be the ones to decide what happens to their citizens.



## Tribal Maps

### Tribal Jurisdiction Service Area



1. Kanza Plaza Lands
2. Kaw Nation Chilocco Land
3. Kaw Nation Cemetery
4. Kaw Nation and Casino Complex
5. KEDA Office Land
6. Smoke Shop II Lands
7. Woolridge Land
8. Washunga Lands
9. Kaw City Lands

Kaw Nation tribal jurisdictional service area encompasses all of Kay County and includes:



## Tribal Resources

The Kaw Nation has identified current resources that will be committed to the completion of these projects and will appropriate funding through tribal enterprises, as well as various grants, and in in-kind contributions. The Kaw Nation has, over the last 25 years, grown and expanded. The following is a partial list of the equipment owned by the Nation which could be utilized in the event of a disaster.

In addition to equipment and money, qualified and responsible personnel will be utilized in the implementation of this plan and the strategies identified within.

**The following is a list of department(s)/program(s) and their resources which will impact the administration and maintenance of this plan with regard to pre and post-disaster mitigation:**

**Administration:** Leadership, guidance and public communication

**Accounting:** A program budget according to grant or contract award and provide timely program contract financial reports, per funding agency requirements.

**Behavioral Health:** Provides pre and post-disasters counseling funded through HIS, private pay, or public organizations.

**Convenience Stores (Woodridge, Southwind Express & Kanza Travel Plaza and Casino):** Food, water, fuel, cleaning supplies, funding for pre and post-disasters mitigation

**Economic Development:** Provides strategic planning, coordinates development priorities and supplies funding to eligible mitigation project such as to remodel and upgrade the Emergency Operation Center.

**Emergency Management:** The primary objective of Kaw Nation Emergency Management (KNEM) is to minimize risk to people and property by assessing hazards and developing plans for responding to emergencies and disasters. This includes coordinating with local fire, EMS, and police departments to share resources and equipment within and across the community. In the event of a disaster or emergency, KNEM is responsible for analyzing and preparing damage assessments, as well as maintaining emergency two-way radio communications equipment and the Emergency Alert System. By working closely with other emergency response organizations, KNEM helps to ensure that appropriate resources are available to effectively manage emergency situations.

**Employment and Training:** E&T funded through tribal funds and Federal grants social services and manpower to facilitate mitigation projects such as bank erosion, remodeling of EOC, and debris removal.

**Environmental Health:** OEH funded through tribal funds and federal funds provide expertise, manpower, heavy equipment and sanitation needs to facilitate planning and completion of mitigation projects.

**Engineering:** The Engineering Department funded through tribal funds and federal grants offers expertise in construction design, heavy equipment, and manpower. The Engineering Department offers assistance in environmental studies, Feasibility studies and mapping of the hazard areas.

**Food Service/Elders Program:** The Food Service Program provides pre-disaster community outreach through Meals On Wheels, nutritional information, guidance and transportation with tribal funding and federal grants. The Elders Program provides post-disaster counseling through Caregiver's Program.

**Housekeeping:** The Housekeeping Department is tribal funded. Manpower is provided in post-disaster response phase.

**Human Resources:** Skilled work force.

**Indian Child Welfare:** ICW offers safe temporary shelters to disaster stricken Native American children and families. ICW is funded through tribal and federal grants.

**Injury Prevention Program:** With funding through federal grants and tribal resources the Injury Prevention Program is provided for children in the community. The IPP offers life safety education to parents and students. An example is the safe car seats program to teach car safety and provide car seats and replace defective seats. Handouts of safety pamphlets related to personal safety are provided at various events and as appropriate.

**Kaw Nation Family Trauma Healing Center:** The Kaw Nation Family Trauma Healing Center is a federally funded program that provides support and assistance to victims of domestic violence, sexual assault, teen dating violence, stalking, elder abuse, and other crimes, as well as their immediate family members. KNFTC offer's a range of services including court advocacy, case management, transportation, relocation assistance, legal assistance, shelter, and other forms of financial assistance based on the specific needs of each victim. The goal is to help restore safety and integrity to those affected by traumatic events.

**Kaw Nation Tag Agency:** Process new and used vehicles for Tribal Citizens tags at a reduced price.

**Kaw Nation Tax Commission:** Responsible for licensing rate of Kaw Nation Enterprises including tobacco sales, alcohol, sales and vendors.

**KIXR, KLOR, WBBZ, KPNC Radio Stations:** Provides public information, communications, and emergency broadcasts on road and weather conditions.

**Language/Culture/Library:** Tribal historic preservation offers technical assistance and is required prior to all mitigations projects. These services are funded through tribal and federal funds.

**Maintenance:** Although funding is limited and is provided through tribal funds, Kaw maintenance provides manpower and equipment in pre and post-disaster mitigation projects.

**Motor Pool:** Transportation needs.

**Networking:** The Kaw Nation IT department oversees and maintains all computers and telephones. It is funded through tribal funds. Kaw Nation IT department works in conjunction with a third part IT service that manages critical data storage, cybersecurity, servers, and tier 3 and 4 level support. throughout the tribal government and is critical function of all mitigation projects.

**Public Information:** Funded through tribal funds the PIO provides information for mitigation projects, government services and emergency information for Tribal Citizens and the community. These services are provided both pre and post-disaster.

**Purchasing:** Funded through tribal funds, Purchasing has established procedure for all purchasing and procurement needs for the tribal government, federal programs and Enterprises. These services are provided both pre and post disasters and are utilized on all mitigation projects.

**Realty Management:** For land in trust, simple fee, surface and mineral rights and leased property.

**Roads/Bridges:** Utilizing tribal funds and federal funds provided through the BIA, Roads and Bridge design and construct new roads and bridges to be disaster resistance. Coordinating with local and state jurisdictions.

**Safety:** The Safety Department is responsible for all safety procedures and policies and provides safety training for tribal employees. Funding is provided through tribal funds. Safety procedures and policies are required on all projects.

**Self-Governance:** Funded by compact, administrates and funds programs under self-governance including clinic operations, dental, pharmacy, contracted services, wellness center, BIA Tribal governance including law enforcement, Indian child welfare, social services, trust and education.

**Grants and Contracts:** Obtains necessary funding for governmental operations through obtaining grants. G&C also oversees administration of grants to ensure compliance with tribal and federal management regulations and provide grant oversight and compliance, providing technical assistance as needed. All pre and post-disaster mitigation grants are awarded through this office.

**Tribal Court:** The Tribal Court system using Tribal Codes consisting of laws and ordinances provide law and order and established building codes most recently with Resolution No 09-101 and enforcement policies to ensure public safety and compliance with all mitigation projects.

**Tribal Police:** Through the tribal police the department ensures public safety and enforces tribal codes through the judicial system and provides security throughout the tribal complex. Funding is provided through federal grants and tribal funds.

**Tribal Rolls:** Maintains a current, accurate listing of all Tribal Citizens, administers Scholarship and burial Assistance Programs.

**Wellness Center:** Prevention health care through managed exercise programs.

## Assurance

The Kaw Nation has demonstrated its capability to comply with all applicable Federal statutes and regulations relating to FEMA and all Federal Grants.

Following are the requirements and assurances for the above FEMA grant:

**Financial Reports** – Financial Status Report is submitted within 30 days after the end of each calendar quarter.

**Performance Reports** – The Kaw Nation has submitted quarterly performance reports detailing financial and overall progress within 30 days after the end of each calendar quarter.

**Budget** – Budget requirements are found in 2 CFR 200.308. The Kaw Nation understands that written approval must be received for any budget revision which would result in the need for additional funds.

**Audit Requirements** – The Kaw Nation agrees to comply with the audit requirements of 2 CFR 200 Subpart F. With respect to the Single Audit Act, the Kaw Nation does not have any material weakness on federal awards.

**Amendments Requirements** – The Kaw Nation will amend this plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR Part 201.7.

## 201.7 Tribal Mitigation Plans

The Indian Tribal Mitigation Plan is the representation of the Indian tribal government's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.

**(a) Plan requirement.** **(1)** Indian Tribal governments applying to FEMA as a recipient must have an approved Tribal Mitigation Plan meeting the requirements of this section as a condition of receiving non-emergency Stafford Act assistance and FEMA mitigation grants. Emergency assistance provided under [42 U.S.C. 5170a](#), 5170b, 5173, 5174, 5177, 5179, 5180, 5182, 5183, 5184, 5192 will not be affected. Mitigation planning grants provided through the PDM program, authorized under section 203 of the Stafford Act, [42 U.S.C. 5133](#), will also continue to be available.

**(2)** Indian Tribal governments applying through the State as a subrecipient must have an approved Tribal Mitigation Plan meeting the requirements of this section to receive HMGP project grants. A Tribe must have an approved Tribal Mitigation Plan to apply for and receive FEMA mitigation project grants, under all other mitigation grant programs. The provisions in § 201.6(a)(3) are available to Tribes applying as subrecipients.

**(3)** Multi-jurisdictional plans (*e.g.*, county-wide or watershed plans) may be accepted, as appropriate, if the Indian Tribal government has participated in the process and has officially adopted the plan. Indian Tribal governments must address all the elements identified in this section to ensure eligibility as a recipient or as a subrecipient.

**(b)** An effective planning process is essential in developing and maintaining a good plan. The mitigation planning process should include coordination with other tribal agencies, appropriate Federal agencies, adjacent jurisdictions, interested groups, and be integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA mitigation programs and initiatives.

**(c) Plan content.** The plan must include the following:

**(1)** Documentation of the *planning process* used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved. This must include:

**(i)** An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval, including a description of how the Indian Tribal government defined “public;”

**(ii)** As appropriate, an opportunity for neighboring communities, Tribal and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process.

**(iii)** Review and incorporation, if appropriate, of existing plans, studies, and reports; and

**(iv)** Be integrated to the extent possible with other ongoing Tribal planning efforts as well as other FEMA programs and initiatives.

**(2)** A *risk assessment* that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Tribal risk assessments must provide sufficient information to enable

the Indian Tribal government to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment must include:

**(i)** A description of the type, location, and extent of all natural hazards that can affect the Tribal planning area. The plan must include information on previous occurrences of hazard events and on the probability of future hazard events.

**(ii)** A description of the Indian Tribal government's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description must include an overall summary of each hazard and its impact on the Tribe. The plan should describe vulnerability in terms of:

**(A)** The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

**(B)** An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

**(C)** A general description of land uses and development trends within the Tribal planning area so that mitigation options can be considered in future land use decisions; and

**(D)** Cultural and sacred sites that are significant, even if they cannot be valued in monetary terms.

**(3)** A *mitigation strategy* that provides the Indian Tribal government's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section must include:

**(i)** A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

**(ii)** A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

**(iii)** An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the Indian Tribal government.

**(iv)** A discussion of the Indian Tribal government's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including: An evaluation of Tribal laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard-prone areas; and a discussion of Tribal funding capabilities for hazard mitigation projects.

**(v)** Identification of current and potential sources of Federal, Tribal, or private funding to implement mitigation activities.

**(vi)** In accordance with § 77.6(b) of this chapter, applicants and sub-applicants for FMA project grants must have a FEMA-approved mitigation plan that addresses identified flood hazards and provides for reduction of flood losses to structures for which NFIP coverage is available.

**(4)** *A plan maintenance process that includes:*

**(i)** A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan.

**(ii)** A system for monitoring implementation of mitigation measures and project closeouts.

**(iii)** A process by which the Indian Tribal government incorporates the requirements of the mitigation plan into other planning mechanisms such as reservation master plans or capital improvement plans, when appropriate.

**(iv)** Discussion on how the Indian Tribal government will continue public participation in the plan maintenance process.

**(v)** A system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy.

**(5)** The plan must be formally adopted by the governing body of the Indian Tribal government prior to submittal to FEMA for final review and approval.

**(6)** The plan must include assurances that the Indian Tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including [2 CFR](#) parts [200](#) and [3002](#). The Indian Tribal government will amend its plan whenever necessary to reflect changes in Tribal or Federal laws and statutes.

**(d) Plan review and updates.** **(1)** Plans must be submitted to the appropriate FEMA Regional Office for formal review and approval. Indian Tribal governments who would like the option of being a subrecipient under the State must also submit their plan to the State Hazard Mitigation Officer for review and coordination.

**(2)** The Regional review will be completed within 45 days after receipt from the Indian Tribal government, whenever possible.

**(3)** Indian Tribal governments must review and revise their plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years to continue to be eligible for non-emergency Stafford Act assistance and FEMA mitigation grant funding.

## Tribal Capability Assessment

### Evaluation of Pre/Post-Disaster Policies, Programs and Capabilities

Various hazards present disaster related threats to the Tribe. With the updating of this plan, ongoing evaluation of programs and policies with disaster mitigation being the focus, will present changes and amendments to many programs that will lead to the development of new ordinances and policies.

The following are some examples of the evaluation of the Kaw Nation's pre- and post-disaster hazard management laws, tribal regulation and ordinances, policies, programs, and capabilities related to development in hazard prone areas.

On the following pages, there is listed the evaluation of the Tribe's pre- and post-disaster hazard management policies, and programs and capabilities. Also, within the matrix, tribal funding capabilities for hazard mitigation projects, challenges due to lack of funding, and some areas where outside funding sources will be needed are noted. In addition, the Tribe's policies related to development in hazard prone areas are also identified.

The Kaw Nation tribe has a Pandemic Influenza Plan from 2011 that needs updating and a Continuity of Operations Plan (COOP) for the tribe had not been completely developed. The Emergency Operation Center has been relocated several times since the adoption of the last MHMP in 2016. Proper communications equipment as well as a properly equipped Emergency Response vehicle is in dire need of upgrading to enable Emergency Response personnel to set up Incident Command or Unified Command with other agencies per NIMS/FEMA guidelines. The use of American Rescue Plan Act (ARPA) funding has been proposed to assist in bringing the EOC and the Emergency Response vehicle into compliance with current standards.

Per 2014 Oklahoma Statutes Title 63 Public Health and Safety 63-695.2, all Oklahoma local and tribal jurisdictions were included in the Oklahoma Intrastate Mutual Aid Compact.

### Tribal Funding Capabilities for Hazard Mitigation Projects

There are many States and Federal grant programs available to Tribes regarding hazard mitigation. These include FEMA, Homeland Security, Flood Mitigation Assistance, Department of Justice, USDA, HMGP, REAP, Army Corps of Engineers, NCRS, Department of Agriculture, Wildlife Department, EPA, BIA, Department of Transportation, and the Indian Community Development Block Grant.

Indian Health Services (IHS) provides funding to develop emergency response capabilities for the Kaw Nation Health Services. Although some departments within the Kaw Nation do not currently have funding for mitigation, they do however have resources such as manpower, equipment, and expertise to complete planned projects through the Maintenance Department. As an example, Kaw Nation needs community storm shelters. HUD has limited funds available for storm shelters, and the Tribe has limited funding. But the Tribe plans to apply for a HMGP grant for assistance. Even with limited funding, the Tribe will be focused on mitigation activities as funding becomes available and additional activities may be implemented.

In the Multi-Hazard Mitigation Project, available funding sources are on each Project along with an estimated budget. Most of these funding sources do require a non-federal tribal match. The Kaw Nation possesses the managerial, administrative, and technical capacity necessary to carry out the proposed



Tribal Multi-Hazard Mitigation Plan. Other funding sources from Kaw Nation will be in-kind match from equipment, labor, and non-federal tribal match through our finance department.

The Emergency Manager will monitor mitigation measures by enforcing codes, and monitoring progress by conducting site visits to ensure the project stays on track. A final report will be submitted to the Chair for closeout procedure. Projects completed by the EM and the Finance Department with all reports compiled and verified before sending to the awarding agency.

## PLANNING PROCESS

Floods, tornadoes, winter storms, drought, and other hazardous events are a part of our world, and their natural occurrence is inevitable and cannot be controlled. It is when these natural events intersect the man-made environment that “disasters” occur. Natural hazards cannot be prevented but action can be taken to reduce their impact upon the human environment so that a disaster is less likely to result.

The Kaw Nation Hazard Mitigation Planning Team will discuss the planning process, provide background information, a hazard and risk assessment of Kaw Nation, describe mitigation strategies, their implementation, and plan maintenance procedures, along with providing a strong contingency plan to assist in time of need.

Hazard mitigation involves recognizing and adapting to natural forces and is defined by the Federal Emergency Management Agency (FEMA) as any sustained action taken to reduce long-term risk to human life and property from natural hazards. Mitigation is the component of emergency management that has the potential to break the cycle of damage and reconstruction that can occur when a community is subjected to repeated natural hazards and therefore should be a high priority.

44 CFR Chapter 1, Subchapter D **Part 201 Mitigation Planning Authority:** Robert T. Stafford Disaster Relief and Emergency Assistance Act, [42 U.S.C. 5121](#) through [5207](#); Homeland Security Act of 2002, [6 U.S.C. 101](#); National Flood Insurance Act of 1968, [42 U.S.C. 4104c](#), provides for States, Indian Tribal governments, and local governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

The hazard mitigation plan is being integrated into all on-going planning efforts such as land use, capital improvements, health plans, etc. The primary purpose of this Plan is to establish and document such a process for areas and assets within the jurisdiction of Kaw Nation and, in doing so, fulfill the requirements of the Robert T. Stafford Act and FEMA. The Plan will address natural hazards that occur within Kaw Nation. Using this Plan, Kaw Nation hopes to lessen its’ vulnerability to disasters caused by natural hazards. The Plan is intended to serve as a guide for Kaw Nation in coordinating and implementing hazard mitigation policies, programs, and projects. The Plan is being integrated with Federal, State, County, and local plans to the extent possible to mitigate hazards within the jurisdiction service area of the Kaw Nation.

The Kaw Nation All Hazard Mitigation Planning Team was formed to provide guidance during the preparation of this Plan and developed following the Draft Tribal Multi-Hazard Mitigation Planning Guidance released by FEMA. Initially, the Planning Team went through the Plan line by line to identify weaknesses and areas of possible improvement. Though the previous mitigation plan was approved by

FEMA and adequate for Tribal operations, it needed updates to include current data and to meet the changing needs of the Kaw Nation.

The Mitigation Planning Team worked closely with Winning Strategies and Consultant Diann Wilson to review the previous plan and identify areas of possible improvement. Consultant Diann Wilson met with the Mitigation Planning Team members on various occasions to discuss changes and updates to the plan over a several month period and then provided copies of the changes and updates to the Mitigation Team for review and comments.

Within this timeframe, Wilson and Hesson, conversed with other area applicable entities to collect information that was pertinent to Kaw Nation tribal needs. Also included in the planning process were in state and out of state tribes who had published their mitigation plans online. Gaining the valuable input of areas tribes was very helpful in the identification of shortfalls and areas of possible improvement. The Mitigation Planning Team provided valuable input to the consultant in the improvement of the previous plan. The Mitigation Planning Team also used a community planning approach, relying on public meeting approach and the Integrated Resource Management Plan to ensure the tribal priorities were reviewed and included in the safety and planning aspects. Having the ability to review the draft in various stages of development helped to ensure that all areas of hazard and concern were fully developed. As the Mitigation Planning Team reviewed the plan line by line, all sections were updated accordingly, and more detailed information was provided to each section reviewed. Some areas had more revisions than others mainly to include current threats and changing priorities. The process integrated FEMA mitigation programs and initiatives through a formal review process with considerations to our service area taking a risk-based approach to reducing hazards and areas of mitigation to reduce possible risks.

Once the plan is formally approved by FEMA, the Emergency Management Director will work with Kaw Nation Chair, Kim Jenkins, and the Tribal Council for formal adoption through tribal resolution. The Tribal Council has shown prior commitment to the planning efforts of the Mitigation Planning Team, first through the original plan and again by ***Tribal Resolution 17-15*** authorizing the update of the previously approved plan.

Mitigation Planning Team citizens, along with their affiliation are listed in Table 1-1. This Team was comprised of Kaw Tribal Citizens and employees.

**TABLE 1-1. KAW NATION HAZARD MITIGATION PLANNING TEAM CITIZENS**

NAME	AFFILIATION
Kim Jenkins	Kaw Nation Chair
	EM Director
Cheryl Craig	Self-Governance/Trust
Ken Bellmard	Government Relations/KGI Director
Robin Banister	Travel Insurance Clerk

### The Goals of the Kaw Nation Mitigation Planning Process

Through this planning process, Kaw Nation plans to achieve the following goals:

- Reduce any repetitive losses from natural hazards in Kaw Nation Tribal jurisdictional service area.

- Facilitate responsible development in Kaw Nation Tribal jurisdictional service area to reduce or eliminate the potential impacts of natural hazards.
- Enhance public awareness and understanding of natural hazard preparedness.
- Develop mitigation measures for specific hazards.

The Kaw Nation Tribal Citizenship will be referred to as the Public. No community outside of the Tribal Citizenship will be utilized and the plan will not be integrated with other Indian tribal planning efforts. The tribal multi-hazard mitigation plan will be integrated to our Emergency Operations Plan (EOP) in reference to Public Education, Outreach Programs, Utilities, and Housing Projects. The hazard mitigation plan will be integrated annually by the emergency manager, by updating hazards and using risk assessment to determine emergency procedures, and supply publications for all outreach, utilities, and housing projects.

### Plan Maintenance

The plan maintenance section of this document describes the formal process that will ensure that the Kaw Nation Tribal Multi-Hazard Mitigation Plan remains an active and relevant document with continued tribal participation. The plan maintenance process includes annual evaluations, revisions or updates as needed by the Mitigation Planning Team and Tribal Citizens. The Plan will be resubmitted for federal review every five years. The Kaw Nation Emergency Manager will be responsible for working with a professional consultant to aid in the evaluating and updating the Plan. Plan updates and revisions will be submitted to the Kaw Nation General Council for adoption.

The Kaw Nation Emergency Manager and the Mitigation Planning Team will evaluate the Multi-Hazard Mitigation Plan every year to determine the effectiveness and/or progress of mitigation actions and the implementation of other actions.

Plan Evaluation/Maintenance should address the following questions:

1. Do actions address current and expected hazardous conditions?
2. Has the nature of the magnitude of risk changed?
3. Are the current resources appropriate for implementing mitigation actions?
4. Are there any implementation problems, such as technical, political, legal, or coordination issues with other agencies?
5. Did outcome of mitigation actions occur as expected?

The Team and Emergency Manager will have three months, from the date of the evaluation meeting, to update the Plan with any changes needed. The Emergency Manager will resubmit the Plan for Federal review every five years.

Items covered during the Evaluation/Maintenance process should include:

1. Evaluate magnitude of risk and determine if it has changed.
2. Evaluate current resources and determine if they are appropriate for implanting actions.
3. Determine if there were any implementation problems, such as technical, political, legal, or coordination issues with other agencies.
4. Evaluate how other agencies and partners have participated.
5. Evaluate mitigation actions and determine if outcome occurred as expected.
  - a. Was the intended purpose of the original mitigation action met?

- b. Was the mitigation action met in the proposed timeline?
- c. Did the listed agencies participate in the mitigation action?
- d. Did mitigation action stay within proposed budget?

The evaluation/mitigation process assesses goals, objectives, and current/expected conditions, change in the nature or magnitude of risk, current resources for implementation, mitigation, action item outcome and weather agencies and partners participation as originally proposed.

### Plan Review and Updates

The Kaw Nation Emergency Manager will be responsible for monitoring the Plan. A monitoring report will be written and submitted to the Mitigation Planning Team on a yearly basis. The Team will request a quarterly report following a period of rapid growth or unexpected events.

The Mitigation Plan, when approved and adopted, will be incorporated into the Tribal Emergency Operation Plan. Other Tribal planning mechanisms include Tribal short-range goals, long range goals, Tribal strategic plans, Tribal Master Plan, and Tribal allocations plans. Once these plans are updated, (there is a specific schedule for each plan), the mitigation can be incorporated into the updated plans. The person responsible for this will be the Emergency Manager.

The Plan will continue to be updated annually during the next five-year cycle process and any time after a disaster. The Tribe will invite the public for participation during the update by posting meeting announcements and informing the public about their potential hazards. Beginning on the fourth year, the Kaw Nation Emergency Manager and Mitigation Planning Team will make all plan revisions to be finalized and be approved by FEMA before the end of the fifth year so that the jurisdiction will maintain eligibility. The Plan will be submitted for State and Federal review every five years.

### Risk Assessment

The risk assessment consists of ten hazards. Each hazard was reassessed to ensure relevance and remained in the updated plan. Risk assessment data was updated, and invalid information removed. No new hazards were addressed but additional detail has been added and reference to man-made hazards were removed.

The updated risk assessment now contains the following hazards:

1. Dam/Levee Failure
2. Drought
3. Earthquake
4. Expansive Soils
5. Extreme Heat
6. Flooding/Flash Flooding
7. Severe Storm
8. Severe Winter Storm
9. Tornado
10. Wildfire

The Kaw Nation MHMP identifies critical facilities located within the Tribal service area and the hazards to which these facilities are susceptible. A critical facility is defined as a facility that provides essential products or services to the public and is necessary to the preservation of the welfare and quality of life

in the Kaw Nation Tribal Jurisdictional Area (TJSA). In this Tribal Plan, the Mitigation Planning Team agreed that all infrastructures that are 100% susceptible to all hazards would be included in this plan. In future updates, other facilities may be added.

Team Citizens and others helped locate the facilities. GIS software was used to map the facilities and determine which are most likely to be affected by hazards. According to the guidelines in the FEMA document *“Understanding Your Risks; Identifying Hazards and Estimating Losses”* the use of a truncated inventory with cost estimates of critical facilities and residential properties is sufficient for providing a very broad picture of the potential extent of damage likely to occur from a hazard event. Therefore, since time, money, and resources were limited, truncated inventories were prepared to estimate the proportion of buildings, and the value of buildings in the TJSA. This is not a multi-jurisdictional plan. This is only facilities critical to the Kaw Nation TJSA.

## Identifying Hazards

The first step in developing a hazard mitigation plan is to identify and describe all the natural hazards capable of occurring within the Kaw Nation Tribal Jurisdictional Service Area (TJSA), which includes 95% of the service areas in the Kay County borders, and the vulnerabilities to each one so that appropriate action can be taken to mitigate the impact of the hazards, minimize the losses and recover as quickly as possible. It is recognized that all the demands of a disaster situation cannot be anticipated, but by being aware of the areas, major facilities and persons that may be vulnerable to each type of hazard, preventive measures, as well as emergency response, can be planned.

Details of each natural hazard and its impact on the Kaw Nation which represents 95% of the service areas of Kay County are given in separate profiles for each hazard. This plan will identify the hazards’ profiles in terms of their history and likelihood to occur within the Kaw Nation. The hazards of “Lightening”, and “Hail” are incorporated into the “Thunderstorms” profiles since, in this region, incidences of damaging lightning, and hail are associated with thunderstorms. “High Winds” were incorporated into the “Tornado” profile. Although the hazards of Wildfire, Extreme Heat, and Expansive Soils are most often associated with drought, these hazards are depicted in separate profiles. However, due to limited resources and the lack of county-specific data pertaining to these hazards, the profiles for Wildfire, Extreme Heat and Expansive Soils are general descriptions of those hazards.

**TABLE 1-2: TYPES OF NATURAL HAZARDS**

<b>Natural Hazard</b>	<b>How Identified</b>	<b>Why Identified</b>
Dam/Levee failure	<ul style="list-style-type: none"> <li>Data from OK Water Resources Board</li> </ul>	Although not directly a <i>natural</i> hazard, it was included as dams exist within the Kaw TJSA and can be associated with flooding should they fail.
Drought	<ul style="list-style-type: none"> <li>Data from the Palmer Drought Indices/National Centers for Environmental Information</li> </ul>	Due to potential losses in agriculture during drought. The Kaw TJSA often has a PDSI of -3 or greater in late summer. History has shown temperatures over 100 for prolonged periods of time for the Kaw TJSA. This affects humans and potential losses in agriculture.
Earthquake	<ul style="list-style-type: none"> <li>Data from the Oklahoma</li> </ul>	The Kaw TJSA has been known to have

	Geological Survey	earthquakes. Kay County contains countless oil & gas pipelines thereby making it a concern.
Expansive Soils	<ul style="list-style-type: none"> <li>Data from the Oklahoma Geological Survey</li> </ul>	Due to potential losses in agriculture during times of soil expansion, and contraction.
Extreme Heat	<ul style="list-style-type: none"> <li>Data from National Integrated Heat Health Information System</li> </ul>	History has shown temperatures over 100 for prolonged periods of time for the Kaw TJSA. This affects humans and potential losses in agriculture.
Flood/Flash Flooding	<ul style="list-style-type: none"> <li>Data from United States Geological Survey</li> </ul>	During significant rain events low lying and poor drainage areas are prone to flash flooding and is a risk to lives and potential financial income.
Storm/Lightning/Hail Thunderstorm <ul style="list-style-type: none"> <li>Lighting</li> <li>Hail</li> </ul>	<ul style="list-style-type: none"> <li>Data from National Climatic Data Center</li> </ul>	<p>Common to state and locale.</p> <p>High Public Concern</p> <p>Significant damages to tribal and public property</p> <p>Thunderstorms often occur within Kaw TJSA and are associated with hail which can cause significant damage of and by itself.</p>
Severe Winter Storm	<ul style="list-style-type: none"> <li>Data from National Oceanic and Atmospheric Administration</li> </ul>	Winter storms occur with the Kaw TJSA, some of which have been severe in times past.
Tornado/High Winds – Including Windstorms	<ul style="list-style-type: none"> <li>Data from National Weather Service</li> </ul>	<p>Common to state and local</p> <p>High Public Concern</p> <p>Kay County is in Tornado Alley and tornado/high winds are common within the State</p>
Wildfires	<ul style="list-style-type: none"> <li>Data from Oklahoma State Fire Marshall</li> </ul>	<p>Wildfires are common to the Kaw TJSA because of the abundance of timber and dry grasses including potential losses in agriculture during Wildfires.</p> <p>The most vulnerable areas of concern for wildfire include Kaw Nation tribal headquarters located in Kaw City due to the area being surrounded by Timber and dry grass.</p>

## Natural Hazard Assessments

The profiles, found later in this chapter, were prepared for each identified natural hazard and assess the hazard per the following nine categories:

### 1. Definition

The definition of each hazard describes what the hazard is.

## 2. Location

Tribal Jurisdictional Service Area (TJSA) that can be affected.

## 3. Extent/Severity

This describes the hazard's impact in terms of how severe of an event the particular hazard is capable of inflicting upon Kaw Nation.

## 4. Previous Occurrence

The description of hazards in the past.

## 5. Probability/Likelihood

Likelihood describes the probability that the hazard will occur within the Kaw TJSA. Each hazard is assigned a Likelihood rating based on the criteria and methods described below.

The "Likelihood" rating was based on the following definitions:

Highly likely	=Event probable in the next year
Likely	=Event probable in next 3 years
Occasional	=Event probable in next 5 years
Unlikely	=Event probable in next 10 years

## 6. Vulnerability

Vulnerability describes how exposed or susceptible to damage the Kaw TJSA is in terms of why and where the hazard can occur within the Kaw TJSA.

## 7. Impact

Potential Severity of Impact describes the hazard's impact in terms of a "worst-case scenario" that the hazard event is capable of inflicting upon the Kaw TJSA. Due to the limited amount of Kaw TJSA specific documented data, the analysis for determining potential severity was limited to obtaining opinion and information furnished by the Kaw Nation Mitigation Planning Team citizens.

## 8. Secondary Hazards

Secondary hazards list other hazards often triggered by the identified hazard event. Some natural disasters set off other types of catastrophes in a cascade of effects that lead to a highly complex situation. Secondary hazards can be events such as transportation and communications disruptions, fire, hazardous materials dispersion, power outages, and other utilities disruptions. These secondary events are identified along with the associated primary hazard due to how they can dictate the amount of impact a natural hazard event can have on the Kaw TJSA.

## 9. Summary

This section summarizes the vulnerability and impact on Kaw TJSA with all the possibilities from a natural disaster.

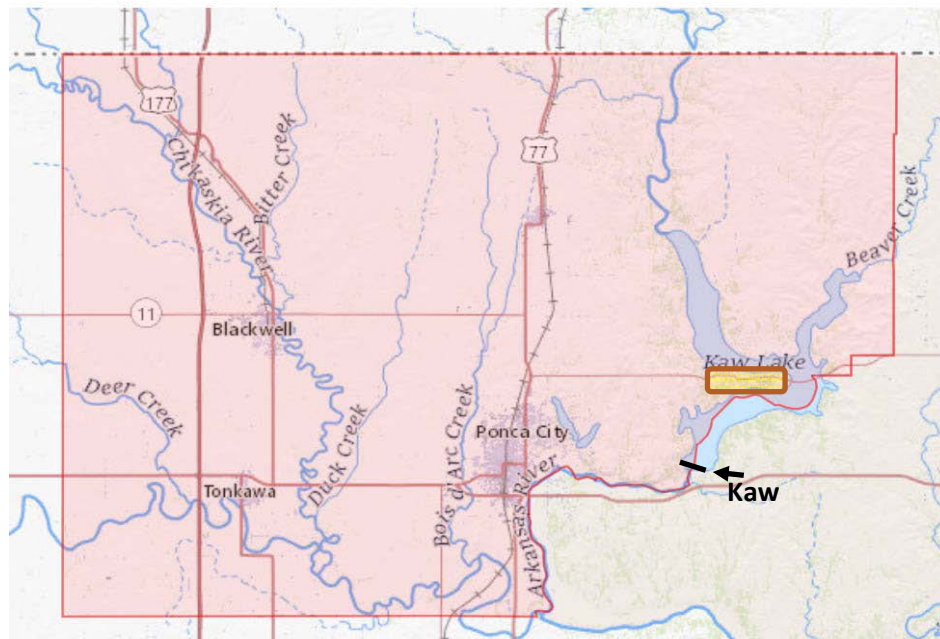
## HAZARD PROFILE: Dam/Levee Failure

**Definition:** Dams can fail by several different means. Three general failure models include:

- Natural disaster related failure, such as when the dam is overtopped by flood waters, which creates a breach through the embankment.
- Intrinsic structural failure, (including foundation problems) either under sunny-day circumstances or during high reservoir levels.
- Failure resulting from an act of terrorism or sabotage.

**Location:** The Ponca Lake Corps of Engineering dam impounds 23,700 acres of water with the capability to do catastrophic damages. The Kaw Nation Headquarters are not vulnerable to dam failure due to the elevation compared to the dam. Kaw Nation Headquarters are in the box on the map where it is located between Kay County and Osage County.

*Location of Kaw Nation Headquarters to Kaw Lake Dam*



**Extent/Severity:** There is no evidence or expectation of a dam failure in Kaw Nation. There could be possible back up water of one foot from the initial dam failure in the lower area of the TJSA located along Kaw Lake.

**Previous Occurrences:** The Spring of 2019 saw the Arkansas River hit a record high at Ponca City, about 70 miles upriver from the City of Tulsa. The flood's longevity triggered concerns about Tulsa County's 70-year-old levee system which was undergoing far more prolonged stress than it did during the record-setting floods of 1986. Rivers overflowed causing significant damage with water over the many roadways. The devastation in Kay County affected hundreds of residents and businesses.



**Probability/Likelihood:** No dam breaks have occurred within the TJSA. The probability of a dam break is currently rated as unlikely.

**Vulnerability:** As long as dams exist so does the chance for failure. Kay County has five man-made dams: Kaw Lake Dam, Lake Ponca, Blackwell Lake, Braman, and the Blackwell Diversion Dam. Kaw Lake Dam is relatively new and structurally sound. It was completed in 1977 and is monitored annually by the Oklahoma Water Resource Board (OWRB) due to its status as a “High Hazard Dam.” According to the US Army Corps of Engineers, this status is assigned to the dam due to its function and location. Although used for hydroelectric power and water supply, its function as flood control warrants the high hazard status because of its location, where failure may cause a serious threat downstream. OWRB also rates the Ponca Lake Dam and the Cremer’s Park Regional Detention Dam as “High Hazard Dams” due to function and location. The smaller dams, Blackwell Lake, Braman, and the Diversion Dams on the Chikaskia River show signs of deterioration. However, population and property improvements in the flood plains below these structures have been at a minimum. Therefore, according to Kaw Nation Emergency Management, there are no tribal homes, roads, or land holdings in the potential inundated areas. The only vulnerabilities that exist would be EM personnel responding to any event in the area based on the mutual aid with Kay County. Potential loss of life and damage to equipment could be expected.

**Secondary Hazards:** Secondary hazards can include transportation disruptions and possible dispersion of contaminants. Although hazardous materials and other contaminants are not identified in the area, this could be of major concern.

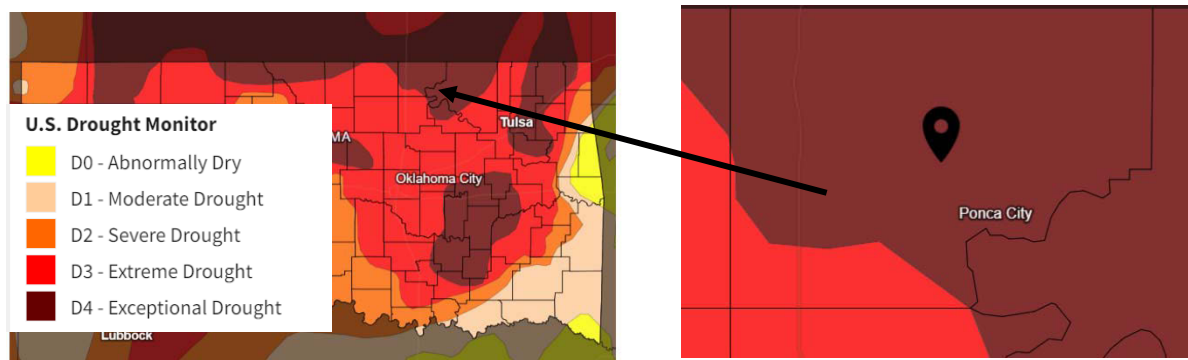
**Summary:** There is no record of dam failure in the history of Kay County. There are 3 “high-hazard” dams within the County. This designation simply reflects a dam’s potential for doing damage downstream if it were to fail and does not mean that a dam needs repair. The areas impacted (swash zones) are delineated using dam breach analysis. However, due to the low population downstream of these dams, the Corps of Engineers have not conducted such analysis.

## HAZARD PROFILE: Drought

**Definition:** A drought is a period of abnormally dry weather which persists long enough to produce a serious hydrologic imbalance. There are four ways that a drought can be defined:

- Meteorological – a measure of departure of precipitation from normal
- Agricultural – refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
- Hydrological – occurs when surface and subsurface water are below normal.
- Socioeconomic – the situation that occurs when physical water shortage begins to affect people.

**Location:** Drought can occur over a large geographical area at any time due to a changing climate. The entire TJSA is at risk. The tribal jurisdiction currently the full range of the Palmer Index for Extreme Drought and Exceptional Drought.

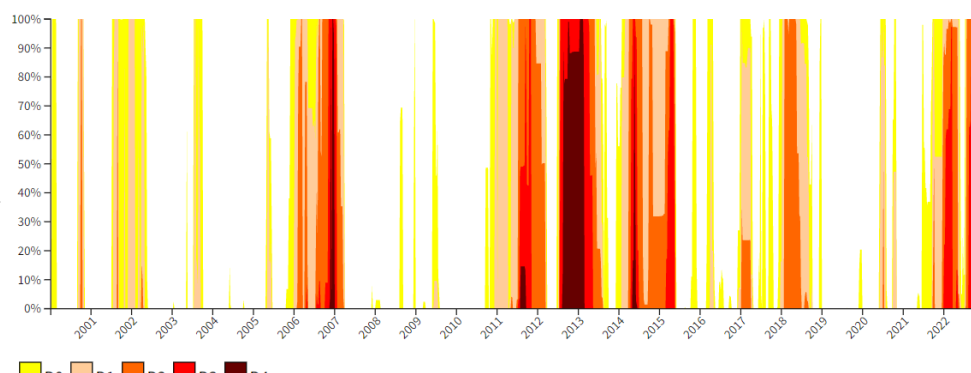


**Extent/Severity:** The extent and severity of a drought impacts in several ways, spanning all regions, and can affect the economy as well as the environment. Specific impacts and include:

- Reduced crop, rangeland.
- Increased livestock and wildlife mortality rates.
- Reduced income for farmers and agribusiness.
- Increased fire hazard.
- Reduced water supplies for municipal/industrial, agricultural, and power uses.
- Damage to fish and wildlife habitat.
- Increased consumer prices for food.
- Reduced tourism and recreational activities.
- Unemployment.
- Reduced tax revenues because of reduced expenditures, and...
- Foreclosures on bank loans to farmers and businesses.

**Probability/Likelihood:** Given the history of drought events across Oklahoma for the past 20+ years, one may conclude that Oklahoma can expect a drought every decade and that we can expect droughts to occur more frequently here than in the Country as a whole. However, long-term forecasts of droughts are difficult and inexact. The U.S. Army Corp of Engineers (USACE) is nearing completion of the National Drought Atlas to provide information on the magnitude and frequency of minimum precipitation and stream flow for the contiguous United States. On average the July-to-January period is the lowest six-month period of stream flow throughout the U.S. and is used to characterize drought. The mean monthly flow from July to January has a once-in-20 years chance of falling below a level that would classify it as a drought. In other words, the average drought is once every twenty years nationwide, with an occurrence most likely lasting for years. As reflected in the chart below, the risk for Kaw Nation is highly likely.

**22 Year Drought History Chart for Kay County**



**Vulnerability:** Kaw Nation is in the south-central United States. The primary air masses that bring moisture to the state originate in the Gulf of Mexico. Air masses that come into the state from the west are usually stripped of moisture by the Rocky Mountains, and as a result, mean annual precipitation increases from west to east. According to USA Facts, Kay County mean annual precipitation is 33.5 inches. Should a drought occur in this TJSA the livestock, crops and land that is leased for hay fields could be vulnerable to revenue loss as well as water restrictions.

**Impact:** The most direct impact of drought is economic rather than loss of life or immediate destruction of property. While drought impacts in TJSA are numerous and often dependent upon the timing and length of individual drought episodes, the greatest impacts of drought are usually experienced in the agricultural community. In addition to the obvious direct losses of both crop and livestock production due to a lack of surface and subsurface water, drought is frequently associated with increases in insect infestation, plant diseases, and wind erosion of course. One of the most significant potential impacts of drought relates to public water supply in metropolitan areas there may be a need to stop washing vehicles, cease from watering the grass and take other water conservation steps. In smaller communities, reduced flow in rivers and streams can have a significant effect on the water amount allowed for municipal use. Hot weather during the summer increases demand and subsequent use of supplies, as well as evaporation. In turn, increased water demand can stress many smaller and/or antiquated delivery and treatment facilities to the point of collapse. Prolonged drought has a much greater impact on rural communities, which usually rely on relatively small watersheds and are especially vulnerable during such periods.

**Secondary Hazards:** Water shortages can also affect firefighting capabilities in both urban and rural settings through reduced water flows and pressures. Most droughts dramatically increase the danger of fires on wildland. When wild lands are destroyed by fire, the resulting erosion can cause heavy silting of streams, rivers, and reservoirs. Serious damage to aquatic life, irrigation and power production then occurs. Although drought can have serious impact during winter months, it is most often associated with extreme heat. Wildlife, pets, livestock, crops, and humans are vulnerable to the high heat that can accompany drought. When temperatures reach 90 degrees and above, people and animals are more likely to suffer sunstroke, heat cramps, and heat exhaustion.

**Summary:** It is difficult to predict drought probabilities for the near future because of the nature and complexity of the hazard. Drought evolves over time as certain conditions are met and are spread over a large geographical area. Drought severity depends on its duration, intensity, geographic extent, and the regional water supply demands that are made by human activities and vegetation. The impact of hazards for Kaw Nation such as Extreme Heat, Expansive Soils, and Wildfires can be intensified during times of drought. Otherwise, the most direct impact of drought is economic rather than loss of life or immediate destruction of property.

## HAZARD PROFILE: Earthquake

**Definition:** An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth surface. This sudden motion or trembling is caused by a release of strain accumulated within or along the edge of earth's tectonic plates.

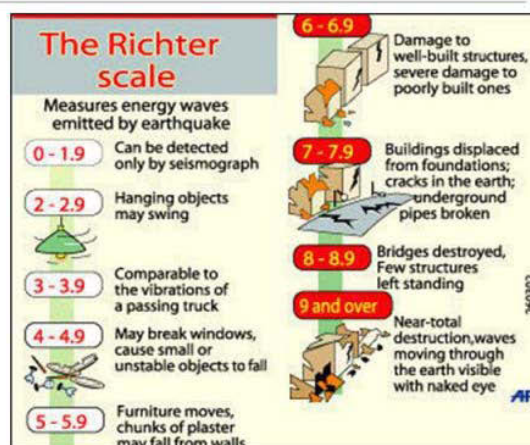
**Location:** Kay County has been shaken in the past by small quakes, but never any of great magnitude. The Nemaha Ridge is a minor fault line in Kay County which connects to the New Madrid fault line along the Mississippi River. The entire Kaw Nation TJSA are susceptible to earthquakes. While we understand that Oklahoma has historically experienced some level of seismicity, we know that the recent rise in earthquakes cannot be entirely attributed to natural causes. Seismologists have documented the relationship between wastewater disposal and triggered seismic activity. The Oklahoma Geological Survey has determined that most recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells. Oklahoma's response to the recent rise in earthquakes is constantly evolving based on the growing body of knowledge dedicated to exploring the issue.

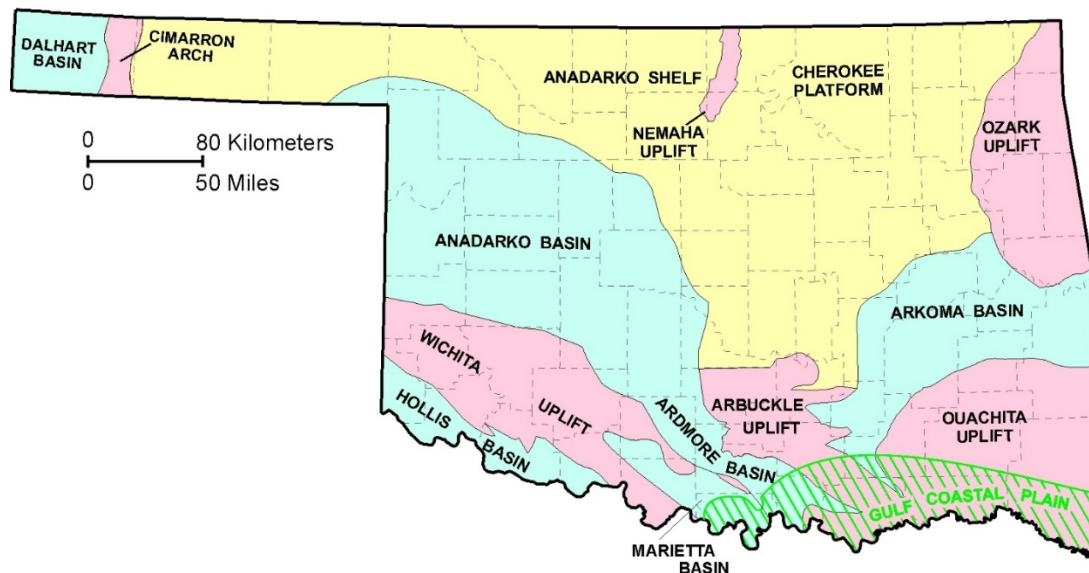
**Extent/Severity:** Kay County has one of the largest petroleum and chemical refineries in the nation. The Ponca City Refinery processes a mixture of light, medium and heavy crude oils. Most of the crude oil processed is received by pipeline from Oklahoma, Texas, and Canada. With countless pipelines, numerous producing oil and gas wells, and large buildings that are not constructed to earthquake codes, the Kaw Nation TJSA has the possibility of a serious catastrophe in the event of a major earthquake. Kaw Nation TJSA anticipates a range of 0-4 on the Richter Scale for an average earthquake that may impact the Tribe. In catastrophic incidences an event greater than 5 will impede tribal daily activities and possibly disrupt several services provided by the Tribe.

### Richter Scale

*A logarithmic scale used to express the total amount of energy released by an earthquake. Its values typically fall between 0 and 9 with each increase of 1 representing a 10-fold increase in energy.*

Value	Potential Hazard
10	Extraordinary
9	Outstanding
8	Far-reaching
7	High
6	Noteworthy
5	Intermediate
4	Moderate
3	Minor
2	Low
1	Insignificant





**Previous Occurrence:** Earthquakes centered within Kay County are rare. The few events that have been recorded are largely unfelt and are seismically rated at or below a level 2. Records maintained by the Oklahoma Geological Survey date back to 1897. The strongest and most widely felt earthquake in Oklahoma occurred on April 9, 1954 near El Reno in Canadian County. This magnitude 5.5 earthquake was felt throughout Oklahoma and in parts of seven other states. On September 3, 2016, a magnitude 5.8 earthquake occurred, centering at Pawnee, in Pawnee County, damaging a dozen buildings. To date, this has been the state's largest earthquake and was located less than 40 miles from Kaw Nation TJSa.

**Probability/Likelihood:** Kay County has a Peak Ground Acceleration value of 2 with a 10% probability of reoccurrence in 50 years. This earthquake measure indicates that there is a probability (10% chance in 50 years) of an earthquake at the severity level of 2 occurring within the County. With this rating and records dating back to 1897, the probability of an earthquake occurring within the Kaw TJSa is likely.

**Vulnerability:** Kay County has beneath its surface the Nemaha Ridge which connects with the New Madrid fault, one of the nation's most seismic active zones. The installation of a statewide earthquake-station network of seismograph stations greatly improved earthquake detection and location. By the end of 2014, 567 earthquakes of at least magnitude 3.0 were recorded in Oklahoma, more than the number of 3.0+ magnitude earthquakes from the previous 30 years combined. In 2014, there were over twice as many earthquakes recorded in Oklahoma as in California, making Oklahoma the most seismically active state in the contiguous United States by a substantial margin. In March 2017, an updated seismic hazard forecast, which like the 2016 version included the risk from induced earthquakes, was released by the United States Geological Survey. The new forecast incorporated earthquakes that occurred in 2016. In 2017 earthquake activity decreased dramatically compared to the previous years, with 294 magnitude 3.0 or greater earthquakes recorded in the state by mid-December. This was less than half the number of similar magnitude quakes recorded in 2016. A correlation between numerous wastewater injection sites being closed or forced to reduce the volume of injection was reported by USGS geologists to have a direct link to the reduction in earthquakes. In the immediate aftermath of the September 3, 2016, earthquake near Pawnee, the Oklahoma Corporation Commission

issued an emergency order shutting down thirty-seven wastewater disposal wells in the immediate vicinity of the epicenter.

**Impact:** The impact from earthquakes can cause road and utility damage hindering response time in the TJSA. In a catastrophic event life can be lost and complete structure damage can be anticipated. The average reported events would cause moderate damage based on the Mercalli Scale.

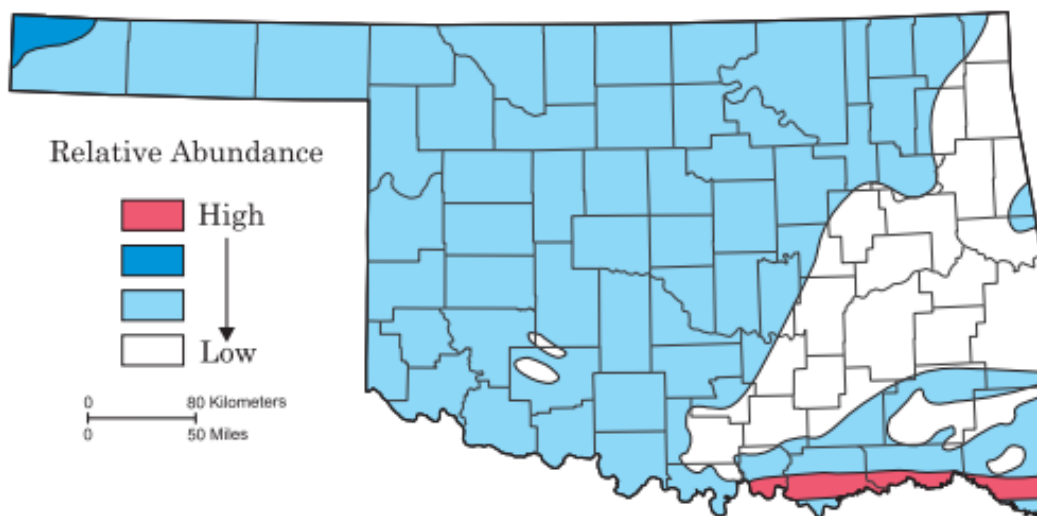
**Secondary Hazards:** Secondary hazards can include fire, explosions, collapse or structural failure of bridges, overpasses, roads, and disruption of economic activity across the region. Dispersion of contaminants could also occur. Hazardous materials and other contaminants were not identified in the area, this could be of major concern.

**Summary:** As the Earth's crust moves and bends, stresses are built up, sometimes for years before suddenly breaking, or slipping. This abrupt release of accumulated tension can be devastating to human communities. The destructiveness of an earthquake depends upon the magnitude of the tremor, direction of the fault, distance from the epicenter, regional geology, local soils and the design characteristics of buildings and infrastructure. Earthquakes centered in Kay County are rare and seldom felt. There is concern as to what the long-term effects of the unfelt earthquakes have on the integrity and infrastructure of the numerous pipelines associated with the oil and gas industries located with the Kaw TJSA.

## HAZARD PROFILE: Expansive Soils

**Definition:** Expansive soils are soils with a relatively high percentage of clay minerals that are subject to changes in volume as they swell and shrink with changing moisture conditions. These volume changes can impact the integrity of structures built on, or within, the surface of such soils.

**Location:** Expansive soils are found throughout the TJSA but are not in a high-risk area identified by the Oklahoma Geological Survey.



**Extent/Severity:** The most extensive damage from expansive soils can occur to highways and streets. However, homes, buildings and other structures can have extensive damage resulting in sticking doors,

uneven floors and cracks in the foundation, floors, walls, and ceilings. Expansive soils are soils that contain water-absorbing minerals. These soils expand as they take in water. Expansive soils can cause nightmares for homeowners and architects because they can damage buildings and other structures due to the force they exert as they expand. Kaw Nation considers Expansion can be determined by severity on a scale of 1 to 2 inch (minor), 2 to 3 inch (major), and 3 to 5 inches or greater (severe).

**Previous Occurrence:** Since this hazard develops gradually and seldom presents a threat to life, problems may not be recognized as being related to expansive soils or may be considered only nuisances and therefore never repaired or reported. No records of specific incidences of structure loss due to expansive soils in Kay County were found.

**Probability/Likelihood:** Since no records of specific incidences of loss associate with expansive soils were found and no specific areas of expansive soils were identified within the County, likelihood cannot be determined at this time. However, according to public opinion, the likelihood of loss due to the expansive soils within the Kaw TJSA is likely.

**Vulnerability:** The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. Other cases of damage result from increases in moisture volume from such sources as broken or leaking water and sewer lines. Dry clays are capable of absorbing water and will increase in volume in an amount proportional to the amount of water absorbed. Areas capable of these changes in soil volume present a hazard to buildings slabs, concrete, asphalt, and other structures built over them and to the pipelines buried in them. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling clays than are multi-story buildings, which are usually heavy enough to counter swelling pressures. However, if constructed on wet clay, multi-story buildings may also be damaged by clay shrinkage when moisture levels are substantially reduced. No specific problem areas of expansive soils were identified within Kaw TJSA.

**Impact:** The greatest damage occurs when structures are constructed when clays are dry (such as during a drought) and then subsequent soaking rains swell the clay. Damage can become so severe that the cost of repair can exceed the value of the building.

**Secondary Hazards:** Depending on the use of the pipeline, contamination of soils and groundwater could occur should buried pipelines become damaged by expansive soils.

**Summary:** Changes in soil volume present a hazard primarily to structures built on top of expansive soils. Damages occur as clay moisture content expands or shrinks the soil volume causing different parts of the structure to move at different rates and distances. Houses and one-story commercial buildings are more apt to be damaged since they are usually not heavy enough to counter swelling pressures. However, multi-story buildings may be damaged by clay shrinkage when moisture levels are substantially reduces. There are no records of specific incidences of loss within the Kaw TJSA due to expansive soils. For large areas of the United States, little information is reported other than field observations of the physical characteristics of clay in a particular stratigraphic unit and little known but damaging hazard in Oklahoma is the Expansive Soils found generally in the Southeast part of the state. Although the Southeast part of the state is the most susceptible, other isolated areas in the state may also be susceptible to Expansive Soils. As a result, fixed criteria for determining the swelling potential



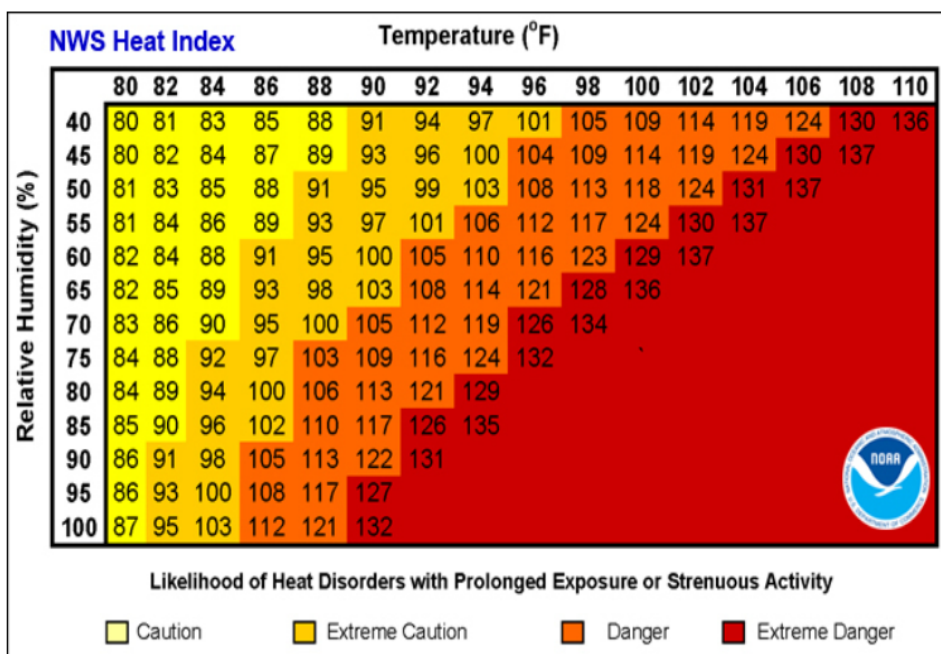
have not been devised but the possibility of expansion still exist with Kaw TJSA and will still have notice as development occurs.

## HAZARD PROFILE: Extreme Heat

**Definition:** Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperature, occur when a “dome” of high atmospheric pressure traps hazy, damp air near the ground.

**Location:** Extreme heat events are regional in nature. The entire Kaw Nation TJSA is equally affected by extreme heat.

**Extent/Severity:** The severity of the extreme heat is dependent on a combination of temperature and humidity. High temperatures , when combined with high humidity can put an area in the “Extreme Danger” category on the National Weather Service Heat Index scale. When extreme heat is combined with drought, results can include not only excessively dry hot conditions that contribute to a high risk of life-threatening heat related illnesses but can also provoke dust storms with low visibility. These conditions can affect the Kaw Nation TJSA with increased demand for water and food due to the loss of livestock and crops, and electrical outages may be more prevalent due to excessive heat.



A measurement of the air temperature in relation to the relative humidity, can be used as an indicator of discomfort. The heat index is higher when high air temperature occurs with high humidity, and lower when they occur with low humidity. The heat index is based on studies of skin cooling caused by the evaporation of sweat, also called *apparent temperature*. Kaw Nation TJSA may experience readings on

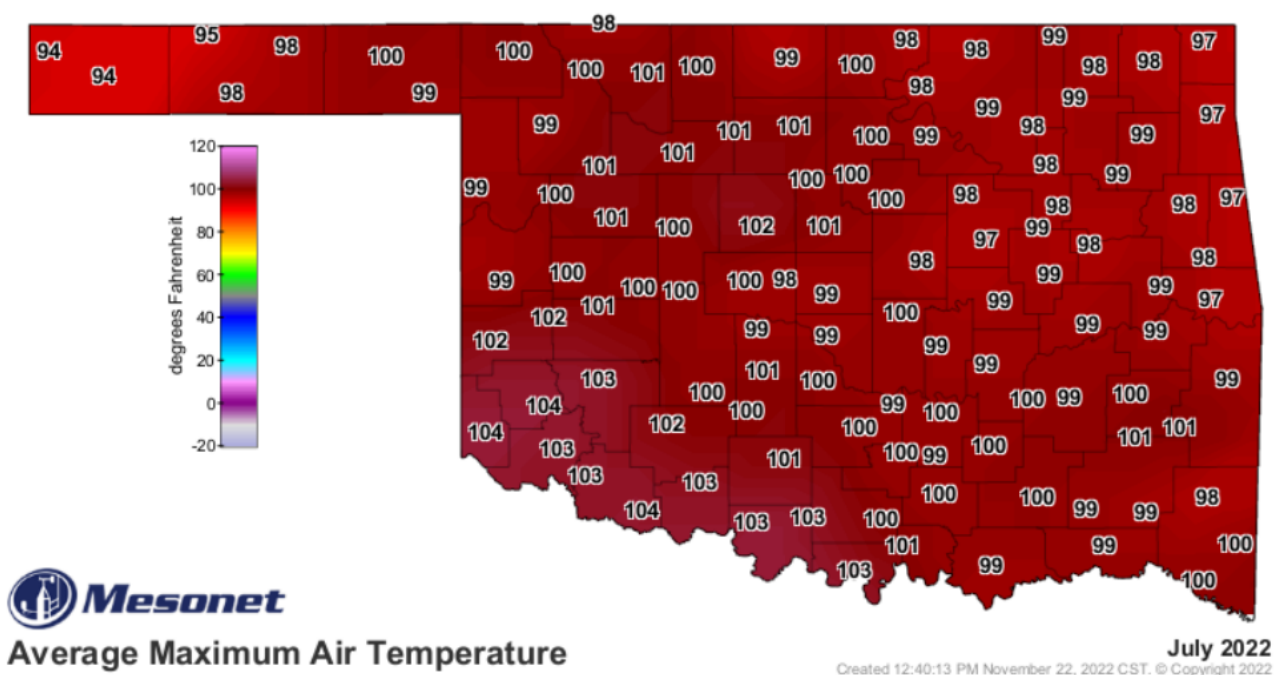


the Heat Index Scale between the danger and extreme danger levels and considers a reading of 91 on the heat index as minor and would consider a reading of 118 as major in severity.

**Previous occurrence:** In a normal year, approximately 175 Americans die from extreme heat. According to Centers for Disease Control and Prevention, an average of approximately 600 people dies each year from exposure to heat. In Oklahoma, July is generally the hottest month of the year, followed by August.

**TABLE 3-1: EXTREME HEAT RECORDS**

Date	Description
2011	Grandfield set a state record by experiencing 101 days with temperatures above 100°F. 2011 brought with it the hottest summer in Oklahoma history.
2011-2012	A record high temperature of 115°F occurred multiple times in multiple locations across the state: Buffalo (7/9/2009), Erick and Hollis (6/26/2011), Wilburton and Wister (8/3/2011), and Kingfisher (8/1/2012)
2022	7th Warmest July on record



**Probability/Likelihood:** According to the Oklahoma Climatological Survey, Kay County averages 15 to 20 days per year of daytime high temperatures greater than 100° F. Therefore, extreme temperatures are highly likely to occur within the Kaw TJSA.

**Vulnerability:** Young children, elderly people, and those who are sick, or overweight are more likely to become victims to extreme heat. Other conditions that can limit the ability to regulate temperature include fever, dehydration, heart disease, mental illness, poor circulation, sunburn, prescription drug use, and alcohol use. Another segment of the population at risk are those whose jobs consist of

strenuous labor outside. Livestock and crops can also become stressed, decreasing in quality or in production, during times of extreme heat.

**Impact:** A prolonged period of extreme heat can influence soil conditions and produce drought conditions. A prolonged drought can have a serious impact on the community. Increased demand for water and electricity to keep cool may result in shortages of resources. Moreover, food shortages may occur if agriculture production is damaged or destroyed by loss of crops or livestock. The Kaw TJSA may experience heat index readings at levels that are threatening to life and health.

**Secondary Hazards:** Extreme high temperatures can cause water shortages, increase fire danger, and prompt excessive demands for energy. Damage to property during extreme heat can be related to expanding and contracting soil, which is covered in the section, “Expansive Soils.” Another secondary hazard is air pollution in summer months resulting from consistent high temperatures, stagnant airflows and blowing dust.

**Summary:** Kaw TJSA can expect to experience extreme heat every summer and is most likely to occur during the months of July and August. The severity of the extreme heat is dependent on temperature and humidity. High temperatures and high humidity can result in dangerous conditions that expose people to an increased risk of heat stroke and other heat related illnesses. The most vulnerable population are the elderly, young children, and those who are sick, overweight, or who work outside. Extreme heat can also cause stress on livestock and other agricultural productions.

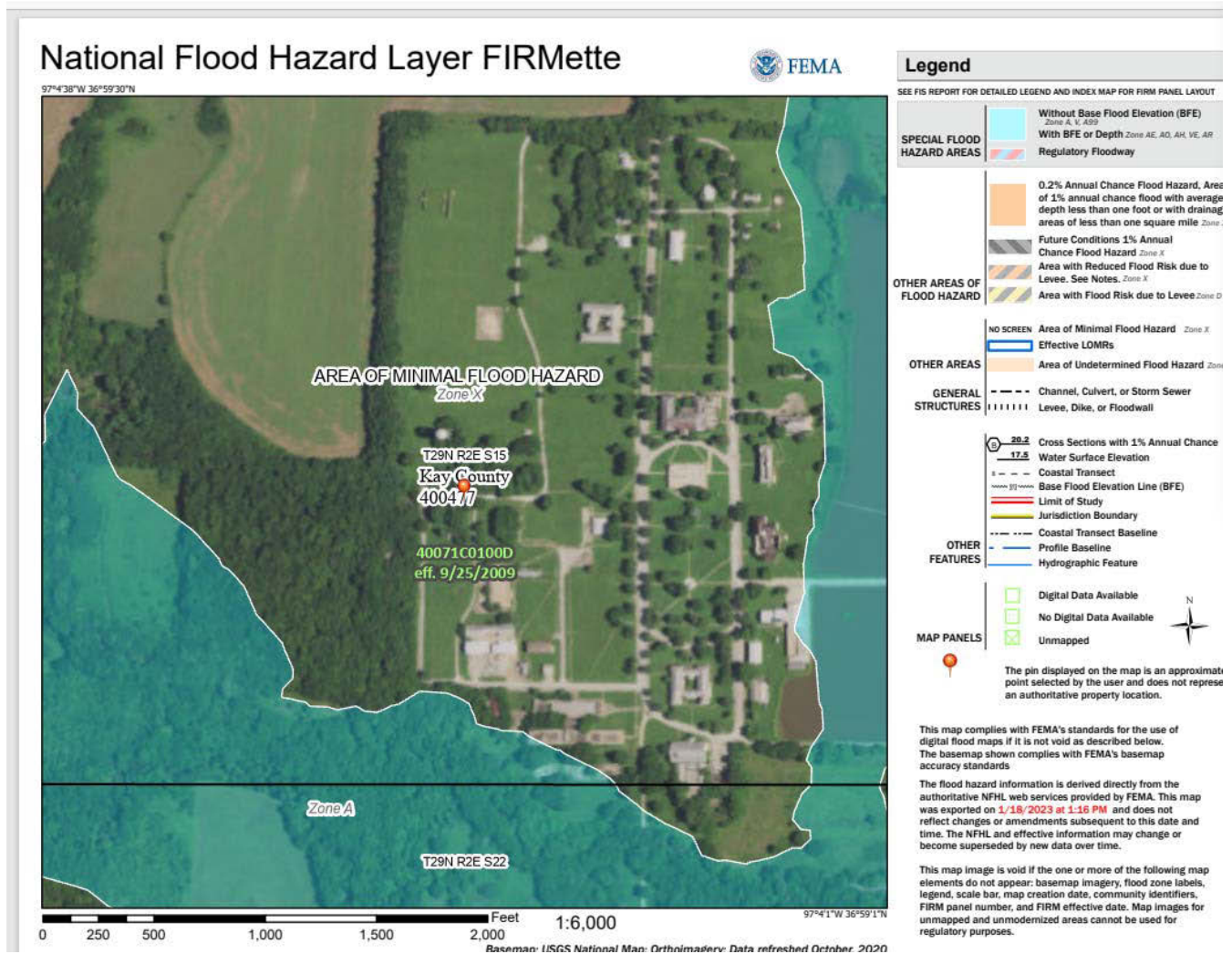
## HAZARD PROFILE: Flood/Flash Flooding

**Definition:** Flash flooding is associated with Thunderstorms and may result from a large amount of rainfall over a short time span, or a small amount of rain on saturated soil or impermeable surfaces.

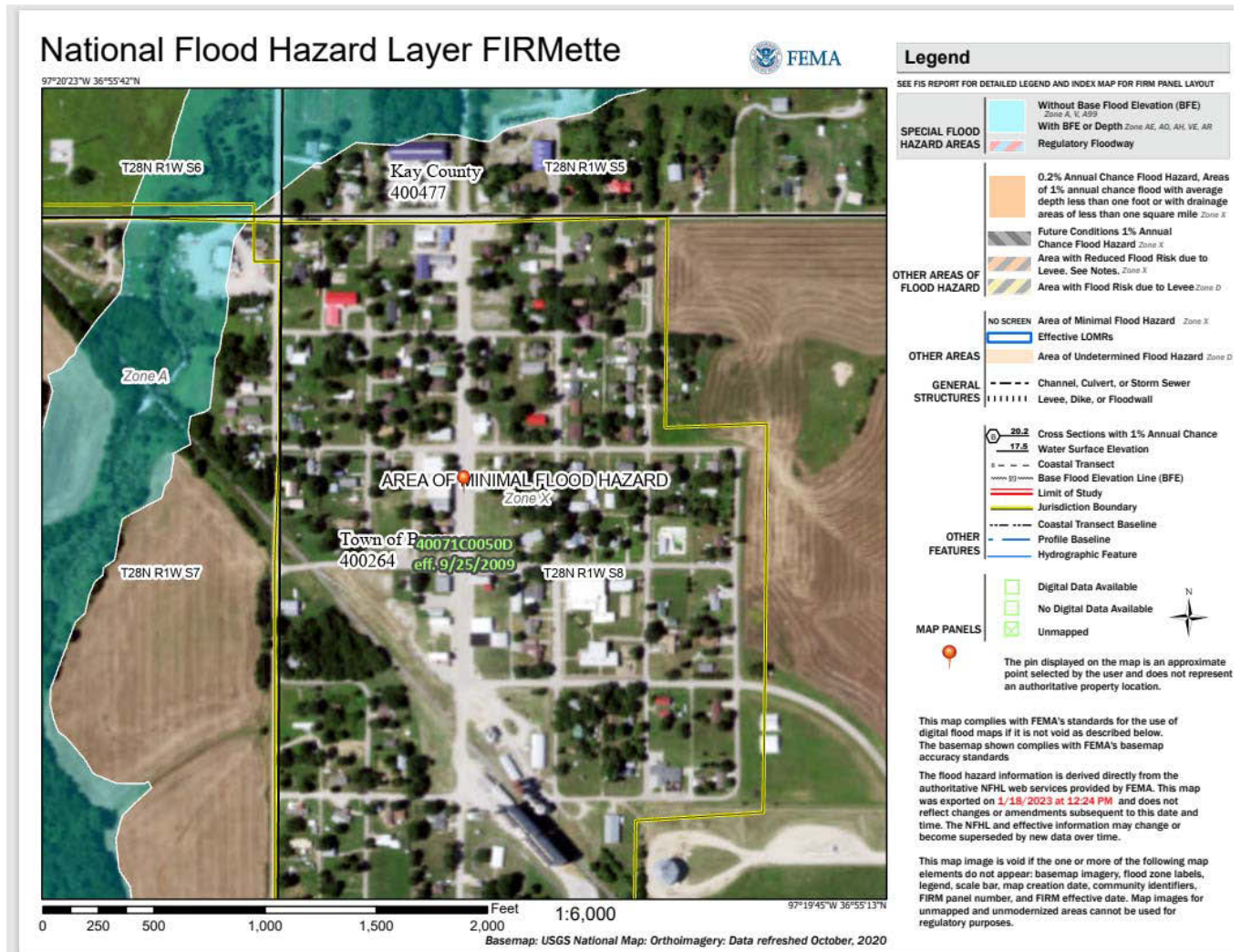
**Location:** Kay County has 965 miles of roads and highways running in and through Kaw TJSA and the topographical layout of the creeks and rivers makes the possibility of flash flooding a reality during periods of intense rain and poor drainage. Kaw Nation is not located in a flood way /flood zone area.

## Flash Flooding High Risk

Chilocco Indian School



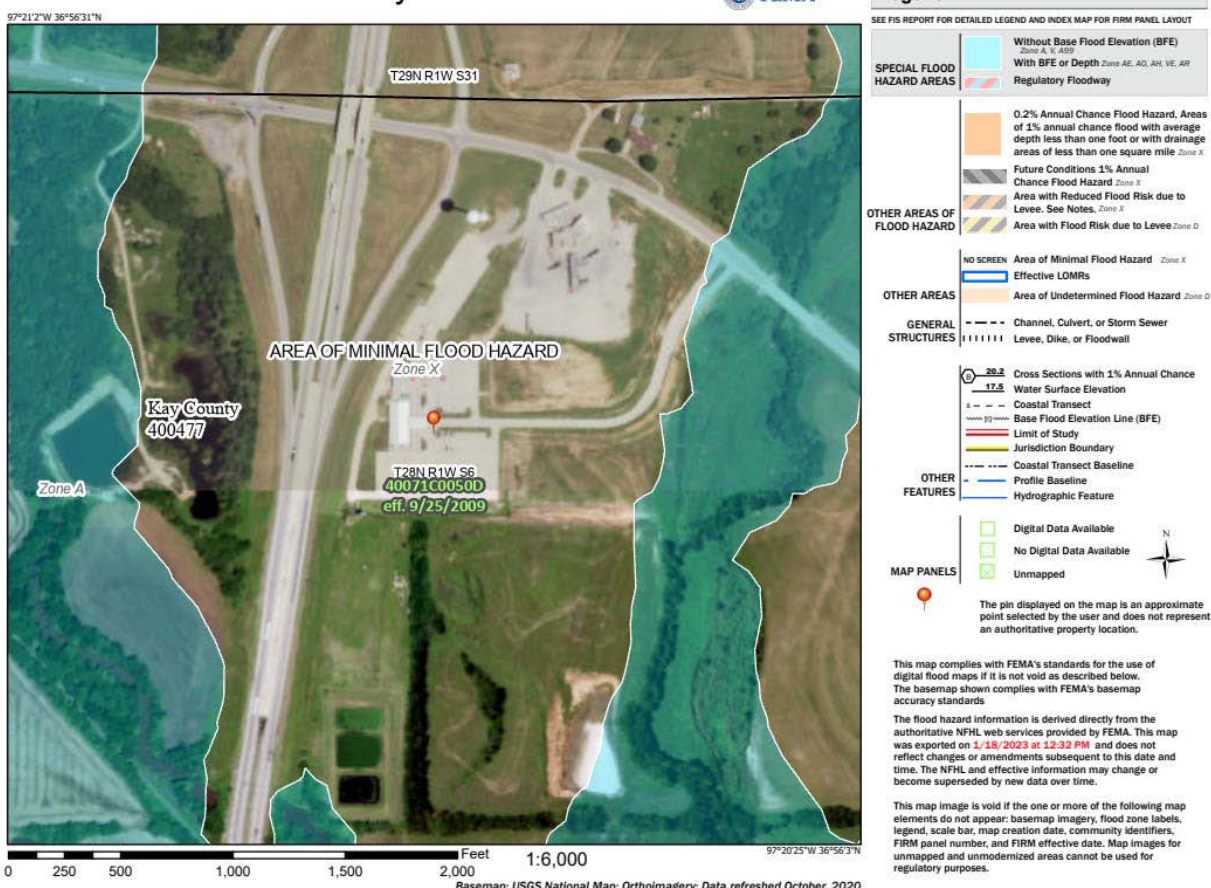
# Town of Braman





## Town of Braman

### National Flood Hazard Layer FIRMette



## Rock and Brews Casino

**Extent/Severity:** It is difficult to determine extent and severity of waters that quickly rise and recede within a matter of a couple of hours. Considering that no scale exists for flash flooding, Kaw Nation considers, 1-2 ft. minor, 2-3 ft. severe, 3+ ft. catastrophic.

**Previous occurrence:** Annually the Kaw TJSA receives abundant rainfall mainly in the spring and fall with accompanying flash flooding likely to occur when the rainfall is very intense. The flashflood of May 2019 resulted in several road closures, sink holes, building collapses, and residential structure losses. Local emergency crews were rapidly depleted or lacked proper resources due to multiple flood and swift water rescues. Multiple Fire, EMS, and rescue teams from across the state had to be deployed to Kay County for rescue operations. At least 1 confirmed fatality, and multiple injuries resulted in this single event. Still to this day 3 years later, some roads are still closed secondary to damages from this flood. It was reportedly the worst flooding the area had experienced since 1957.

**Probability/Likelihood:** Kay County receives abundant rainfall mainly in the spring and fall. Consequently, roadways with inadequate drainage are involved with flash flooding. Flooding is verified by the National Climatic Data Center, and before every flooding event, flash flooding occurs, therefore this ratio indicates that the probability that a flash flood event will occur within the County each year is highly likely within the Kaw TJSA.

**Vulnerability:** All low-lying roads, intersections, bridges, and infrastructure are vulnerable to flash flooding due to the nature of the hazard. Entrance and exits of some roads would be closed for an undetermined period causing delays to events and jobs within the TJSA.

**Impact:** The greatest impact is to loss of human lives being swept away in flash flooding roadways into creeks and rivers. The loss of nutrient rich topsoil impacts the production of food stuffs. Roads and intersections would be temporarily blocking access to Kaw Nation TJSA Medical Facilities and Governmental Facilities

**Secondary Hazards:** Secondary hazards also include transportation disruptions, dam/levee failure, dispersion of contaminants, and threatened water supplies. Hazardous materials, and other possible sources of contaminants are not identified in the area, this could be of major concern.









**Summary:** A maximum flood threat could result if soils are saturated and widespread heavy rains begin to fall. Such an event could cause all streams and rivers within Kay County to rise. Not only would communities such as Blackwell and Tonkawa flood from rising water, but flash flooding would most likely close most small roads and several main highways.

Intense Spring and fall rains can result in an increase in the likelihood of flash flooding within the Kaw TJSA. Flash floods are most likely to close most small roads and some major highways within Kaw TJSA.

## HAZARD PROFILE: Severe Storm/Lighting/Hail

### Severe Storm/Lighting

#### Beaufort Scale

Beaufort Number	Description	Wind speed	Beaufort Number	Description	Wind speed
0	 Calm	0-2 km/hr	6	 Strong Breeze	39-49 km/hr
1	 Light Air	2-5 km/hr	7	 High Wind	50-61 km/hr
2	 Light Breeze	6-11 km/hr	8	 Gale	62-74 km/hr
3	 Gentle Breeze	12-19 km/hr	9	 Strong Gale	75-88 km/hr
4	 Moderate Breeze	20-28 km/hr	10	 Storm	89-102 km/hr
5	 Fresh Breeze	29-38 km/hr	11	 Violent Storm	103-117 km/hr
			12	 Hurricane	≥118 km/hr

Kaw Nation considers the National Weather Service criteria for severe thunderstorms as the same for a severe event in the nation. Also included in the criteria Kaw Nation considers 3 or more inches of rain in an hour as a severe event and 1-2 inches of rain per hour if the ground is previously saturated.

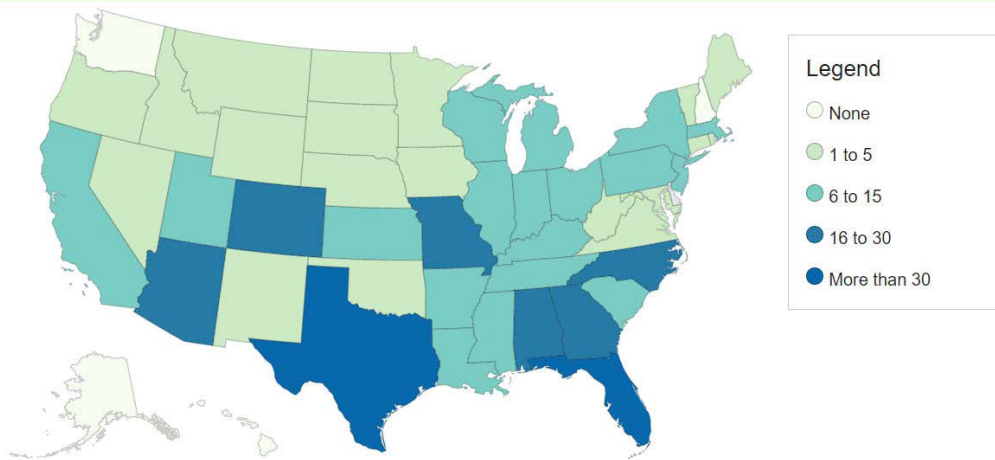
**Definition:** Produced by a cumulonimbus cloud, a thunderstorm is an atmospheric disturbance with lightning and thunder almost always associated. Lightning is generated by the buildup of charged ions in a thundercloud. When that buildup interacts with the best conducting object or surface of the ground, the result is a discharge of a lightning bolt. Thunder is the sound of the shock wave produced by the rapid heating and cooling of the air near the lightning bolt. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes and may be accompanied by high winds, rain, and hail.

**Location:** All parts of Kay County and the Kaw Nation TJSA are at risk for thunderstorms and lightning events.

**Extent/Severity:** According to Oklahoma Emergency Management, every year people are killed by lightning strikes in Oklahoma. Statistics show that about 50 bolts of lightning strike less than a mile from any resident of Oklahoma during the year and the state experiences about 1 million strikes per year. Secondary effects from lightning include fires, power disruption, and damage to objects struck by the flash. A lightning strike within 10 yards of a building can potentially cause damage. Kay County considers no strikes a minimum severity and one or more strikes a major severity.

**Previous occurrence:** From 2006-2021 there were 444 lightning strike deaths in the United States with southeastern states being most at risk.

#### Lightning Deaths in the United States, 2006–2021



**Probability/Likelihood:** Considering the likely hood of a Thunderstorm that can produce lightning the probability that a least one severe thunderstorm event will occur within the Kaw Nation TJSA is highly likely.

**Vulnerability:** It is difficult to evaluate thunderstorms because they can occur at different levels of strength, at random locations, and create narrow paths of destruction. Due to this randomness, the entire population of the Kaw Nation TJSA is vulnerable to possible injury and/or property loss from lightning. Lightning can strike up to 15 miles out from the rain column, enabling injurious lightning strikes to be a tremendous hazard to human beings. This can occur even if there is a clear sky ahead of the storm. Most people wait to seek shelter until the last minute which puts them at risk from a lightning strike. Lightning can cause wildland fires that could be damaging to livestock, crops and including hay fields that are leased to individuals for revenue.

**Impact:** The loss of a human life would be devastating. All buildings and infrastructures are at risk. This loss of use to buildings, homes and infrastructure can and will have an impact upon the ability of the Kaw Nation to serve their citizens from the impact of death, injury, and restoration.

**Secondary Hazards:** Secondary hazards can include fires and power failures.

**Summary:** All the Kaw Nation TJSA has significant exposure to thunderstorms. In addition to lightning, thunderstorms can produce tornadoes, hail and rain causing flash flooding. This plan profiles lightning with thunderstorms. Overall, lightning is the most constant and widespread threat to people and property during the thunderstorm season and can occur during any month in Kay County. The result is that people can be displaced from their homes, and suffer financial loss due to wildfire, structure fires and electronic equipment damage.



## Hail

**Definition:** According to NOAA National Severe Storm Laboratory, hail is a form of precipitation consisting of solid ice that forms inside thunderstorm updrafts. Hail can damage aircraft, homes, and cars, and can be deadly to people and livestock. Hailstones are formed when raindrops are carried upward by thunderstorm updrafts into extremely cold areas of the atmosphere and freeze. Hailstones then grow by colliding with liquid water drops that freeze onto the hailstone's surface. If the water freezes instantaneously when colliding with the hailstone, cloudy ice will form as air bubbles will be trapped in the newly formed ice. However, if the water freezes slowly, the air bubbles can escape, and the new ice will be clear. The hail falls when the thunderstorm's updraft can no longer support the weight of the hailstone, which can occur if the stone becomes large enough or the updraft weakens.

*Note that although hail is associated with Thunderstorms, this Plan profiles hail equal to or larger than 1.75" in diameter as a separate natural hazard event. Based on history, when hail gets this large, it can be particularly damaging to cars, roofs, and windows, but can also hurt people.*

**Location:** All locations of Kaw Nation TJSA are equally vulnerable to Hail events.

**Extent/Severity:** The severity of damage caused by hailstorms depends on the hailstone sizes (average and maximum), number of hailstones per unit area, and associated winds. Storms that produce high winds in addition to hail are most damaging and can result in numerous broken windows and damaged siding. The intensity of H3 to H10 would be damaged to glass and plastic structures all the way to extensive structural damaged and even severe injury or death can occur to members of the tribe and TJSA.

**TABLE 3-2: TORRO SCALE**

Size Code	Typical Hail Diameter (cm)	Description	Typical Damage Impacts
H0	0.5-0.9	Pea	No damage
H1	1.0-1.5	Mothball	Slight general damage to plants, crops
H2	1.6-2.0	Marble, grape	Significant damage to fruit, crops, vegetation
H3	2.1-3.0	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	3.1-4.0	Pigeon egg to golf ball	Widespread glass damage, vehicle body work damage
H5	4.1-5	Pullet egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	5.1-6.0	Hen egg	Bodywork of grounded aircraft dented; brick walls pitted
H7	6.1-7.0	Tennis ball to cricket ball	Severe roof damage, risk of serious injuries
H8	7.1-8.0	Large orange to soft ball	Severe damage to aircraft bodywork
H9	8.1-9.0	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	>10	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

**Previous occurrence:** Hail Reports documented a total of 196 hail events occurring in Kay County between 2004 and 2022. Of those, nearly half had large hail equal to or greater than 1.75” in diameter, but about 11 years ago, Blackwell was recorded as having large hail measuring up to 4.25 inches.

**Probability/Likelihood:** Based on the history of 82 large-hail events recorded in the last 19 years, these result in an average of 4.4 events per year. Therefore, the probability of large-hail (equal to or greater than 1.75 “in diameter) occurring within the County each year is highly likely.

**Vulnerability:** Vulnerability is difficult to evaluate since hail occurs in random locations and creates relatively narrow paths of destruction. Hail can cause considerable damage to crops, buildings, and vehicles, and occasionally death to farm animals. Hail can also strip leaves and small limbs from non-evergreen trees. While large hail poses a threat to people caught outside in a storm, it seldom causes loss of human life. Hail larger than 1.5 inches can cause serious damaged to cars, roofs, walls, windows, and inflict serious bodily harm to tribal members that are exposed to the hail.

**Impact:** The economic impact of damage caused by hailstorms can be very large in dollar amounts. Storms that produce high winds in addition to hail can cause the most damaging and can result in numerous broken windows and damaged siding adding to the economic impact facing the tribe. The annual Kaw Nation Pow-Wow has numerous Recreational Vehicles along with canvas tents used for camping purposes that can sustain substantial damage and in the case of canvas tents provide little protection from a significant hail storm to the Kaw Nation TJSA.

**Secondary Hazards:** Deep hail can easily worsen a flash flood situation by clogging drainage paths, culverts, and grates.

**Summary:** Hail can occur in any strong thunderstorm. However, the size of the hailstones is a direct function of the severity and size of the storm. Hail, larger than 1.75, can cause serious damage to cars, roofs, walls, windows, and inflict serious bodily injury as well. When Kaw Nation TJSA experiences significant exposure to hailstorms, then virtually all buildings and automobiles are at risk. Crops are also at risk since the peak periods for hailstorms occur during early spring and late fall, which coincide with critical agricultural seasons.

## HAZARD PROFILE: Severe Winter Storms

**Definition:** This Plan defines a winter storm as a single or combination of the following winter weather types occurring over a wide area of the County:

- **Ice storm.** Described by the National Weather Service (NWS), as an occasion when damaging accumulations of ice are expected during freezing rain situations. Significant ice accumulations are usually accumulations of 0.25 inches or greater.
- **Heavy snow.** Defined as either a snowfall accumulating to 4 inches in depth in 12 hours or less, or snowfall accumulation to 6 inches or more in depth in 24 hours or less.
- **Freezing rain or freezing drizzle.** An occasion when rain or drizzle freezes on surfaces such as trees, power lines, highways, etc.

**Location:** All of Kay County and Kaw Nation TJSA will be affected in major winter storms.

**Extent/Severity:** Based on past occurrence, Kay County winter storms have not been shown to have significant impact on agricultural and loss of life, but there has been property and economic damage. Most recently, in January 2002, Kay and several other Counties experienced one of the worst ice storms recorded in the State's history. The entire population of the County was affected, with thousands without power for days at one point, and some were without power for weeks. Loss of power also disabled rural and municipal water districts for days, leaving rural and town residents without running water, some without water for days. Kaw Nation TJSA can experience the entire severity of this Index.

TABLE 3-3: NOAA WINTER STORM SEVERITY INDEX

WSSI Descriptor	General Description	General Effects
Level 1- Limited	Small accumulations of snow or ice forecast. Minimal impacts, if any expected. In general, society goes about their normal routine.	Little to no effect on the TJSA
Level 2-Minor	Roughly equated to NWS Advisory Level criteria. Minor disruptions, primarily to those who were not prepared. None to minimal recovery time needed.	Untreated roadways may become hazardous and slick. Livestock may need additional supplemental feed.
Level 3- Moderate	Roughly equated to an NWS Warning Level criterion. Definite Impacts to those with little preparation. Perhaps a day or two of recovery time for snow and/or ice accumulation events.	
Level 4-Major	Significant impacts, even with preparation. Typically, several days recovery time for snow and/or ice accumulation events	Widespread hazardous road conditions. Travel discouraged. Areas isolated because of drifting snow. Isolated power outages because of down power lines from ice accumulation. Tree damage. Livestock loss potential increases, supplemental feed necessary.
Level 5- Extreme	Historic, widespread severe impacts. Many days to at least a week of recovery needed for snow and/or ice accumulation events.	Road conditions hazardous to impassible. People and livestock isolated. Widespread power and utility outages. Infrastructure damage. High potential for loss of livestock. Structures threatened from accumulating snow and ice. Communications infrastructure lost from ice accumulation. May be a long-lasting event.

**Previous occurrence:** Since April 1, 1974, FEMA has recorded that Kay County has experienced 35 declared disasters that include 7 severe ice storms and 5 severe winter storm events which contained combinations of winter precipitation. According to the Oklahoma Climatological Survey, the greatest seasonal snowfall was 41 inches during the winter of 1987-1988 and the greatest daily snowfall was 15

inches in Braman, February 24, 2003. During that storm, below freezing temperatures and ice-covered roads contributed to a man losing his life on I-35 south of Tonkawa.

**Probability/Likelihood:** Based on the history of 35 declared disasters and data from the Oklahoma Climatological Survey, the probability of a winter storm occurring within the County is highly likely.

**Vulnerability:** All Kaw Nation TJSA is equally at risk from the effects of snow and ice events. Power failures, communications and transportation disruptions are common consequences of winter storms in TJSA. Heavy accumulations of ice or snow can also result in collapse or structural damage to buildings. The damage may be caused directly by the excessive weight of the ice/snow accumulation, or by ice-laden trees or branches falling on structures.

**Impact:** The aftermath of a winter storm can continue to impact a region for weeks, and even months. Houses, roads, electrical poles and lines, water systems, people and livestock are all vulnerable to severe winter storms. Houses are damaged from the weight of the ice, roads buckle and or become slick and hazardous. Electrical poles and lines break. Tribal member's loss of electricity and heat can be life threatening. Water lines freeze and burst due to the cold weather. People and livestock have no access to water and are susceptible to frostbite and death from exposure. Tribal members may lose use of their homes and must move temporarily and in some cases possibly to another city to find a place to stay. Businesses will be closed and in turn may cause employees to have to search for employment elsewhere. All Kaw Nation governmental facilities would have impact.

**Secondary Hazards:** Secondary hazards can include traffic accidents due to snow- and ice-covered roads, and death from hypothermia due to prolonged exposure to cold. Wind-driven snow can result in "whiteout" conditions which can also make driving extremely dangerous. House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

**Summary:** A winter storm can range from accumulating snow and/or ice over a few hours to blizzard conditions with blinding, wind-driven snow lasting several days. In latitudes like Oklahoma's, where moist Gulf air collides with arctic temperatures from the Canadian Shield, winter storms - particularly ice storms - have the potential to cause significant property damage, transportation problems, and utility service failure over large areas of the State. The aftermath of a winter storm can continue to impact a region for weeks, and even months.

## HAZARD PROFILE: Tornado/High Winds

**Definition:** Tornadoes and high winds are combined in profile because of similarities in potential damage and mitigation measures.

- **Tornado:** A tornado is a violent rotating column of wind, characteristically accompanied by a funnel-shaped cloud. Tornadoes are the result of great instability in the atmosphere and are associated with severe Thunderstorms or in advance of cold fronts. Note that although

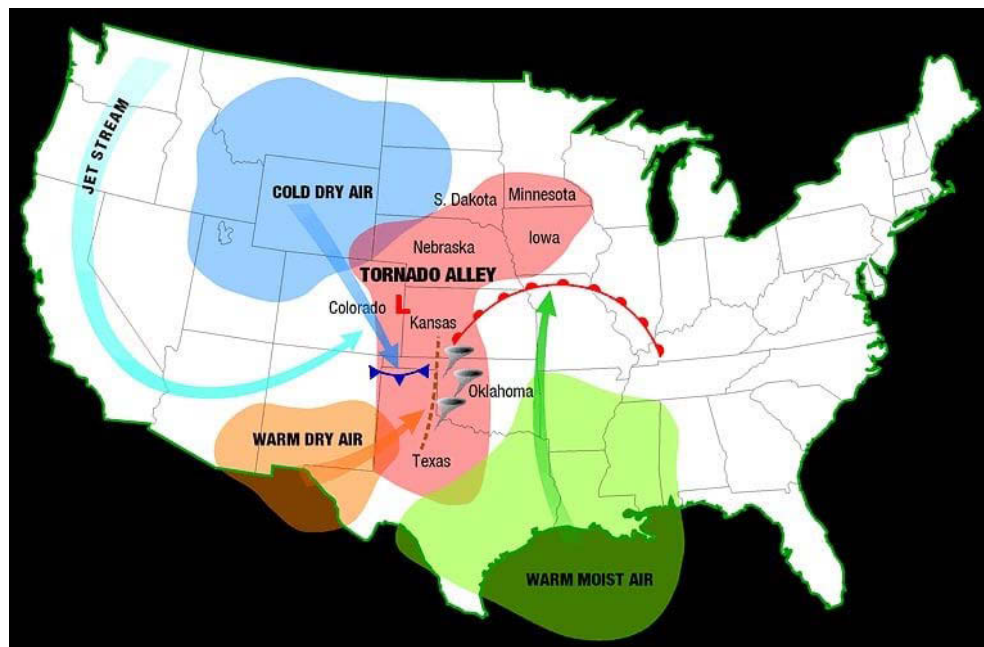
tornadoes and high winds are associated with Thunderstorms, tornadoes and high winds are profiled in this plan as a separate event.

- **High Winds:** Wind is defined as the motion of air relative to the earth's surface. High winds (over 50 mph) can result from thunderstorm inflow and outflow, or downburst wind when the storm cloud collapses and can result from strong frontal systems, or gradient winds (high- or low-pressure systems), moving across Oklahoma. High winds are speeds reaching 50 mph or greater, either sustaining or gusting. Down draft winds are from a strong thunderstorm downburst that causes damaging winds on or near the ground and can extend to a little as 2 ½ miles or extend over a hundred miles. These winds can range from light breezes to sustained speeds of 80 to 100 mph.

High winds in Kay County can be caused by thunderstorms, but high winds can also occur without a thunderstorm event, such as a severe pressure gradient.

**Location:** All of Kay County is equally susceptible to tornado and high wind damages. Due to the countrywide probability every structure has equal probability to be struck by a tornado or high wind. According to NOAA data, this area of the United States is the most tornado prone in the country. This area has a reported concentration of more than 11 tornadoes per 1000 square miles.

**Tornado Alley Map**



**Extent/Severity:** The most severe impact by a tornado would be the result of an F5 tornado moving through Kaw Nation TJSA and hitting several communities especially those with large populations or the South Wind Casino at peak activity. Tornadoes which drop in areas of low development cause little damage. Conversely, tornadoes, which drop in heavily populated areas, can cause extreme loss of

property and loss of human life. Winds of such velocity can lift even the most solidly built structure. Mature trees can be uprooted and flung across fields or into homes or businesses. Automobiles can be lifted and projected into other structures. Smaller projectiles made of glass shards, splintered lumber or metal have been documented to pierce trees, homes, and other property. Death can result from any debris at this speed.

According to the Enhanced Fujita Scale a tornado reading F1 on the scale would be a minor hazard in Kaw Nation TJSA. This reading can peel the surface off roofs, mobile homes can be pushed off foundation or overturned, moving autos are capable of being pushed off the roads and attached garages may be destroyed. A reading of F4 would be considered a major hazard in Kaw Nation TJSA because well-constructed houses would be leveled, structures with weak foundations would be leveled, structure with weak foundations would be flown off some distance and cars would be thrown, and large missiles would be generated.

TABLE 3-4: ENHANCED FUJITA TORNADO SCALE

EF Rating	Wind Speed	Expected Damage
EF-0	65-85 mph	'Minor' damage: shingles, gutters, tree branches.
EF-1	86-110 mph	'Moderate' damage: roof, broken windows, exterior doors, overturned mobile homes.
EF-2	111-135 mph	'Considerable' damage: roofs torn off, mobile homes destroyed, trees uprooted, cars tossed.
EF-3	136-165 mph	'Severe' damage: homes destroyed, buildings damaged, homes with weak foundations can be blown away.
EF-4	166-200 mph	'Extreme' damage: homes leveled, cars thrown, top story exterior walls of masonry buildings likely to collapse.
EF-5	>200 mph	'Massive' damage: homes swept away, high-rise buildings severely damaged, steel-reinforced concrete structures damaged, trees snapped.

Wind speeds, even in these extreme wind events, rapidly increase and decrease. An obstruction, such as a house, in the path of the wind causes the wind to change direction. This change in wind direction increases pressure on parts of the house. The combination of increased pressures and fluctuating wind speeds creates stress on the house that frequently causes connection between building components to fail. For example, the roof or siding can be pulled off or the windows can be pushed in. Kay County may experience winds of 0-12 on the Beaufort scale.

On the Beaufort scale which measures high winds a Beaufort number of 9, which would have winds measuring at 47-53 mph, would be considered a minor hazard by Kay County. These strong gale winds would be capable of producing structure and roof damage. Beaufort number of 10 would have winds measuring 55-63 mph and would be a major hazard by Kay County because trees would be damaged along with structures.



TABLE 3-5: BEAUFORT WIND SCALE

WIND SPEED				
KPH	MPH	KNOTS	#	DESCRIPTION
0	0	0	0	Calm
1 - 5	1 - 3	1 - 3	1	Light air
6 - 11	4 - 7	4 - 6	2	Light Breeze
12 - 19	8 - 12	7 - 10	3	Gentle Breeze
20 - 28	13 - 18	11 - 16	4	Moderate Breeze
29 - 38	19 - 24	17 - 21	5	Fresh Breeze
39 - 49	25 - 31	22 - 27	6	Strong Breeze
50 - 61	32 - 38	28 - 33	7	Near Gale
62 - 74	39 - 46	34 - 40	8	Gale
75 - 88	47 - 54	41 - 47	9	Strong Gale
89 - 102	55 - 63	48 - 55	10	Storm
103 - 117	64 - 72	56 - 63	11	Violent Storm
> 118	> 73	> 64	12	Hurricane

**Previous occurrence:** From 1950 to the Present, the National Climatic Data Center recorded 97 tornadoes with 9 being equal to or greater than an F3 in Kay County. Ten significant tornadic events within the county recorded a total of 22 deaths and 335 injured. Many of these events were listed as a single tornado, but it is most likely that some events included a series of tornadoes.

**Probability/Likelihood:** Using data from 1950 until present day, Kay County has experienced tornadic events that have resulted in an average of 4.2 tornadoes per year. Therefore, the probability of a tornado or high wind occurring within the Kaw Nation TJSA is highly likely.

**Vulnerability:** Located in the central part of Oklahoma, Kay County is an active part of tornado alley and has a designated wind speed rating of a zone IV. Zone IV is associated with 250 mph wind speeds. Historically the average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Consequently, vulnerability of humans and property is difficult to evaluate since tornadoes form a different strength, in random locations and create relatively narrow paths of destruction. Residents most vulnerable to tornadoes and high winds are those living in mobile homes. Most Kaw Tribal citizens are aware they live in tornado alley and take appropriate precautions during tornado and high wind warnings. Warning systems, as well as trained spotters exist in the most populated areas in Kaw Nation TJSA. Older buildings, power lines equipment, vehicles, and injury and death could be expected to tribal members due to extreme high winds in the TJSA.

**Impact:** The most severe impact by a tornado would be the result of a F5 tornado moving through the Kaw Nation TJSA and hitting several communities. A worst-case scenario involving thunderstorms would be a solid, or redeveloping line, of severe thunderstorms that move through the entire Kay County area. These storms can result in heavy rains causing widespread flooding and road closures. Large economic loss to Kaw enterprises and/or major damage to buildings and other property can result if such storms are accompanied by high winds. High winds and lightning associated with such storms can also down trees and highline poles and result in power outages capable of affecting large areas of the Kaw Nation TJSA.

**Secondary Hazards:** Secondary hazards can include fire, power outages, communications disruption, and failure of municipal services in communities where Kaw citizens live.

**Summary:** Located in “Tornado Alley”, Oklahoma is hit by more tornadoes each year, on average, than any other state except Texas. Texas has twice as many tornadoes, but it also is more than twice the size of Oklahoma. Oklahoma has experienced an average of 57.2 tornadoes per year occurring from 1950 till the present. They are most likely to occur between March and June within the afternoon hours of 3:00 to 7:00pm. A tornado can generate winds exceeding 300 mph. The path width of a tornado is generally less than a half-mile, but path length can vary from a few hundred yards to dozens of miles. Therefore, the impact of human life and property can be substantial. Based on wind speed and type of damage done, tornado intensity is rated using the Fujita Scale of F0 to F5.

## HAZARD PROFILE: Wildfire

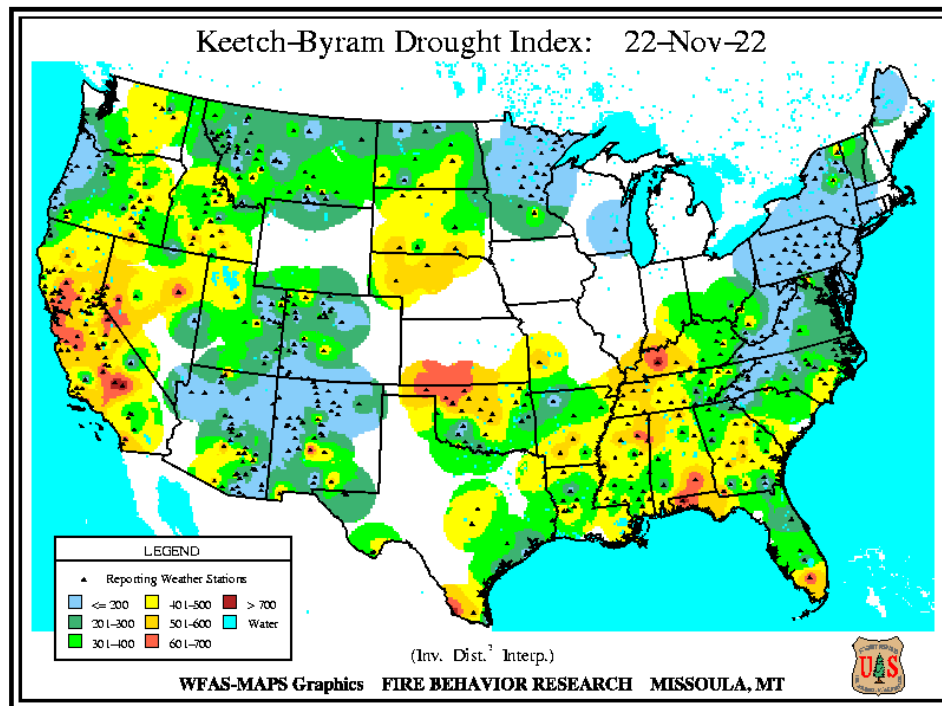
**Definition:** A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed and spread quickly and are usually signaled by dense smoke that fills the air for miles around. A “Wildland” fire is a fire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. An “Urban-Wildland Interface” fire is a wildfire in a geographical area where structures and other human development meet or intermingle with Wildland or vegetative fuels.

**Location:** Due to the Kaw Nation TJSA being mostly rural in nature the probability of a Wildfire, from either timber or grass land is likely.

**Extent/Severity:** Dry conditions, high temperatures, low humidity, and high winds can increase the potential and severity of a wildfire. In such conditions, wildfires can spread quickly, affecting large areas in a short amount of time. A worst-case scenario would be multiple wildfires started simultaneously by lightning during dry thunderstorms that move across an area experiencing drought conditions. Any wildfire event ranging from less than an acre burned to multiple acres burned would be considered a major event. We also anticipate the complete range of the Keetch-Byram Scale below with varying ranges throughout the year.

Keetch-Byram (1968) designed a drought index specifically for fire potential assessment. It is a number representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material on the ground.





The KBDI attempts to measure the amount of precipitation necessary to return the soil to full field capacity. It is a closed system ranging from 0 to 800 units and represents a moisture regime from 0 to 8 inches of water through the soil layer. At 8 inches of water, the KBDI assumes saturation. Zero is the point of no moisture deficiency and 800 is the maximum drought that is possible. At any point along the scale, the index number indicates the amount of net rainfall that is required to reduce the index to zero, or saturation.

The inputs for KBDI are weather station latitude, mean annual precipitation, maximum dry bulb temperature, and the last 24 hours of rainfall. Reduction in drought occurs only when rainfall exceeds 0.20 inch (called net rainfall). The computational steps involve reducing the drought index by the net rain amount and increasing the drought index by a drought factor.

- KBDI = 0 - 200: Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of spring dormant season following winter precipitation.
- KBDI = 200 - 400: Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- KBDI = 400 - 600: Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
- KBDI = 600 - 800: Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

**Previous occurrence:** People start more than four out of every five wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are another leading cause of wildfires. Other sources of ignition include railroads, catalytic converters on automobiles, and spontaneous ignition of hay bales. None of the reported fires had any impact on Kaw Nation TJSA. Although reports from the Oklahoma State Fire

Marshal, fire departments within Kay County reported the following number of grass, crop, and wildland fires in 2021, not all departments calculated or reported the number of acres burned:

**TABLE 3-6: WILDFIRES**

Fire Department	# Of Reported Incidences of Grass, Cropland, & Wildland fires	# Of Acres Burned
Blackwell Fire Dept.	27	Not reported
Braman Fire Dept.	7	300
Kaw City Fire Dept.	9	Not reported
Kildare Fire Dept.	22	198
Con 106 Fire District	10	7250
Newkirk Fire Dept.	10	Not reported
Ponca City Fire Dept.	44	Not reported
Tonkawa Fire Dept.	23	Not reported
Dale Township Fire Dept.	13	75.5
Peckham Fire Dept.	4	Not reported
Ranch Drive Fire Dept.	29	107.7
River Road Rural Fire Dept.	4	3
<b>TOTALS</b>	<b>202</b>	<b>7934.2</b>

**Probability/Likelihood:** Although the number of incidences indicate that wildfires are likely to occur, most wildfires are small and contained by local resources. But fire fuel has increased within the Wildland/Urban interface area. Therefore, firefighters within Kay County consider wildfire to be a major threat to the Kaw Nation TJSA. Due to the Kaw Nation TJSA being mostly rural in nature the probability of a Wildfire, from either timber or grass land is likely.

**Vulnerability:** Periods of drought, dry conditions, high temperatures, and low humidity set the stage for wildfires. Areas along railroads and people whose homes are in woodland settings (especially cedar woodlands) in rural areas have an increased risk of wildfire. The sparsely populated tall, grassed range lands, located in the far eastern portion of the County, can experience large sweeping fires. Ironically, fire suppression can create larger fire hazards.

When live and dead vegetation is allowed to accumulate in areas where fire has been excluded the likelihood of a fire is increased. Large accumulations of deadfall throughout the Kaw Nation TJSA, are susceptible to wildfires that could damage or threaten tribal buildings, business, and infrastructure in these areas.

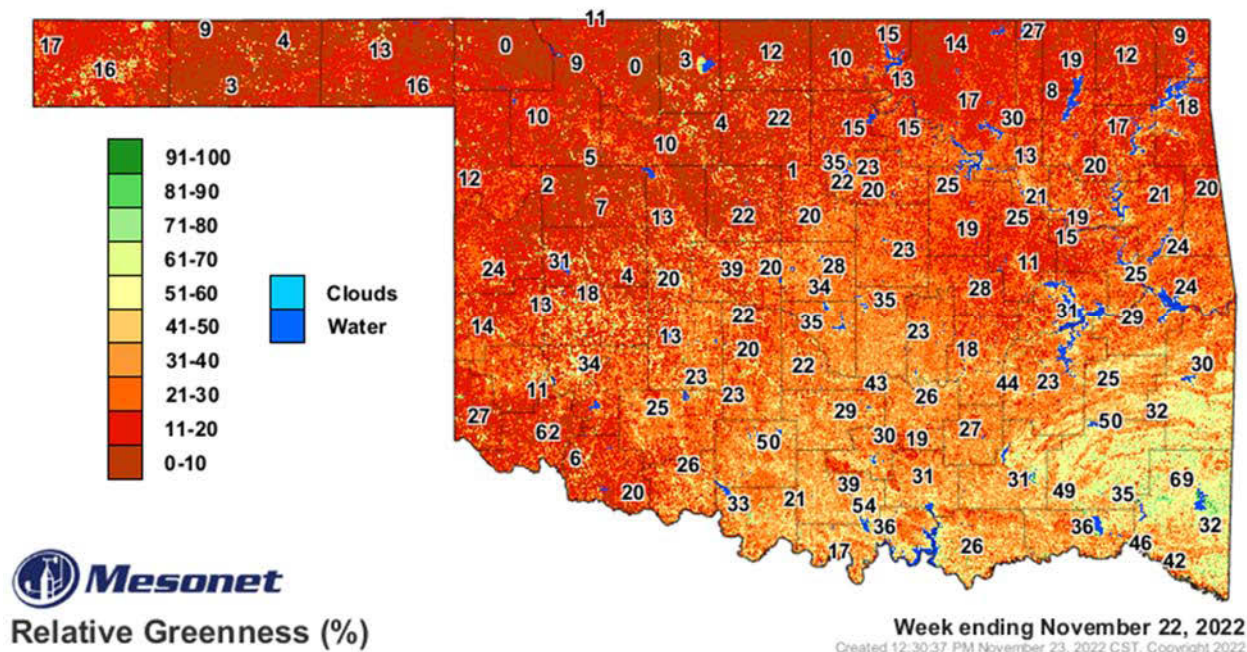
The Kaw Nation Administrative offices are located on a hill overlooking Kaw Lake with the north side exposed to timber and a large fuel load of undergrowth.

**Impact:** Fires burns with different intensities and will readily burn in all directions engulfing everything in its path. The amount of damage to structures is determined mainly by fuel loads and wind direction. This could leave tribal members homeless and possibly injured. Tribal buildings, and historical sites could also be impacted leaving them in need of restoration.

**Secondary Hazards:** The loss of groundcover from fire makes areas more susceptible to soil erosion from rainstorms. Water quality can also deteriorate as runoff from burned areas carries mud, agriculture-related chemicals, and other debris into waterways.

**Summary:** Wildfires can be caused by arson, debris burns, lightning strikes, railroads, catalytic converters on autos, and carelessness. Population growth in rural areas within the County is low therefore wildfires are not a major threat to homes. However, fire can increase erosion and result in a deterioration of soil and water quality. Fortunately, most wildfires are small and quickly contained by the local fire departments within the Kaw Nation TJSA.

In the map below, relative greenness (RG) ranges from 0-100% and indicates how green each 500-m square pixel of land is in relation to a 10+ year historical (2012-2022) database of greenness values for that particular pixel. An RG value of 100% signifies that this is the highest greenness level ever reached for that pixel during the multi-year period, while an RG value of 0% indicates that this is the lowest greenness level reached over that same period.



## FINDINGS

This summary identifies the major natural hazards that could occur, and includes history and likelihood of them occurring, within the Kaw Nation Tribal Jurisdictional Service Area within Kay County:

**TABLE 4-1: FINDINGS**

<b>Hazard</b>	<b>History</b>	<b>Likelihood</b>
Dam/Levee Failure	No record of this occurring	Unlikely
Drought	Historical data shows that Oklahoma can expect a drought every decade and the TJSA expectation for droughts more frequently.	Highly Likely
Earthquake	In 2014, there were over twice as many earthquakes recorded in Oklahoma as in California. This was found in a relationship between wastewater disposal and triggered seismic activity. Although many wastewater disposal wells have been shut down, concern as to what the long-term effects have on the integrity and infrastructure of the numerous pipelines associated with the oil and gas industries located with the Kaw TJSA is problematic.	Likely
Expansive Soils	Due to limited or non-existent data, no specific occurrences could be found documented but the possibility still exists.	Likely
Extreme Heat	Kay County averages 15 to 20 days per year of daytime high temperatures greater than 100° F.	Highly Likely
Flood/Flash Flood	May 2019 was reportedly the worst flooding the area had experienced since 1957.	Highly Likely
Severe Storm <ul style="list-style-type: none"> <li>• Lightning</li> <li>• High Winds</li> <li>• Hail</li> </ul>	Lightning is the most constant and widespread threat to people and property during the thunderstorm season and can occur during any month in Kay County.  196 hail events recorded in Kay County between 2004 and 2022.	Highly Likely
Severe Winter Storm	Since 1953, Kay County has experienced 35 declared disasters that included 7 severe ice storms and 5 severe winter storm events	Highly Likely
Tornado	From 1950 until present day, Kay County has experienced tornadic events that have resulted in an average of 4.2 tornadoes per year.	Highly Likely
Wildfire	Over 200 fires were reported and nearly 8,000 reported acres burned in the year 2021 but the area saw extreme drought conditions in the year 2022 which will result in a dramatic increase.	Highly Likely

## RISK ASSESSMENT: Identifying Assets and Estimating Potential Dollar Losses

### Identifying Assets:

**Kaw Nation Assets affected by Floods:** At this time the Kaw Nation does not have any facilities or properties located within a 100-year flood plain.

### Kaw Nation Tribal Jurisdictional Service Area Assets affected by all other Hazards

*(Because the Kaw Nation Tribal Jurisdictional Service Area includes 95% of Kay County, data collected and used will be Kay County-specific.)*

Table 5-2 reflects estimate replacement values of Tribal owned buildings and other structures that are in areas affected by earthquakes, extreme heat, hail, thunderstorms (including lightning and high winds), tornadoes, wildfires, and winter storms, which is the entire Kaw Nation Tribal jurisdictional service area.

### Potential Dollar Loss for Each Hazard:

Drought, floods, freezing temperatures, severe storms, tropical cyclones, wildfires, winter storms—every year since 1980, these weather and climate disasters have claimed countless lives and caused billions of dollars in damages in the United States. The National Center for Environmental Information (NCEI) is the Nations’ scorekeeper in terms of addressing severe weather and climate events in their historical perspective. Their data and information are used to examine past events and gauge future risk.

In calculating the cost assessments, the NCEI receives input from a variety of public and private data sources including:

- Insurance Services Office
- FEMA
- USDA
- National Interagency Fire Center
- Energy Information Administration
- US Army Corps
- State Agencies

Each of these data sources provides key pieces of information that capture the total, direct costs – both insured and uninsured – of weather and climate events. These costs include:

- Physical damage to residential, commercial, and government or municipal buildings
- Material assets within a building
- Time element losses like business interruption
- Vehicles and boats
- Public infrastructure like roads, bridges, and buildings
- Agricultural assets like crops, livestock, and timber
- Disaster restoration and wildfire suppression costs

However, these loss assessments do not consider losses to natural capital or assets, health care related losses, or values associated with loss of life. Therefore, estimates should be considered conservative with respect to what is truly lost but cannot be completely measured.

**Historic and Future Risks:** The following table is intended to provide information and guidance on susceptibility to weather and climate hazards, as well as potential future impacts from them. Kay County's risk depends on several factors including population, infrastructure, (i.e., the number of homes, businesses, vehicles, crops, etc) that could be vulnerable, and its physical exposure to natural hazards. Vulnerability reflects a county's reduced ability to prepare for, respond to, and recover from hazards based on many social economic factors.

**TABLE 5-1: HISTORIC NATURAL HAZARD RISK**

HISTORIC RISK	KAY COUNTY	OKLAHOMA	U.S.
Drought Risk	16.60	18.71	11.61
Flooding Risk	11.91	9.01	9.13
Freeze Risk	48.13	25.62	15.72
Severe Storm Risk	34.18	22.82	16.99
Wildfire Risk	13.22	14.06	6.30
Winter Storm Risk	13.11	18.01	13.71
Weather and Climate Combined Risk	45.53	40.09	38.35

Potential dollar loss was estimated for each hazard based on losses recorded from previous natural hazard events. The total recorded loss was divided by the number of events to obtain an average potential dollar loss per event. An attempt was made to estimate losses for all hazards profiled in this Plan, however due to limited resources, detailed data for estimating County-specific potential dollar loss for some of the natural hazards were not available.

**Dam/Levee Failure:** There is no record of dam failure occurring within the Kaw Nation TJSA and although the tribe has one high hazard dam adjacent to its service area, no swash zone studies exist. Therefore, potential dollar loss for Dam / Levee failure was not estimated.

**Drought:** In the entire state of Oklahoma, six major drought events have been reported since 1929 and resulted in an estimated total of \$900 million in crop damages. Dollar losses do not necessarily reflect total loss since damages resulting from drought are not often fully compensated. Therefore, potential dollar loss is difficult to estimate.

**Earthquake:** Kay County has one of the largest petroleum and chemical refineries in the nation. With countless pipelines, numerous producing oil and gas wells, and large buildings that are not constructed to earthquake codes, the Kaw Nation TJSA has the possibility of a serious catastrophe in the event of a major earthquake. In catastrophic incidences an event greater than 5 will impede tribal daily activities and possibly disrupt several services provided by the Tribe.

**Expansive Soils:** Should a long period of extreme heat or a drought occur in the TJSA, tribal buildings would have cracked foundations and wall due to the expansive soil cracking and pulling away from structures.

**Extreme Heat:** Kaw Nation TJSA -specific data pertaining to dollar loss resulting from Extreme Heat was not found. Therefore, estimates for potential loss could not be derived. Such loss is likely to include livestock and crop damage, but it is most likely to be associated with drought, rather than Extreme Heat.

**Flood:** According to the National Weather Service, Kay County, has experienced 54 flood events that resulted in approximately \$6.5 million in flood damages since 1993. Therefore, the average potential dollar loss is estimated at \$ 250,000 per year. Kaw Nation TJSA is not in the flood plain.

**Severe Storms/Hailstorms (includes High Winds & Lightning):** It was found documented that Kay County had 295 thunderstorm/high wind events and 16 lightning events recorded with damages totaling \$ 5.8 million. Although this dollar loss, recorded by National Weather Service includes damages that resulted in loss occurring within municipalities, these values were used to estimate loss for the County. Therefore, based on these values, it is concluded that the Kaw Nation TJSA can experience an estimated potential dollar loss of \$19,661 for each thunderstorm event that includes high wind and/or lightning.

**Hail:** According to the National Weather Service, Kay County experienced 115 large-hail events since 1950, with a total of \$40,000 in damages recorded. Therefore, based on these total damages recorded, the average potential dollar loss per hail event is estimated at \$348. However, this total is suspect since much hail damage is believed to go unreported. It must also be noted that dollar loss specific to hail damages recorded for areas *outside municipalities* within the County was not available, therefore crop damage due to hail may not be accurately recorded in the NCDC, and thus, not accurately reflected in the estimated potential dollar loss per event.

**Severe Winter Storms: Winter Storms:** Kaw Nation has experienced many winter storms of varied intensities that consisted of snow and/or ice. Snow blocked and ice-covered roads not only make travel dangerous, but the removal and clearing of snow and ice can be costly. Downed electrical lines and the resulting loss of power to homes, businesses, and water systems not only increase hardships and hinder recovery but can also increase potential dollar losses during and after winter storm events.

In late December 2000, a winter storm caused an estimated \$2,010,264 in damages in Kay County. In 2002, Kay County experienced another winter storm. This storm was considered one of the worst ice storms in the State's history. This event caused an estimated \$4,288,612 in damages within Kay County alone. Therefore, based on past damages, potential dollar loss per event can be substantial. Kaw Nation received considerable damage during the 2002 ice storm but was not able to recover all its losses from the Federal Government because they did not have the ability to communicate with the State Emergency Management or FEMA. The Kaw Nation established an Emergency Management department December 2003 with the express commitment to develop communications and develop emergency plans in conjunction with State and Federal agencies to prevent being overlooked again if another catastrophic disaster affects the Tribe.

**Tornadoes/High Winds:** According to the National Weather Service, Kay County and its communities have experienced 97 tornadic events that resulted in approximately \$37 million dollars in damages in the last 52 years. Therefore, the average potential dollar loss per event is estimated to be approximately \$450,000 dollars per event.

Estimated potential dollar loss in a scenario involving an F5 tornado in Kaw Nation TJSA:



TABLE 5-2: REPLACEMENT COST ESTIMATES

<b>KAW NATION Building Replacement Cost Estimates 12/30/2022</b>	
<b>Description</b>	<b>Estimated Replacement Cost</b>
Administration Building	\$2,113,163
Justice	\$1,116,216
Museum/Multi-purpose Offices	\$1,740,948
Mehojah/Title VI	\$1,746,301
BIA	\$162,343
Social Services Building	\$1,580,290
Library Learning Center	\$1,138,722
Community Building	\$1,156,758
Historic Council House	\$432,178
Arbor & 4 lights	\$294,021
Morton Storage Building	\$88,384
Restrooms	\$71,767
Maintenance Workshop	\$134,739
Air Boat Storage	\$53,296
Environmental Dept Storage	\$59,595
Clinic	\$2,152,316
Community/Gymnasium/Multi-purpose	\$4,174,545
Storage building 1	\$11,425
Storage building 2	\$11,425
Daycare w playground equip	\$729,880
Wellness Center	\$3,390,968
Maintenance Building & Equipment	\$345,448
Daycare Storage Shed	\$17,124
Solar Restroom	\$19,824
Arbor	\$353,228
Air Shed	\$17,124
Modular Home	\$209,478
Johnson Property Dwelling	\$255,007
Johnson Property Garage	\$135,668
Johnson Property Large Barn	\$149,746
Johnson Property Storage Building #1	\$11,209
Johnson Property Storage Building #2	\$4,208
Eagle Drive Property Metal Building & Poles	
Newkirk Smokeshop	\$134,361
Ponca City Smokeshop	\$138,726
Tobacco Row, Inc.	\$292,644



Metal Building behind Tobacco Row (Quanset Type)	\$292,644
Woodridge Market	\$741,519
Leased - American Legion Occupies	\$356,797
Log Cabin (occupancy Office)	\$214,359
Braman House - ACV	
Southwind Express Store	\$1,063,104
Domestic Violence Trailer	\$168,093
Cabin	\$48,494
Cabin	\$48,494
Cabin	\$48,494
Cabin	\$48,494
Cabin	\$48,494
Medical Annex Building (Braman)	\$2,073,365
Medical Annex Building (Kaw City)	\$2,073,365
Child Care Building	\$1,090,400
Sanitation Station	\$550,953
Office Building	\$2,074,834
Storage building	\$10,049
<b>TOTAL</b>	<b>\$35,395,027</b>

**Wildfires:** According to the National Interagency Fire Center, in 2021 the State of Oklahoma experienced 1,727 wildfires with a total of 113,235 acres burned.

Kay County, in 2021, the Fire Departments within the County reported the following estimated number of and losses pertaining to Grass, Crop, and Wildland fires:

**TABLE 5-3: WILDFIRE COST ESTIMATES**

Fire Department	# Of Grass, Wildland fires	# Of Acres Burned	Grass \$ Loss
Blackwell Fire Dept.	27	Not reported	Not reported
Braman Fire Dept.	7	300	Not reported
Kaw City Fire Dept.	9	Not reported	Not reported
Kildare Fire Dept.	22	198	Not reported
Con 106 Fire District	10	7250	Not reported
Newkirk Fire Dept.	10	Not reported	Not reported
Ponca City Fire Dept.	44	Not reported	Not reported

Tonkawa Fire Dept.	23	Not reported	Not reported
Dale Township Fire Dept.	13	75.5	Not reported
Peckham Fire Dept.	4	Not reported	Not reported
Ranch Drive Fire Dept.	29	107.7	Not reported
River Road Rural Fire Dept.	4	3	Not reported
TOTALS	202	7934.2	\$ loss not reported in county

**The hazard mitigation planning process used the following overall goals for hazard mitigation:**

- Reduce any repetitive losses from natural hazards in Kaw Nation Tribal jurisdictional service area.
- Facilitate responsible development in Kaw Nation Tribal jurisdictional service area to reduce or eliminate the potential impacts of natural hazards.
- Enhance public awareness and understanding of natural hazard preparedness.
- Develop mitigation measures for specific hazards.

These goals were developed by the Kaw Nation Hazard Mitigation Planning Team from review of other hazard mitigation plans, planning team meetings, and discussions with team members. The individual goals were then condensed to provide a concise message of the overall goal.

***“Reduce the loss of life and property, while maximizing public awareness and minimizing economic loss to the Kaw Nation’s Tribal Jurisdictional Service Area during natural hazard events.”***

**Objectives:** To meet the Kaw Nations overall goal, the following objectives, as they relate to specific natural hazards, were developed through discussions and a consensus reached at the public meetings that included the Kaw Nation Hazard Mitigation team:

#### **Dam/Levee Failure**

- Develop evacuation strategies that can be executed in the event of dam/levee failure
- Periodically review as needed water levels and risk levels of levee/dam failure, report results as necessary

#### **Drought**

- Promote awareness of the importance of mindful water use.
- Involve public in finding new ways to conserve water.
- Encourage the purchase of adequate crop insurance.

#### **Earthquake**

- Promote awareness and importance of being prepared
- Publicize information on what to do during and after an earthquake

- Encourage adequate building coverage and insurance

#### **Expansive Soils**

- Educate community and tribal citizens concerning foundation problems related to expansive soils
- Engage in effective design strategies when developing areas with high expansion potential and clay structure mitigated by confining pressure and soil movement

#### **Extreme Heat**

- Publicize dangers and the signs of heat stroke.
- Inform the public of preventive measures against heat stroke and other heat related conditions.
- Invite churches and community groups to distribute box fans and/or provide air-conditioned shelters.

#### **Flood**

- Address moving repetitive loss structures.
- Educate residents who live in flood plain on how to minimize flood damage.
- Improve warning systems.

#### **Severe Storms/Hailstorms- (includes Lightning-High Winds)**

- Promote public awareness of lightning dangers and what can be done to prevent/reduce personal injury and property damage.
- Provide public shelters in parks.
- Educate residents on construction techniques and materials that better withstand high winds, hail, and other natural hazards.
- Identify County buildings that are vulnerable to loss from high winds and suggest ways that can prepare them for storms.
- Improve warning systems
- Encourage the purchase of adequate insurance.
- Publicize and encourage better roof construction and materials to withstand hailstorms.

#### **Severe Winter Storm**

- Improve warning systems.
- Identify elderly and/or disabled citizens who are at risk from winter storms.
- Place exposed power and telephone lines underground to prevent damage from ice loading.
- Encourage churches and community groups to assist persons at risk during power loss.
- Provide alternate source of electricity to critical facilities during power outages.
- Maintain higher level of readiness for snow and ice removal from roads.
- Provide mobile power source for those on oxygen or other life support systems

#### **Tornadoes**

- Publicize and encourage better construction and the use of materials that can better withstand tornadic winds.
- Improve warning systems.
- Increase availability of storm shelters.
- Provide alternate source of electricity to critical facilities during power outages.

- Continue and expand training of storm spotters.

### Wildfires

- Alert homeowners when fire risk is great in rural and remote areas.
- Educate homeowners how to minimize their risk to wildfires.
- Educate the public about techniques and regulations pertaining to controlled burns.
- Improve firefighting capabilities.
- Reduce and control Cedar tree encroachment.

## Mitigation Development

The current mitigation activities are discussed and then followed by future mitigation activities which include descriptions of selected objectives and their associated mitigation actions. These mitigation activities help the Kaw Nation meet its overall goal for hazard mitigation. However, the team recognized that additional mitigation activities may need to be added to the updates of this Plan. Due to the Kaw Nation's limited resources, all objectives cannot be addressed in this initial Plan, therefore only those objectives that included action(s) that the Hazard Mitigation Team felt were most desired, effective and/or feasible, should funding become available, were selected, and discussed. Table 7-1 summarizes the selected actions.

Mitigation actions associated with each of these selected objectives were developed, discussed, and prioritized. Table 7-3, at the end of this chapter, reflects the selected Actions and their priority ranking. There are eight hazards overall because the Kaw Nation's planning team eliminated dam failure, earthquake, and expansive soil from the mitigation strategy due to their low probability and lack of impacts.

## Future Mitigation Actions

### Hazard: Dam/Levee Failure

- Eliminated due to low probability and lack of impacts.

### Hazard: Drought

**Action #1** Retrofit existing water towers to serve as an additional water source. Time frame: would need to be a long-term project, continued as funding becomes available.

**Action #2:** Educate the tribal citizens about the conservation and the dangers associated with the hazard. Time frame: would be 24 months, continued as funding becomes available.

**TABLE 6-1: MITIGATION ACTIONS - DROUGHT**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action DR1	\$150,000 per water tower for retrofit	(HMGP) (ICDBG)	Kaw Nation's Environmental Department would oversee retrofit along with Kaw Nation Emergency Management
Action DR2	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

### **Hazard: Earthquake**

**Action #1** Promote/plan steps for before, during and after an earthquake, to limit damage. Steps to include plans for dealing with the emergency by storing supplies of water, medicines, flashlights, radios, blankets, etc in safe places. Time frame: would need to be a long-term project, continued as funding becomes available.

**Action #2:** Educate the tribal citizens about earthquakes and the dangers associated with the hazard. Time frame: would be 24 months, continued as funding becomes available.

**TABLE 6-2: MITIGATION ACTIONS - EARTHQUAKE**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action EQ1	\$1,000 to \$2,500	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management
Action EQ2	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

### **Hazard: Extreme Heat**

**Action #1** Programmable thermostats to regulate temperature more efficiently due to time of occupancy. Time frame: Initiate, install and continue as funding becomes available.

**Action #2** Electronic signage. This will facilitate public awareness as to health hazards due to excessive heat (plus additional hazards) and recommended actions to take. Time frame: Initiate, install and continue as funding becomes available.

**Action #3** Fans. Purchase and distribute box or oscillating fans to tribal citizens who may be at a greater risk. (Elderly and infants) Time frame: Initiate, install and continue as funding becomes available.

**Action #4** Use of misting systems to cool patio areas. This will allow those who must work outside an area to retreat to when warning signs of excessive heat present themselves. (Dizziness, heat exhaustion, etc.). Time frame: Initiate, install and continue as funding becomes available

**Action #5** Tinted film for exterior glass. This tinted film will be installed to all tribal facilities. This tinted film, when applied to exterior windows, will reduce the amount of direct sun light into a room while

providing a layer of protection should an obstacle hit the glass and shatter it. Time frame: Initiate, install and continue as funding becomes available.

**Action #6** Educate tribal members through distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. Time frame: 12 months and continue as funding becomes available.

**TABLE 6-3: MITIGATION ACTIONS – EXTREME HEAT**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action EH1	\$300	FEMA Hazard Mitigation Grant Program (HMGP)	Kaw Nation's Maintenance Department
Action EH2	\$59,845 each - multipurpose	FEMA HMGP	Kaw Nation's Maintenance Department
Action EH3	\$40 each	FEMA HMGP	Kaw Nation's Maintenance Department
Action EH4	\$150 each	FEMA HMGP	Kaw Nation's Maintenance Department
Action EH5	\$50,000 total	FEMA HMGP	Kaw Nation's Maintenance Department
Action EH6	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation's Emergency Management

### Hazard: Soil Expansion

Should a long period of extreme heat or a drought occur in the TJSA, tribal buildings would have cracked foundations and walls due to the expansive soil cracking and pulling away from structures.

**Action #1** Programmable thermostats to regulate temperature more efficiently due to time of occupancy. Time frame: Initiate, install and continue as funding becomes available.

**Action #2** Electronic signage. This will facilitate public awareness as to health hazards due to excessive heat (plus additional hazards) and recommended actions to take. Time frame: Initiate, install and continue as funding becomes available.

**Action #3** Fans. Purchase and distribute box or oscillating fans to tribal citizens who may be at a greater risk. (Elderly and infants) Time frame: Initiate, install and continue as funding becomes available.

**Action #4** Use of misting systems to cool patio areas. This will allow those who must work outside an area to retreat to when warning signs of excessive heat present themselves. (Dizziness, heat exhaustion, etc.). Time frame: Initiate, install and continue as funding becomes available

**Action #5** Tinted film for exterior glass. This tinted film will be installed to all tribal facilities. This tinted film will when applied to exterior windows will reduce the amount of direct sun light into a room while providing a layer of protection should an obstacle hit the glass and shatter it. Time frame: Initiate, install and continue as funding becomes available.

**Action #6** Educate tribal members through distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. Time frame: 12 months and continue as funding becomes available.

**TABLE 6-4: MITIGATION ACTIONS – SOIL EXPANSION**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action SE1	\$150 each	FEMA Hazard Mitigation Grant Program (HMGP)	Kaw Nation's Maintenance Department
Action SE2	\$59,845 each - Multipurpose	FEMA HMGP	Kaw Nation's Maintenance Department
Action SE3	\$40 each	FEMA HMGP	Kaw Nation's Maintenance Department
Action SE4	\$150 each	FEMA HMGP	Kaw Nation's Maintenance Department
Action SE5	\$50,000 total	FEMA HMGP	Kaw Nation's Maintenance Department
Action ESE6	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation's Emergency Management

## Hazard: Floods

According to the National Weather Service, Kay County, has experienced 54 flood events that resulted in approximately \$6.5 million in flood damages since 1993. Therefore, the average potential dollar loss is estimated at \$ 250,000 per year. Kaw Nation TJSA is not in the flood plain.

**Action #1** Work with County and State departments to improve drainage in flash flood prone areas. (Improve ditch maintenance, debris removal, damaged culverts and drainage elevations achieved and maintained) Install cement drainage ditches to facilitate faster drainage to creeks and rivers to eliminate flash flood prone areas. Time frame: would need to be a long-term project, continued as funding becomes available.

**Action #2** Electronic signage. This will facilitate public awareness as to flash flooding dangers (plus additional hazards) and recommended actions to take. Time frame: Initiate, install and continue as funding becomes available.

**Action #3** Educate tribal citizens about the dangers of driving through water covered roadways through the distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. Time Frame: 12 Months, continued as funding becomes available.

**TABLE 6-5: MITIGATION ACTIONS - FLOODS**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action FF1	\$3,250,000 total	Pre-Disaster Mitigation Grant Federal Road Grant	Kaw Nation Emergency Management
Action FF2	\$59,845 each - Multipurpose	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management
Action FF3	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

### **Hazard: Severe Storms/Hailstorms (Includes Lightning & High Winds)**

**Action #1** Installation of steel roofing material on existing tribal facilities. This will reduce penetration of large hail. This would be applied to new buildings as well. Time frame: would need to be a long-term project, installed, and continued as funding becomes available

**Action #2** Fabricate shelters for protection of tribal and employee's vehicles at all tribal facilities. Time frame: would need to be a long-term project, fabricated, installed, and continued as funding becomes available.

**Action #3** Protective film for exterior glass. This tinted film will be installed to all tribal facilities. This tinted film, when applied to exterior windows, will provide a layer of protection should an obstacle hit the glass and shatter it. This would apply to new buildings as well. Time frame: Initiate, install and continue as funding becomes available.

**Action #4** Educate tribal citizens on the dangers of Hailstorms during severe weather events by distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. Time Frame: 12 Months, continued as funding becomes available.

**TABLE 6-6: MITIGATION ACTIONS – SEVERE STORMS/HAILSTORMS**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action HA1	\$12.50 per square installed	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management
Action HA2	\$TBD	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management



Action HA3	\$50,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management
Action HA4	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

### Hazard: Lightning

**Action #1** Install lightning rods on all tribal facilities to dissipate lightning strikes and lightning electromagnetic fields to ground. This will protect facility by reducing fires related to lightning events. Time frame: Initiate, install and continue as funding becomes available.

**Action #2** Lightning surge/suppressors to be installed on all main breaker panels in all Kaw Nation facilities. This will reduce damage to electronics from lightning strikes and surges from voltage spikes. This will also be applied to new buildings and infrastructure. Time frame: Initiate, install and continue as funding becomes available.

**Action #3** Educate tribal citizens on the dangers of lightning during severe weather events by distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. Time Frame: 12 Months, continued as funding becomes available.

**TABLE 6-7: MITIGATION ACTIONS - LIGHTNING**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action LT1	\$55,000 installed total	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation's Maintenance Department
Action LT2	\$150,000 installed total	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation's Maintenance Department
Action LT3	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

### Hazard: Severe Winter Storm

**Action #1** Install generators at critical facilities. Winter Ice storms are notorious for taking down electrical distribution lines over a wide expanse of service area. Time frame: Initiate, install and continue as funding becomes available.

**Action #2** Electronic signage. This will facilitate public awareness as to upcoming severe winter storms (plus additional hazards) and recommended actions to take. Time frame: Initiate, install and continue as funding becomes available.

**Action #3** Provide mobile power source for those on oxygen or other life support. Time frame: Identify potential at-risk citizens, purchase mobile units, and continue as funding becomes available.

**Action #4** Burying all utility lines to eliminate the likelihood of built-up ice on residential trees and utility lines which break due to added weight of ice destroying electrical power to houses and critical facilities which affects their quality of life. This would also apply to new buildings and infrastructures.

**Action #5** Educate tribal citizens on the dangers of severe winter storms by distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. (Specifically, the preparation of a survival kit for first 72 hours) and enhance awareness about warning devices. Time Frame: 12 Months, continue as funding becomes available.

**TABLE 6-8: MITIGATION ACTIONS – SEVERE WINTER STORM**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action WS1	\$800,000 total	FEMA Hazard Mitigation Grant Program (HMGP) Pre-Disaster Mitigation Grant	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management
Action WS2	\$59,845 each - Multipurpose	FEMA (HMGP)	Kaw Nation's Maintenance Department
Action WS3	\$500,000 total	FEMA Hazard Mitigation Grant Program (HMGP) Pre-Disaster Mitigation Grant	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management
Action WS4	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

### Hazard: Tornadoes/High Winds

According to the National Weather Service, Kay County and its communities have experienced 97 tornadic events that resulted in approximately \$37 million dollars in damages in the last 52 years. Therefore, the average potential dollar loss per event is estimated to be approximately \$450,000 dollars per event.

**Action #1** Safe rooms for critical facilities. Provide safety and protection of loss of life. Time frame: would need to be a long-term project, continued as funding becomes available

**Action #2** Community tornado / storm shelters. This will provide safety and protection of loss of life in areas where there are not adequate individual storm shelters. Time frame: would need to be a long-term project, continued as funding becomes available

**Action #3** Upgrade outdoor warning devices in all communities that have tribal members living there with installation provided. Time frame: would need to be a long-term project, continued as funding becomes available

**Action #4** Community type tornado / storm shelter at Kaw Nation Pow Wow ground on Kaw Lake. Because of the amount of camping tents and trailers during the Pow Wow event there isn't any type of shelter on the grounds. This will provide a safe haven should a severe storm capable of producing a tornado or high winds materialize. Time frame: would need to be a long-term project, continued as funding becomes available.

**Action #5** Educate tribal citizens on where to shelter during a tornado warning by distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management and enhance awareness about warning devices. Time Frame: 12 Months, continued as funding becomes available.

**TABLE 6-9: MITIGATION ACTIONS – TORNADOS/HIGH WINDS**

<b>Action</b>	<b>Estimated Cost</b>	<b>Funding Sources</b>	<b>Who Will Implement Action</b>
Action THW1	Clinic: \$75,000  Administration: \$90,000  Casino: \$250,000  (All Community Safe Room Type)	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation’s Maintenance Department with Kaw Nation Emergency Management oversight
Action THW2	\$250,000 total  (All Community Safe Room Type)	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation’s Maintenance Department with Kaw Nation Emergency Management oversight
Action THW3	\$30,000 per device	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation’s Maintenance Department with Kaw Nation Emergency Management oversight
Action THW4	\$150,000 total	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation’s Maintenance Department with Kaw Nation Emergency Management oversight
Action THW5	\$500 to \$1,000	Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management

## **Hazard: Wildfires**

Based on past *reported* dollar losses, the average potential gross dollar loss for wildfire within the County is estimated at \$35,459 per year, or \$265 per event. However, potential dollar loss can increase dramatically during drought conditions as acres of valuable pastureland becomes more vulnerable to wildfires. Kaw Nation has not suffered significant loss due to wildfires

**Action #1** Work with Corp of Engineers and Forestry to implement natural fire breaks. This will reduce the speed of the fire to allow fire fighters to gain control of the fire situation. This will protect wildlife

and livestock. Time frame: Initiate collaboration with Corp of Engineers and Forestry Service to develop plan for implementation, then initiate and continue as funding becomes available.

**Action #2** Secure grant money to purchase fire equipment, apparatus, and training for local and rural fire departments. The Kaw Nation does not have a fire department, so it relies on the surrounding fire response agencies to provide fire protection. Therefore, it is in our best interest that they are equipped to handle all fire situations that may confront the Kaw Nation. Time frame: Initiate, install, deliver, and continue as funding becomes available.

**Action #3** Develop a Community Wildfire Plan and use to education tribal citizens on the dangers of allowing vegetation to grow excessively around their houses and outbuildings to create an unnecessary fuel load and ignition point for wildfires. Educational materials will be shared by distribution of literature, Kaw Nation Tribal Newsletter, and Kaw Nation Website under Emergency Management. Time Frame: 12 Months, continue as funding becomes available.

**TABLE 6-10: MITIGATION ACTIONS - WILDFIRES**

Action	Estimated Cost	Funding Sources	Who Will Implement Action
Action WF1	\$800,000 total	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management
Action WF2	\$500,000 total	FEMA Hazard Mitigation Grant Program (HMGP)  Pre-Disaster Mitigation Grant	Kaw Nation Emergency Management
Action WF3	\$7,500	Pre-Disaster Mitigation Grant  Community Wildfire Defense Grant	Kaw Nation Emergency Management

## Plan Implementation

As previously mentioned, the Kaw Nation Hazard Mitigation team discussed several objectives to implement the Tribe's goal to mitigate natural hazards, but due to the Tribes limited resources at this time, only a few were selected and addressed in this Plan. Each objective consists of a(n) Action(s) that were discussed to determine which could best meet the Objective. Each Action was discussed with the Hazard Mitigation team. After considering the tribal citizens input and other opinions, the Hazard Mitigation Team members selected and prioritized the actions in the order (#1 being the highest priority ranking) that they felt the actions should be implemented should they receive funding. These actions are presented in Table 7-1 which includes their priority rating. The categories of cost, citizens served, likelihood of the event, and # of hazards mitigated by the Action were considered when prioritizing rank

of the Actions. Table 7-2 illustrates the criteria used to determine the priorities. Note that these priorities are subject to change. It is also important to note that additional mitigation actions will be included as more of the public, and other entities within the Kaw Nation Tribal jurisdictional service area, become involved and as the Plan is updated and as funding becomes available to the Kaw Nation. There are eight hazards overall for priority ranking. Final priority summation can be found in Table 7-3.

**TABLE 7-1: PLAN IMPLEMENTATION – ACTIONS AND PRIORITY RANKING**

<b>ACTION</b>	<b>ESTIMATED COST</b>	<b>FUNDING SOURCES</b>	<b>WHO WILL IMPLEMENT ACTION</b>	<b>PRIORITY RANKING</b>
Action DR1	\$150,000 per water tower for retrofit	HMGP ICDBG	Kaw Nation's Environmental Department would oversee retrofit along with Kaw Nation Emergency Management	6
Action DR2	\$500 to \$1,000	PDMG HMPG	Kaw Nation Emergency Management oversight	13
Action EQ1	\$1,000 to \$2,500	PDMG	Kaw Nation Emergency Management oversight	12
Action EQ2	\$500 to \$1,000	PDMG	Kaw Nation Emergency Management oversight	13
Action EH1 & SE1	\$300 each	HMGP	Kaw Nation's Maintenance Department	14
Action EH2 & SE 2	\$59,845 - Multipurpose	HMGP	Kaw Nation's Maintenance Department	7
Action EH3 & SE 3	\$40 each	HMGP	Kaw Nation's Maintenance Department	16
Action EH4 & SE 4	\$150 each	HMGP	Kaw Nation's Maintenance Department	15
Action EH5 & SE5	\$50,000 total	HMGP	Kaw Nation's Maintenance Department	9
Action EH6 & SE6	\$500 to \$1,000	PDMG	Kaw Nation's Emergency Management	13
Action FF1	\$3,250,000 total	PDMG Federal Road Grant	Kaw Nation's Emergency Management	1
Action FF2	\$59,845 - Multipurpose	PDMG	Kaw Nation Emergency Management	7
Action FF3	\$500 to \$1,000	PDMG	Kaw Nation Emergency Management	13

Action HA1	\$12.50 per square installed	PDMG	Kaw Nation Emergency Management	17
Action HA2	\$TBD	PDMG	Kaw Nation's Maintenance Department	--
Action HA3	\$50,000 total	PDMG	Kaw Nation's Maintenance Department	9
Action HA4	\$500 to \$1000	PDMG	Kaw Nation Emergency Management	13
Action LT1	\$55,000 installed total	HMGP PDMG	Kaw Nation's Maintenance Department	8
Action LT2	\$150,000 installed total	HGMP PDMG	Kaw Nation's Maintenance Department	6
Action LT3	\$500 to \$1,000	PDMG	Kaw Nation Emergency Management	13
Action WS1	\$800,000 total	HGMP PDMG	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management	2
Action WS2	\$59,845 – Multipurpose	FEMA HGMP	Kaw Nation's Maintenance Department	7
Action WS3	\$500,000 total	HGMP PDMG	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management	3
Action WS4	\$500 to \$1,000	PDMG	Kaw Nation Emergency Management	13
Action THW1	Clinic: \$75,000  Administration: \$90,000  Casino: \$250,000  (All Community Safe Room Type)	HGMP  PDMG	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management	4
Action THW2	\$250,000 total  (All Community Safe Room Type)	HGMP PDMG	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management	5
Action THW3	\$30,000 per device	HGMP PDMG	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management	13
Action THW4	\$150,000 total	HGMP PDMG	Kaw Nation's Maintenance Department with Kaw Nation Emergency Management	6
Action THW5	\$500 to \$1,000	HGMP PDMG	Kaw Nation Emergency Management	13



Action WF1	\$800,000 total	HGMP PDMG	Kaw Nation Emergency Management	2
Action WF2	\$500,000 total	HGMP PDMG	Kaw Nation Emergency Management	3
Action WF3	\$7,500	PDMG Community Wildfire Defense Grant	Kaw Nation Emergency Management	11

**TABLE 7-2: PLAN IMPLEMENTATION – PRIORITY SELECTION CATEGORIES**

Summary of selective categories and scales used to determine priority ranking of Mitigation Actions. The higher the TOTAL, the higher the PRIORITY. The following scales were used for each category:

- **Cost:**  
Cost was ranked, starting with the value of 1 to indicate the MOST expensive Action:  
Example:       1 = Most expensive Action  
                  2 = Next expensive Action  
                  3 = Next.... etc.  
*(Note: Items serving more than one Hazard or of the same cost are ranked using the same Level of Value)*
- **Citizens potentially served:**  
1 = A few individuals (less than 25%)  
2 = A fourth of the County (25%)  
3 = Half the County (50%)  
4 = Entire County (100%)
- **Likelihood of natural hazard that requires the Action:**  
1 = Unlikely  
2 = Occasional  
3 = Likely  
4 = High likely
- **# Of Natural Hazards mitigated by the Action:**  
The value assigned for this category simply represented the number of natural hazards mitigated with the Action.

**TABLE 7-3: PLAN IMPLEMENTATION – FINAL PRIORITY SELECTION**

Action	Citizens Served	Likelihood of Event	# Of hazards mitigated	TOTAL	PRIORITY
Action DR1	2	1	1	4	6
Action EQ1	2	3	1	6	5
Action EH1 & SE1	4	3	2	9	2
Action FF1	2	4	1	7	4
Action HA1	3	4	1	8	3
Action LT1	3	3	1	7	4
Action WS1	4	4	3	11	1
Action THW1	2	4	1	7	4
Action WF1	3	3	1	7	4

## TRIBAL MULTI-HAZARD MITIGATION PLAN REVIEW CROSSWALK

<b>Tribal Jurisdiction:</b> Kaw Nation	<b>Title of Plan:</b> Kaw Nation Multi-Hazard Mitigation Plan	<b>Date of Plan:</b> January, 2023
<b>Tribal Point of Contact:</b>	<b>Address:</b> 3251 E. River Road, 74647 Newkirk, OK	
<b>Title:</b> Emergency Manager		
<b>Agency:</b> Kaw Nation		
<b>Phone Number:</b> 580-362-1232		
		Email: emergencymanagement@kawnation.gov

<b>State Reviewer (if applicable):</b>	<b>Title:</b>	<b>Date:</b>
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<b>FEMA Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
<b>Date Received in FEMA Region:</b> (insert #)		
<b>Plan Not Approved</b>		
<b>Plan Approvable Pending Adoption</b>		
<b>Plan Approvable</b>		

### Section 1: REGULATION CHECKLIST

1. Standard Regulation Checklist Regulation (44 CFR 201.7 Tribal Mitigation Plans)		Location in Plan (section and/or page number)	Met	Not Met
<b>ELEMENT A. PLANNING PROCESS</b>				
A.1 Does the plan document the planning process, including how it was prepared and who was involved in the process? [44 CFR 201.7(c)]		Planning Process Pages 17-19		
A.3 Does the plan document an opportunity for public comment during the drafting stage and prior to plan approval, including a description of how the tribal government defined "public"? [44 CFR 201.7(c)(i)]		Meeting/Planning Documents Pages 82-		
A.3 Does the plan document, as appropriate, an opportunity for neighboring communities, tribal and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? [44 CFR 201.7(c)(ii)]		Pages 17-18		
A.4 Does the plan describe the review and incorporation of existing plans, studies, and reports? [44 CFR 201.7(c)(iii)]		Page 18		

A.5 Does the plan include a discussion on how the planning process was integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA programs and initiatives? [44 CFR 201.7(c)(iv)]	Pages 17-19		
A.6 Does the plan include a description of the method and schedule for keeping the plan current (monitoring, evaluating, and updating the mitigation plan within the plan update cycle)? [44 CFR 201.7(c)(i)]	Pages 19-20		
A.7 Does the plan include a discussion on how the tribal government will continue public participation in the plan maintenance process? [44 CFR 201.7(c)(iv)]	Page 20		
<b>ELEMENT A. REQUIRED REVISIONS</b>			
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>			
B.1 Does the plan include a description of the type, location, and extent of all natural hazards that can affect the tribal planning area? [44 CFR 201.7(c)(2)(i)]	Pages 20-22		
A.2 Does the plan include information on previous occurrences of hazard events and on the probability of future hazard events for the tribal planning area? (44 CFR 201.7(c)(2)(i)]	Pages 24-51		
A.3 Does the plan include a description of each identified hazard's impact as well as an overall summary of the vulnerability of the tribal planning area? [44 CFR 201.7(c)(2)(ii)]	Pages 24-51		
<b>ELEMENT B. REQUIRED REVISIONS</b>			
<b>ELEMENT C. MITIGATION STRATEGY</b>			

C.1 Does the plan include a discussion of the tribal government's pre-and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including an evaluation of tribal laws and regulations related to hazard mitigation as well as to development in hazard-prone areas? [44 CFR 201.7(c)(3) and 201(c)3(iv)]	Pages 7-8		
C.2 Does the plan include a discussion of tribal funding sources for hazard mitigation projects and identify current and potential sources of Federal, tribal, or private funding to implement mitigation activities? [44 CFR 201.7(c)(3)(iv) and 201.7(c)3(v)]	Pages 16-17		
C.3 Does the Mitigation Strategy include goals to reduce or avoid long-term vulnerabilities to the identified hazards? [44 CFR 201.7(c)3(i)]	Pages 58-60 Pages 18-19		
C.4 Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure? [44 CFR 201.7(c)3(ii)]	Pages 60-72		
C.5 Does the plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by the tribal government? [44 CFR 201.7(c)3(iii)]	Pages 71-72		
C.6 Does the plan describe a process by which the tribal government will incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate? [44 CFR 201.7(c)4(iii)]	Page 20		
C.7 Does the plan describe a system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy, including monitoring implementation of mitigation measures and project closeouts? [44 CFR 201.7(c)4(ii and 201.7(c)4(v)]	Pages 19-20		
<b>ELEMENT C. REQUIRED REVISIONS</b>			
<b>ELEMENT D. PLAN UPDATES</b>			

D.1 Was the plan revised to reflect changes in development? [44 CFR 201.7(d)3]	Pages 17-18		
D.2 Was the plan revised to reflect changes in development? [44 CFR 201.7(d)(3) and 201.7(c)4(iii)]	Page 18		
D.3 Was the plan revised to reflect changes in priorities? [44 CFR 201.7(d)3]	Page 18		
<b>ELEMENT D. REQUIRED REVISIONS</b>			
<b>ELEMENT E. ASSURANCES AND PLAN ADOPTION</b>			
E.1 Does the plan include assurances that the tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR Parts 200 and 300.2 and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes? [44 CFR 201.7(c)(6)]	Pages 12-15		
E.2 Does the plan include documentation that it has been formally adopted by the governing body of the tribal government requesting approval? [44 CFR 201.7(c)(5)]	Page 18		
<b>ELEMENT E. REQUIRED REVISIONS</b>			
<b>ELEMENT F. STANDARD PLAN REQUIREMENTS</b>			
F.1 Does the enhanced plan include all elements of the standard tribal mitigation plan? [44 CFR 201.3(e)3 and 201.5(b) and 201.7]	Page 12-15		
<b>ELEMENT F. REQUIRED REVISIONS</b>			
<b>ELEMENT G. INTEGRATED PLANNING</b>			

F.1 Does the enhanced plan demonstrate integration to the extent practicable with other tribal and/or regional planning initiatives and FEMA mitigation programs and initiatives? [44 CFR 201.3(e)(3) and 201.5(b)(1)]	Page 16		
<b>ELEMENT G. REQUIRED REVISIONS</b>			
<b>ELEMENT H. TRIBAL MITIGATION CAPABILITIES</b>			
H.1 Does the tribal government demonstrate commitment to a comprehensive mitigation program? [44 CFR 201.3(e)(3), and 201.5(b)(4)]	Page 15		
H.2 Does the enhanced plan document capability to implement mitigation actions? [44 CFR 201.3(e)(3), and 201.5(b)(4)]	Page 17		
H.3 Is the tribal government using existing mitigation programs to achieve mitigation goals? [44 CFR 201.3(e)(3), and 201.5(a) and 201.5(b)(3)]	Page 17		
<b>ELEMENT H. REQUIRED REVISIONS</b>			
<b>ELEMENT I. HMA GRANTS MANAGEMENT PERFORMANCE</b>			
I.1 With regard to HMA, is the tribal government maintaining the capability to meet application timeframes and submitting complete project applications? [44 CFR 201.3(e)(3), and 201.5(b)(2)(iii)(A)]	Page 16		
I.2 With regard to HMA, is the tribal government maintaining the capability to prepare and submit accurate environmental reviews and benefit-cost analyses? [44 CFR 201.3(e)(3), and 201.5(b)(2)(iii)(B)]	Page 10		
I.3 With regard to HMA, is the tribal government maintaining the capability to submit complete and accurate quarterly progress and financial reports on time? [44 CFR 201.3(e)(3), and 201.5(b)(2)(iii)(C)]	Page 20		



<p>I.4 With regard to HMA, is the tribal government maintaining the capability to submit complete HMA project within established performance periods, including financial reconciliation? [44 CFR 201.3(e)(3), and 201.5(b)(2)(iii)(D)]</p>	<p>Pages 10 &amp; 12</p>		
<p><b>ELEMENT I. REQUIRED REVISIONS</b></p>			

## APPENDIX A (Tribal Profile & Maps)

### KAW NATION PROFILE 2022

Kaw Nation  
P.O. Box 50  
698 Grandview Drive  
Kaw City, OK 64761  
Phone (580)269-2552  
Fax (580)269-1161  
Website: [www.kawnation.gov](http://www.kawnation.gov)

<b>Total Acres owned by Kaw Nation</b>	<b>1801.41</b>
<b>Total Acres in Trust Status</b> (Jointly owned as undivided shares by 5 tribes)	<b>167.42</b>
<b>Total Acres in Trust Status</b> (Excluding jointly owned properties)	<b>1270.51 or (70%)</b>
<b>Total Acres in Fee Status</b>	<b>530.9 or (30%)</b>
<b>Total Tribal Population</b>	<b>3,776</b>

#### LOCATION AND LAND STATUS

The Kaw Nation is in Kay County, in North Central Oklahoma. Tribal Headquarters are in Kaw City, Oklahoma which is surrounded by the Kaw Lake Reservoir. The town of Kaw City is located 11 miles west on Highway 11 from Ponca City, Oklahoma.

From a population of several thousand, the Kaw had declined through disease and starvation to 1,500 by the year 1800, to 553 by 1872, and to 194 within sixteen years after the move to Oklahoma's Indian Territory. Even here their land claim was not safe. The Kaw Allotment Act of 1902 legally obliterated the tribe until federal reorganization in 1959. Their former reservation land was inundated in the mid 1960's by the construction of Kaw Reservoir. This required the relocation of the Tribal Council House and Tribal cemetery.

The Kaw Nation has survived adversity and today is a federally recognized self-governing tribe of 3,376 members. Administrative headquarters are in a four-building complex in Kaw City, Oklahoma. Tribal enterprises include Kanza Travel Plaza, Kanza Casino, and Rock and Brews Casino in Bristow, OK, located on Interstate 35 and Highway 177, Southwind Express in Kaw City, OK; Town Discount Tobacco Shop, Woodridge Market gas station and Ice House located in Ponca City, OK.

The Kaw Nation Tribe also oversees the Kaw Housing Project, Kaw Nation Police, Kanza Health Clinic (including a pharmacy & dental office), Wellness Center, Kaw Nation Environmental Department (KNED),

Food Services for Elders, Kamp Kanza, CCDF Program, and is a member of the Chilocco Development Authority. Emergency assistance, Social Services programs, and Academic scholarships are available to tribal members as well as our Tribal District and Supreme Courts that were established in 1992.

## **GOVERNMENT**

The tribal Council is comprised of the following elected officers: Chair, Vice-Chair, Secretary and four (4) Council Members. Each shall serve a four (4) year term. They serve as the governing body for all enrolled tribal members.

## **ECONOMY**

The Kaw Nation Business Services (KNBS) and Kaw Gaming, Inc. (KGI) operates and manages (2) gaming facilities: One named Rock and Brews Casino and another named Kanza Casino, both on Interstate 35 near Braman, OK. The following businesses are also owned by Kaw Nation and managed by KGI: Smoke shop located in Ponca City, OK; Woodridge Market is located east of Ponca City, OK; the Travel Plaza at Braman, OK; and Southwind Express in Kaw City, OK.

## **SERVICES**

- In addition to tribal owned business, Kaw Nation also administers several federally funded programs and services in education
- Diabetic Care
- Dental Care
- Child Care Services
- Emergency Utility Assistance
- Burial Assistance
- Eyeglass Assistance
- Denture & Hearing Aid Assistance
- General Assistance due to loss of job, divorce, or pending SSI/unemployment benefits
- Headstone Assistance

## **INFRASTRUCTURE**

Kaw Nation headquarters are accessible from Ponca City, via U.S. Highway 11; we are approximately 90 miles to three major cities, Oklahoma City, OK; Tulsa, OK and Wichita, KS. Commercial and private air service is available in Ponca City, Fed-Ex, truck line & private carriers also serve this area.

## **COMMUNITY FACILITIES**

A Community Center is located North of Kaw nation Headquarters across the lake from Washunga Bay; 12613 E. Ferguson Avenue Kaw City, OK. This complex provides a large building that will accommodate large groups with cooking facilities and showers. The grounds include RV hook-ups, electric, water, and propane is provided by local vendors.

Tribal citizens receive health care through our Kanza Health Clinic, 22 miles from Kaw Nation Headquarters. Hospitals and emergency rooms are in Ponca City. Options to attend schools within Kay County are available.

