Kaltag, Alaska

Multi-Jurisdictional Hazard Mitigation Plan Update

January 2018

Prepared for:

City of Kaltag
Native Village of Kaltag

LeMay Engineering & Consulting, Inc.

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Acronyms/Abbreviations

°F	Degrees Fahrenheit
"	inches
ADF&G	Alaska Department of Fish and Game
AFG	Assistance to Firefighters Grant
AHFC	Alaska Housing Finance Corporation
AICC	Alaska Interagency Coordination Center
ANA	Administration for Native Americans
ANTHC	Alaska Native Tribal Health Consortium
APA	American Planning Association
ARC	American Red Cross
ATV	all-terrain vehicle
AVEC	Alaska Village Electric Cooperative
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CD	Compact Disc
CDBG	Community Development Block Grant
CHEMS	Community Health and Emergency Medical Services
City	The City of Kaltag
CFR	Code of Federal Regulations
DCCED	Department of Commerce, Community, and Economic Development
DCRA	Division of Community and Regional Affairs
DEC	Division of Environmental Conservation
DEED	Department of Education and Early Development
DGGS	Alaska Division of Geological and Geophysical Survey
DHHS/ACF	Department of Health and Human Services, Administration of Children & Families
DHS	United States Department of Homeland Security
DHSS	Department of Health and Social Services
DHS&EM	Division of Homeland Security and Emergency Management
DMA 2000	Disaster Mitigation Act of 2000
DMVA	Department of Military and Veterans Affairs
DNR	Department of Natural Resources
DOE	Department of Energy
DOF	Division of Forestry
DOI	Division of Insurance
DOL	Department of Labor
DOT/PF	Department of Transportation and Public Facilities

DSS	Division of Senior Services
EDA	Economic Development Administration
ESFP	Emergency Food and Shelter Program
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
FP&S	Fire Prevention and Safety
ft	feet
FY	Fiscal Year
g	gravity as a measure of peak ground acceleration
GIS	Geographic Information System
HAZUS-MH	Hazards U.S.-Multi-Hazard
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HUD	Housing and Urban Development
IBHS	Institute for Business and Home Safety
ICDBG	Indian Community Development Block Grant Program
IHS	Indian Health Service
IRS	Internal Revenue Service
LGP	Lindbergh Grants Program
M	Magnitude
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
MMI	Modified Mercalli Intensity
mph	miles per hour
N/A	Not Applicable
NAHASDA	Indian Housing Block Grant – Native American Housing Assistance and Self Determination Act
NFIP	National Flood Insurance Program
NRCS	Natural Resource Conservation Service
NWS	National Weather Service
ONHW	Oregon Natural Hazards Workgroup
PDC	PDC Incorporated, Planning Design, and Construction
PDM	Pre-Disaster Mitigation
PGA	peak ground acceleration
RL	repetitive loss
RFC	repetitive flood claims
SAFER	Staffing for Adequate Fire and Emergency Response

SBA	Small Business Administration
SRL	Severe Repetitive Loss
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
USACE	United States Army Corp of Engineers
USDA/RD	United States Department of Agriculture/Rural Development
USFA	United State Fire Administration
USFWS	US Fish and Wildlife Service
US and U.S.	United States
USC	United States Code
USGS	United States Geological Survey

This section provides a brief introduction to hazard mitigation planning, the grants associated with these requirements, and a description of this Multi-Jurisdictional Hazard Mitigation Plan Update (MJHMP).

1.1 HAZARD MITIGATION PLANNING

Hazard mitigation, as defined in Title 44 of the Code of Federal Regulations (CFR), Part 201.2, is "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." Many areas have expanded this definition to also include human-caused hazards. As such, hazard mitigation is any work done to minimize the impacts of any type of hazard event before it occurs. It aims to reduce losses from future disasters. Hazard mitigation is a process in which hazards are identified and profiled, people and facilities at risk are analyzed, and mitigation actions are developed. The implementation of the mitigation actions, which include long-term strategies that may include planning, policy changes, programs, projects, and other activities, is the end result of this process.

1.2 PLANNING REQUIREMENTS

1.2.1 Local Mitigation Plans

Local hazard mitigation planning has been driven by a Federal law. On October 30, 2000, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390) which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (Title 42 of the United States Code [USC] 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. In addition, it provided the legal basis for the Federal Emergency Management Agency's (FEMA) mitigation plan requirements for mitigation grant assistance.

To implement these planning requirements, FEMA published an Interim Final Rule in the Federal Register on February 26, 2002 (FEMA 2002a), 44 CFR Part 201 with subsequent updates. The planning requirements for local entities are described in detail in Section 2 and are identified in their appropriate sections throughout this MJHMP.

FEMA's October 31, 2007 and July 2008 changes to 44 CFR Part 201 combined and expanded flood mitigation planning requirements with local hazard mitigation plans (44 CFR §201.6 and §201.7). Furthermore, all Federal Hazard Mitigation Assistance (HMA) program planning requirements were combined eliminating duplicated mitigation plan requirements. This change also required participating National Flood Insurance Program (NFIP) communities' risk assessments and mitigation strategies to identify and address repetitively flood damaged properties. Local hazard mitigation plans now qualify communities for several Federal HMA grant programs.

1.3 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

FEMA HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local Mitigation Plan. Two of the grants, Hazard Mitigation

the Stafford Act and DMA 2000, while the remaining three are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act. As of June 19, 2008, the grant programs were segregated. The HMGP is a directly funded competitive disaster grant program. Whereas the remaining Hazard Mitigation Assistance Programs: PDM, Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL) programs although competitive, rely on specific grant pre-disaster grant funding sources, sharing several common elements.

> *"The Department of Homeland Security FEMA HMA grant programs present a critical opportunity to protect individuals and property from natural hazards while simultaneously* ***reducing reliance on Federal disaster funds****. The HMA programs provide pre-disaster mitigation grants annually to States, Territories, Tribes, and local communities. The statutory origins of the programs differ, but all share the common goal of reducing the loss of life and property due to natural hazards.*
>
> *The PDM program is authorized by the Stafford Act and focuses on mitigation project and planning activities that address multiple natural hazards, although these activities may also address hazards caused by manmade events. The FMA program, RFC program, and SRL program are authorized by the National Flood Insurance Act, and focus on reducing claims against the NFIP."* (FEMA 2006e)

1.3.1 HMA Unified Programs

The HMGP provides grants to States, Tribes, and local entities to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. FEMA may provide a State or Tribe with up to 20% of the total aggregate disaster damage costs to fund HMGP project or planning grants. The cost-share for this grant is 75% Federal/25% non-Federal.

The PDM grant program provides funds to State, Tribes, and local entities, including universities, for hazard mitigation planning and mitigation project implementation prior to a disaster event. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM project's potential savings must be more than the cost of implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The total amount of PDM funding available is appropriated by Congress on an annual basis. In Fiscal Year (FY) 2016, PDM program funding totaled approximately $90 million. The cost-share for this grant is 75% Federal/25% non-Federal.

The goal of the FMA grant program is to reduce or eliminate flood insurance claims under the NFIP. Particular emphasis for this program is placed on mitigating repetitive loss (RL) properties. The primary source of funding for this program is the National Flood Insurance Fund. Grant funding is available for three types of grants, including Planning, Project, and Technical Assistance. Project grants, which use the majority of the program's total funding, are awarded to States, Tribes, and local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2016, FMA funding totaled $199 million. The cost-share for this grant is 75% Federal/25% non-Federal. However, 90% Federal/10% non-Federal to mitigate SRL properties is available in certain situations.

The community of Kaltag does not currently participate in the NFIP and is, therefore, ineligible for National Flood Insurance Act Grant Programs until it becomes a NFIP participant.

This has been identified as a medium priority action as a result of this hazard mitigation planning process, and the Kaltag community is continuing to investigate application to the NFIP program as of this 2018 MJHMP update.

1.4 MJHMP DESCRIPTION

The remainder of this MJHMP consists of the following sections and appendices:

Prerequisites

Section 2 addresses the prerequisites of plan adoption, which include adoption by the City of Kaltag (City) and the Native Village of Kaltag (Tribe). The adoption resolution is included in Appendix B.

Community Description

Section 3 provides a general history and background of the Kaltag area, including historical trends for population and the demographic and economic conditions that have shaped the area. Trends in land use and development are also discussed. A location figure of the area is included.

Planning Process

Section 4 describes the planning process and identifies the Planning Team Members, the meetings held as part of the planning process, and the key stakeholders within the community and the surrounding area. In addition, this section documents public outreach activities (Appendix C) and the review and incorporation of relevant plans, reports, and other appropriate information.

Hazard Analysis

Section 5 describes the process through which the Planning Team identified, screened, and selected the hazards to be profiled in this MJHMP. The hazard analysis includes the nature, history, location, extent, impact, and probability of future events for each hazard. In addition, historical and hazard location figures are included.

Vulnerability Analysis

Section 6 identifies potentially vulnerable assets—people, residential and nonresidential building dwelling units (where available), critical facilities, and critical infrastructure—in the community and the surrounding area. This data was compiled by assessing the potential impacts from each hazard using Geographic Information System (GIS) information. The resulting information identifies the full range of hazards that the City and Tribe could face and potential social impacts, damages, and economic losses.

Mitigation Strategy

Section 7 defines the mitigation strategy which provides a blueprint for reducing the potential losses identified in the vulnerability analysis. The Planning Team developed a list of mitigation goals and potential actions to address the risks facing the community. Mitigation actions include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities. Mitigation strategies developed for the 2010 HMP (note: the 2010 HMP was solely a City plan) were updated in this 2018 MJHMP.

Plan Maintenance

Section 8 describes the Planning Team's formal plan maintenance process to ensure that the MJHMP remains an active and applicable document. The process includes monitoring, evaluating (Appendix E), and updating the MJHMP; implementation through existing planning mechanisms; and continued public involvement.

References

Section 9 lists the reference materials used to prepare this MJHMP.

Appendix A

Appendix A provides the FEMA review tool, which documents compliance with FEMA criteria.

Appendix B

Appendix B provides the adoption resolution for the City and Tribe.

Appendix C

Appendix C provides public outreach information, including newsletters, meeting sign-in sheets, and trip reports.

Appendix D

Appendix D contains the Benefit-Cost Analysis Fact Sheet used to prioritize mitigation actions.

Appendix E

Appendix E provides the plan maintenance documents, such as an annual review sheet and community survey.

2.1 ADOPTION BY LOCAL GOVERNING BODIES AND SUPPORTING DOCUMENTATION

The requirements for the adoption of this MJHMP by the local governing bodies, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PREREQUISITES

Local Plan Adoption

Requirement §201.6(c)(5) and §201.7: The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, Commissioner, Tribal Council).

Element

- Has the local governing body adopted the new or updated plan?
- Is supporting documentation, such as a resolution, included?

Source: FEMA, July 2008.

The City and Tribe are represented in this MJHMP and meet the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000, and 44 CFR §201.6(c)(5) and the intent of 44 CFR §201.7 to assist Indian Tribal governments and other tribal entities to identify and assess their risk to natural hazards through FEMA's multi-hazard mitigation planning process.

The Tribe's participation is in compliance with 44 CFR §201.7 to fulfill government to government application development and project funding match requirements. The Tribe has participated with this MJHMP's development through Joint Council governing activities and has also provided signatory evidence it intends to follow and implement applicable tribal activities to qualify the Native Village of Kaltag for tribal mitigation grant opportunities through DHS&EM on _____, 2018. Furthermore, the Native Village of Kaltag will continue to comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR 13.11(d).

The Kaltag City Council adopted the MJHMP on _____, 2018, and submitted the final draft MJHMP to the State and FEMA for formal approval.

A scanned copy of the City's and Tribe's formal adoptions of this MJHMP are included in Appendix B.

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This section describes the location, geography, and history; demographics; and land use development trends of the Kaltag area.

3.1 LOCATION, GEOGRAPHY, AND HISTORY

"Kaltag is a second-class city located within an unorganized borough. The community is situated on the west bank of the Yukon River, 75 miles west of Galena and 335 miles west of Fairbanks. It is situated on a 35-foot bluff at the base of the Nulato Hills, west of the Innoko National Wildlife Refuge. It lies at approximately 64.327220 North Latitude and -158.721940 West Longitude. (Sec. 29, T013S, R001E, Kateel River Meridian.)" (Department of Community and Commerce and Economics Development/Division of Community and Regional Affairs [DCCED/DCRA] 2017)

Figure 3-1 Kaltag Location Map

The City is located on the Yukon River and covers approximately 23.3 square miles of land and 4.1 square miles of water.

"Kaltag falls within the continental climate zone, characterized by extreme temperature differences. The continental climate zone encompasses most of the central part of the state and experiences extremely cold winters and warm summers. Sustained temperatures of -40 degrees Fahrenheit (°F) are common during winter. Extreme temperatures have been measured from -55 to 90 °F. The river is ice-free from mid-May through mid-October." (DCCED/DCRA 2017)

- The Koyukon-Athabascan tribes had seasonal hunting and fishing camps requiring the tribes to move along with the availability of their subsistence food sources.
- The City location was originally a joint native cemetery located with easy access for neighboring tribes.
- Russian traders named the Village after the Kaltaga Yukon Indians located in the area.
- The City was officially founded in the late 1800s to early 1900s.
- The first Post Office was built in 1903, closed in 1904, then reopened in 1906 as the village underwent boom and bust growth spurts.
- Kaltag's first school opened in 1925.
- A watering point, airport, and clinic were constructed in the 1960s.
- The City Government became incorporated in 1969.

(DCCED/DCRA 2017)

3.2 DEMOGRAPHICS

The 2010 census recorded 190 residents, of which the median age was 32; a 2016 Department of Labor (DOL) estimate indicated that the population had decreased to 172. Kaltag is a blended Koyukon Athabascan community, and about 91.8% of residents recognize themselves as Alaska Native. The male and female composition is approximately 61.1 and 38.9%, respectively. The 2010 census indicated that there are 70 households with the average household having three individuals. The following graph illustrates the historic population of the City.

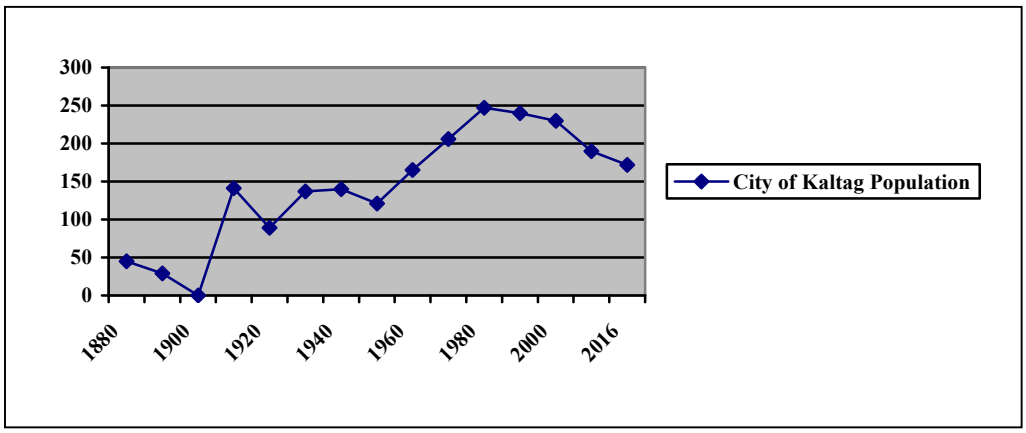

Figure 3-2 City Historical Population

3.3 ECONOMY

There are limited employment opportunities in the City. Established government provides the bulk of the employment opportunities within the City and Tribal offices, the school district, the health clinic, and other commercial enterprises. The summer months bring fire fighting and outside construction job opportunities along with fish processing and commercial fishing. However, subsistence is the primary mechanism by which residents survive. They harvest fish, moose, bear, and waterfowl and gather berries.

According to the Census Bureau's 2009-2013 American Community Survey 5-Year Estimates, the median household income in Kaltag is $25,833. Approximately 20.9% were reported to be living below the poverty level. In 2010, the potential work force (those aged 16 years or older) in Kaltag was estimated to be 141, of which 86 were actively employed. However, only 60% of the work force is employed year-round. The 2010 Census data shows Kaltag has a 29.9% unemployment rate.

Figure 3-3 depicts an area use map of the community and surrounding area obtained from DCRA.

Figure 3-3 Area use map detailing the Community of Kaltag (DCRA 2009)

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This section provides an overview of the planning process; identifies the Planning Team members and key stakeholders; documents public outreach efforts; and summarizes the review and incorporation of existing plans, studies, and reports used to develop this MJHMP. Additional information regarding the Planning Team and public outreach efforts is provided in Appendix C.

The requirements for the planning process, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Planning Process

Local Planning Process

Requirement §201.6(b) and §201.7: An open public involvement process is essential to the development of an effective plan.

In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

Element

- An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- An opportunity for neighboring communities, local 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; and
- Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1) and §201.7: [The plan shall document] 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.

Element

- Does the plan provide a narrative description of the process followed to prepare the new or updated plan?
- Does the new or updated plan indicate who was involved in the planning process?
- Does the new or updated plan indicate how the public was involved?
- Does the new or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?
- Does the updated plan document how the Planning Team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?

Source: FEMA, July 2008.

4.1 OVERVIEW OF PLANNING PROCESS

The State of Alaska Division of Homeland Security and Emergency Management (DHS&EM) provided funding and project oversight to LeMay Engineering & Consulting, Inc. to facilitate and guide Planning Team development and the HMP updating process.

The planning process began when a planner from LeMay Engineering & Consulting, Inc. contacted Jacqueline Nicholas, the city clerk, to set a date for the first public meeting of December 6, 2017. The planner explained how the HMP differed from other emergency plans, that the HMP is required to be updated every five years, and the process to update the plan. During the December 6, 2017 meeting, LeMay Engineering & Consulting, Inc. led the Planning Team through the first stages of the update process. The Planning Team asked participants to assist reviewing and updating a list of the community's resources and capabilities, hazards affecting the City and Tribe, and the community's critical infrastructure from the 2010 HMP, and to assist in identifying, updating, and prioritizing mitigation actions. The Planning Team also

discussed the roles of the City and Tribe such as: acting as an advocate for the planning process, assisting with gathering information, and supporting public participation opportunities.

In summary, the following five-step process took place from November 2017 through April 2018:

1. Organize resources: Members of the Planning Team identified resources, including staff, agencies, and local community members, who could provide technical expertise and historical information needed in updating the HMP.
2. Monitor, evaluate, and update the plan: The Planning Team reviewed hazards identified in the 2010 HMP and the status of mitigation strategies. They also strategized new mitigation actions to reduce future damage to the community from mitigation hazards. They then outlined a method to share their successes with community members to encourage support for mitigation activities and to provide data for incorporating mitigation actions into existing planning mechanisms and to provide data for this MJHMP.
3. Assess risks: The Planning Team identified the hazards specific to Kaltag, and with the assistance of a hazard mitigation planning consultant (LeMay Engineering & Consulting, Inc.), updated the risk assessment developed in the 2010 HMP and also added climate change as a new hazard. The Planning Team reviewed and updated the risk assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.
4. Assess capabilities: The Planning Team reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately addressed relevant hazards.
5. Develop a mitigation strategy: After reviewing the risks posed by each hazard, the Planning Team updated the comprehensive range of potential mitigation goals and actions developed in the 2010 HMP. Additionally, the Planning Team determined that five new actions were required, and these new actions have been added to this MJHMP.

4.2 HAZARD MITIGATION PLANNING TEAM

The Planning Team consisted of Mayor Violet Burnham, Donna Esmailka, Jacqueline Nicholas, the City Council, and the Kaltag Tribal Council. The State of Alaska DHS&EM provided funding and project oversight. LeMay Engineering & Consulting, Inc., DHS&EM's contractor, provided assistance to the Planning Team. Table 4-1 identifies the Planning Team members.

Table 4-1 Hazard Mitigation Planning Team

Name	Title	Organization	Phone
Violet Burnham, Team Co-Leader	Mayor, City Council Member	City of Kaltag	907.534.2301
Donna Esmailka, Team Co-Leader	Tribal Administrator	Kaltag Tribal Council	907.534.2224
Jacqueline Nicholas	City Clerk	City of Kaltag	907.534.2301
Doreen Nickoli	Environmental Coordinator	Kaltag Tribal Council	907.534.2280
Thelma Saunders	City Council Member	City of Kaltag	907.534.2246
Cora Madros	City Council Member	City of Kaltag	

Table 4-1 Hazard Mitigation Planning Team

Name	Title	Organization	Phone
Georgiana Madros		Kaltag Tribal Council	907.534.2282
Dale Akrell, Sr.	City Council Member	City of Kaltag	907.534.2229
John Madros	City Council Member	City of Kaltag	
Veronica Miller	Community Member	City of Kaltag	907.534.2331
Christine Semaken	City Council Member	City of Kaltag	
Lizzie Alexie	City Council Member	City of Kaltag	
Susan Conbere	Tribal Coordinator	Indian General Assistance Program (IGAP)/Environmental Protection Agency (EPA)	206.553.6243
Jennifer LeMay, PE, PMP	Planner/Consultant	LeMay Engineering & Consulting, Inc.	907.350.6061
Patrick LeMay, PE	Planner/Consultant	LeMay Engineering & Consulting, Inc.	907.250.9038
John Farr, EIT	Planner	LeMay Engineering & Consulting, Inc.	907.350.6061
Brent Nichols, CFM	State Hazard Mitigation Officer	DHS&EM	907.428.7085

4.3 PUBLIC INVOLVEMENT & OPPORTUNITY FOR INTERESTED PARTIES TO PARTICIPATE

Table 4-2 lists the community's public involvement initiatives intended to encourage public participation and to welcome community member's insight in the MJHMP update effort. The City and Tribe work well together, and all residents of Kaltag are considered the public.

Table 4-2 Public Involvement Mechanisms

Mechanism	Description
Newsletter #1 Distribution (December 2017)	In December 2017, the City and Tribe distributed a newsletter describing the upcoming planning activity. The newsletter encouraged the community to provide hazard and critical facility information and to attend the December 6 planning team meeting. The newsletter was posted in public locations throughout the community.
Planning Team Meeting #1 (December 6, 2017)	The Planning Team held a public meeting to review hazard profiles and critical infrastructure in the previous HMP, identify new hazards, and discuss mitigation actions.
Newsletter #2 Distribution (January 2018)	In January 2018, the City and Tribe distributed a newsletter describing the next steps in the planning process and opportunities for public involvement. The newsletter encouraged the community to review the Draft MJHMP and provide feedback and to attend the January 29 planning team meeting. The newsletter was posted in public locations throughout the community.

Table 4-2 Public Involvement Mechanisms

Mechanism	Description
Planning Team Meeting #2 (January 29, 2018)	The planning team held its second public meeting and reviewed the Draft MJHMP, specifically the mitigation actions, and sought public feedback as to how the Draft MJHMP may be revised to best meet the needs of the community.

Invitations were extended to individuals and entities via Project Newsletters #1 and 2 describing the planning update process and announcing the upcoming public meetings.

The Planning Team held their first public meeting on December 6, 2017. During the meeting, the Planning Team confirmed the hazards identified in development of the 2010 HMP remain the same in nature and intensity: drought, earthquake, erosion, flood, permafrost, severe weather, and wildland fire, and added climate change as an eighth hazard.

Following the hazard screening process, the Planning Team reviewed and updated the list of critical facilities in the 2010 HMP. LeMay Engineering & Consulting, Inc. also described the specific information needed from the Planning Team and public to complete the risk assessment including the locations and values of critical facilities in the community.

After the community asset data was collected by the Planning Team over the winter of 2017, an updated risk assessment was completed that illustrated the assets that are exposed and vulnerable to specific hazards. Mitigation actions were also reviewed, and five new ones were developed and added to the mitigation action matrix based on the results of the risk assessment.

At the second meeting on January 29, 2018, the Planning Team reviewed the Draft MJHMP for accuracy – ensuring it met the City's and Tribe's needs. The meeting was productive with the Planning Team highlighting several minor corrections or refinements.

4.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Planning Team reviewed and incorporated information from existing plans, studies, reports, and technical reports into the MJHMP. The following were reviewed and used as references for the jurisdiction information and hazard profiles in the risk assessment of the MJHMP for the City and Tribe:

- *State of Alaska Hazard Mitigation Plan,* October 2013; defined statewide hazards and local impacts.
- U.S. Army Corp of Engineers, Alaska Baseline Erosion Assessment*, Erosion Information Paper-Kaltag, Alaska.* March 5, 2007; defined the erosion threat. (USACE 2009b)
- *Sanitation Facilities Master Plan 2002;* provided permafrost information and challenges.
- SOA*, Department of Commerce, Community and Economic Development Community Profile;* provided Village specific demographic data and history.
- *City of Kaltag Hazard Mitigation Plan*, 2010; defined hazards and impacts for the City.

A complete list of references consulted is provided in Section 9.

This section identifies and profiles the hazards that could affect the City and Tribe.

5.1 OVERVIEW OF A HAZARD ANALYSIS

A hazard analysis includes the identification, screening, and profiling of each hazard. Hazard identification is the process of recognizing the natural events that threaten an area. Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude. Human and Technological, and Terrorism-related hazards are beyond the scope of this plan. Even though a particular hazard may not have occurred in recent history in the study area, all-natural hazards that may potentially affect the study area are considered; the hazards that are unlikely to occur or for which the risk of damage is accepted as being very low, are eliminated from consideration.

Hazard profiling is accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, extent, and probability. Hazards are identified through historical and anecdotal information, existing plans, studies, and hazard maps collection and review for the study area. Hazard maps are used to determine the geographic extent of the hazards and define the approximate boundaries of the areas at risk.

5.2 HAZARD IDENTIFICATION AND SCREENING

The requirements for hazard identification, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Risk Assessment: Identifying Hazards

Identifying Hazards

Requirement §201.6(c)(2)(i) and §201.7: [The risk assessment shall include a] description of the type of all natural hazards that can affect the jurisdiction.

Element

- Does the new or updated plan include a description of the types of all natural hazards that affect the jurisdiction?

Source: FEMA, July 2008.

For the first step of the hazard analysis, in December 2017, the Planning Team reviewed eleven possible hazards that could affect the community from the 2010 HMP. They evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard (see Table 5-1). The Planning Team determined that seven hazards posed the greatest threat to the community: drought, earthquake, erosion, flood, permafrost, severe weather, and wildland fire. For this MJHMP update, the Planning Team also evaluated whether there were any additional hazards that posed a threat to the community and added climate change as an eighth hazard. The remaining hazards excluded through the screening process were considered to pose a lower threat to life and property in Kaltag due to the low likelihood of occurrence or the low probability that life and property would be significantly affected.

Table 5-1 Identification and Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Avalanche	No	This hazard does not exist for the community.
Drought	Yes	Drought seasons have a direct negative impact preventing wild food, fish, or wild game availability for harvesting. This creates a negative impact to essential subsistence requirements.
Earthquake	Yes	Periodic, unpredictable occurrences. The community has experienced numerous slight tremors from close proximity earthquakes. The school is located on an elevated section of the community and experiences more intense shaking than other structures. The worst earthquake experienced was the 1964 Good Friday earthquake where the area experienced severe shaking.
Erosion (Riverine)	Yes	Erosion occurs during high water events, ice jam scouring, and normal river current flow as the community is located on the outside bend of the termination of the confluence of the Kaltag and Yukon Rivers. The City has approximately ½ mile embankment exposure to erosion activity.
Flood	Yes	Rain, snowmelt, and ice jam flooding occurs during spring thaw. Fall flooding events rarely impact the City. These flood causes also increase the adjacent River's erosion impact along the community's ½-mile embankment. Heavy rain and spring thaw causes high river water which reduces residents' capability to harvest king salmon for subsistence needs.
Landslide/Debris Flow	No	This hazard does not exist for the community.
Permafrost	Yes	Discontinuous permafrost is present throughout the community. The new town area has approximately 14 homes which have experienced settling from permafrost thaw. Residents periodically re-level their homes.
Tsunami	No	This hazard does not exist for the community.
Volcanic Hazards	No	This hazard does not exist for the community.
Weather (Severe)	Yes	Annual weather patterns, severe cold, freezing rain, and snow accumulations are predominant threats. The snowfall amount directly determines winter weather damages. Less snow causes frost line to deepen, resulting in frozen water and sewer pipes. More snow provides better ground insulation. Severe cold usually occurs during December-January. High winds typically occur from February-March and August-September. August experiences the most rain. Too much rain causes wild game to move to more distant dry ground away from the community, increasing resident travel to harvest subsistence foods. Heavy rain and spring thaw causes high river water which reduces residents' capability to harvest king salmon for subsistence needs.
Wildland Fire (Wildland/Urban Interface)	Yes	Historic wildfires occur during the summer dry season (April-October). A 2007 lightning strike caused a wildfire to occur approximately four miles west of the community. This was potentially hazardous as winds are unpredictable. If the wind had shifted, it would have blown the fire directly to the community. Kaltag is surrounded by scrub growth and low fuels making the wildfire urban interface quite hazardous.
Climate Change	Yes	Warmer winters, cooler and wetter summers, and shifting seasonal timing affect the subsistence lifestyle of residents.

5.3 HAZARD PROFILE

The requirements for hazard profiles, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Risk Assessment-Profiling Hazards

Profiling Hazards

Requirement §201.6(c)(2)(i) and §201.7: [The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Element

- Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?
- Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?
- Does the plan provide information on previous occurrences of each hazard addressed in the new or updated plan?
- Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?

Source: FEMA, July 2008.

The specific hazards selected by the Planning Team for profiling have been examined in a methodical manner based on the following factors:

- Nature
- History
- Location
- Extent (to include magnitude and severity)
- Impact (general impacts associated with each hazard are described in the following profiles; detailed impacts to residents and critical facilities are further described in Section 6 as part of the overall vulnerability summary for each hazard)
- Probability of future events

Each hazard is assigned a rating based on the following criteria for probability (Table 5-2) and magnitude/severity (Table 5-3).

Table 5-2 Hazard Probability Criteria

Probability	Criteria
4 - Highly Likely	Event is probable within the calendar year. Event has up to 1 in 1 year's chance of occurring (1/1 = 100%). History of events is greater than 33% likely per year. Event is "Highly Likely" to occur.
3 - Likely	Event is probable within the next three years. Event has up to 1 in 3 year's chance of occurring (1/3 = 33%). History of events is greater than 20% but less than or equal to 33% likely per year. Event is "Likely" to occur.
2 - Possible	Event is probable within the next five years. Event has up to 1 in 5 year's chance of occurring (1/5 = 20%). History of events is greater than 10% but less than or equal to 20% likely per year. Event could "Possibly" occur.

1 - Unlikely	Event is possible within the next 10 years. Event has up to 1 in 10 year's chance of occurring (1/10 = 10%). History of events is less than or equal to 10% likely per year. Event is "Unlikely" but is possible of occurring.

Probability is determined based on historic events, using the criteria identified above, to provide the likelihood of a future event.

Table 5-3 Hazard Magnitude/Severity Criteria

Magnitude / Severity	Criteria
4 - Catastrophic	Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50% of property is severely damaged.
3 - Critical	Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least two weeks. More than 25% of property is severely damaged.
2 - Limited	Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than one week. More than 10% of property is severely damaged.
1 - Negligible	Injuries and/or illnesses are treatable with first aid. Minor quality of life lost. Shutdown of critical facilities and services for 24 hours or less. Less than 10% percent of property is severely damaged.

Similar to estimating probability, magnitude and severity are determined based on historic events using the criteria identified above.

The hazards profiled for the community are presented in the rest of Section 5.3. The order of presentation does not signify the level of importance or risk.

5.3.1 Drought

5.3.1.1 Nature

Drought is variously defined as a period of abnormally dry weather creating hydrologic imbalance, shortage of precipitation adversely affecting crops, or a period of below average water in streams and lakes, reservoirs, aquifers, and soils. (U.S. Geological Survey [USGS] 2008) There is no universal measure of precipitation or dryness that signifies drought. Historically, droughts have been seen as unpredictable and unavoidable events. Drought severity depends on duration, intensity, and geographic extent, as well as the demand on the water supply. Climate fluctuations occur everywhere, and periods of low precipitation are a normal, recurrent feature of climate. Droughts are fairly rare in Alaska.

> *"A drought may result in crops not maturing [both wild and agricultural], land values declining, livestock [and wildlife] becoming malnourished, increases in unemployment, and contribute to an increased wildland fire hazard. It can also lead to a shortage of water for residential, industrial, recreational, and navigational purposes [and adversely impact fish habitat]."* (DHS&EM 2007)

Other direct environmental effects of drought include livestock [and wildlife] death or decreased production, wildland fire, impaired productivity of forest land, damage to fish habitat, loss of wetlands, and air quality effects. Indirect effects to society are measured by the economic and physical hardships brought on by drought and by the increased stress on residents of a drought-stricken area. (Oregon Natural Hazards Workgroup [ONHW] 2004) The economic impact of drought is estimated between $6 and $8 billion annually in the U.S. These costs primarily affect agricultural, forestry, fisheries, recreation and tourism, transportation, and energy sectors. Drought is also associated with insect infestation, disease, and wind erosion. (ONHW 2004)

This hazard is complicated because there is no easily identifiable beginning or end and because the impacts are not very obvious and can affect a wide area. There are four ways to define drought:

- Meteorological: a degree of dryness. Measures lack of actual precipitation compared to an expressed average.
- Agricultural: defined as soil moisture deficiencies relative to what the plant life needs.
- Hydrological: relates to the effects of the lack of precipitation on streams, rivers, lakes, and groundwater levels.
- Socioeconomic: the demand for water is greater than the supply. This results from a reduction in supply, an increase in demand, or both.

The community is very aware of their environment and how weather fluctuations affect subsistence crop viability, normal wildlife patterns, and subsistence fish return rates. These food sources directly determine if residents will need to find alternate food sources to enable them to survive the long winter season. Kaltag is not connected to a road system to facilitate supply transport. Consequently, the only alternative to subsistence is having food flown or transported in from commercial food vendors and shipping companies which is very expensive.

5.3.1.2 History

Drought occurs sporadically throughout Alaska and periodically impacts Kaltag. Drought periods affect subsistence and agricultural enterprises. Environmental consequences also include insect infestations in forests, insufficient stream flows to support fish species, and increased fire susceptibility.

Researchers reviewed the relationship between drought and forest fires from 1959 -1999 and found a direct correlation. The years 1963, 1969, 1989, and 1995 experienced less than normal precipitation, while experiencing high temperatures and increased fire incidents. These were good indicators for drought. The researchers stated, “This relationship between drought affected area and area burned suggests that drought may have affected the annual area burned in Canada and Alaska, and area burned increased exponentially with drought affected areas.” (Xiao & Zhuang 2007)

The City’s Planning Team indicated that drought is a cyclic part of the climate. The summers of 1955, 1965, and 1989 were especially severe causing subsistence herds to change their behavior

patterns away from the City where water and feed were available. Berry picking was very bad requiring residents to purchase these food sources from outside community commercial vendors.

5.3.1.3 Location, Extent, Impact, and Probability of Future Events

Location

Drought occurs in every climate zone and varies from region to region. Droughts occur in all parts of Alaska including Kaltag, and have a profound negative impact on rural communities' subsistence requirements.

Dry seasons prevent sufficient groundwater for essential berry and subsistence food growth. Insufficient water also reduces food sources for wild game and reduces river water replenishments. Mayor Violet Burnham and various Planning Team Members stated "reduced water depth increases water temperature and high-water temperature which reduces fish fry survivability. Consequently, drought seasons have a direct negative impact preventing wild food, fish, or game from being available for harvesting. This creates a financial impact to residents' subsistence needs."

Extent

The severity of drought depends on the degree of moisture deficiency, duration, and size of the affected area. A community's food gathering and wildlife subsistence requirements are usually the first to feel the impacts of drought because of their dependence on soil moisture.

Drought events have additional magnitude and severity criteria as those listed in Table 5-3. This hazard extends to limiting available subsistence foods requiring residents to purchase required daily staples. Food and delivery transportation costs are very high with sometimes lengthy delivery times.

The Planning Team determined that drought events do not follow the criteria identified in Table 5-3 as the community is experiencing a loss of their subsistence lifestyle that is not minor. This loss will not result in a shutdown of critical facilities and services for 24 hours or less with less than 10% of property severely damaged.

Impact

Drought damages include decreased subsistence food source availability, excess travel costs to access subsistence herds, flocks, and reduced fish return rates. Reduced food source availability results in excessive expenditures for both replacement food sources and their shipping costs due to Kaltag's rural location.

Probability of Future Events

The Planning Team stated that drought recurrence probability follows the criteria in Table 5-2 where the probability of future drought events is possible in the next five year's (event has up to 1 in 5 year's chance of occurring) as the history of events is greater than 10% but less than or equal to 20% likely per year.

5.3.2 Earthquake

5.3.2.1 Nature

An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and after only a few seconds can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, or the vibration or shaking of the ground during an earthquake.

Ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. An earthquake causes waves in the earth's interior (i.e., seismic waves) and along the earth's surface (i.e., surface waves). Two kinds of seismic waves occur: P (primary) waves are longitudinal or compressional waves similar in character to sound waves that cause back and forth oscillation along the direction of travel (vertical motion), and S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side to side (horizontal motion). There are also two types of surface waves: Raleigh waves and Love waves. These waves travel more slowly and typically are significantly less damaging than seismic waves.

In addition to ground motion, several secondary natural hazards can occur from earthquakes such as:

- **Surface Faulting** is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (e.g., up to 20 feet [ft]), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to linear structures, including railways, highways, pipelines, and tunnels.
- **Liquefaction** occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Pore water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 ft, but up to 100 ft), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.
- **Landslides/Debris Flows** occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.

The severity of an earthquake can be expressed in terms of intensity and magnitude. Intensity is based on the damage and observed effects on people and the natural and built environment. It varies from place to place depending on the location with respect to the earthquake epicenter, which is the point on the earth's surface that is directly above where the earthquake occurred.

The severity of intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale. As shown in Table 5-4, the MMI Scale consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location. PGA can be measured as acceleration due to gravity (*g*). (See Table 5-4.) (MMI 2006)

Magnitude (M) is the measure of the earthquake strength. It is related to the amount of seismic energy released at the earthquake's hypocenter, the actual location of the energy released inside the earth. It is based on the amplitude of the earthquake waves recorded on instruments, known as the Richter magnitude test scales, which have a common calibration (see Table 5-4).

Table 5-4 Magnitude/Intensity/Ground-Shaking Comparisons

Magnitude	Intensity	PGA (% *g*)	Perceived Shaking
0-4.3	I	<0.17	Not Felt
	II-III	0.17-1.4	Weak
4.3-4.8	IV	1.4-3.9	Light
	V	3.9-9.2	Moderate
4.8-6.2	VI	9.2-18	Strong
	VII	18-34	Very Strong
6.2-7.3	VIII	34-65	Severe
	IX	65-124	Violent
	X	124 +	Extreme
7.3-8.9	XI		
	XII		

(MMI 2006)

5.3.2.2 History

The community stated they have a very minor earthquake threat. However, members of the Planning Team stated "Kaltag experienced severe shaking during the 1964 [Good Friday] Earthquake causing numerous shelves and unsecured items to fall to the floor."

Therefore, the Planning Team decided to limit their concern to earthquake events which exceeded M 5.0. Table 5-5 lists the only historical earthquake from 1971 to the present which exceeded M 5.0 located within 100 miles of the City limits.

Table 5-5 Historical Earthquakes for the City

Cat	Year	Mo	Day	Orig Time	Lat	Long	Depth (Miles)	Magnitude	Distance (Miles)
PDE	1978	12	24	131308.10	63.56	-157.59	20.5	5.3 MLPMR	62.7

(USGS 2017)

The community has no history of damaging earthquakes. Since 1977, 66 earthquakes have been recorded within a 100-mile radius of the City limits. The average magnitude of these earthquakes is 3.2. The largest recorded earthquake within 100 miles of the City measured M 5.3 in 1978. This event did not damage critical facilities, residences, non-residential buildings, or infrastructure.

5.3.2.3 Location, Extent, Impact, and Probability of Future Events

Location

The entire geographic area of Alaska, and subsequently Kaltag, is prone to the effects of an earthquake. Peter Haeussler, Alaska Region USGS explained during a telephone conversation, the Kaltag Fault follows the Yukon River and is relatively centered on the Koyukuk/Yukon River confluence.

The Kobuk Fault Zone comprises a fault system of smaller faults located north of Alatna Village running east to west along the border of the Brooks Range. (GSA 1998)

Of the 66 recorded earthquakes since 1977, one exceeded M 5.0. It occurred on December 24, 1978, measuring M 5.3 at a depth of 20.5 miles. The epicenter was located approximately 62.7 miles from the City limits. (Table 5-5)

Figure 5-1 shows the locations of active and potentially active faults in Alaska.

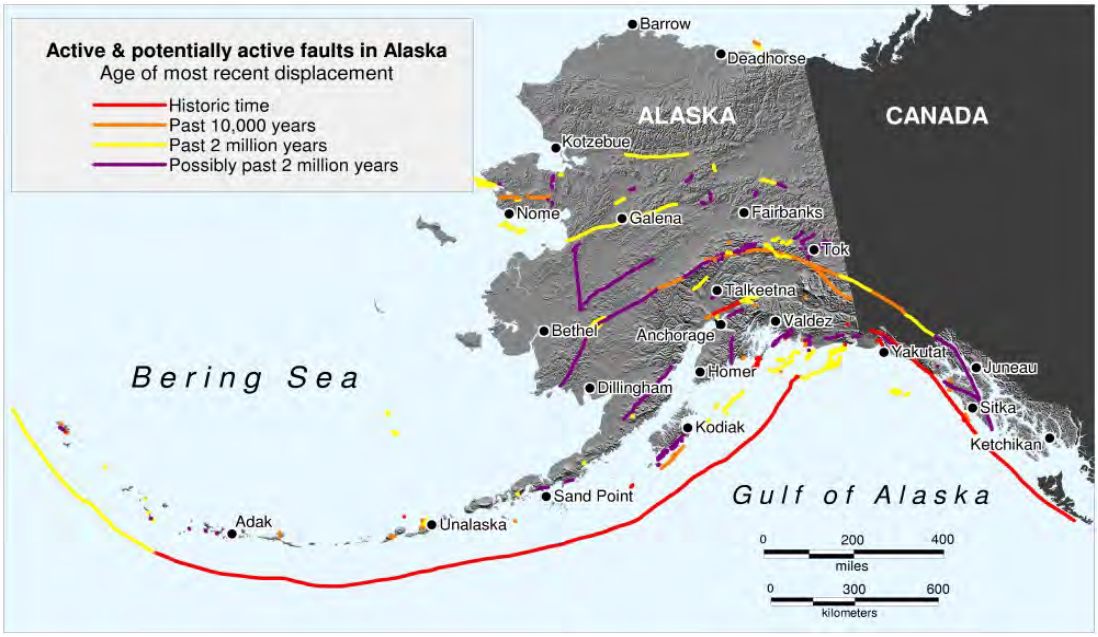

Figure 5-1 Active and Potentially Active Faults in Alaska

Extent

The Kaltag Fault and Kobuk Fault Zone produce intraplate earthquakes, which occur within a tectonic plate sometimes at great distance from the plate boundaries. These types of earthquakes can have magnitudes of 7.0 and greater. Shallow earthquakes in the Fairbanks area are an example of intraplate earthquakes. (GSA 1998)

Earthquakes felt in the Kaltag area have not exceeded M 5.3 in the past 40 years, and damage has never been reported due to an earthquake event.

Based on historic earthquake events and the criteria identified in Table 5-3, the magnitude and severity of earthquake impacts in Kaltag are considered negligible with minor injuries, the potential for critical facilities to be shut down for less than 24 hours, less than 10% of property or critical infrastructure being severely damaged, and little to no permanent damage to transportation or infrastructure or the economy.

Impact

The community is located in an area that is moderately more active than others in the State, as it sits along the Kaltag Fault. The effects of earthquakes centered elsewhere are also expected to be felt in the community. Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. Minor shaking may be seen or felt based on past events. Impacts to future populations, residences, critical facilities, and infrastructure are anticipated to remain the same.

Probability of Future Events

Kaltag has no official record of significant earthquake activity resulting in damage or injuries. While it is not possible to predict when an earthquake will occur, Using the USGS map shown in Figure 5-2, the Kaltag has a 2% probability of ground acceleration of 0.18-0.20g occurring in 50 years.

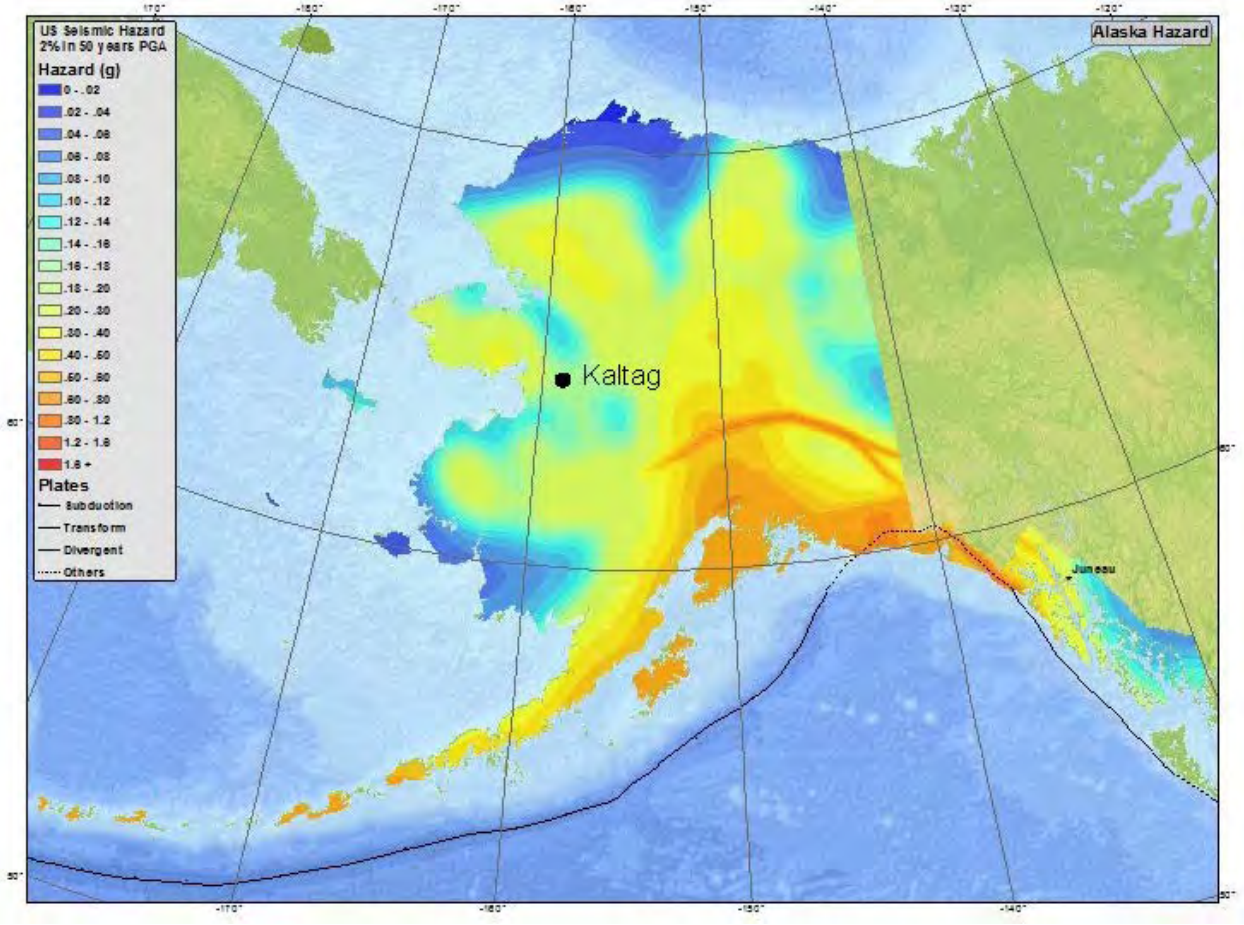

Figure 5-2 Kaltag Earthquake Probability (USGS 2007)

5.3.3 Erosion

5.3.3.1 Nature

Erosion rarely causes death or injury. However, erosion causes the destruction of property, development, and infrastructure. Erosion is the wearing away, transportation, and movement of land. It is usually gradual but can occur rapidly as the result of floods, storms, and other events. or slowly as the result of long-term environmental changes. Erosion is a natural process, but its effects can be exacerbated by human activity.

Riverine erosion results from the force of flowing water and ice formations in and adjacent to river channels. This erosion affects the bed and banks of the channel and can alter or preclude any channel navigation or riverbank development. In less stable braided channel reaches, erosion, and deposition of material are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally.

Riverine erosion is a problem in developed areas where disappearing land threatens development and infrastructure. Riverine erosion does threaten Kaltag's embankment and subsistence livelihood.

5.3.3.2 History

Kaltag does not have an estimate for its 20-foot-high Yukon River embankment erosion rate; however, the City stated its Kaltag river embankment erodes at approximately one foot per year.

> *"Riprap was placed in some areas along the Yukon River for erosion protection about 30 years ago…there has been no maintenance and the riprap has failed although a rock source is close to the community, the erosion on the Kaltag banks has made establishing a barge landing area difficult, and tests of the bank indicate it is too soft to support rip rapping over the long term."* (US Army Corp of Engineers [USACE] 2009b)
>
> *"The Front Street cemetery caved into the Yukon River in 1937" due to erosion* (DCCED/DCRA 2009)

5.3.3.3 Location, Extent, Impact, and Probability of Future Events

Location

Kaltag experiences significant bank erosion along the river. Riverine erosion mainly occurs from high-water flows and wind-driven waves. Kaltag's unconsolidated soils are easily erodible. Ice rich, fine soils coupled with human foot and vehicle traffic along the river bank exacerbate erosion action. Heavy ice scouring during the spring thaw adds to the problem. (PDC Incorporated, Planning Design, and Construction [PDC] 2002)

Erosion hazards are known to affect the community. Factors that influence erosion include high water flows, flooding, ice jams, spring break-up, and melting permafrost. The riverbanks around Kaltag are essential to the lives of the residents and are susceptible to the effects of erosion (Figure 5-3).

The USACE 2009 Alaska Baseline Erosion Assessment Study states erosion predominantly threatens, "four houses, outbuildings, sheds, portions of Front Street, the present-day cemetery two miles upriver of the community, and some houses upriver on the east bank of the Yukon River …. Those structures and facilities are reportedly less than 100 feet from the eroding river banks." (USACE 2009b)

As of December 2017, no structures or facilities have eroded from the river banks. Additionally, erosion since the USACE 2009 assessment has been minimal.

Figure 5-3 depicts an aerial photograph of the community obtained from the USACE, Alaska Region, Alaska Baseline Erosion Assessment, 2009. (USACE 2009a) This photo shows the extent of river embankment exposure to erosion and flooding.

Figure 5-3 Aerial Photograph of Kaltag

Extent

A variety of natural and human-induced factors influence the erosion process within the community. River orientation and proximity to up and downstream river bends can influence erosion rates. Embankment composition also influences erosion rates, as sand and silt will erode easily, whereas boulders or large rocks are more erosion resistant. Other factors that may influence riverine erosion include:

- Geomorphology
- Amount of encroachment in the high hazard zone
- Proximity to erosion inducing structures
- Nature of the topography
- Density of development
- Structure types along the embankment
- Embankment elevation

The Yukon River erosion events usually remove small areas at a time. Significant events can cause infrastructure and homes to fall into the river. Erosion sites have also been noted to be less than 100 ft from important structures and critical facilities, including “A number of houses,

outbuildings, sheds, portions of Front Street, the present-day cemetery two miles upriver of the community, and some houses upriver on the east bank of the Yukon River are threatened by riverbank erosion." (USACE 2009b)

The USACE 2009 Alaska Erosion Baseline Assessment listed Kaltag with a rating of "Minimal Erosion [where the] community has reported erosion impacts that are not serious and are not affecting the viability of the community. At this time, erosion does not appear to warrant Federal, State, or other intervention." (USACE 2009a)

Based on past events, the USACE assessment, and the criteria identified in Table 5-3, the magnitude and severity of erosion impacts in Kaltag are considered negligible with injuries and/or illnesses that are treatable with first aid, minor quality of life lost, the potential for critical facilities to be shutdown for 24 hours or less, and less than 10% of property is severely damaged.

Impact

Impacts from erosion include loss of land and any development on that land. Erosion can cause increased sedimentation of river deltas and hinder channel navigation—affecting marine transport. Other impacts include reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (fuel headers and electric and water/wastewater utilities), and economic impacts associated with the costs of trying to prevent or control erosion sites.

> *The 1984 Department of Transportation and Public Facilities (DOT/PF) Task Force on Erosion Control Final Report states, "a large island in the Yukon River upstream from Kaltag could cause the channel to move east, which might slow the rate of erosion along the community. DOT/PF suggested that erosion rates be monitored at Kaltag."* (USACE 2009b)

Probability of Future Events

Based on the Yukon and Kaltag Rivers' erosion rates, the USACE 2009 Alaska Erosion Baseline Assessment, and applying the criteria identified in Table 5-2, it is likely that erosion will occur in the next three years (event has up to 1 in 3 year's chance of occurring) as the history of events is greater than 20% but less than or equal to 33% likely per year.

5.3.4 Flood

5.3.4.1 Nature

Flooding is the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, reservoir, glacier, or coastal body of water onto adjacent floodplains. Floodplains are lowlands adjacent to water bodies that are subject to recurring floods. Floods are natural events that are considered hazards only when people and property are affected.

Four primary types of flooding occur in Kaltag including: rainfall-runoff floods; snowmelt floods; ice jam floods; and ice overflow (aufeis) flooding.

Rainfall-Runoff Flood

Rainfall-runoff flooding occurs in late summer and early fall. The rainfall intensity, duration, distribution, and geomorphic characteristics of the watershed all play a role in determining the

magnitude of the flood. Rainfall-runoff flooding is the most common type of flood. This type of flood event generally results from weather systems that have associated prolonged rainfall.

Snowmelt Flood

Snowmelt floods typically occur in spring or early summer. The depths of the snow pack and spring weather patterns influence the magnitude of flooding.

Ice Jam Flood

Ice jam floods occur after an ice jam develops; thus, this type of flood can occur any time of the year that a river has ice on it. Ice jams can form during fall freeze up, in midwinter when stream channels freeze forming anchor ice, and during spring break-up when the existing ice cover gets broken into pieces and the pieces get stuck at bridges or other constrictions. Ice jams restrict water flow on a river or stream and form during the following three situations:

- fall freeze-up
- spring break-up (i.e., when the existing ice cover is broken into pieces that block flowing water at bridges or other constrictions)
- midwinter (i.e., when stream channels freeze forming anchor ice)

Ice jams commonly develop in areas where the channel slope decreases, becomes shallower, or where constrictions occur such as at bridges, bends in the river, headwaters, and reservoirs. Ice jams frequently impede water along big rivers during spring break-up.

Water levels increase upstream behind the location of the ice jam. The result is flooding of an area by creating a lake-like effect covering a large area. Little damage typically occurs from the water current upstream of the ice jam, but significant damage can result from flooding. However, the downstream effect is very different. As soon as the ice jam is breached there is usually rapid draining of the dammed water. Downstream water levels rise substantially after the ice jam is breached and strong water currents are created, which can cause erosion and other significant damages. Additionally, the rising water causes the ice to float while increased velocities of water move the ice further downstream. The motion of large solid ice blocks is often destructive to natural and material property in the vicinities. When ice jams cause flood events during spring break-up, snowmelt can contribute to the flood. Notable large floods in recent years on the Kenai, Susitna, Kuskokwim, and Yukon rivers were all caused by ice jams and snowmelt.

Ice Overflow (Aufeis) Flood

Aufeis is glaciation or icing of streams and rivers, affecting road surfaces and infrastructure. Aufeis forms during the winter when emerging ground water freezes. Stream glacial flooding occurs when ice forms from the bottom up, not from the top down forcing water out of the stream channel.

Timing of Events

Many floods are predictable based on snowmelt and rainfall patterns. Most of the annual precipitation for Kaltag is received from snowfall, not rain. Snowfall typically occurs from November through February with the heaviest snowfall during January. Rain typically occurs from August through September with August being the wettest.

5.3.4.2 History

Kaltag is located on a bluff approximately 35 ft above the Yukon River and does not routinely experience flood damage. However, the northern (lower) section of Kaltag has experienced recurrent flooding from river break-up, downstream ice jams, spring thaw, and rain. The last flood event occurred in 1989 from a downriver ice jam. An ice jam eight-miles downstream caused the 1937 flood. Water covered the riverbank of the community during that flood. It was reported that flooding in 1945 and 1979 covered the far bank of the Yukon River. (Kaltag 2009, USACE 2009)

The Yukon River has an annual spring thaw cycle as river ice breaks up and flows downstream. However, ice jam flood recurrence intervals are unpredictable.

Table 5-6 list the more hazardous historical flood events.

Table 5-6 Historical Flood Events

Zone(s)	Location(s)	Date(s)	Event	Description
AK008	Kaltag	1937	Flood, Ice Jam	Ice jam occurred eight miles downstream. Water covered the riverbank of the community. This flood had little impact on the community's current site. (State Disaster)
AK008	Kaltag	1945	Flood	Flood waters covered the far bank of the Yukon River. (State Disaster)
AK008	Kaltag	1979	Flood	Flood waters covered the far bank of the Yukon River.
AK008	Kaltag	5/26/1988	Flood, Spring Thaw	Flooding of the Yukon River and tributaries washed out an essential bridge in the community of Kaltag. State disaster assistance provided funding to replace the bridge. (State Disaster)
AK008	Kaltag	6/10/89	Flood, Spring	Incorporated sixteen local declarations and applied to all communities on Yukon… Rivers and their tributaries. Federal: Spring Floods (FEMA DR-0832)

Flooding has not occurred from 1990 to 2017. (Alaska Disaster Cost Index, 2016)

5.3.4.3 Location, Extent, Impact, and Probability of Future Events

Location

The majority of Kaltag is located on a bluff overlooking the Yukon River.

Extent

Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence.

The following factors contribute to riverine flooding frequency and severity:

- Rainfall intensity and duration.
- Antecedent moisture conditions.

- Watershed conditions, including terrain steepness, soil types, amount, vegetation type, and development density.
- The attenuating feature existence in the watershed, including natural features such as swamps and lakes and human-built features such as dams.
- The flood control feature existence, such as levees and flood control channels.
- Flow velocity.
- Availability of sediment for transport, and the bed and embankment watercourse erodibility.
- Village or city location related to the base flood elevation as indicated with their certified high-water mark.

Most of the community's structures are above the level of this periodic flooding. Based on past flood events and the criteria identified in Table 5-3, the extent of flood impacts in the community are considered limited where injuries do not result in permanent disability, complete shutdown of critical facilities occurs for more than one week, and more than 10% of property is severely damaged.

Impact

Nationwide, floods result in more deaths than any other natural hazard. Physical damage from floods include the following:

- Structure flood inundation, causing water damage to structural elements and contents.
- Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features.
- Damage to structures, roads, bridges, culverts, and other features from high-velocity flow and debris carried by floodwaters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater damages.
- Sewage and hazardous or toxic materials release as wastewater treatment plants or sewage lagoons are inundated, storage tanks are damaged, and pipelines are severed.

Floods also result in economic losses through business and government facility closure, communications, utility (such as water and sewer), and transportation services disruptions. Floods result in excessive expenditures for emergency response, and generally disrupt the normal function of a community.

Impacts and problems also related to flooding are deposition and stream bank erosion (erosion is discussed in detail in Section 5.3.3).

Deposition is the accumulation of soil, silt, and other particles on a river bottom or delta. Deposition leads to the destruction of fish habitat and presents a challenge for navigational purposes. Deposition also reduces channel capacity, resulting in increased flooding or bank erosion. Stream bank erosion involves the removal of material from the stream bank. When bank erosion is excessive, it becomes a concern because it results in loss of streamside vegetation, loss of fish habitat, and loss of land and property. (BKP 1988)

Probability of Future Events

Based on previous occurrences and applying the criteria identified in Table 5-2, it is likely a flood event will occur in the next three years (event has up to 1 in 3 year's chance of occurring) as the history of events is greater than 20% but less than or equal to 33% likely per year.

5.3.5 Permafrost

5.3.5.1 Nature

Permafrost is defined as soil, sand, gravel, or bedrock that has remained below 32° F for two or more years. Permafrost can exist as massive ice wedges and lenses in poorly-drained soils or as relatively dry matrix in well-drained gravel or bedrock. During the summer, the surficial soil material thaws to a depth of a few feet, but the underlying frozen materials prevent drainage. The surficial material that is subject to annual freezing and thawing is referred to as the "active layer".

Permafrost melting (or degradation) occurs naturally as a result of climate change, although this is usually a very gradual process. Thermokarst is the process by which characteristic land forms result from the melting of ice-rich permafrost. As a result of thermokarst, subsidence often creates depressions that fill with melt water, producing water bodies referred to as thermokarst lakes or thaw lakes.

Human-induced ground warming can often degrade permafrost much faster than natural degradation caused by a warming climate. Permafrost degradation can be caused by constructing warm structures on the ground surface allowing heat transfer to the underlying ground. Under this scenario, improperly designed and constructed structures can settle as the ground subsides, resulting in loss of the structure or expensive repairs. Permafrost is also degraded by damaging the insulating vegetative ground cover, allowing the summer thaw to extend deeper into the soil causing subsidence of ice-rich permafrost, often leading to creation of thermokarst water bodies. Evidence of this type of degradation can be seen where thermokarst water bodies are abundant in the ruts of an old trail used by heavy equipment (cat trails) or where roads or railroads constructed by clearing and grubbing have settled unevenly.

5.3.5.2 History

The community is situated on discontinuous permafrost. The new town site development area had approximately 14 homes in the 2010 HMP that were experiencing uneven settlement (thawing) or uplift (frost heaves); as a result, residents periodically re-level their homes. These incidents are directly related to human-induced thawing and refreezing permafrost conditions. Uneven settling throughout the years within the community has damaged other buildings and roads constructed in permafrost areas.

5.3.5.3 Location, Extent, Impact, and Probability of Future Events

Location

According to mapping completed by the Alaska Division of Geological and Geophysical Survey (DGGS) for the 2013 State Hazard Mitigation Plan, the entire Village is underlain by discontinuous permafrost (Figure 5-4).

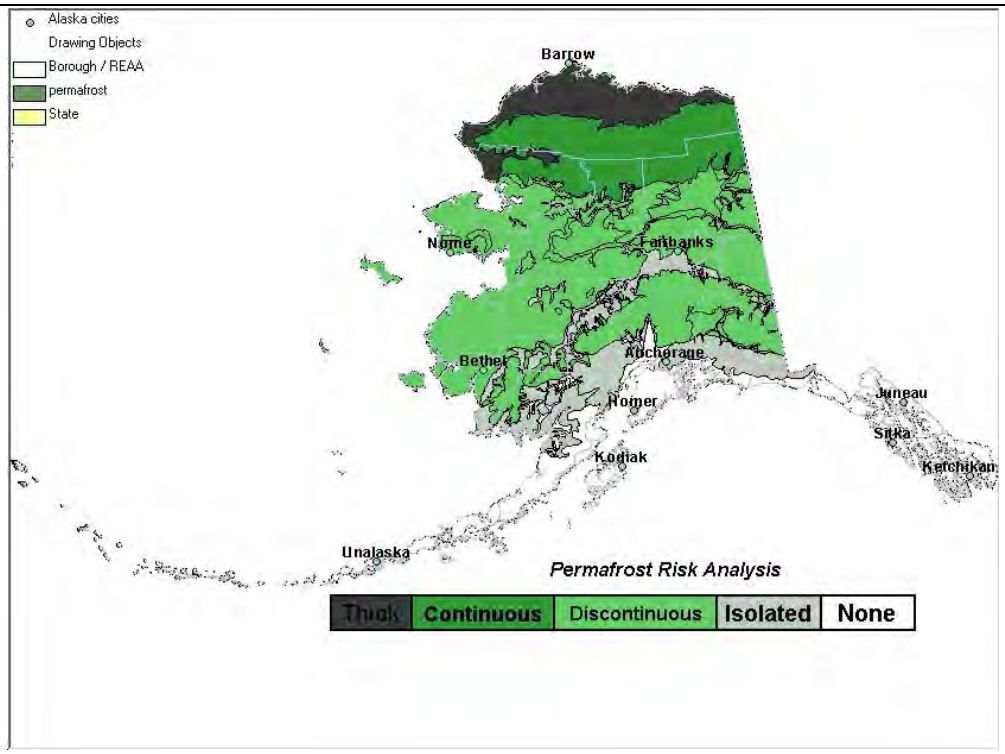

Figure 5-4 Permafrost Map of Alaska (DHS&EM 2013)

The 2002 Sanitation Facilities Master Plan stated, "Kaltag is underlain by discontinuous permafrost. Average depth of the permafrost is about 70 ft, but it has been estimated at 600 ft in some areas. The active layer ranges from one to three ft thick." (PDC 2002)

Extent

The damage magnitude could range from minor with some repairs required and little to no damage to transportation, infrastructure, or the economy to major if a critical facility (such as the airport) were damaged, and transportation was affected.

Based on past permafrost degradation events and the criteria identified in Table 5-3, the extent of permafrost degradation impacts in Kaltag are considered limited where injuries do not result in permanent disability, shutdown of critical facilities and services occurs for more than one week, and more than 10% of property is severely damaged.

Impact

Impacts associated with degrading permafrost include surface subsidence, infrastructure, structure, and/or road damage. Permafrost does not pose a sudden and catastrophic hazard but improperly designed and constructed structures can settle as the ground subsides, resulting in structure loss or expensive repairs. Permafrost restricts ground surface use, and affects the location and design of roads, buildings, communities, pipelines, airfields, and bridges. To avoid costly damage to these facilities, careful planning and design is warranted, particularly during facility siting and construction.

Probability of Future Events

Historical permafrost damage data is non-existent for Kaltag. However, the Planning Team stated that permafrost damage occurs annually to those structures and roads located in the new residential area in the lowlands adjacent to the river. The Planning Team further stated that the probability for future permafrost impacts follows the criteria identified in Table 5-2, it is likely permafrost will impact community structures in the next three years (event has up to 1 in 3 year's chance of occurring) as the history of events is greater than 20% but less than or equal to 33% likely per year.

5.3.6 Weather (Severe)

5.3.6.1 Nature

Severe weather in Alaska includes thunderstorms, lightening, hail, heavy and drifting snow, freezing rain/ice storm, extreme cold, and high winds. The community experiences the following.

Heavy and Drifting Snow

Heavy snow generally means snowfall accumulating to four inches or more in depth in 12 hours or less or six inches or more in depth in 24 hours or less. Drifting is the uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall.

Freezing Rain/Ice Storm

Freezing rain and ice storms occur when rain or drizzle freezes on surfaces, accumulating 12 inches in less than 24 hours.

Extreme Cold

The definition of extreme cold varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme". In Alaska, extreme cold usually involves temperatures between -20 to -50 °F. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. The City's lowest documented temperature was -65°F occurring in February 1999.

High Winds

High winds occur in Alaska when there are winter low-pressure systems in the North Pacific Ocean and the Gulf of Alaska. Alaska's high wind can equal hurricane force but fall under a different classification because they are not cyclonic nor possess other characteristics of hurricanes. In Alaska, high winds (winds in excess of 60 miles per hour [mph]) occur rather frequently over the interior due to strong pressure differences, especially where influenced by mountainous terrain.

5.3.6.2 History

Table 5-7 lists 46 major National Weather Service's (NWS) storm events for Kaltag's Weather Zone. Each weather event may not have specifically impacted the community, but they were listed due to the community's close proximity to listed communities or by location within the identified zone.

Table 5-7 Severe Weather Events

Zone(s)	Location(s)	Date(s)	Event	Description
AK004, AK008,	Various	24-25 Feb 89	Winter Storm	Wind and heavy snow in many areas, probably affected all villages.
	Statewide	02 Feb 89	Severe Cold	Omega Block cold spell, (-85 degrees Fahrenheit [ºF]) suffered extensive permanent damage to water & sewer systems. Federal: (FEMA DR-0826) Omega Block Disaster.
AK008	Galena	27-28 Dec 90	Heavy Snow	11-13 inches (") (1-day).
AK004	Bettles	01-05 Mar 91	Heavy Snow	13" (2-day).
AK008	Galena	22 Mar 91	Heavy Snow	6" (1-day).
AK004		24-26 Feb 96	High Wind	Strong winds in the passes of the Alaska and Brooks Ranges.
AK004 & AK008	Kaltag	26-29 Feb 96	Heavy Snow	Snowfall totals for the one-to-two-day event. Kaltag 12-16".
AK004 & AK008	Kaltag	22-24 Jan 99	Heavy Snow	Blizzard conditions, precipitation, and strong winds. Kaltag, 12", 23rd.
AK004 & AK008	Kaltag	29-31 Jan 99	Extreme Cold	Cold air mass -50.ºF to -60.ºF., Galena -64ºF, 31st.
AK004 & AK008	Kaltag	01-12 Feb 99	Extreme Cold	Continuation of January event. -50.ºF to -60ºF Kaltag.
AK004 & AK008	Kaltag	22-24 Jan 00	Winter Storm	Variety of winter weather, heavy snow Kaltag 7".
AK004 & AK008	Kaltag	01-03 Feb 00	Blizzard	Variety of winter weather, strong winds, blizzard heavy snow Kaltag 8".
AK004 & AK008	Kaltag	09-11-Nov-00	Winter Storm	Winter weather, strong south winds, cold air, blizzard conditions, freezing rain.
AK008	Kaltag	12-13 Nov 00	Heavy Snow	Blizzard conditions, heavy snow, and strong winds, 8" snow.
AK215 & AK216	Kaltag	10-12 Feb 01	Winter Storm	Heavy snow, blizzard conditions, light freezing rain, strong south winds. Kaltag reported 6" of snow.
AK216	Kaltag	02-03-Apr-01	Heavy Snow	Blizzard conditions, heavy snow, Kaltag 6".
AK216	Kaltag	06-07 Jan 02	Heavy Snow	Heavy snow, Kaltag reported 6" of new snowfall over a 12-hour period.
AK216	Kaltag	14-15 Jan 02	Heavy Snow	Heavy snow, Kaltag reported 6" of new snow over a 12-hour period.
AK216-AK218	Kaltag	16-17 Apr 02	Heavy Snow	Heavy snow, strong winds, blizzard conditions. Kaltag reported 6" of new snow in the 24 hours ending at 0730 AST on the 17th.
AK216	Kaltag	03-04 Feb 03	Heavy Snow	Heavy snow, Kaltag reported 6" over a 24-hour period.

Table 5-7 Severe Weather Events

Zone(s)	Location(s)	Date(s)	Event	Description
AK216 & AK219	Kaltag	30-31 Oct 03	Winter Storm	Zone 216 -Widespread rain, freezing rain, sleet, and a little snow.
AK216	Kaltag	23-24 Nov 03	Heavy Snow	Zone 216 -Kaltag Co-: 9" Snow began at 0300 AST and reached 6" at 1100 AST.
AK216	Kaltag	29 Dec 03	Heavy Snow	Zone 216: Kaltag, 15.0". Snow began around 0800 AST on the 28th and reached 6"at 0030 AST on the 29th.
AK216	Galena	15 Feb 04	Heavy Snow	Cold air mass, heavy snow.
AK216	Galena	10 Nov 04	Heavy Snow	Heavy snow.
AK216	Galena	01 Dec 04	Heavy Snow	Snow.
AK216	Galena	22 Dec 04	Heavy Snow	Winter storm conditions, heavy snow.
AK216-AK219	Galena, Bettles	02-05 Jan 05	Heavy Snow	Heavy snow.
AK216	Kaltag	05-07 Feb 05	Heavy Snow	Heavy snow: Kaltag reported 16.0" of snow through the 7th.
AK216	Kaltag	20-22 Mar 05	High Wind	Strong winds, Kaltag ASOS Peak Wind 55 mph.
AK215 & AK216	Kaltag	03-05 Apr 08	Winter Storm	Precipitation turned to rain and/or freezing rain, snowfall amounts of 6.8".
AK216	Kaltag	26 Nov 06	Heavy Snow	Kaltag reported 12" of snow.
AK216	Kaltag	04-05 Nov 07	Heavy Snow	Heavy snow. Kaltag reported 8" of snow.
AK215, AK216 & AK219	Kaltag	13-16 Jan 09	Winter Storm	Snow, freezing temperatures, snow changed to freezing rain, snow changed to freezing rain, and the freezing rain likely accumulated in excess of a tenth of an inch.
AK216	Galena	17 Jan 09	High Wind	Sustained wind of 50 mph with gust to 64 mph in Galena. Damaged power lines.
AK216	Kaltag	18-19 Feb 09	Heavy Snow	Kaltag reported 13” of snow.
AK216	Kaltag	27-28 Oct 10	Heavy Snow	Kaltag reported 10” of new snow in 24 hrs.
AK216	Kaltag	21-24 Nov 10	Ice Storm	Kaltag reported 0.72” of rain and melted snow.
AK216	Kaltag	8-9 Feb 11	Heavy Snow	Snow fell across lower Koyukuk Valley and middle Yukon Valleys up to 1 ft. in areas.
AK216	Kaltag	3-4 Nov 11	Winter Storm	Blowing snow, wind gust up to 35 mph, and brief reduced visibility (<¼ mile).
AK216	Kaltag	3-4 Dec 11	Winter Storm	Heavy snowfall, significant blowing and drifting snow observed across lower Yukon

Table 5-7 Severe Weather Events

Zone(s)	Location(s)	Date(s)	Event	Description
				Valley.
	Statewide (Kaltag & Galena)	1-31 Jan 12	Extreme Cold	One of coldest months on record. Galena recorded an avg. temp. of -32.6 degrees with a low temp. of -65 degrees on the 29th, and four consecutive days below -60 degrees.
AK216	Galena	1-2 Feb 12	Heavy Snow	11" of new snow in Galena and surroundings in 16 hrs.
AK216	Kaltag	13 Nov 13	Ice Storm	Rain fell (0.12 inches accumulation). Ground was frozen.
AK216	Kaltag	19-20 Nov 15	Heavy Snow	8" of new snow fell.
AK216	Kaltag	23 Nov 15	Blizzard	Blizzard conditions observed at Kaltag ASOS. Visibility reduced to ¼ mile or less in snow and blowing snow.

(NWS 2017)

5.3.6.3 Location, Extent, Impact, and Probability of Future Events

Location

The NWS has continued to modify their system for assigning weather zones to facilitate and more accurately confine weather patterns to relevant geographic areas. Consequently, the data in Table 5-7 reflects different zone numbering patterns and should be used to depict weather events that have historically impacted the area; some of which may not have impacted the community as severely as other areas within the same zone.

Extent

The entire community is equally vulnerable to the effects of severe weather from a cold climate with extreme temperature variations. The average January temperature is 0ºF but temperatures can remain at -40ºF or below during the winter. Extreme summer temperatures have reached 90ºF. Figures 5-5 and 5-6 show the climate summaries for both temperature and precipitation for the Galena climate recording station, the closest recording station in the Kaltag area.

GALENA, ALASKA

Period of Record General Climate Summary - Temperature

Station: (503212) GALENA															
From Year=1996 To Year=2012															
	Monthly Averages			Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
	Max.	Min.	Mean	High	Date	Low	Date	Highest Mean	Year	Lowest Mean	Year	>= 90 F	<= 32 F	<= 32 F	<= 0 F
	F	F	F	F	dd/yyyy or yyyymmdd	F	dd/yyyy or yyyymmdd	F	-	F	-	# Days	# Days	# Days	# Days
January	-4.2	-20.1	-12.2	42	17/2009	-65	29/2012	8.2	2001	-32.6	2012	0.0	30.2	31.0	24.8
February	11.6	-7.6	2.0	39	14/2006	-64	02/1999	11.7	2000	-17.3	1999	0.0	26.4	28.0	16.8
March	18.3	-6.4	5.9	48	19/1998	-44	30/2004	18.3	1998	-7.1	2007	0.0	27.0	30.9	20.2
April	38.4	15.6	27.0	64	27/2005	-26	04/2005	36.1	2007	20.0	2006	0.0	7.7	28.3	5.0
May	57.3	34.0	45.7	85	25/2002	-7	03/2001	52.2	2005	34.6	2001	0.0	0.4	13.4	0.1
June	70.0	47.7	58.9	87	28/2004	25	03/2006	63.5	2004	55.7	2006	0.0	0.0	0.2	0.0
July	70.5	50.5	60.5	90	08/2009	33	27/2000	64.7	2004	56.8	2000	0.1	0.0	0.0	0.0
August	63.8	45.5	54.6	86	18/2004	28	18/1997	60.3	2004	49.9	1998	0.0	0.0	1.1	0.0
September	53.2	35.9	44.5	73	06/2009	12	29/1999	49.8	2006	38.9	2004	0.0	0.1	10.0	0.0
October	31.4	19.1	25.3	59	01/2003	-20	31/1997	33.6	2006	13.4	2008	0.0	15.9	27.6	3.1
November	11.3	-1.3	5.0	39	03/2003	-42	18/2011	17.3	2002	-7.3	2011	0.0	28.1	29.8	16.5
December	2.3	-13.4	-5.5	36	08/2005	-55	30/1999	4.5	2002	-18.6	1999	0.0	30.4	31.0	22.9
Annual	35.3	16.6	26.0	90	20090708	-65	20120129	29.5	2002	20.8	1999	0.1	166.2	231.3	109.6
Winter	3.2	-13.7	-5.2	42	20090117	-65	20120129	7.2	2001	-16.0	1999	0.0	87.1	90.0	64.6
Spring	38.0	14.4	26.2	85	20020525	-44	20040330	32.7	1998	22.2	2001	0.0	35.1	72.6	25.4
Summer	68.1	47.9	58.0	90	20090708	25	20060603	62.8	2004	55.8	1998	0.1	0.0	1.3	0.0
Fall	32.0	17.9	24.9	73	20090906	-42	20111118	30.9	2002	19.6	2008	0.0	44.1	67.4	19.7

Table updated on Oct 31, 2012

Figure 5-5 Kaltag Area Climate Summary - Temperature (WRCC 2012)

GALENA, ALASKA

Period of Record General Climate Summary - Precipitation

Station:(503212) GALENA														
From Year=1996 To Year=2012														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	0.70	1.85	2002	0.16	2004	0.51	02/2005	8	3	0	0	11.9	34.8	2002
February	0.85	1.80	2003	0.02	1998	0.75	02/2000	10	3	0	0	15.2	35.4	2004
March	0.50	1.17	1999	0.00	1997	0.41	01/2003	7	2	0	0	9.7	19.1	2008
April	0.39	0.90	2002	0.01	2000	0.54	16/2004	6	1	0	0	4.8	15.0	2001
May	0.45	1.13	1999	0.01	2007	0.49	26/1999	5	2	0	0	0.6	4.0	2010
June	1.47	2.76	2008	0.06	2002	1.19	24/2008	9	5	1	0	0.0	0.0	1997
July	2.06	3.11	2000	0.53	2004	0.92	30/1999	11	6	1	0	0.0	0.0	1997
August	2.28	3.21	2011	0.72	2008	0.75	17/2002	15	9	1	0	0.0	0.0	1997
September	1.46	3.41	2005	0.49	2001	0.86	10/2005	12	5	0	0	0.4	4.0	2004
October	1.07	2.04	2006	0.39	1997	0.50	17/2012	12	4	0	0	9.4	19.5	2007
November	0.83	2.26	2010	0.22	2001	0.64	22/2010	11	3	0	0	13.7	26.2	2004
December	0.91	2.30	2011	0.18	1998	0.90	13/2011	11	3	0	0	14.8	31.0	2004
Annual	12.97	17.05	2011	9.79	1997	1.19	20080624	115	44	3	0	80.3	124.0	2005
Winter	2.46	4.56	2005	1.05	2010	0.90	20111213	28	8	0	0	41.9	81.0	2005
Spring	1.34	2.66	1999	0.07	2007	0.54	20040416	18	5	0	0	15.0	31.4	2008
Summer	5.82	7.91	1998	4.00	2004	1.19	20080624	35	20	2	0	0.0	0.0	1997
Fall	3.35	5.15	2005	2.00	1999	0.86	20050910	34	11	0	0	23.4	42.6	2011

Table updated on Oct 31, 2012

Figure 5-6 Kaltag Area Climate Summary - Precipitation (WRCC 2012)

Based on past severe weather events and the criteria identified in Table 5-3, the extent of severe weather in the community is considered limited where injuries do not result in permanent disability, complete shutdown of critical facilities occurs for more than one week, and more than 10% of property is severely damaged.

Impact

Air transport is the only way to access Kaltag. Heavy snow can immobilize a community by bringing transportation to a halt. Until the snow can be removed, the airport is impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Closure of the airport could potentially last days, especially in winter. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on the community of Kaltag.

Injuries and deaths related to heavy snow usually occur as a result of motor vehicle, all-terrain vehicle (ATV), and snow machine accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

Extreme cold can also bring transportation to a halt. Aircraft may be grounded due to extreme cold and ice fog conditions, cutting off access as well as the flow of supplies to communities. Long cold spells can cause rivers to freeze, disrupting shipping and increasing the likelihood of ice jams and associated flooding.

Extreme cold also interferes with the proper functioning of a community's infrastructure by causing fuel to congeal in storage tanks and supply lines, stopping electric generation. Without electricity, heaters and furnaces do not work, causing water and sewer pipes to freeze or rupture. Fuel can begin to turn to globs at temperatures below 14°F. An entire winter's supply of fuel is either typically flown into the community via air transport or barged via river in the summer. Fuel congealing could be detrimental as it cannot be readily replaced. If extreme cold conditions are combined with low or no snow cover, the ground's frost depth can increase, disturbing buried pipes. The greatest danger from extreme cold is its effect on people. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. The risk of hypothermia due to exposure greatly increases during episodes of extreme cold, and carbon monoxide poisoning is possible as people use supplemental heating devices.

Probability of Future Events

Based on previous occurrences and the criteria identified in Table 5-2, it is likely a severe storm event will occur in the next three years (event has up to 1 in 3 year's chance of occurring) as the history of events is greater than 20% but less than or equal to 33% likely per year.

5.3.7 Wildland Fire

5.3.7.1 Nature

A wildland fire is a type of wildfire that spreads through consumption of vegetation. It often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildland fires can be caused by human activities (such as arson or campfires) or by natural events such as lightning. Wildland fires often occur in forests or other areas with ample vegetation. In addition to wildland fires, wildfires can be classified as urban fires, interface or intermix fires, and prescribed fires.

The following three factors contribute significantly to wildland fire behavior and can be used to identify wildland fire hazard areas.

- **Topography:** As slope increases, the rate of wildland fire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildland fire behavior. However, ridge-tops may mark the end of wildland fire spread, since fire spreads more slowly or may even be unable to spread downhill.
- **Fuel:** The type and condition of vegetation plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases.
- **Weather:** The most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. By contrast, cooling and higher humidity often signal reduced wildland fire occurrence and easier containment.

The frequency and severity of wildland fires is also dependent on other hazards, such as lightning, drought, and infestations (such as the damage caused by spruce-bark beetle infestations). If not promptly controlled, wildland fires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildland fires may severely affect livestock and pets. Such events may require emergency water/food, evacuation, and shelter.

The indirect effects of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance rivers and stream siltation, thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards.

5.3.7.2 History

Wildland fires have not been documented within the boundaries of the community; however, wildland fires have occurred in the vicinity.

The Alaska Interagency Coordination Center (AICC) lists 300 wildland fires which have occurred within 50 miles of the community. Seventy-five of these fire events exceeded 3,000 acres (Table 5-8 and Figure 5-7) during a historical period of 78 years (1939 to 2017).

Table 5-8 Wildfire History Locations from 1939 to 2017
(Within 50 Miles Of Kaltag)

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Specific Cause
Khotol	2017	20131.9	64.3261111	-158.2422222	Lightning
River North	2017	3078.8	64.2665	-160.1478333	Lightning
Old Woman	2015	49182.4	64.0023333	-159.7923334	Lightning
Nulato	2015	42402.8	64.7298333	-158.1525	Lightning

Table 5-8 Wildfire History Locations from 1939 to 2017

(Within 50 Miles Of Kaltag)

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Specific Cause
Bare Mt	2015	33362.6	64.1721667	-156.6765	Lightning
Illinois Mine	2015	25687.5	64.035	-157.8378333	Lightning
Yukon Creek	2015	21492.9	64.342	-158.0266667	Lightning
Camp Creek	2015	13556.3	64.293	-157.4793333	Lightning
Egavik	2015	10906.6	64.03	-160.6966667	Lightning
Little Mud River	2015	9527.4	63.8080556	-158.0272222	Lightning
Khotol	2015	9453.2	64.354	-158.045	Lightning
Ungalik	2015	8289.9	64.8675	-160.0163333	Lightning
Yukon Creek 2	2015	7563.2	64.261	-158.094	Lightning
Kaiyuh	2015	6500.8	64.6088334	-158.1485	Lightning
Nikolai Slough	2015	5802.2	64.9026666	-157.0493333	Lightning
Shaktoolik	2015	5459	64.722	-159.7388333	Lightning
Nulato River 2	2015	4904	64.8405	-158.2838333	Lightning
South Fork	2015	4692.5	64.7155	-158.2645	Lightning
Totson	2015	4223.7	64.4731667	-157.2920278	Lightning
Bear Creek	2013	13179.8	63.6966667	-159.5883333	Lightning
Shaktoolik River	2013	11699.5	64.1213333	-160.298	Lightning
Old Woman River	2013	5121.8	63.7556667	-159.7816667	Lightning
Gisasa River	2005	52606.4	64.85	-158.7833	Lightning
Little Mud River #1	2005	35577.2	63.96667	-157.8	Lightning
Little Mud River #2	2005	30170.7	64.08417	-157.4667	Lightning
Nulato #3	2005	14404.6	64.78861	-158.2781	Lightning
Kalyuh Hill	2005	8958.8	64.08556	-157.9356	Lightning
Tlatl Hills	2005	6690	63.91667	-157.6483	Lightning
Bonanza Creek	2004	265916	64.46833	-157.6908	Lightning
Rodo River	2004	8715.7	64.19334	-159.2767	Lightning
Bear Creek	2004	4066	63.86333	-159.575	Lightning
Galatea Creek	2002	74511	63.885	-157.1483	Lightning
Khotol River	2002	50811	63.91417	-158.6572	Lightning
Yukon Creek	2000	61291	64.18333	-158.0333	Lightning
ROKETALOI	1997	35490	63.9000015	-158.3000031	Lightning
SOONKAKAT RIVER	1997	3070	64.6166687	-157.5833282	Lightning
331653	1993	4800	64.0999985	-157.1333313	Lightning
331639	1993	3410	64.25	-157.6333313	Lightning
331662	1993	3300	64.1666641	-156.8333282	Lightning
131356	1991	5170	64.3000031	-157.2666626	Lightning
832097	1988	83300	63.7833328	-157.1833344	Lightning
831024	1988	52600	64.0166702	-157.7666626	Lightning
GAL S 51	1986	11000	63.9000015	-157.4666595	Lightning
631043	1986	6000	63.9500008	-157.1166687	Lightning
GAL SW 65	1986	3600	63.7666664	-158.0666656	Lightning
WAPOO FIRE	1984	37570	63.7833328	-157.6666718	Lightning
MUD FIRE	1984	12000	63.9333344	-157.4499969	Lightning
UNK-E-55	1983	16000	63.7833328	-158.6166687	Lightning

Table 5-8 Wildfire History Locations from 1939 to 2017

(Within 50 Miles Of Kaltag)

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Specific Cause
KOYUKUK	1973	10240	64.8833313	-157.8333282	Lightning
CABLE	1972	14000	64.6999969	-160.75	Lightning
LITTLE MUD RIVER	1972	10000	64.1166687	-158	Lightning
YUKON	1972	3200	64	-158.9333344	Lightning
ENGLAND	1971	28000	64.3333359	-157.5833282	Lightning
BEAR	1969	422000	64.8333359	-156.8333282	Lightning
GALATEA	1968	17280	63.7999992	-157.3333282	Lightning
KHOTOL MT	1968	15300	64.4000015	-157.5333405	Lightning
BULLFROG	1968	12000	63.8166656	-159.5333405	Lightning
WAPOO	1968	10000	63.9000015	-157.6166687	Lightning
X-MAS CREEK	1968	6000	64.8666687	-159.9333344	Lightning
PEPYS	1968	4800	63.75	-158.3666687	Lightning
9 MILE SLOUGH	1968	3500	64.7166672	-159.2833405	Lightning
NULATO	1960	16500	64.6333313	-158	Lightning
KAYIUH MTN	1959	5100	64.3499985	-157.7166595	Lightning
HOLIKACHUK	1957	435000	63.75	-158.8333282	Lightning
HILL 1224	1957	151800	64	-158.5	Lightning
INNOKO #1	1957	47300	63.8333321	-156.8000031	Lightning
South Fork Nulato River	1957	40000	64.4833298	-158.6833344	Lightning
NULATO S-10	1956	129840	64.5500031	-157.5833282	Lightning
Kotol River	1953	11000	64.3000031	-158.3166656	Lightning
South Kotol MT.	1953	9700	64	-158.3000031	Lightning
Galena	1941	10000	64.6999969	-157.0333405	Unknown
Kaltag	1941	10000	64.3333359	-158.7833405	Trapper
Nulato	1941	10000	64.75	-158.1333313	Trapper
Norton Bay	1941	10000	64.6999969	-160.6333313	Unknown
Galena	1940	5000	64.5999985	-157.3666687	Trappers

(AICC 2018)

The 2018 Planning Team stated that the Stake Creek fire, which occurred in the 1930s, was one of the largest fires to take place near Kaltag. The impacts of this fire are still felt by the community as the fire affected the migration patterns of caribou in the area.

5.3.7.3 Location, Extent, Impact, and Probability of Future Events

Location

Under certain conditions, wildland fires may occur in any area with fuel surrounding the community. Since fuels data is not readily available, for the purposes of this MJHMP, all areas outside City limits are considered to be vulnerable to wildland fire impacts.

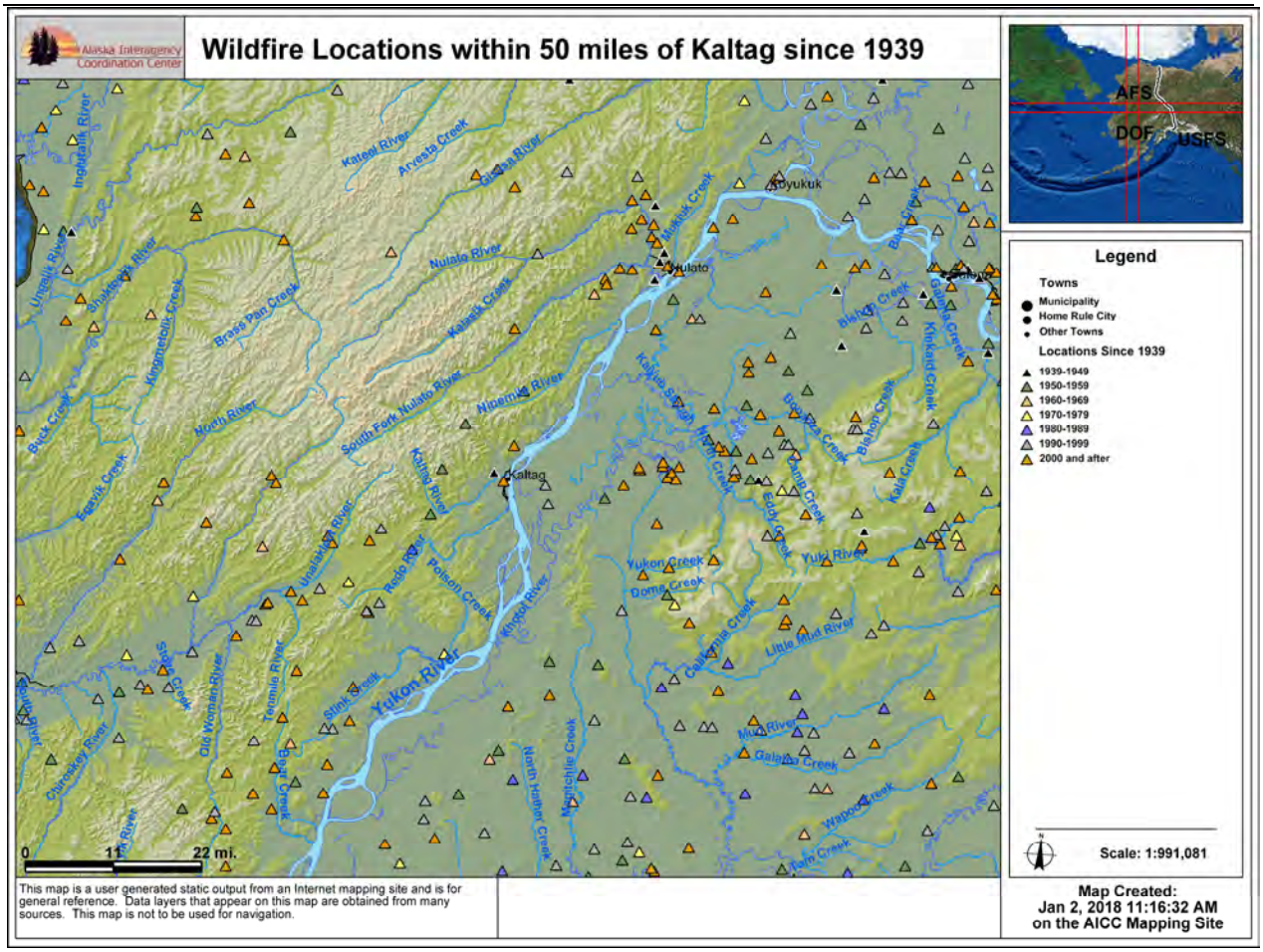

Figure 5-7 Kaltag Wildfire History (AICC 2018)

Extent

Generally, fire vulnerability dramatically increases in the late summer and early fall as vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. However, various other factors, including humidity, wind speed and direction, fuel load and fuel type, and topography can contribute to the intensity and spread of wildland fires. The common causes of wildland fires in Alaska include lightning strikes and human negligence.

Fuel, weather, and topography influence wildland fire behavior. Fuel determines how much energy the fire releases, how quickly the fire spreads, and how much effort is needed to contain the fire. High temperatures and low humidity encourage fire activity while low temperatures and high humidity retard fire spread. Wind affects the speed and direction of fire spread. Topography directs the movement of air, which also affects fire behavior. When the terrain funnels air, as happens in a canyon, it can lead to faster spreading. Fire also spreads up slope faster than down slope.

The 75 largest wildland fire events (over 3,000 acres) that occurred within 50 miles of Kaltag burned an average of 35,397 acres per event. However, none of these fires directly affected the community.

Based on the criteria identified in Table 5-3, the magnitude and severity of impacts in the community are considered limited with injuries that do not result in permanent disability, the

potential for critical facilities to be shutdown for more than one week, and more than 10% of property or critical infrastructure being severely damaged.

Impact

Impacts of a wildland fire that interfaces with the population center of Kaltag could grow into an emergency or disaster if not properly controlled. A small fire can threaten lives and resources and destroy property. In addition to impacting people, wildland fires may severely impact livestock and pets. Such events may require emergency food and water, evacuation, and alternative shelter.

Indirect impacts of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams. As a result, erosion increases flood potential, harms aquatic life, and degrades water quality.

Probability of Future Events

Fire is recognized as a critical feature of the natural history of many ecosystems. It is essential to maintain the biodiversity and long-term ecological health of the land. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process. A full range of fire management activities is exercised in Alaska to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighter and public safety and welfare as well as natural and cultural resources threatened. In Alaska, the natural fire regime is characterized by a return interval of 50 to 200 years, depending on the vegetation type, topography, and location.

Based on the history of wildland fires in the area, applying the criteria identified in Table 5-2, it is likely a wildland fire event will occur in the next three years. The event has up to 1 in 3 year's chance of occurring and the history of events is greater than 20% but less than or equal to 33% likely each year.

5.3.8 Climate Change

5.3.8.1 Description

For this MJHMP, climate change refers to the long-term variation in atmospheric composition and weather patterns on a global scale. Global climate change may occur gradually due to small variations or rapidly due to large catastrophic forces. Greenhouse gasses, especially carbon dioxide and methane, are commonly regarded as the most significant factors influencing the Earth's current climate.

Significant atmospheric variations may also be influenced by more than one event; for instance, an asteroid impact and a major eruption over a longer time period. For scientists studying climate change, both hazards imply different time periods. Therefore, the time period estimates for previous climate change events tend to vary and cannot be accurately applied to current predictive climate change models, which now must account for human activity. This is significant because hazard mitigation planning relies greatly upon the historical record.

5.3.8.2 Location

Climate change is a global event. Therefore, the entire community of Kaltag is vulnerable to climate change.

5.3.8.3 Extent

Through studies of the historical record, it is known climate change affects water acidity, atmospheric composition, precipitation, weather patterns, and temperatures. Climate change has the potential to aggravate natural disasters along the coastline and rivers, particularly flooding and erosion. Climate change also has the potential to increase the rate of permafrost degradation and the incidence of forest fires.

5.3.8.4 Local Impact

The community of Kaltag is being impacted by more moderate temperatures and changing seasonal timing. The community relies heavily on subsistence practices to provide food and resources that supplement store bought goods. Over the past years, residents have had to alter their subsistence practices because of a changing climate. Residents provided the following observations during a community meeting in December 2017:

- Summers have been much wetter; there is less drought.
- Winters have been much warmer, which affects wildlife migration patterns and berry seasons.
- The Yukon river freezes later, which affects the moose hunters that traditionally cross the river to hunt after it is frozen. The residents said the river was freezing on average one to two weeks later.
- A warmer climate has exacerbated permafrost degradation. Residents are experiencing more frequent water pipe damage, houses shifting, and impacts on the community's water plant.

The complete local impact of climate change on the community of Kaltag is difficult to quantify because there is no conclusive data about the impacts of climate change on the region. Additionally, issues often correlated with climate change may have other factors that may be contributing to the issue. Due to this, the best information about the local impact of climate change is the testimonies given by residents.

This section provides an overview of the vulnerability analysis and describes the five specific steps: asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

6.1 OVERVIEW OF A VULNERABILITY ANALYSIS

A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps:

1. Asset Inventory
2. Methodology
3. Data Limitations
4. Exposure Analysis for Current Assets
5. Areas of Future Development

The requirements for a vulnerability analysis, as stipulated in DMA 2000 and its implementing regulations, are described here.

- A summary of the community's vulnerability to each hazard that addresses the impact of each hazard on the community.

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii) and §201.7: [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.

Element

- Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- Does the new or updated plan address the impact of each hazard on the jurisdiction?

Source: FEMA, July 2008.

- Identification of the types and numbers of RL properties in the identified hazard areas.

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties

Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii) and §201.7: [The risk assessment] **must** also address National Flood Insurance Program Insured structures that have been repetitively damaged floods.

Element

- Does the new or updated plan describe vulnerability in terms of the types and numbers of repetitive loss properties in the identified hazard areas?

Source: FEMA, July 2008.

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Identifying Structures

Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A) and §201.7: The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Element

- Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
- Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

Source: FEMA, July 2008.

- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Estimating Potential Losses

Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B) and §201.7: [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.

Element

- Does the new or updated plan estimate potential dollar losses to vulnerable structures?
- Does the new or updated plan describe the methodology used to prepare the estimate?

Source: FEMA, July 2008.

6.2 VULNERABILITY ANALYSIS: SPECIFIC STEPS

6.2.1 Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population (for community-wide hazards), residential buildings (where data is available), and critical facilities and infrastructure. The assets and associated values throughout the City are identified and discussed in detail in the following sections.

6.2.1.1 Population and Building Stock

Population data for the community was obtained from the 2010 U.S. Census. Kaltag's total population for 2010 was 190, and the DOL estimated population for 2016 was 172 (Table 6-1) with 87 residential structures.

Table 6-1 Estimated Population and Building Inventory

Population		Residential Buildings	
2010 Census	2016 DOL Estimate	Total Building Count	Total Value of Buildings[1]
190	172	87	$2,340,300

Sources: City, U.S. Census 2010, and the 2016 DCRA Community Profile.
1 Median structural value of all single-family residential buildings is $26,900 per structure.

Estimated numbers of residential buildings and replacement values for those structures, as shown in Table 6-1, were obtained from the City and Tribe, the 2010 U.S. Census, and DCRA. A total of 87 single-family residential buildings were considered in this analysis.

6.2.1.2 Repetitive Loss Properties

Kaltag does not currently participate in the NFIP, and, therefore, does not have an inventory of properties that meet the RL or SRL criteria. This has been identified as a medium priority action as a result of this hazard mitigation planning process, and the community is continuing to investigate application to the NFIP program.

6.2.1.3 Existing Critical Facilities and Infrastructure

A critical facility is defined as a facility that provides essential products and services to the general public, such as preserving the quality of life in the community and fulfilling important public safety, emergency response, and disaster recovery functions. The critical facilities profiled in this plan include the following:

- Government facilities, such as City and Tribal administrative offices, departments, or agencies
- Emergency response facilities, including police, fire, and Code Red equipment
- Educational facilities, including K-12
- Care facilities, such as medical clinics, congregate living health, residential and continuing care, and retirement facilities
- Community gathering places, such as community and youth centers
- Utilities, such as electric generation, communications, water and waste water treatment, sewage lagoons, landfills

Critical facilities are identified in Table 6-2.

Table 6-2 Kaltag Critical Facilities

Occupancy Type	Facility Name	Location/Address	Structure Replacement Value	Size or Dimensions	Total Miles, Acres, Feet, Gallons (Gal), Occupants
Government Facility	Kaltag City Office	5th Avenue	$100,000		2 Occupants
	Tribal Council Office	5th Avenue	$250,000		9 Occupants
	US Post Office	5th Avenue	$150,000		1 Occupant
	City Maintenance Building	A Street	$400,000		0 Occupants
	National Guard Building	7th Avenue	$150,000		0 Occupants
Transportation Facilities	Kaltag Airport, lighted, gravel	N/A	$152,250		5,000 Feet 0 Occupants
	Barge Facility	N/A	$50,000		0 Occupants
Emergency Response Facility	Kaltag Fire Hall (Fire Response Equipment)	5th Avenue	$80,000		4 Occupants
Educational Facility	Head Start	11th Avenue	$100,000		1 Occupant
	Kaltag School	12th Avenue	$2,461,577		30 Occupants
Care Facility	Kaltag Health Clinic	5th Avenue	$1,600,000	40'x70'	4 Occupants
Community Facility	Kaltag Cooperative Store	7th Avenue	$500,000		3 Occupants
	Catholic Church	5th Avenue	$500,000		1 Occupants
	Store		$250,000		1 Occupant
	Bible Baptist Church	New Subdivision	$150,000		0 Occupants
	Community Storage Shed 1	8th Avenue	$50,000		5 Occupants
	Community Storage Shed 2	8th Avenue	$70,000		0 Occupants
	Takathlee Tondin Kuskino Community Center	E Street	$80,000		0 Occupants
	Fish/Roe Processing Facility	A Street	$1,563,000		0 Occupants
	Youth Center		$100,000	30' x 30'	1 Occupant
	Kaltag Heritage Center	5th Avenue	$100,000		0 Occupants
	Cemetery-North		$0		0 Occupants
	Cemetery-South		$0		0 Occupants
Roads	Community Streets				0 Occupants

Table 6-2 Kaltag Critical Facilities

Occupancy Type	Facility Name	Location/Address	Structure Replacement Value	Size or Dimensions	Total Miles, Acres, Feet, Gallons (Gal), Occupants
	Cemetery Road		$1,700,000		0 Occupants
Bridges (local, State, & Federal)	BIA Bridge	Upper Cemetery Road	$1,000,000		120 Feet 0 Occupants
Utilities	City Fuel Tank	9th Avenue	$2,658,534 (co-located bulk storage tanks)		19,300 Gal 0 Occupants
	Yukon-Koyukuk Schools Fuel Tank				33,200 Gal 1 Occupant in the entire bulk fuel facility
	Kaltag Cooperative Industries Fuel Tanks - 108,000 gal				Diesel 57,800 Gal; Gas 50,200 Gal 0 Occupants
	Alaska Village Electric Cooperative (AVEC) Fuel Tank				120,000 Gal 0 Occupants
	Catholic Church Fuel Tank	5th Avenue	$18,000		9,000 Gal 0 Occupants
	AK DOT/Airport Fuel Tank	Airport Way	$10,000		4,000 Gal 0 Occupants
	Army National Guard Fuel Tanks	7th Avenue	$6,000		3,000 Gal 0 Occupants
	Generator - School	12th Avenue	$50,000		0 Occupants
	Generator - Water Plant	New Subdivision	$50,000		0 Occupants
	Generator – AVEC (3 generators)		$2,034,118	1-315KW, 1-200KW, and 1-200KW	0 Occupants
	Water Plant & Washeteria	New Subdivision	$1,400,000		0 Occupants
	City Well	Cemetery Road	$500,000		16 Feet Shallow 0 Occupants
	City Circulating Public Water System (1972)	Community Wide	$5,370,777	12,800' x 4" PVC & HDPE arctic pipe	23,500 Gal/Day 0 Occupants
	Wastewater system (buried)	Community Wide	$2,187,141	9,700' x 8" PVC & HDPE arctic sewer	0 Occupants

Table 6-2 Kaltag Critical Facilities

Occupancy Type	Facility Name	Location/Address	Structure Replacement Value	Size or Dimensions	Total Miles, Acres, Feet, Gallons (Gal), Occupants
				pipe	
	Landfill, Class 3 (2001)	Lower Cemetery Road 64.284722 -158.73833	$500,000	5.0 acres	0 Occupants
	Barge Fuel Header	Yukon River & A Street	$177,500		0 Occupants

6.2.1.4 Future Critical Facilities and Infrastructure

Immediate plans for future development in the community includes constructing a senior-assisted living facility, and new single-family homes in the new residential area. Renovation projects include the airport runway, and water and sewer system upgrades. No future buildings will be constructed in known hazard areas.

6.2.2 Methodology

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of probability or level of damage.

Critical facilities were identified by the Planning Team and were compared to locations where hazards are likely to occur. If any portion of the critical facility fell within a hazard area, it was counted as being exposed and vulnerable to the particular hazard.

Replacement structure and contents values were developed for physical assets. These values were obtained from the State of Alaska Critical Facilities Database, the capital projects database, Kaltag, Alaska, or provided by the City and Tribe.

For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

6.2.3 Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge

concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this MJHMP to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the MJHMP.

6.2.4 Exposure Analysis

The City and Tribe populations are identical. As such, vulnerabilities to the City and Tribe are also the same. The results of the exposure analysis for loss estimations in Kaltag are summarized in Table 6-3 and in the following discussion.

Table 6-3 Kaltag Potential Hazard Exposure Analysis

			Residential Structures		Critical Facilities		Total	
Hazard	Methodology	Population[a]	Number	Structure Value[b]	Number	Structure Value[b]	Structures	Value[b]
Drought	Simplified exposure-level analysis	86 (50% of population)	0	0	0	0	0	0
Earthquake	Simplified exposure-level analysis	86 (50% of population)	43	$1,317,150	21	$14,088,716	64	$15,405,866
Erosion	Simplified exposure-level analysis	9 (5% of population)	4	$107,600	4	$1,727,500	8	$1,835,100
Flood	DCRA community flood mapping	9 (5% of population)	4	$107,600	4	$1,727,500	8	$1,835,100
Permafrost	Simplified exposure-level analysis	86 (50% of population)	43	$1,317,150	21	$14,088,716	64	$15,405,866
Weather (Severe)	Simplified exposure-level analysis	34 (20% of population)	17	$468,060	9	$5,635,486	26	$6,121,546
Wildland Fire	Simplified exposure-level analysis	86 (50% of population)	43	$1,317,150	21	$14,088,716	64	$15,405,866
Climate Change	86 (50% of population)	86 (50% of population)	0	0	0	0	0	0

N/A = not available
(a) Total population was based on DOL 2016 population data.
(b) Cost estimates from 2010 United States Census, DOL, and Planning Team.

Drought

Area-wide droughts have historically occurred in Alaska, and as it is a region-wide phenomenon, all residents within the region are equally at risk. Structural damage from drought is not expected; rather the risks are present to humans and resources. Agriculture, fishing, timber, and wildlife have historically been impacted, as well as local and regional economies. This includes 50% of the 172 people who rely almost totally on subsistence for their livelihood and survival.

Earthquake

Based on earthquake probability model maps produced by the USGS, the entire area is at risk of experiencing impacts from an earthquake. However, the probability is low (see Section 5.3.2.3). Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. The existing and future Kaltag population, residences, and critical facilities are exposed to the effects of an earthquake. This includes 50% of the 172 people and 87 residences (worth approximately $2,340,300), and 42 critical facilities (worth approximately $28,177,431).

Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. Minor shaking may be seen or felt based on past events. Although all structures are exposed to earthquakes, buildings within the community constructed with wood have slightly less vulnerability to the effects of earthquakes than those with masonry.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level as the community is not located in an area with a high probability of strong shaking (i.e., > M 4.8).

Erosion

Based on local knowledge, areas within Kaltag affected by erosion are the same areas impacted by flood. There are four critical facilities (worth approximately $1,727,500) located in areas exposed and historically prone to erosion. These include: the barge landing area (worth $50,000), the Kaltag River Bridge (worth $1,000,000), the City well (worth $500,000), and the hardened fuel header (worth $177,500). There are approximately nine people in four residential buildings (worth approximately $107,600) located in areas exposed and historically prone to erosion.

Impacts from erosion include loss of land and any development on that land. Erosion can cause increased sedimentation of harbors and river deltas and hinder channel navigation, reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (docks, harbors, electric and water/wastewater utilities), and economic impacts associated with costs trying to prevent or control erosion sites. In the community, only the location of a building can lessen its vulnerability to erosion.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level until the City and Tribe institute land use controls prohibiting new construction in erosion prone areas. Impacts could also be lessened if affected properties could be relocated.

Flood

Based on local knowledge, areas within Kaltag affected by erosion are the same areas impacted by flood. There are four critical facilities (worth approximately $1,727,500) located in areas exposed and historically prone to erosion. These include: the barge landing area (worth $50,000), the Kaltag River Bridge (worth $1,000,000), the City well (worth $500,000), and the hardened fuel header (worth $177,500). There are approximately nine people in four residential buildings (worth approximately $107,600) located in areas exposed and historically prone to erosion.

Impacts associated with flooding include water damage to structures and contents, roadbed erosion and damage, boat strandings, areas of standing water in roadways, and damage or displacement of fuel tanks, power lines, or other infrastructure. Buildings on slab foundations, not located on raised foundations, and/or not constructed with materials designed to withstand flooding events (e.g., cross vents to allow water to pass through an open area under the main floor of a building) are more vulnerable to the impacts of flooding.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level.

Permafrost

Kaltag is located in an area with discontinuous permafrost at an average depth of 70 ft with an active layer from one to three ft thick. This includes 50% of the 172 people and 87 residences (worth approximately $2,340,300), and 42 critical facilities (worth approximately $28,177,431).

Impacts associated with degrading permafrost include surface subsidence, infrastructure, structure, and/or road damage. Buildings that are built on slab foundations and/or not constructed with materials designed to accommodate the movement associated with building on permafrost are more vulnerable to the impacts of permafrost.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. To lessen future impacts the City and Tribe could institute and enforce land use controls prohibiting new construction in permafrost zones and building codes to accommodate the effects of permafrost on structures.

Weather, Severe

Using information provided by the NWS, the entire City's population, residences, and critical facilities are equally exposed to severe weather events. This includes 50% of the 172 people and 87 residences (worth approximately $2,340,300), and 42 critical facilities (worth approximately $28,177,431).

Impacts associated with heavy snow events includes roof collapse, trees and power lines falling, damage light aircraft and sinking small boats, injury and death resulting from snow machine or vehicle accidents, and overexertion while shoveling. A quick thaw after a heavy snow can also cause substantial flooding. Impacts from extreme cold include hypothermia, halting transportation from fog and ice, congealed fuel, frozen pipes, disruption in utilities, frozen pipes, and carbon monoxide poisoning. Section 5.3.6.3 provides additional detail regarding the impacts of severe weather. Buildings that are older and/or not constructed with materials designed to withstand heavy snow and wind (e.g., hurricane ties on crossbeams) are more vulnerable to the impacts of severe weather.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. To lessen future impacts, the City and Tribe could institute and enforce building codes to accommodate the effects of severe weather on structures.

Wildland Fire

According to AICC, there are no areas within Kaltag's boundaries with a wildland fire threat. However, 300 wildland fires have occurred within a 50-mile radius of the City from 1939 to 2017. There is potential for wildland fire to interface with the population center of the City. Thus, for the purposes of this exposure and vulnerability assessment, it is assumed that 20% of structures within the community are exposed to the impacts of a wildland fire event. This includes 20% of 172 people, 87 residences (worth approximately $2,340,300), and 42 critical facilities (worth approximately $28,177,431).

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. Community education, building materials, and prepared response personnel are some actions that could lessen future impacts.

Climate Change

Climate change is a global phenomenon. Structural damage from climate change is not expected; rather the risks are present to humans and resources. Agriculture, fishing, timber, and wildlife have historically been impacted, as well as local and regional economies. This includes 50% of the 172 people who rely almost totally on subsistence for their livelihood and survival.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Analyzing Development Trends

Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C) and §201.7: [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Element

- Does the new or updated plan describe land uses and development trends?

Source: FEMA, July 2008.

6.3 LAND USE AND DEVELOPMENT TRENDS

Land use in Kaltag is predominately residential with limited area for commercial services and community (or institutional) facilities. Kaltag is located approximately 35 ft above the Yukon River on relatively flat land. Kaltag encompasses approximately 17,632 acres which has been subdivided into 145 parcels. The surrounding area is undeveloped and owned by Gana-A'Yoo, LTD. Much of this land is not developable due to poor soils, drainage problems, and existing permafrost.

The City and Tribe have no formal zoning or other land use controls. Implementing land use ordinances to prevent building in hazard areas would reduce hazard impacts and losses.

Community facilities are classified under institutional land uses such as schools and government facilities. Critical facilities are classified under community facilities and institutional land uses.

Development Trends

Tables 6-4 and 6-5 list identified infrastructure improvement projects. They provide a depiction of the community's ongoing development trends. Subsequent development within the community will likely be mostly steady based on its population trends. However, water and sewer service demands will continue to grow as new buildings are constructed with modern appliances and water requirements. The community believes that more infrastructure is necessary to spur economic growth and it will continue to seek funding for infrastructure development.

Piped water and sewer has only existed since 1982 in Kaltag. A circulating water and gravity sewage system is used. Water is derived from a shallow 16 ft deep well and is treated. The majority of households are fully plumbed. A 13-unit Housing and Urban Development (HUD) subdivision was recently connected to the circulating water and gravity sewage system. An extension to 6th Avenue HUD subdivision is under construction.

Table 6-4 lists projects in various stages from planning to construction.

Table 6-4 Projects Under Development

Lead Agency	Fiscal Year	Project Status	Project Description
Federal Aviation Administration (FAA), Department of Transportation/ Public Facilities (DOT/PF)	2017	Design	Resurface the runway, reconstruct the taxiway and apron, and apply dust palliative. Remove airspace obstructions and rehabilitate and extend the airport lighting system.
FAA-DOT/PF	2017	Design	Snow Removal Equipment Building Replacement
FAA-DOT/PF	2016	Construction	Replace the grader at the Kaltag Airport
Department of Community, Commerce, and Economic Development (DCCED)	2015	Construction	Barge Mooring Points Installation – Legislative Grant
FAA-DOT/PF	2011	Planned	Conduct aeronautical survey for Wide Area Augmentation System (WAAS) approach
Economic Development Administration (EDA)	2008	Funded	Fish & Roe Processing Equip. - Keeping competitive in the Worldwide Marketplace
DCCED	2007	Funded	Phase I Fish Processing Plant - Legislative Grant, Construction
FAA/DOT/PF	2005	Funded	Rehabilitate Runway
DCCED	2003	Lack of Funding	Kaltag Heritage Center - Capital Project and Improvements - Capital Matching, Construction

(DCRA 2017)

This section outlines the four-step process for preparing a mitigation strategy including:

1. Developing Mitigation Goals
2. Identifying Mitigation Actions
3. Evaluating Mitigation Actions
4. Implementing Mitigation Action Plans

Within this section the Planning Team developed the mitigation goals and potential mitigation actions for the City and the Tribe.

7.1 DEVELOPING MITIGATION GOALS

The requirements for the local hazard mitigation goals, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy-Local Hazard Mitigation Goals

Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i) and §201.7: [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Element

- Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?

Source: FEMA, July 2008.

The exposure analysis results were used as a basis for developing the mitigation goals and actions. Mitigation goals are defined as general guidelines that describe what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. As such, 10 goals were developed to reduce or avoid long-term vulnerabilities to the identified hazards (Table 7-1).

Table 7-1 Mitigation Goals Considered

No.	Goal Description
1	Promote recognition and mitigation of all-natural hazards that affect the City and Tribe.
2	Reduce the possibility of losses from all-natural hazards that affect the City and Tribe.
3	Promote cross referencing mitigation goals and actions with other planning mechanisms and projects.
4	Reduce the possibility of damage and losses due to drought.
5	Reduce the possibility of damage and losses due to earthquake.
6	Reduce the possibility of damage and losses due to erosion.
7	Reduce the possibility of damage and losses due to floods.
8	Reduce the possibility of damage and losses due to permafrost.
9	Reduce the possibility of damage and losses due to severe weather.
10	Reduce the possibility of damage and losses due to wildland fire.

7.2 IDENTIFYING MITIGATION ACTIONS

The requirements for the identification and analysis of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions

Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii) and §201.7: [The mitigation strategy shall include 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.

Element

- Does the new or updated plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?
- Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure?
- Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure?

Source: FEMA, July 2008.

After mitigation goals and actions were developed, the Planning Team assessed the potential mitigation actions to carry forward in the mitigation strategy. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. As listed in Table 7-2, 56 potential mitigation actions were developed in the 2010 HMP, with a particular emphasis placed on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure.

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	**Description**	**ID**	**Description**	**Update in 2018 (Only for Actions Selected in 2010)**
1	Promote recognition and mitigation of all-natural hazards that affect the City and Tribe.	**A**	Hold an annual or biennial "hazard meeting" to provide information to residents about recognizing and mitigating all-natural hazards that affect the City and Tribe.	The City and Tribe regularly discuss hazards at community meetings and takes the initiative to create hazard awareness within the community through the river watch, fire watch, and school fire education programs.
		B	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all-natural hazards.	Action not chosen in 2010
		C	Join the National Flood Insurance Program to reduce monetary losses to individuals and the community.	Action not chosen in 2010
		D	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic, and other hazards to ensure occupant safety.	Action not chosen in 2010
		E	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.	Action not chosen in 2010
		F	Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to protect the threatened population.	Action not chosen in 2010
2	Promote cross referencing Mitigation Goals and Actions with other City and Tribe planning	**A**	Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate community-wide mitigation actions. (Make a City and Tribe agenda item – a living document for continuous evaluation)	The City and Tribe have been hindered due to limited resources and have not been able to establish a formal role for the Jurisdictional Hazard Mitigation Planning Committees.

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	**Description**	**ID**	**Description**	**Update in 2018 (Only for Actions Selected in 2010)**
	mechanisms and projects.	**B**	The City and Tribe will aggressively manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	The community has no other development plans beyond the HMP, and since the 2010 HMP, the community has not written additional plans due to their limited available resources.
		C	Review ordinances and develop outreach programs to assure propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as flood or seismic events.	Action not chosen in 2010
		D	Integrate the Mitigation Plan findings for enhanced emergency planning.	This process is ongoing within the community as leaders and planners work to develop emergency plans.
		E	Develop and implement strategies and educational outreach programs for debris management from natural hazard events.	Action not chosen in 2010
		F	Update or develop, implement, and maintain jurisdictional debris management plans.	Action not chosen in 2010
3	Reduce possibility of losses from all-natural hazards that affect the City and Tribe.	**A**	Identify and pursue funding opportunities to implement mitigation actions.	The City and Tribe are continuing to pursue funding opportunities, including funding to raise and reroute the road to the cemetery.
		B	Identify potential outside agencies to fund identified mitigation projects (ANTHC, DCCED, ADOT, and HUD etc.).	The City and Tribe are continuing to identify potential funding sources for mitigation projects, such as BIA Roads for roadway improvements.
		C	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.	Action not chosen in 2010

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	Description	ID	Description	Update in 2018 (Only for Actions Selected in 2010)
		D	Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	The limited extent of structural vulnerability makes acquisition or demolition impractical for the community.
		E	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.	The City and Tribe have access to hydrologic studies that are part of the Kaltag Sanitation Master Plan produced by ANTHC in 2002. Additional studies will be performed on a per project basis by outside organizations, as the community does not have sufficient resources to support these studies.
		F	Perform hydrologic and hydraulic engineering to determine most cost effective alternative energy resources.	The community lacks sufficient resources to independently study and implement alternative energy resources at this time.
4	Reduce possibility of damage and losses from drought.	A	Promote drought outreach programs that address soil health and soil moisture preservation and the effects on subsistence.	Action not chosen in 2010
		B	Develop educational programs and initiatives related to water conservation and irrigation during drought periods.	Action not chosen in 2010
5	Reduce vulnerability of structures to earthquake damage.	**A**	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.	Due to the low earthquake vulnerability, the community does not consider structural retrofits a high priority at this time and has focused its limited resources elsewhere.
		B	Retrofit important public facilities with significant seismic vulnerabilities.	Action not chosen in 2010

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	**Description**	**ID**	**Description**	**Update in 2018 (Only for Actions Selected in 2010)**
		C	Develop a Memorandum of Agreement to encourage AVEC and Telephone utilities to share utility pole resources. This will allow elevating telephone lines from the ground, dramatically reducing damage and repair expenses.	A workable program has been evaluated and is not feasible.
6	Reduce possibility of damage and losses from erosion.	A	Develop, maintain, and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.	Action not chosen in 2010
		B	Relocate buildings that are at risk of being affected by erosion.	There are currently no buildings at risk of erosion.
		C	Apply for grants/funds to implement riverbank protection methods.	The community has been unable to secure funds for riverbank protection.
		D	Develop and provide information to all residents on hillside and riverbank erosion and methods to present it in an easily distributed format.	Action not chosen in 2010
		E	Harden culvert entrance bottoms with asphalt, concrete, rock, etc. to reduce erosion or scour.	This action is not feasible at this time due to lack of funding.
		F	Install embankment protection such as riprap, gabion baskets, sheet piling, revetment, and walls to reduce or eliminate erosion.	Action not chosen in 2010
7	Reduce the possibility of damage and losses from flooding.	A	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100-year floodplain using survey elevation data.	Action not chosen in 2010
		B	Determine and implement the most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.	Action not chosen in 2010

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	**Description**	**ID**	**Description**	**Update in 2018 (Only for Actions Selected in 2010)**
		C	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate compliance with the NFIP.	The community is still evaluating participation into the NFIP.
		D	Develop outreach program to educate residents concerning flood- proofed well and sewer/septic installation.	Action not chosen in 2010
		E	Increase culvert size to increase its drainage efficiency.	Action not chosen in 2010
8	Reduce possibility of damage and losses from permafrost.	**A**	Identify and map existing permafrost areas to assist in critical facility relocation siting.	The community is still identifying and compiling the information about permafrost in the area.
		B Ongoing	Promote permafrost sensitive construction practices in permafrost areas.	Permafrost sensitive construction practices are used when building new infrastructure. The City and Tribe are continuing to promote permafrost sensitive construction.
9	Reduce vulnerability of structures to severe weather damage.	**A Ongoing**	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.	The City and Tribe are continuing to maintain and update infrastructure to be less susceptible to severe weather. The school building was recently improved with new siding that makes it more impervious to weather.
		B Ongoing	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.	The City and Tribe are working on developing a public outreach program to educate the public about the benefits of mitigation actions.

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	**Description**	**ID**	**Description**	**Update in 2018 (Only for Actions Selected in 2010)**
		C Ongoing	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.	The community promotes tree clearing as a mitigation strategy for severe weather damage and wildfires. It is working on improving its programs.
		D Ongoing	Coordinate Utility Company tree harvesting with personal use needs to maximize essential fire wood use and debris management.	The community makes good use of trees cleared as firewood. The community is in the planning process of coordinating a deal with the Alaska Energy Authority to acquire a boiler that would allow centralized heating from the harvested trees.
		E	Develop an outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.	Action not chosen in 2010
10	Reduce possibility of damage and losses from wildland fires.	**A**	Identify critical facilities and vulnerable populations based on mapped high hazard areas.	The City and Tribe have identified the critical facilities and populations that are vulnerable.
		B	Identify evacuation routes away from high hazard areas and develop an outreach program to educate the public concerning warnings and evacuation procedures.	Action not chosen in 2010
		C	Develop Community Wildland Fire Protection Plans for the community.	Action not chosen in 2010
		D	Provide wildland fire information in an easily distributed format for all residents.	The City and Tribe are working on improving wildfire awareness and distributing wildfire information throughout the community.

Table 7-2 Mitigation Goals Implemented and Potential Actions

(Bold ID Items indicate those actions chosen for implementation in Mitigation Action Plan)

Goals		Actions		
No.	**Description**	**ID**	**Description**	**Update in 2018 (Only for Actions Selected in 2010)**
		E	Develop an outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.	Action not chosen in 2010
		F	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.	Action not chosen in 2010
		G	Develop an outreach program to educate residents about under-ground wildfire causes, their long duration, and fuels because of the extensive peat moss type ground cover.	The community is working on forming such a program, but has focused most of its effort on above-ground wildfire awareness and mitigation.
Mitigation Actions added in 2018				
7	Reduce possibility of damage and losses from flooding.	**G**	Elevate the road to the Cemetery to reduce vulnerability of the road surface, well head and water piping, and the sewer system to flooding.	Selected in 2018
		H	Promote community involvement and public awareness of the River-Watch program.	
10	Reduce possibility of damage and losses from wildland fires.	**H**	Encourage homeowners to clear land to reduce fuels around homes.	
		I	Improve the firebreak around the community.	
4	Reduce possibility of damage and losses from drought.	**C**	Monitor climate change using a web-based camera system recording water levels at Kaiyuh Slough.	

7.3 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

The requirements for the evaluation and implementation of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions

Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii) and §201.7: [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Element

- Does the new or updated mitigation strategy include how the actions are prioritized?
- Does the new or updated mitigation strategy address how the actions will be implemented and administered?
- Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?
- Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred?

Source: FEMA, July 2008.

The Planning Team evaluated and prioritized each of the mitigation actions to determine which actions would be included in the Mitigation Action Plan. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities in the City and Tribe. To complete this task, the Planning Team first prioritized the hazards that were regarded as the most significant within the community (erosion, severe weather, and wildland fire). The Planning Team reviewed the simplified Social, Technical, Administrative, Political, Legal, Economical, and Environmental (STAPLEE) evaluation criteria (shown in Table 7-3) and the Benefit-Cost Analysis Fact Sheet (Appendix D) to consider the opportunities and constraints of implementing each particular mitigation action. For each action considered for implementation, a qualitative statement is provided regarding the benefits and costs and where available the technical feasibility. A detailed cost-benefit analysis is anticipated as part of the application process for those projects the City and Tribe choose to implement.

Table 7-3 Social, Technical, Administrative, Political, Legal, Economic, and Environmental STAPLEE Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance/operations

Table 7-3 Social, Technical, Administrative, Political, Legal, Economic, and Environmental STAPLEE Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management.	Political support Local champion Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations.	Local, State, and Federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit-Cost Analysis.	Benefit/cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community.	Effect on local flora and fauna Consistent with community environmental goals Consistent with Local, State, and Federal laws

The Planning Team considered each hazard's history, extent, and probability to determine each mitigation action's priority. A rating system based on *high*, *medium*, or *low* was used. *High* priorities are associated with actions for hazards that impact the community on an annual or near annual basis and generate impacts to critical facilities and/or people. *Medium* priorities are associated with actions for hazards that impact the community less frequently, and do not typically generate impacts to critical facilities and/or people. *Low* priorities are associated with actions for hazards that rarely impact the community and have rarely generated documented impacts to critical facilities and/or people.

Prioritizing the mitigation actions in the Mitigation Action Plan provided the City and Tribe with an approach to Mitigation Action Plan implementation. Priorities remained the same as the 2010 Plan. Table 7-4 summarizes the community's mitigation action priorities.

7.4 IMPLEMENTING A MITIGATION ACTION PLAN

Table 7-4 displays the community's Mitigation Action Plan Matrix that shows how the mitigation actions were prioritized, provides an overall benefit/cost consideration, and the Planning Team's mitigation action implementation and administration responsibility.

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
1A	Hold an annual or biennial "hazard meeting" to provide information to residents about recognizing and mitigating all-natural hazards that affect the City and Tribe.	High	Mayor, Tribal Administrator (In order to obtain ANA Grant funding, the Tribe would need to be the applicant)	Lindbergh Grants Program (LGP), FEMA HMA, FEMA Assistance to Firefighters Grant (AFG) Program's Fire Prevention and Safety Grant (FP&S) Program, and Staffing for Adequate Fire and Emergency Response (SAFER) Program, NWS, Natural Resource Conservation Service (NRCS), ANA Grant Programs, Emergency Food and Shelter Program (ESFP)	1-2 years	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type of activity enables the public to prepare for, respond to, and recover from disasters. TF: This low-cost activity can be combined with recurring community meetings where hazard-specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
2A	Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate community-wide mitigation actions. (Make a City and Tribe agenda item – a living document for continuous evaluation)	Medium	Mayor, Tribal Administrator	City, Kaltag Tribal Council	1-3 years	B/C: The existing team has gained experienced throughout this process which can provide invaluable for ensuring a sustained effort toward mitigating natural hazard damages. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.
2B	The City and Tribe will aggressively manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate	Medium	Mayor, Tribal Administrator	City, Kaltag Tribal Council, Denali Commission, DCCED/Community Development Block Grant (CDBG)	1-3 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and residents. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
	multi-benefit considerations and facilitate using multiple funding source consideration.					
2D	Integrate the Mitigation Plan findings for enhanced emergency planning.	Medium	Mayor, Tribal Administrator	City, Kaltag Tribal Council	1-3 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and residents. TF: This action is feasible with limited fund expenditures.
3A and 3B	Identify and pursue funding opportunities to implement mitigation actions from potential outside agencies to fund identified mitigation projects (ANTHC, DCCED, AKDOT, and HUD, etc.).	High	Mayor, Tribal Administrator	City, Kaltag Tribal Council, Denali Commission, DCCED/CDBG	Ongoing	B/C: This ongoing activity is essential for the community as there are limited funds available to accomplish effective mitigation actions. TF: This activity is ongoing demonstrating its feasibility.
3D	Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	High	Mayor, Tribal Administrator	HMA, NRCS, ANA	3-5 years	B/C: This project would be eliminating future damage while keeping land clear for perpetuity. TF: This project is feasible using existing staff skills, equipment, and materials.
3E	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.	Low	Mayor, Tribal Administrator	NWS, NRCS, ANA	3-5 years	B/C: This project will help the community obtain data to plan for future development, eliminating future damage. TF: This project is dependent on outside funding.
3F	Perform hydrologic and hydraulic engineering to	Low	Mayor, Tribal Administrator	NWS, NRCS, ANA	3-5 years	B/C: This project will help the community obtain data to plan for future development, eliminating future damage.

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
	determine most cost effective alternative energy resources.					TF: This project relies on outside contractor support.
4C	Monitor drought/climate change using a web-based camera system recording water levels at Kaiyuh Slough.	Medium	Mayor, Tribal Administrator	City, Tribe, EPA, ANA, NWS	1-5 years	B/C: Monitoring river levels is important to gaining and understanding and quantifying how the climate is changing. The camera also helps hunters know whether the slough is navigable in real time and save time when choosing whether to travel by boat or overland. TF: This activity is technically feasible using existing City and Tribal resources once funding for the camera system is available, but may require some technical support from outside the community.
5A	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.	Medium	Mayor, Tribal Administrator	HMA	1-3 years	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. This type of activity enables the public to prepare for, respond to, and recover from disasters. TF: This low-cost activity can be combined with recurring community meetings where hazard-specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
5C	Develop a Memorandum of Agreement to encourage AVEC and Telephone utilities to share utility pole resources. This will allow elevating telephone lines from the ground, dramatically reducing damage and repair expenses.	High	Mayor, Tribal Administrator	City, Kaltag Tribal Council	1-2 Years	B/C: This project will help the community to remove telephone lines that are currently run along the ground where they are continually damaged. This will dramatically reduce future damage. TF: This project is feasible using existing staff skills, equipment, and materials.
6B	Relocate buildings that are at risk of being affected by erosion.	High	Mayor, Tribal Administrator	HMA, NRCS, ANA	1-5 years	B/C: This project would remove threatened structures from the floodplain, eliminating future damage while keeping land clear for perpetuity. TF: This project is feasible using contractor support.
6C	Apply for grants/funds to implement riverbank	High	Mayor, Tribal Administrator	City, Kaltag Tribal Council, Denali Commission,	Ongoing	B/C: This ongoing activity is essential for the City and Tribe as there are limited funds available to accomplish

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
	protection methods.			DCCED/CDBG		effective mitigation actions. TF: This activity feasible.
6E	Harden culvert entrance bottoms with asphalt, concrete, rock, etc. to reduce erosion or scour.	Medium	Mayor, Tribal Administrator	City, Kaltag Tribal Council, HMA, ANA	2-4 years	B/C: This retrofit project can be a very cost-prohibitive method for bush communities as materials and shipping costs are very high. TF: This project is technically feasible as the community need only demonstrate cost savings by demonstrating losses from historical utility impacts and down time.
7C	Develop an outreach program to educate the public concerning NFIP participation benefits, floodplain development, land use regulation.	Low	Mayor, Tribal Administrator	HMA, Denali Commission	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. FEMA provides free publications for community education purposes. TF: Low to no cost makes this outreach activity very feasible.
7G	Elevate the road to the Cemetery to reduce the vulnerability of the road surface, well head and water piping, and the sewer system.	High	Mayor, Tribal Administrator	DOT&PF, BIA Roads, HMA	1-5 years	B/C: The road to the upriver cemetery is vulnerable to flooding (in the 2006 flood, the road had 7 ft of water on it). Elevating the road reduces the road's susceptibility to flood damages. TF: This project is technically feasible, but will require resources and technical support from State and Federal agencies.
7H	Promote community involvement and public awareness of the River-Watch program.	Medium	Mayor, Tribal Administrator	City, Tribe, NWS, HMA	Ongoing	B/C: Promoting public awareness of the River-Watch program is a low-cost activity that raises community knowledge about flood hazards. TF: This activity is technically feasible with existing City and Tribal resources.
8A	Identify and map existing permafrost areas to assist in critical facility relocation siting.	Medium	Mayor, Tribal Administrator	LGP, ANA, ESFP	4 years	B/C: Identifying permafrost locations is a minimal cost which would decrease damage to facilities sited inappropriately TF: The community has identified permafrost locations but they have not created a map defining the area. They dig test holes to determine permafrost depth prior

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
						to construction on a project by project basis.
8B	Promote permafrost sensitive construction practices in permafrost areas.	Low	Mayor, Tribal Administrator	City, Denali Commission, DCCED/CDBG	Ongoing	B/C: This project would assist the community with ensuring that structures are not placed or constructed inappropriately and are built with the hazard as a focus. TF: This is feasible using existing resources as the community has awareness of permafrost areas due to prior projects.
9A	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.	Medium	Mayor, Tribal Administrator	City, Denali Commission, DCCED/CDBG	Ongoing	B/C: This project would ensure that structures are maintained to minimize weather-related damage while keeping potential hazard impacts as a focus. TF: This is feasible using existing resources.
9B	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.	Low	Mayor, Tribal Administrator	LGP, HMA, AFG, FP&S, SAFER, ANA, Division of Forestry (DOF) FireWise Program	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type of activity enables the public to prepare for, respond to, and recover from disasters. TF: This low-cost activity can be combined with recurring community meetings where hazard-specific information can be presented in small increments. This activity is ongoing, demonstrating its feasibility.
9C	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.	Low	Mayor, Tribal Administrator	AFG, FP&S	Ongoing	B/C: Implementing this mitigation activity will potentially reduce ancillary damage from severe winter storms caused by heavy snow loads, icy rain, and wind. TF: This type of activity is technically feasible within the community typically using existing labor, equipment, and materials.
9D	Coordinate Utility Company tree harvesting with personal use needs to maximize	Low	Mayor, Tribal Administrator	City, Kaltag Tribal Council, AVEC and Telephone Utilities, AFG,	Ongoing	B/C: Implementing this mitigation activities will potentially reduce ancillary damage from severe winter storms caused by heavy snow loads, icy rain, and wind.

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
	essential fire wood use and debris management.			FP&S		TF: This type of activity is technically feasible within the community typically using existing labor, equipment, and materials.
10A	Identify critical facilities and vulnerable populations based on mapped high wildfire hazard areas.	High	Mayor, Tribal Administrator	Alaska Fire Service, DOF, US Forest Service, AFG, FP&S	Ongoing	B/C: This project will ensure the community looks closely at their wildland fire hazard to ensure they can safely address actions and needs during a wildland fire event. TF: This is technically feasible using existing City and Tribal resources with existing State and Federal agency support and guidance.
10D	Provide wildland fire information in an easily distributed format for all residents.	Medium	Mayor, Tribal Administrator	AK Fire Service, DOF FireWise Program, AFG, FP&S	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type of activity enables the public to prepare for, respond to, and recover from disasters. TF: This low-cost activity can be combined with recurring community meetings where hazard-specific information can be presented in small increments. This activity is ongoing, demonstrating its feasibility.
10G	Develop an outreach program to educate residents about under-ground wildfire causes, their long duration and fuels because of the extensive peat moss type ground cover.	Medium	Mayor, Tribal Administrator	AK Fire Service, DOF FireWise Program, AFG, FP&S	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. TF: This low-cost activity can be combined with recurring community meetings where hazard-specific information can be presented in small increments. This activity is ongoing, demonstrating its feasibility.
10H	Encourage homeowners to clear land to reduce fuels around homes.	High	Mayor, Tribal Administrator	Alaska Fire Service, DOF, US Forest Service, AFG, FP&S	Ongoing	B/C: Clearing land around houses reduces the vulnerability of the houses to fire, severe weather, and other damage, and the wood may be used to heat the homes. TF: This activity is technically feasible with existing resources within the community.

Table 7-4 City of Kaltag Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Time frame	Benefit-Costs / Technical Feasibility
10I	Improve the firebreak around the community.	High	Mayor, Tribal Administrator	Alaska Fire Service, DOF, US Forest Service, AFG FP&S	Ongoing	B/C: Firebreaks are the community's primary defense against wildfires. Enlarging the breaks reduces the vulnerability of the community to wildfires. TF: This activity is technically feasible, but will require support from State and Federal agencies

This section describes a formal plan maintenance process to ensure that the MJHMP remains an active and applicable document. It includes an explanation of how the Planning Team intends to organize their efforts to ensure that improvements and revisions to the MJHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail here:

- Monitoring, evaluating, and updating the MJHMP
- Implementation through existing planning mechanisms
- Continued public involvement

8.1 MONITORING, EVALUATING, AND UPDATING THE MJHMP

The requirements for monitoring, evaluating, and updating the MJHMP, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Monitoring, Evaluating, and Updating the Plan

Monitoring, Evaluating and Updating the Plan

Requirement §201.6(c)(4)(i) and §201.7: [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element

- Does the new or updated plan describe the method and schedule for monitoring the plan, including the responsible department?
- Does the new or updated plan describe the method and schedule for evaluating the plan, including how, when, and by whom (i.e., the responsible department?
- Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?

Source: FEMA, July 2008.

The MJHMP was prepared as a collaborative effort among the Planning Team members. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the City and Tribe will use the Planning Team to monitor, evaluate, and update the MJHMP. Each authority identified in Table 7-4 will be responsible for implementing the Mitigation Action Plan. The Mayor of Kaltag and Kaltag Tribal Council Administrator will serve as the primary points of contact and will coordinate local efforts to monitor, evaluate, and revise the MJHMP.

The Planning Team will conduct an annual review during the anniversary week of the plan's official FEMA approval date to monitor the progress in implementing the MJHMP, particularly the Mitigation Action Plan. As shown in Appendix E, the Annual Review Worksheet will provide the basis for possible changes in the MJHMP Mitigation Action Plan by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the MJHMP implementation. The Planning Team Leader will initiate the annual review two months prior to the scheduled planning meeting date to ensure that all data is assembled for discussion with the Planning Team. The findings from these reviews will be presented at the annual Planning Team meeting. Each review, as shown on the Annual Review Worksheet, will include an evaluation of the following:

- Participation of authorities and others in the MJHMP implementation
- Notable changes in the risk of natural or human-caused hazards
- Impacts of land development activities and related programs on hazard mitigation
- Progress made with the Mitigation Action Plan (identify problems and suggest improvements as necessary)
- The adequacy of local resources for implementation of the MJHMP

A system of reviewing the progress on achieving the mitigation goals and implementing the Mitigation Action Plan activities and projects will also be accomplished during the annual review process. During each annual review, each authority administering a mitigation project will submit a Progress Report to the Planning Team. As shown in Appendix E, the report will include the current status of the mitigation project, including any changes made to the project, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped achieved the appropriate goals identified in the plan.

In addition to the annual review, the Planning Team will update the MJHMP every five years. To ensure that this update occurs, in the third year following adoption of the MJHMP, the Planning Team will undertake the following activities:

- Request grant assistance from DHS&EM to update the MJHMP (this can take up to one year to obtain and one year to update the plan)
- Thoroughly analyze and update the risk of natural and human-made hazards
- Provide a new annual review (as noted above), plus a review of the three previous annual reviews
- Provide a detailed review and revision of the mitigation strategy
- Prepare a new Mitigation Action Plan
- Prepare a new draft MJHMP
- Submit an updated MJHMP to the DH&EM and FEMA for approval
- Submit the FEMA-approved plan for adoption by the City and Tribe

8.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The requirements for implementation through existing planning mechanisms, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Incorporation into Existing Planning Mechanisms

Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii) and §201.7: [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Element

- Does the new or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?
- Does the new or updated plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?
- Does the updated plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?

Source: FEMA, July 2008.

After the adoption of the MJHMP, each Planning Team Member will ensure that the MJHMP, in particular each Mitigation Action Project, is incorporated into existing planning mechanisms. The 2010 HMP was not integrated into other planning documents. This 2018 HMP will be assimilated into other Kaltag plans and documents as they come up for review. Each member of the Planning Team will achieve this incorporation by undertaking the following activities.

- Conduct a review of the community-specific regulatory tools to assess the integration of the mitigation strategy. These regulatory tools are identified in the following capability assessment section.
- Work with the community to increase awareness of the MJHMP and provide assistance in integrating the mitigation strategy (including the Mitigation Action Plan) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.

8.3 CITY AND TRIBE CAPABILITY ASSESSMENT

The capability assessment reviews the technical and fiscal resources available to the community and the funding resources available to the City and Tribe for mitigation and mitigation-related funding and training. The Tribe was added to this capability assessment in the 2018 update.

Table 8-1 Existing Plans, Regulatory Tools, and Other Relevant Information

Regulatory Tools (ordinances, codes, plans)	Existing for City?	Existing for Tribe?	Comments (Year of most recent update; problems administering it, etc.)
Building code	No	No	
Zoning ordinances	No	No	
Subdivision ordinances or regulations	No	No	
Special purpose ordinances	No	No	
Comprehensive Plan	No	No	
Economic Development Plan	Yes	No	Completed in 2003 for the years 2004-2009.
Emergency Response Plan	No	No	
Land Use Ordinance	No	No	

Table 8-1 Existing Plans, Regulatory Tools, and Other Relevant Information

Regulatory Tools (ordinances, codes, plans)	Existing for City?	Existing for Tribe?	Comments (Year of most recent update; problems administering it, etc.)
Land Use Plan	No	No	

Federal Resources

The Federal government requires local governments to have a MJHMP in place to be eligible for mitigation funding opportunities through FEMA such as the UHMA Programs and the HMGP. The Mitigation Technical Assistance Programs available to local governments are also a valuable resource. FEMA may also provide temporary housing assistance through rental assistance, mobile homes, furniture rental, mortgage assistance, and emergency home repairs. The Disaster Preparedness Improvement Grant also promotes educational opportunities with respect to hazard awareness and mitigation.

- FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from FEMA Publication Warehouse and are briefly described here:
  - How-to Guides. FEMA has developed a series of how-to guides to assist states, communities, and tribes in enhancing their hazard mitigation planning capabilities. The first four guides describe the four major phases of hazard mitigation planning. The last five how-to guides address special topics that arise in hazard mitigation planning such as conducting cost-benefit analysis and preparing multi-jurisdictional plans. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting DMA 2000 requirements (http://www.fema.gov/fima/planhowto.shtm).
  - Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments. FEMA DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation and shows state and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.
  - Mitigation Resources for Success compact disc (CD). FEMA 372, September 2001. This CD contains a wealth of information about mitigation and is useful for state and local government planners and other stakeholders in the mitigation process. It provides mitigation case studies, success stories, information about Federal mitigation programs, suggestions for mitigation measures to homes and businesses, appropriate relevant mitigation publications, and contact information.
  - A Guide to Federal Aid in Disasters. FEMA 262, April 1995. When disasters exceed the capabilities of state and local governments, the President's disaster assistance programs (administered by FEMA) is the primary source of Federal

assistance. This handbook discusses the procedures and process for obtaining this assistance, and provides a brief overview of each program.

  - The Emergency Management Guide for Business and Industry. FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to a community's industries and businesses located in hazard prone areas.

- US Department of Agriculture (USDA). Assistance provided includes: Emergency Conservation Program, Non-Insured Assistance, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service.
- Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program. This program minimizes the adverse effects of high energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services such as an all-around safety check of major energy systems, including heating system modifications and insulation checks.
- Department of Health and Human Services, Administration of Children & Families (DHHS/ACF), Administration for Native Americans (ANA). The ANA awards funds through grants to American Indians, Native Americans, Native Alaskans, Native Hawaiians, and Pacific Islanders. These grants are awarded to individual organizations that successfully apply for discretionary funds. ANA publishes in the Federal Register an announcement of funds available, the primary areas of focus, review criteria, and the method of application. (http://www.acf.hhs.gov/programs/ana/)
- HUD, Office of Homes and Communities, Section 108 Loan Guarantee Programs. This program provides loan guarantees as security for Federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing.
- Department of Housing and Urban Development, Community Development Block Grants. (HUD/CDBG) Provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income persons.
- Department of Labor (DOL), Employment and Training Administration, Disaster Unemployment Assistance. Provides weekly unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible.
- Federal Financial Institutions. Member banks of Federal Deposit Insurance Corporation, Financial Reporting Standards or Federal Home Loan Bank Board may

be permitted to waive early withdrawal penalties for Certificates of Deposit and Individual Retirement Accounts.

- Internal Revenue Service (IRS), Tax Relief. Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous tax returns to reflect loss back to three years.
- USACE. The USACE Alaska District's Civil Works Branch studies potential water resource projects in Alaska. These studies analyze and solve water resource issues of concern to the local communities. These issues may involve navigational improvements, flood control or ecosystem restoration. The agency also tracks flood hazard data for over 300 Alaskan communities on floodplains or the sea coast. These data help local communities assess the risk of floods to their communities and prepare for potential future floods. The USACE is a member and co-chair of the Alaska Climate Change Sub-Cabinet.
- US Small Business Administration (SBA). May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. Requests for SBA loan assistance should be submitted to DHS&EM.

State Resources

- DHS&EM is responsible for improving hazard mitigation technical assistance for local governments for the State of Alaska. Providing hazard mitigation training, current hazard information and communication facilitation with other agencies will enhance local hazard mitigation efforts. DHS&EM administers FEMA mitigation grants to mitigate future disaster damages such as those that may affect infrastructure including the elevation, relocation, or acquisition of hazard-prone properties. DHS&EM also provides mitigation funding resources for mitigation planning.
- Division of Senior Services (DSS): Provides special outreach services for seniors, including food, shelter and clothing.
- Division of Insurance (DOI): Provides assistance in obtaining copies of policies and provides information regarding filing claims.
- Department of Military and Veterans Affairs (DMVA): Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits.
- The Community Health and Emergency Medical Services (CHEMS) is a section within Division of Public Health within the Department of Health and Social Services (DHSS). DHSS is charged with promoting and protecting the public health and one of CHEMS' responsibilities is developing, implementing, and maintaining a statewide comprehensive emergency medical services system. The department's statutory mandate (Alaska Statute 18.08.010) requires it to:
    - Coordinate public and private agencies engaged in the planning and delivery of emergency medical services, including trauma care, to plan an emergency medical services system.
    - Assist public and private agencies to deliver emergency medical services, including trauma care, through the award of grants in aid.

  - Conduct, encourage, and approve programs of education and training designed to upgrade the knowledge and skills of health personnel involved in emergency medical services, including trauma care.
  - Establish and maintain a process under which hospitals and clinics can represent themselves to be trauma centers because they voluntarily meet criteria adopted by the department which are based on an applicable national evaluation system.

- DCRA within the DCCED. DCRA administers the HUD/CDBG, FMA, and the Climate Change Sub-Cabinet's Interagency Working Group's program; funds and administers various flood and erosion mitigation projects, including the elevation, relocation, or acquisition of flood-prone homes and businesses, throughout the State. This department also administers programs for State "distressed" and "targeted" communities.
- Division of Environmental Conservation (DEC). DEC primary roles and responsibilities concerning hazards mitigation are ensuring safe food and safe water, and pollution prevention and pollution response. DEC ensures water treatment plants, landfills, and bulk fuel storage tank farms are safely constructed and operated in communities. Agency and facility response plans include hazards identification and pollution prevention and response strategies.
- Department of Transportation and Public Facilities (DOT/PF). DOT/PF personnel provide technical assistance to the various emergency management programs, to include mitigation. This assistance is addressed in the DHS&EM-DOT/PF Memorandum of Agreement and includes, but is not limited to: environmental reviews; archaeological surveys; and historic preservation reviews.

  In addition, DOT/PF and DHS&EM coordinate buy-out projects to ensure that there are no potential right-of-way conflicts with future use of land for bridge and highway projects, and collaborate on earthquake mitigation.

  Additionally, DOT/PF provides safe, efficient, economical, and effective operation of the State's highways, harbors, and airports. DOT/PF uses it's Planning, Design & Engineering, Maintenance & Operations, and Intelligent Transportation Systems resources to identify the hazard, plan and initiate mitigation activities to meet the transportation needs of Alaskans and make Alaska a better place to live and work. DOT/PF budgets for the temporary replacement bridges and materials necessary to make the multi-model transportation system operational following a natural disaster.
- Department of Natural Resources (DNR) administers various projects designed to reduce stream bank erosion, reduce localized flooding, improve drainage, and improve discharge water quality through the stormwater grant program funds. Within DNR, the Division of Geological and Geophysical Survey (DGGS) is responsible for the use and development of Alaska's mineral, land, and water resources, and collaboration on earthquake mitigation.
  - DNR's DGGS. DGGS collects and distributes information about the State's geologic resources and hazards. Their geologists and support staff are leaders in researching Alaska's geology and implementing technological tools to most

efficiently collect, interpret, publish, archive, and disseminate that information to the public.

- The DNR's Division of Forestry (DOF). DOF participates in a statewide wildfire control program in cooperation with the forest industry, rural fire departments and other agencies. Prescribed burning may increase the risks of fire hazards; however, prescribed burning reduces the availability of fire fuels and therefore the potential for future, more serious fires.
- DOF also manages various wildland fire programs, activities, and grant programs such as the FireWise Program, the Community Forestry Program and the Volunteer Fire Assistance and Rural Fire Assistance Grant programs. Information can be found at http://forestry.alaska.gov/fire/current.htm.

Other Funding Sources and Resources

The following provide focused access to valuable planning resources for communities interested in sustainable development activities.

- FEMA. http://www.fema.gov - includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.
- American Planning Association (APA), http://www.planning.org - a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.
- Institute for Business and Home Safety (IBHS), http://ibhs.org - an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters.
- American Red Cross (ARC). Provides for the critical needs of individuals such as food, clothing, shelter, and supplemental medical needs. Provides recovery needs such as furniture, home repair, home purchasing, essential tools, and some bill payment may be provided.
- Crisis Counseling Program. Provides grants to State and Borough mental health departments, which in turn provide training for screening, diagnosing, and counseling techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster.

Local Resources

The City and Tribe have a number of planning and land management tools that will allow them to implement hazard mitigation activities. The resources available in these areas have been assessed by the Planning Team and are summarized below.

Table 8-2 City and Tribal Staff Resources

Staff/Personnel Resources	City (Y/N)	Tribe (Y/N)	Department/Agency and Position
Planner or engineer with knowledge of land development and land management practices	No	No	Community hires consultants with land development and land management knowledge
Engineer or professional trained in construction practices related to buildings and/or infrastructure	No	No	Community may hire engineering consulting services
Planner or engineer with an understanding of natural and/or human-caused hazards	No	No	Community hires consultants with hazard mitigation knowledge
Floodplain Manager	No	No	State Floodplain Manager
Surveyors	No	No	Community may hire surveying consulting services
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	No	No	US Fish and Wildlife Service (USFWS) local office; Alaska Department of Fish and Game (ADF&G) local office
Personnel skilled in GIS and/or HAZUS	No	No	City hires consultants with this capability
Emergency manager	Yes	No	City Mayor
Grant writers	No	Yes	City Administrator, Tribal Administrator, BIA, IGAP (situation dependent)
Public Information Officer	Yes	Yes	Mayor or Tribal Chief (situation dependent)

Table 8-3 City and Tribal Financial Resources

Financial Resources	Accessible or Eligible to Use by City (Yes/No/DK-Don't Know)	Accessible or Eligible to Use by Tribe (Yes/No)
General Fund	Yes, insufficient funds to enable extensive mitigation actions implementation	Yes, insufficient funds to enable extensive mitigation action implementation
Community Development Block Grants (CDBG)	Yes	Yes
Capital Improvement Projects Funding	Yes	Yes
Authority to levy taxes for specific purposes	Yes	No
Fees for water, sewer, gas, or electric service	No	No
Impact fees for homebuyers or developers for new developments/homes	No	No

Table 8-3 City and Tribal Financial Resources

Financial Resources	Accessible or Eligible to Use by City (Yes/No/DK-Don't Know)	Accessible or Eligible to Use by Tribe (Yes/No)
Withhold spending in hazard-prone areas	No	No
Hazard Mitigation Grant Program (HMGP) - Federal Emergency Management Agency (FEMA) funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.	Yes	Yes
Pre-Disaster Mitigation (PDM) grant program - FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only	Yes	Yes
Flood Mitigation Assistance (FMA) grant program - FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.	Yes	Yes
United State Fire Administration (USFA) Grants - The purpose of these grants is to assist State, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.	Yes	Yes

8.4 CONTINUED PUBLIC INVOLVEMENT

The requirements for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Continued Public Involvement

Continued Public Involvement

Requirement §201.6(c)(4)(iii) and §201.7: [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Element

- Does the new or updated plan explain how continued public participation will be obtained?

Source: FEMA, July 2008.

The City and Tribe are dedicated to involving the public directly in the continual reshaping and updating of the MJHMP. A paper copy of the MJHMP and any proposed changes will be available at the City and Tribal Offices. The addresses and phone numbers of the Planning Team

Leaders to whom people can direct their comments or concerns will also be available at the City and Tribal Offices.

The Planning Team will also sponsor a booth at the Yearly 4th of July celebration and ask community members to complete a survey (see Appendix E). Completed surveys received regarding the MJHMP will be collected by the Planning Team Leaders, included in the annual report, and considered during future MJHMP updates.

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Appendix A: FEMA Review Tool

FEMA REGION 10 LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to participating jurisdictions.

1. The Multi-Jurisdiction Summary Sheet is used to document how each jurisdiction met the requirements in the Plan.
2. The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
3. The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.

The FEMA Mitigation Planner must reference the *Local Mitigation Plan Review Guide* when completing this *Local Mitigation Plan Review Tool*.

Jurisdiction: Kaltag, Alaska (Region 10)	**Title of Plan:** Kaltag Local Hazard Mitigation Plan Update	**Date of Plan:** February 3, 2018
Local Point of Contact: Violet Burnham	**Address:** PO Box 9 Kaltag, AK 99748	
Title: Mayor		
Agency: City of Kaltag		
Phone Number: (907) 534-2301	**E-Mail:** vburnham54@hotmail.com	

State Reviewer: Mike Johnson	**Title:** DHS&EM Planner	**Date:** February 8, 2018

FEMA Reviewer: Josh Vidmar Kate Skaggs Kate.Skaggs@mbakerintl.com	**Title:** CERC, Mitigation Planner Mitigation Champion	**Date:** March 26, 2017 April 6, 2018
Date Received in FEMA Region 10	February 20, 2018	
Plan Not Approved		
Plan Approvable Pending Adoption	July 5, 2018	
Plan Approved	February 12, 2019	

SECTION 1: MULTI-JURISDICTION SUMMARY SHEET (used only for multi-jurisdictional plans)

INSTRUCTIONS: The Multi-Jurisdiction Summary Spreadsheet is completed by listing each participating jurisdiction and which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it is used to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET (Add additional pages if necessary)											
#	Jurisdiction Name	Jurisdiction Type (city/borough/ district, etc.)	POC	Required Revisions / Comments	Requirements Met (Y/N)					
					A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
1	Kaltag	City	Violet Burnham (907) 534-2301		Y	Y	Y	Y	Y	N/A
2	Kaltag	Native Village	Donna Esmailka 907-534-2224		Y	Y	Y	Y	N	N/A
3										
4										
5										
6										
7										
8										

SECTION 2: REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist is completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element is completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions are explained for each plan sub-element that is 'Not Met.' Sub-elements are referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	PDF 19-22, 130-166	X	
A2. Does the Plan document an opportunity for neighboring communities, local 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? (Requirement §201.6(b)(2))	PDF 21-22, 130-166	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	PDF 21-22, 130-166	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	PDF 22, 98-99	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	PDF 95-96, 177-181	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	PDF 86-96, 173-181	X	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	PDF 24-45, 48-49, 51-54	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	PDF 27-28, 30-31, 34, 38, 40, 42-47, 49-52, 54	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	PDF 28, 32, 36, 39, 41, 48, 53, 54, 62-65	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	N/A – Kaltag does not participate in NFIP PDF 11, 57	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	PDF 79-80, 88-89, 94-95	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	N/A—Kaltag does not participate in NFIP PDF 11, 57	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	PDF 67	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	PDF 68-84	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	PDF 78-84	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	PDF 88	X	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	PDF 65-66	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	PDF 69-75	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	PDF 77-84	X	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Adoption Letter to be included in Appendix B	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Adoption Letter to be included in Appendix B		X
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 3: PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths

- Either 1st time used or 1st time included the PPT used in the community meeting. The draft review was a good way to engage those in attendance ESP the "Take Action" slide.
- City administrator made calls to the community to encourage attendance at draft planning meeting.
- Appeared to be one of the longest council meetings observed (4 HRS).
- Planning team offered usable input to the plan.
- Continued public involvement will be carried out through the existing public forums (the 4th of July celebration, for instance).

Opportunities for Improvement

- Spelling errors, formatting and comments have been added to the plan. Consider reformatting and additional editing in the next plan update.
- Consider utilizing other existing planning meetings as a place to discuss mitigation.

Element B: Hazard Identification and Risk Assessment

Plan Strengths

- Maps are used frequently where appropriate within each of the hazards profiled.
- Table 5-1 details why each hazard was or was not profiled.
- Each hazard profile is well laid-out. The organization into separate sub-sections makes the plan easy to follow and read.

Opportunities for Improvement

- Severe weather encompasses both winter storms and thunderstorms. Consider separating these as they have relatively different scales and formation patterns. This could help inform developing mitigation actions that are more strategic to reducing vulnerabilities.
- Consider using FEMA's GIS tool HAZUS to expand the risk assessment and vulnerability analysis even further in the next plan update.

Element C: Mitigation Strategy

Plan Strengths

- Mitigation actions are specific and well-written.
- Overall, the mitigation strategy ties in well to the Risk Assessment.
- The STAPLEE method is used to prioritize mitigation actions.

Opportunities for Improvement

- The discussion on how the plan will be integrated into other existing planning mechanisms could be strengthened. Consider expanding the Capability Assessment to include individual discussions on how these existing mechanisms can be expanded to include mitigation.

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

Plan Strengths

- Plan specifies which week the review will occur and identifies two members of the planning team that area responsible for it. (With annual planning team meeting scheduled)
- Provides for an 8-step directive on year 3 to prepare for the update of the MJHMP.

Opportunities for Improvement

- More information could be provided for those actions that were not chosen to advance from 2010. In future iterations, provide a concise description of why. This information can inform future planning teams at the start of the plan update.

B. Resources for Implementing Your Approved Plan Resources for Implementing Your Approved Plan

The **Region 10 Integrating Natural Hazard Mitigation into Comprehensive Planning** is a resource specific to Region 10 states and provides examples of how communities are integrating natural hazard mitigation strategies into comprehensive planning. You can find it in the FEMA Library at http://www.fema.gov/media-library/assets/documents/89725.

The **Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials** resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns. It includes recommended steps and tools to assist with local integration efforts, along with ideas for overcoming possible impediments, and presents a series of case studies to demonstrate successful integration in practice. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7130.

The **Mitigation Ideas: A Resource for Reducing Risk from Natural Hazards** resource presents ideas for how to mitigate the impacts of different natural hazards, from drought and sea level rise, to severe winter weather and wildfire. The document also includes ideas for actions that communities can take to reduce risk to multiple hazards, such as incorporating a hazard risk assessment into the local development review process. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=6938.

The **Local Mitigation Planning Handbook** provides guidance to local governments on developing or updating hazard mitigation plans to meet and go above the requirements. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7209.

The **Integration Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned** resource is a 2014 ICLEI publication for San Diego with a clear methodology that could assist in next steps for integration impacts of climate change throughout mitigation actions. http://icleiusa.org/wp-content/uploads/2015/08/Integrating-Hazard-Mitigation-and-Climate-Adaptation-Planning.pdf

The **Local Mitigation Plan Review Guide and Tool** resource is available through FEMA's Library and should be referred to for the next plan update. http://www.fema.gov/library/viewRecord.do?id=4859

The **Tribal Multi-Hazard Mitigation Planning Guidance:** This resource is specific to tribal governments developing or updating tribal mitigation plans. It covers all aspects of tribal planning requirements and the steps to developing tribal mitigation plans. You can find the document in the FEMA Library at http://www.fema.gov/media-library/assets/documents/18355

Volcanic Eruption Mitigation Measures: For information on Mitigation Actions for Volcanic Eruptions that would satisfy the C4 requirement, please visit: http://earthzine.org/2011/03/21/volcanic-crisis-management-and-mitigation-strategies-a-multi-risk-framework-case-study/ and http://www.gvess.org/publ.html.

The FEMA Region 10 **Risk Mapping, Analysis, and Planning program (Risk MAP)** releases a monthly newsletter that includes information about upcoming events and training opportunities, as well as hazard and risk related news from around the Region. Past newsletters can be viewed at http://www.starr-team.com/starr/RegionalWorkspaces/RegionX/Pages/default.aspx. If you would like to receive future newsletters, email rxnewsletter@starr-team.com and ask to be included.

The mitigation strategy may include eligible projects to be funded through FEMA's hazard mitigation grant programs (Pre-Disaster Mitigation, Hazard Mitigation Grant Program, Flood Mitigation Assistance). Contact your State Hazard Mitigation Officer, Brent Nichols at Brent.Nichols@alaska.gov, for more information.

Tribal Mitigation Plan Review and Approval Status

Tribe: Native Village of Kaltag	**Title of Plan:** Kaltag Local HMP Update	**Date of Plan:** February 3, 2018
Tribal Point of Contact: Donna Esmailka	**Address:** PO BOX 129 Kaltag, AK 99748	
Title: Tribal Adminstrator		
Agency: Native Village of Kaltag		
Phone Number: 907-534-2224	**E-Mail:** esmailka32@yahoo.com	

State Reviewer (if applicable):	**Title:**	**Date:**

FEMA Reviewer: Josh Vidmar Kate Skaggs Amanda Siok Amanda.Siok@fema.dhs.gov	**Title:** CERC, Mitigation Planner Mitigation Champion Mitigation Planner	**Date:** March 27, 2018 April 6, 2018 April 18, 2018
Date Received in FEMA Region 10	February 20, 2018	
Plan Not Approved	April 18, 2018	
Plan Approved		
Date Approved		

Additional Indian Tribal Governments (if appropriate): N/A	**DFIRM**		**NFIP Status***			
	In Plan	**NOT In Plan**	**Y**	**N**	**N/A**	**CRS Class**
1.						
2.						
3.						

Notes: **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

TRIBAL MULTI-HAZARD MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.
S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Planning Process	N	S
1. Documentation of the Planning Process: 201.7(b) and 201.7(c)(1)(i) and (ii)	X	
2. Program Integration: 201.7(c)(1)(iii) and (iv)		X

Risk Assessment	N	S
3. Identifying Hazards: 201.7(c)(2)(i)		X
4. Profiling Hazards: 201.7(c)(2)(i)	X	
5. Assessing Vulnerability: Overview: 201.7(c)(2)(ii)		X
6. Assessing Vulnerability: Identifying Structures: 201.7(c)(2)(ii)(A)		X
7. Assessing Vulnerability: Estimating Potential Losses: 201.7(c)(2)(ii)(B)		X
8. Assessing Vulnerability: Analyzing Development Trends: 201.7(c)(2)(ii)(C)		X
9. Assessing Vulnerability: Assessing Cultural and Sacred sites: 201.7(c)(2)(ii)(D)		X

Mitigation Strategy	N	S
10. Tribal Multi-Hazard Mitigation Goals: 201.7(c)(3)(i)		X
11. Identification and Analysis of Tribal Mitigation Actions: 201.7(c)(3)(ii)		X
12. Implementation of Tribal Mitigation Actions: 201.7(c)(3)(iii)		X
13. Tribal Capability Assessment: 201.7(c)(3)(iv)		X
14. Tribal Funding Sources: 201.7(c)(3)(v)	X	

Plan Maintenance Process	N	S
15. Monitoring, Evaluating, and Updating the Plan: 201.7(c)(4)(i)		X
16. Monitoring Progress of Mitigation Activities: 201.7(c)(4)(ii) and 201.7(4)(v)		X
17. Incorporation into Existing Planning Mechanisms: 201.7(c)(4)(iii)		X
18. Continued Member and Stakeholder Involvement: 201.7(c)(4)(iv)		X

Prerequisites	NOT MET	MET
19. Adoption by the Tribal Governing Body : 201.7(c)(5) and (c)(6) ***[single Indian Tribal government only]***	X	
20. Multi-Jurisdictional Plan Adoption: 201.7(a)(4), (c)(5) and(c)(6) ***[multi-jurisdictional only]***		N/A
21. Multi-Jurisdictional Planning Participation: 201.7(a)(4) ***[multi-jurisdictional only]***		N/A

Severe Repetitive Loss Strategy (Optional)	N	S
22. Repetitive Loss Strategy: 201.7(c)(3)(vi)		

TRIBAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	X
See Reviewer's Comments	
PLAN APPROVED	

PLANNING PROCESS: *201.7(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.*

1. Documentation of the Planning Process

Requirement 201.7(c)(1): *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was defined and involved. This **shall** 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;" and

(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.

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative **description of the process** followed to prepare the new or updated plan?	PDF19-22, 127-166	*Recommended Revision: Spelling errors, formatting and comments have been added to the plan. Additional editing in the next plan update.*		X
B. Does the new or updated plan indicate **who was involved** in the current planning process?	PDF 20-21, 130-132, 137-138, 166			X
C. Does the new or updated plan indicate **how the "public" was defined and involved**? How was the "public" defined? How was the "public" involved? Were they provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?	PDF 21-22, 130-132, 137-138, 166	**Required Revision** Although there was public involvement, it is never explicitly stated who that public is. Did the tribe consider only tribal members, or did the tribe consider both tribal members and surrounding public? Revise the plan to show how the tribe defined the 'public' during the planning process or clarify if all City residents are the "public." The City and Tribe work well together in Kaltag. Each jurisdiction considers the public to be all residents. Text was added on PDF 21 before Table 4-2.	**X**	
D. Does the new or updated plan discuss the opportunity for other Indian Tribal governments, tribal and regional agencies, businesses, academia, nonprofits, neighboring communities, and other affected stakeholders and interested parties to be involved in the planning process?	PDF 21-22, 130, 137, plan will be uploaded to DHS&EM website for review	*Recommended Revision: Consider engaging other external stakeholders during the planning process such as BIA, AK DOT, Fish and Wildlife, etc.*		X
E. Does the updated plan document how the planning team reviewed and analyzed each section of the plan? ***[Updates only.]***	PDF 19-20	Tribal Plan is not an Update		N/A

F. Does the updated plan indicate for each section of the plan whether or not it was revised as part of the update process? ***[Updates only.]***	PDF 19-22	Tribal Plan is not an Update		N/A
		SUMMARY SCORE	**X**	

2. Program Integration

Requirement 201.7(c)(1)(iii) and (iv): *[The plan **shall**:]*
[include] (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.

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the new or updated plan describe the review and incorporation, if appropriate, of existing plans, studies, and reports in the new or updated plan?	PDF 22			X
B. Does the new or updated plan describe how the Indian tribal mitigation plan is **integrated with other ongoing Indian tribal planning efforts**?	PDF 88	*Recommended Revision: Consider providing additional information for the Tribe Capability Assessment. If all of those planning mechanisms don't exist, what does? Or explicitly state if the two governments work to support each other in plans, regulatory tools, and in other capacities.*		X
C. Does the new or updated plan describe how the Indian tribal mitigation planning process is **integrated with FEMA mitigation programs and initiatives**?	PDF 9-11			X
		SUMMARY SCORE		X

RISK ASSESSMENT: *201.7(c)(2): [The plan **shall** include 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.*

3. Identifying Hazards

Requirement 201.7(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the tribal planning area.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the new or updated plan describe the **tribal planning area**?	PDF 15-17	The City and Village are co-located.		X
B. Does the new or updated plan include a description of the **types of all natural hazards** that affect the tribal planning area?	PDF 23-54	Table 5-1 details why each hazard was or was not profiled.		X
		SUMMARY SCORE		X

4. Profiling Hazards

Requirement 201.7(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the tribal planning area. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?	PDF 26-45, 48-49, 51-54			X
B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?	PDF 26-45, 48-49, 51-54			X
C. Does the new or updated plan provide information on **previous occurrences** of each hazard addressed in the plan?	PDF 27-28, 30-31, 34, 38, 40, 42-47, 49-52, 54			X
D. Does the new or updated plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?	PDF 27-28, 30-31, 34, 38, 40, 42-47, 49-52, 54			X
E. Does the updated plan address data deficiencies, if any, noted in the previously approved plan?	No. None noted.	Severe weather encompasses both winter storms and thunderstorms. Consider separating these as they have relatively different scales and formation patterns. This could help inform developing mitigation actions that are more strategic to reducing vulnerabilities.		N/A
				X

5. Assessing Vulnerability: Overview

Requirement 201.7(c)(2)(ii): *[The risk assessment **shall** include a] description of the Indian Tribal government's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the tribe.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan include an **overall summary** description of the Indian tribe's **vulnerability** to each hazard?	PDF 62	Consider using FEMA's GIS tool HAZUS to expand the risk assessment and vulnerability analysis even further in the next plan update.		X
B. Does the new or updated plan address the **impact** of each hazard on the Indian tribe?	PDF 62-65			X
		SUMMARY SCORE		X

6. Assessing Vulnerability: Identifying Structures

Requirement 201.7(c)(2)(ii)(A): *[The plan **should** describe vulnerability in terms of the] types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	PDF 57-60, 62	Review Table 6-2 for many critical facilities.		X
B. Does the new or updated plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	PDF 60, 65-66	Plan explicitly states that "No future buildings will be constructed in known hazard areas."		X
		SUMMARY SCORE		X

7. Assessing Vulnerability: Estimating Potential Losses

Requirement 201.7(c)(2)(ii)(B): *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan estimate **potential dollar losses** to vulnerable structures?	PDF 58-60			X
B. Does the new or updated plan describe the **methodology** used to prepare the estimate?	PDF 60			X
C. Does the updated plan reflect the effects of **changes in development** on loss estimates?	PDF 65-66	Tribal Plan is not an update.		N/A
		SUMMARY SCORE		X

8. Assessing Vulnerability: Analyzing Development Trends

Requirement 201.7(c)(2)(ii)(C): *[The plan **should** describe vulnerability in terms of 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.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe land uses and development trends within the tribal planning area?	PDF 60, 65-66	The City and Village are co-located.		X
B. Does the updated plan reflect changes in development for tribal lands in hazard prone areas within the tribal planning area?	PDF 66	Tribal plan is not an update		N/A
		SUMMARY SCORE		X

9. Assessing Vulnerability: Assessing Cultural and Sacred Sites

Requirement 201.7(c)(2)(ii)(D): *[The plan **should** describe vulnerability in terms of] cultural and sacred sites that are significant, even if they cannot be valued in monetary terms.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe significant cultural and sacred sites that are located in hazard areas?	PDF 58	Two cemeteries are listed in Critical Facilities table.		X
		SUMMARY SCORE		X

MITIGATION STRATEGY: *201.7(c)(3): [The plan **shall** include 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.*

10. Tribal Multi-Hazard Mitigation Goals

Requirement 201.7(c)(3)(i): *[The mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the new or updated plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	PDF 67			X
B. Does the updated plan demonstrate that the goals were evaluated and either remain valid or have been revised?	PDF 67	Tribal plan is not an update		N/A
		SUMMARY SCORE		X

11. Identification and Analysis of Tribal Mitigation Actions

Requirement 201.7(c)(3)(ii): *[The mitigation strategy **shall** include 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	PDF 68-84			X
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	PDF 78-84			X
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	PDF 78-84			X
		SUMMARY SCORE		X

12. Implementation of Tribal Mitigation Actions

Requirement: 201.7(c)(3)(iii): *[The mitigation strategy **shall** include an] action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the Indian Tribal government.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	SCORE N	SCORE S
A. Does the mitigation strategy in the new or updated plan include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	PDF 76-77	STAPLEE process is identified.		X
B. Does the mitigation strategy in the new or updated plan address how the actions will be **implemented and administered,** including the responsible agency, existing or potential resources, and the timeframe to complete each action?	PDF 78-84			X
C. Does the **updated** plan identify the completed, deleted, or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred?	PDF 69-75	Tribal Plan is not an update.		N/A
		SUMMARY SCORE		X

13. Tribal Capability Assessment

Requirement 201.7(c)(3)(iv): *[The mitigation strategy **shall** include 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.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	SCORE	
			N	**S**
A. Does the new or updated plan include an evaluation of the Indian Tribal government's **pre-disaster hazard management** laws, regulations, policies, programs, and capabilities?	PDF 88			X
B. Does the new or updated plan include an evaluation of the Indian Tribal government's **post-disaster hazard management** laws, regulations, policies, programs, and capabilities?	PDF 88			X
C. Does the new or updated plan include an evaluation of the Indian Tribal government's laws, regulations, policies, programs, and capabilities **related to development** in hazard prone areas?	PDF 60	Consider referencing the economic development plan in this section.		X
D. Does the new or updated plan include a discussion of the Indian Tribal government's **funding capabilities** for hazard mitigation projects?	PDF 89-93			X
E. Does the updated plan address any hazard management laws, policies, programs, capabilities, or funding capabilities of the Indian Tribal government's that have changed since approval of the previous plan?	PDF 89-93	Tribal Plan is not an update		N/A
		SUMMARY SCORE		X

14. Tribal Funding Sources

Requirement 201.7(c)(3)(v): *[The mitigation strategy **shall** include an] identification of current and potential sources of Federal, tribal, or private funding to implement mitigation activities.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan identify **current** sources of Federal, tribal, or private funding to implement mitigation activities?	PDF 88-92	**Required Revision:** No single comprehensive list of current sources of Federal, tribal, or private funding are provided. PDF 88-92 For example, in Table 7-4, Goal 'MH-1' says that an update in 2015 was the community applying for a grant to elevate 20 homes. Was this grant approved? No. What grant was this? HMGP. The project was not selected to be put forward as a project by the State of Alaska to FEMA. Additionally, what internal funding may be supporting mitigation actions? Kaltag does not have a revenue source other than the State. They rely on subsistence for survival.	**X**	
B. Does the new or updated plan identify **potential** sources of Federal, tribal, or private funding to implement mitigation activities?	PDF 89-93			X
C. Does the updated plan identify the sources of mitigation funding used to implement activities in the mitigation strategy since approval of the previous plan?	PDF 78-84	Tribal plan is not an update		N/A
		SUMMARY SCORE	**X**	

PLAN MAINTENANCE PROCESS

15. Monitoring, Evaluating, and Updating the Plan

Requirement 201.7(c)(4)(i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe the method and schedule for **monitoring** the plan, including how, when, and by whom (e.g., the responsible agency)?	PDF 86-88, 173-181			X
B. Does the new or updated plan describe the method and schedule for **evaluating** the plan, including how, when, and by whom (e.g., the responsible agency)?	PDF 86-88, 173-181			X
C. Does the new or updated plan describe the method and schedule for **updating** the plan, including how, when, and by whom (e.g., the responsible agency), within the 5-year cycle?	PDF 86-88, 173-181			X
D. Does the updated plan include an analysis of whether the previously approved plan's method and schedule worked, and what elements or processes, if any, were changed for the next 5 years?	New community survey was added. PDF 95-96, 177-181	Tribal plan is not an update		N/A
		SUMMARY SCORE		X

16. Monitoring Progress of Mitigation Activities

Requirement 201.7(c)(4)(ii): *[The plan maintenance process **shall** include a] system for monitoring implementation of mitigation measures and project closeouts.*

Requirement 201.7(c)(4)(v): *[The plan maintenance process **shall** include a] system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe how mitigation measures and project closeouts will be **monitored**?	PDF 86-88, 173-181			X
B. Does the new or updated plan identify a **system for reviewing progress** on achieving goals and implementing activities and projects in the Mitigation Strategy?	PDF 86-88, 173-181			X
C. Does the updated plan describe any modifications, if any, to the system identified in the previously approved plan to track the initiation, status, and completion of mitigation activities?	New community survey was added. PDF 95-96, 177-181			X
D. Does the updated plan discuss whether mitigation actions were implemented as planned?	PDF 69-75	Tribal plan is not an update		N/A
		SUMMARY SCORE		X

17. Incorporation into Existing Planning Mechanisms

Requirement 201.7(c)(4)(iii): *[The plan maintenance process **shall** include 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.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan identify **other tribal planning mechanisms** available for incorporating the requirements of the mitigation plan?	PDF 87-88			X

B. Does the new or updated plan include a **process by which the Indian Tribal government will incorporate the mitigation strategy** and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?	PDF 87-88			X
			SUMMARY SCORE	X

18. Continued Member and Stakeholder Involvement

Requirement 201.7(c)(4)(iv): *[The plan maintenance process **shall** include a] discussion on how the Indian Tribal government will continue public participation in the plan maintenance process.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	New community survey was added. PDF 95-96, 177-181			X
		SUMMARY SCORE		X

PREREQUISITES

19. Adoption by the Tribal Governing Body (*Single Indian Tribal government*)

***Requirement 201.7(c)(5)*:** *The plan **must** be formally adopted by the governing body of the Indian Tribal government prior to submitting to FEMA for final review and approval.*

Requirement 201.7(c)(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, in compliance with 13.11(c) of this chapter. The Indian Tribal government will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 13.11(d) of this chapter.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the Indian tribal governing body formally adopted the new or updated plan?	PDF 13, Appendix B once the resolution is received		X	
B. Is supporting documentation, such as a resolution, included with the new or updated plan?	PDF 13, Appendix B once the resolution is received		X	
C. Does the new or updated plan provide assurances that the Indian Tribal government will continue to comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR 13.11(d)?		**Required Revision:** Tribal Plans must be compliant with 44 CFR 201.7. PDF 13 inaccurately describes the tribe's participation in a multi-jurisdictional plan as in lieu of meeting 201.7 requirements. The tribe is still required to follow requirements pursuant to 44 CFR 201.7. Revise the plan to demonstrate tribal compliance with CFR 201.7 in all instances where 201.6 is also mentioned. I apologize for this error. The text has been revised accordingly.	**X**	
		SUMMARY SCORE	**X**	

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Appendix B: Adoption Resolution

KALTAG CITY COUNCIL
KALTAG, ALASKA 99748

RESOLUTION 19-01

RESOLUTION OF ADOPTION

CITY OF KALTAG, STATE OF ALASKA HAZARD MITIGATION PLAN

WHEREAS, the City of Kaltag is vulnerable to damages from natural hazard events which pose a threat to public health and safety and could result in property loss and economic hardship; AND

WHEREAS, a Hazard Mitigation Plan (the Plan) has been developed through the work of the City of Kaltag Planning Team, and interested parties within the City of Kaltag; AND

WHEREAS, the plan recommends hazard mitigation actions that will protect people and property affect by natural hazards that face the City of Kaltag, that will reduce future, public, private, community, and personal cost of disaster response and recovery; and that will reinforce the City of Kaltag's leadership in emergency preparedness efforts; AND

WHEREAS, the Disaster Mitigation Act of 2000 (P.L. 106-390) (DMA 2000) and associated Federal regulation published under 44 CFR Part 201 require the City of Kaltag to formally adopt a Hazard Mitigation plan subject to the approval of the Federal Emergency Management Agency to be eligible for federal hazard mitigation projects and activities funds; AND

WHEREAS, the public meetings were held to receive comment on the Plan as required by DMA 2000; AND

NOW THEREFORE BE IT RESOLVED by the City Council of City of Kaltag that:

1. The plan is hereby adopted as an official plan of the City of Kaltag
2. The City of Kaltag officials identified in the Mitigation Action Plan (Section 8) are hereby directed to implement the recommended actions assigned to them. These officials will report quarterly on their activities, accomplishments, and progress to the City Council.
3. The City of Kaltag's Hazard Mitigation Planning Team will prove annual progress reports on the status of the implemented Mitigation Action plan's projects to the Planning Team Leader. This report shall be submitted to the City Council annually by the Plan's adoption anniversary date.

4. The City of Kaltag's Planning Team, will complete periodic updates of the plan as indicated in the Plan Maintenance Section (Section 8), but no less frequently than every five years.

NOW THEREFORE BE IT RESOLVED by City Council that the City of Kaltag adopts the City of Kaltag Hazard Mitigation plan, dated January 30, 2019 as this jurisdiction's Hazard Mitigation Plan, and resolves to execute the actions in the plan.

PASS AND APPROVED by a duly constituted quorum of the City Council this **30th** day of **January, 2019**.

Violet Burnham, Mayor

ATTESTED: _____
City Clerk

U.S. Department of Homeland Security
FEMA Region 10
130 – 228th Street, SW
Bothell, Washington 98021

FEMA

February 13, 2019

The Honorable Violet Burnham
Mayor, City of Kaltag
P.O. Box 9
Kaltag, AK 99748

Dear Mayor Burnham:

On February 12, 2019, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10, approved the *Kaltag Local Hazard Mitigation Plan Update* as a multi-jurisdictional local plan as outlined in Code of Federal Regulations Title 44 Part 201. This approval provides the below jurisdictions eligibility to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's, Hazard Mitigation Assistance (HMA) grants projects through February 11, 2024, through your state:

City of Kaltag

FEMA individually evaluates all application requests for funding according to the specific eligibility requirements of the applicable program. Though a specific mitigation activity or project identified in the plan may meet the eligibility requirements, it may not automatically receive approval for FEMA funding under any of the aforementioned programs.

Over the next five years, we encourage your communities to follow the plan's schedule for monitoring and updating, and to develop further mitigation actions. To continue eligibility, jurisdictions must review, revise as appropriate, and resubmit the plan within five years of the original approval date.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact Mike Johnson, State Mitigation Planner with Alaska Division of Homeland Security and Emergency Management, at (907) 428-7055, who coordinates and administers these efforts for local entities.

Sincerely,

Mark Carey, Director
Mitigation Division

cc: Brent Nichols, Alaska Division of Homeland Security and Emergency Management

Enclosure

KS:vl

Appendix C: Public Involvement

December 6, 2017

Brent Nichols, CFM
State of Alaska
DMVA DHS&EM
P.O. Box 5750
Joint Base Elmendorf-Richardson, Alaska 99505-5750

Mr. Nichols:

This letter serves as the City of Kaltag's Letter of Commitment to support DMVA DHS&EM and LeMay Engineering & Consulting, Inc. in their Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation (PDM) planning grant to update the 2010 hazard mitigation plan for the City of Kaltag. The end goal of this grant is a State- and FEMA- approved hazard mitigation plan that the City of Kaltag will adopt.

Sincerely,

Violet Burnham
Mayor, City of Kaltag

Kaltag Tribal Council
P.O. Box 129
Kaltag, AK 99748
Phone # 907-534-2224
Fax # 907-534-2299

December 7, 2017

Brent Nichols, CFM
State OF Alaska
DMVA DHS&EM
P.O. Box 5750
Joint Base Elmendorf-Richardson, Alaska 99505-5750

Mr. Nichols:
This letter serves as the Kaltag Tribal Council's Letter of Commitment to support DMVA DHS&EM and LeMay Engineering & Consulting, Inc. in their Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation (PDM) planning grant to update the 2010 hazard mitigation plan for the Kaltag Tribal Council. The end goal of this Grant is a State- and FEMA-approved hazard mitigation plan that the Kaltag Tribal Council will adopt.

Sincerely,

Donna Esmailka

Donna Esmailka
Tribal Administrator,
Kaltag Tribal Council

KALTAG TRIBAL COUNCIL

PO Box 129

Kaltag, Alaska 99748

Phone # (907) 534-2224

FAX # (907) 534-2299

Kaltag Tribal Council Members			
First Name	Last Name	Title	Term Expires
Mary Rose	Agnes	Traditional Chief	N/A
Justin	Esmailka	1st Chief	Oct 2018
Georgianna	Madros	2nd Chief	Oct 2017
Vacant		Sec/Treas.	Oct 2017
Christina	Semaken	Member	Oct 2017
Tristan	Madros	Member	Oct 2018
Lizzie	Alexie	Member	Oct 2017
Joseph	Dentler	Member	Oct 2018

Kaltag Tribal Staff		
Name & Title	**E-mail**	**Phone/FAX**
Donna Esmailka, Tribal Administrator	**esmailka32@hotmail.com**	**(907)534-2265/(907)534-2299**
Tyler Saunders, Tribal Bookkeeper	**Saunderswildcat12@gmail.com**	**(907)534-2224/(907)534-2299**
Cory Madros, Tribal Clerk		**(907)534-2224/(907)534-2299**
VACANT, Transportation Assist.		**(907)534-2306/(907)534-2299**
VACANT, Maintenance/Janitor		**(907)534-2263/(907)534-2299**
Doreen Nickoli, EPA Coordinator	**doreennickoli@yahoo.com**	**(907)534-2280/(907)534-2329**
Cora Madros, EPA Assistant		**(907)534-2280/(907)534-2329**
Devon Esmailka, EPA Laborer		**(907)534-2280/(907)534-2329**

TCC Kaltag Village Staff		
Name & Title	E-mail	Phone/FAX
Kendra Ekada, TFYS	Kendra.ekada@tananachiefs.org	**(907)534-2243/(907)534-2227**
Marissa Solomon-McGinty/TWDS	marissasolomon-mcginty@tananachiefs.or	**(907)534-2305/(907)534-2299**
Vacant, Elders Cook		**(907)534-2263/(907)534-2299**
Jessica McGinty, Health Aide	Jessica.McGinty@tananachiefs.org	**(907)534-2209/(907)534-2216**
Loreena Semaken, Health Aide	loreena.semaken@tananachiefs.org	**(907)534-2209/(907)534-2216**
VACANT, Health Aide		**(907)534-2209/(907)534-2216**
Ann Neglaska, Behavioral Health	Ann.neglaska@tananachiefs.org	**(907)534-2269/(907)534-2216**

Hazard Mitigation Plan Update for Kaltag, Alaska

Newsletter #1: December 2017

The State of Alaska, Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management (DHS&EM) was awarded a Pre-Disaster Mitigation Program grant from the Federal Emergency Management Agency (FEMA) to update the 2010 hazard mitigation plan (HMP) for the City of Kaltag. This plan will assist the City as a valuable resource tool in making decisions. Additionally, communities must have a State- and FEMA-approved and community-adopted HMP plan to receive FEMA pre- and post- disaster grants.

LeMay Engineering & Consulting, Inc. was contracted to assist Kaltag with preparing a 2017 HMP update. The HMP will identify all applicable natural hazards. The plan will identify the people and facilities potentially at risk and ways to mitigate damage from future hazard impacts.

Join the planning team and offer your advice: Any interested community member may join the planning team. To join, call or send Jennifer LeMay an email at jlemay@lemayengineering.com. The purpose of this newsletter is to introduce this project and encourage public involvement during this process. The goal is to receive comments, identify key issues or concerns, and improve mitigation ideas.

Attend the December 6, 2017, City Meeting at 11 am at City Hall: The agenda will be a summary of the hazard mitigation plan process by Patrick LeMay. You're invited to provide input to the plan. Specifically, we'll be discussing which of the following hazards are realistic for Kaltag: earthquake, tsunami, flood/erosion, ground failure/avalanche, severe weather, wildland fire, and climate change? Also, what facilities are critical to your community? What mitigation actions should be implemented to prevent damage from potential hazards?

For more information, contact:
Violet Burnham, Mayor (907) 534-2301
Patrick LeMay, PE, Planner (907) 250-9038
Jennifer LeMay, PE, PMP, Lead Planner (907) 350-6061
Brent Nichols, DMVA, DHS&EM Project Manager (907) 428-7085

City of Kaltag Hazard Mitigation Plan Committee Introductory Meeting

December 6, 2017

11 AM at City Office

Name	Organization	Contact Information (phone or email)
Patrick M. LeMay, PE	LeMay Engineering & Consulting, Inc	(907) 250-9038
Donna Esmailka Tribal Admin.	Kaltag Tribal Council	(907) 534-2224 esmailka32@hotmail.com
Doreen Nickolw Env. Coordinator	Kaltag Tribal Council	(907) 534-2280 doreennickoli@yahoo.com
Violet Burnham	Mayor City Council	534-2301 vburnham54@hotmail.com
Jacqueline Nicholas	City of Kaltag	534-2301 jdsnicholas@hotmail.com
Thelma Sequenden	" "	534-2246
Robert Nicholas		534-2232
Dale Ackell	City Council	534-2229
Susie J. Nicholi	City Council	534 2225
Georgiana Madros	Kaltag Tribal Council	534-2282
Veronica Miller	Public	534-2331
Fr. Joseph Hennessy	St Francis Ch.	907-534-2210

Patrick M. LeMay, P.E.
President
4272 Chelsea Way
Anchorage, AK 99504
(907) 250-9038
patrick.lemay@lemayengineering.com

December 6, 2017

Brent A. Nichols, EMSII, CFM
Emergency Management Specialist (EMS) II & Certified Floodplain Manager (CFM)
Department of Military and Veterans Affairs (DMVA)
Division of Homeland Security and Emergency Management (DHS&EM)
P.O. Box 5750
JBER, AK 99505-5750

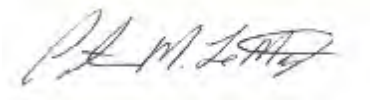
Subject: **Hazard Mitigation Planning Process Trip Report**
City of Kaltag and the Kaltag Traditional Council, Alaska

On December 6, 2017, Patrick M. LeMay, PE of LeMay Engineering & Consulting, Inc. traveled to Kaltag, Alaska. The purpose of this trip was to conduct an introductory meeting, gather hazard data, review with community leaders the applicable hazards for the area, review potential mitigation strategies, and update the critical facilities within the community.

A Kaltag City and Tribal Hazard Mitigation Plan Committee Introductory Meeting occurred from 10 AM to 2:00 PM and included members of the community, Tribal Council and City Council.

The meeting resulted in valuable information to update the Kaltag Hazard Mitigation Plan to include local climate change issues and mitigation action strategies. Both the City and Tribal entities work great together and want to participate in this HMP Update.

If you have any questions, please do not hesitate to call me at (907) 250-9038.



12/6/17
Patrick M. LeMay, P.E./Date
LeMay Engineering & Consulting, Inc.

Hazard Mitigation Planning Process

Updates to existing plans

Plans must be updated every five years and approved by DHS&EM and FEMA and then adopted by the community by resolution for the community to remain eligible for FEMA grant funding

This is a public process. Everyone who wants to be involved will be given the opportunity to be involved in this process. Send Jennifer LeMay, PE, PMP an email if you'd like more information at jlemay@lemayengineering.com or call her at (907) 350-6061.

We welcome public input and will have a public comment hearing at a public meeting for you to provide input on the plan.

Which hazards are applicable for your community?

- Flood
- Erosion
- Wildland Fire
- Tsunami/Seiche
- Earthquake
- Volcano
- Avalanche
- Ground Failure/Landslide
- Permafrost Degradation
- Severe Weather
- Climate Change

We're interested in information related to:

- hazard identification,
- profiles,
- previous occurrences,
- probability of occurrences, and
- typical recurrence intervals

for each potential hazard.

Plan Process

- Today's introductory meeting
- Gathering of data
- Draft Plan available for public comment (December is our goal month)
- Public hearing for Draft Plan (public comment period)
- State/FEMA review and pre-approval
- Newsletter announcing Final Plan (the public may still comment)
- City and/or Tribal adoption
- Final Approval from State/FEMA (prior to April 23, 2018).

After Plan is completed, approved, and adopted, your community will be eligible to apply for mitigation project funds from DHS&EM and FEMA for five years until the plan requires another update.

Contacts:
Patrick LeMay, PE, LeMay Engineering & Consulting, Inc. Planner (907) 250-9038
Jennifer LeMay, PE, PMP LeMay Engineering & Consulting, Inc. Planner (907) 350-6061
Brent Nichols, CFM, State of Alaska DHS&EM Hazard Mitigation Officer (907) 428-7085

Hazard Mitigation Plan Update for Kaltag, Alaska

Newsletter #2: January 10, 2018

LeMay Engineering & Consulting, Inc. was contracted to assist Kaltag with preparing a 2018 Hazard Mitigation Plan (HMP) update. The HMP will identify all applicable natural hazards. The plan will identify the people and facilities potentially at risk and ways to mitigate damage from future hazard impacts.

Offer your comments on the Draft HMP Update: The goal of Newsletter #2 is to announce the availability of the draft update and invite you to provide comments, identify key issues or concerns, and improve mitigation ideas. This plan has been posted at the Kaltag City and the Native Village of Kaltag Office for your review. Comments can be provided verbally to Jennifer LeMay at (907) 350-6061 or emailed to: jlemay@lemayengineering.com.

Attend the Tuesday, January 28, 2018, Public Hearing of the Draft HMP Update at the Kaltag City Office at 7 pm: The agenda will be a summary of the Draft Plan Update by John Farr. You're invited to provide input to the plan and can present your comments verbally. We'll be discussing:

- 2017 Plan Hazards, which include:
  - Drought
  - Earthquake
  - Erosion
  - Flood
  - Permafrost
  - Severe Weather
  - Wildland Fires
  - Climate Change

  What would be your top three hazards from the above list?

- Critical Infrastructure
- Vulnerability Overview Percentages
- Mitigation Projects.

For more information, contact:
Michelle, City Manager (907) 591-2929
Patrick LeMay, PE, Planner (907) 250-9038
Jennifer LeMay, PE, PMP, Lead Planner, (907) 350-6061
Brent Nichols, DMVA, DHS&EM Project Manager, (907) 428-7085

Kaltag (City &Tribe) Hazard Mitigation Plan Public Hearing on Draft HMP

January 29, 2017

7:00 pm at City Office

Name	Organization	Contact Information (phone or email)
JOHN FARR	LE MAY ENGINEERING & CONSULTING, INC.	907-980-5484 john.farr@lemayengineering.com
Violet Burnham	City of Kaltag	534-2203 vburnham54@hotmail.com
Jacqueline Nicholas	City of Kaltag	534-2301 jdsnicholas@hotmail.com
Dale Ackell	City of Kaltag	534-2229
Franklin Madros	City of Kaltag	534-2244
John F. Madros	city of Kaltag	534-2240
F. Joseph Turner	City of Kaltag	534-2218

Kaltag Hazard Mitigation Plan

Prepared by LeMay Engineering & Consulting, Inc.
for the Community of Kaltag

Kaltag Multi-Jurisdiction Hazard Mitigation Plan (HMP) Update

- The City developed a HMP in 2009, FEMA approved it in 2010, the HMP expired in 2015.
- FEMA requires HMPs to be updated every 5 years.
- The State of Alaska, Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management (DHS&EM) was awarded a Pre-Disaster Mitigation Program grant from FEMA to update the Kaltag HMP.
- LeMay Engineering & Consulting, Inc. was contracted to assist the City with updating the HMP in 2018.

What is a Hazard Mitigation Plan (HMP)?

HMPs are community plans which include:

- 1. Profiles of natural hazards that affect a community
- 2. An assessment of the community's vulnerability to hazards
- 3. Mitigation actions to reduce the community's vulnerability to hazards

Natural Hazard Profiles

Hazard profiles detail the:

- Nature of hazard
- History of hazard's impacts on community
- Location (proximity to community)
- Extent (magnitude and severity)
- Impact on communiy
- Probability of future events

Natural Hazards affecting Kaltag

The Kaltag HMP identifies and profiles the following hazards:

- Drought
- Earthquake
- Erosion
- Flood
- Permafrost
- Severe Weather
- Wildland Fire
- Climate Change

Do you believe any other natural hazards threaten Kaltag and should be profiled? (Avalanche, Landslide, Tsunami, Volcano, etc.)

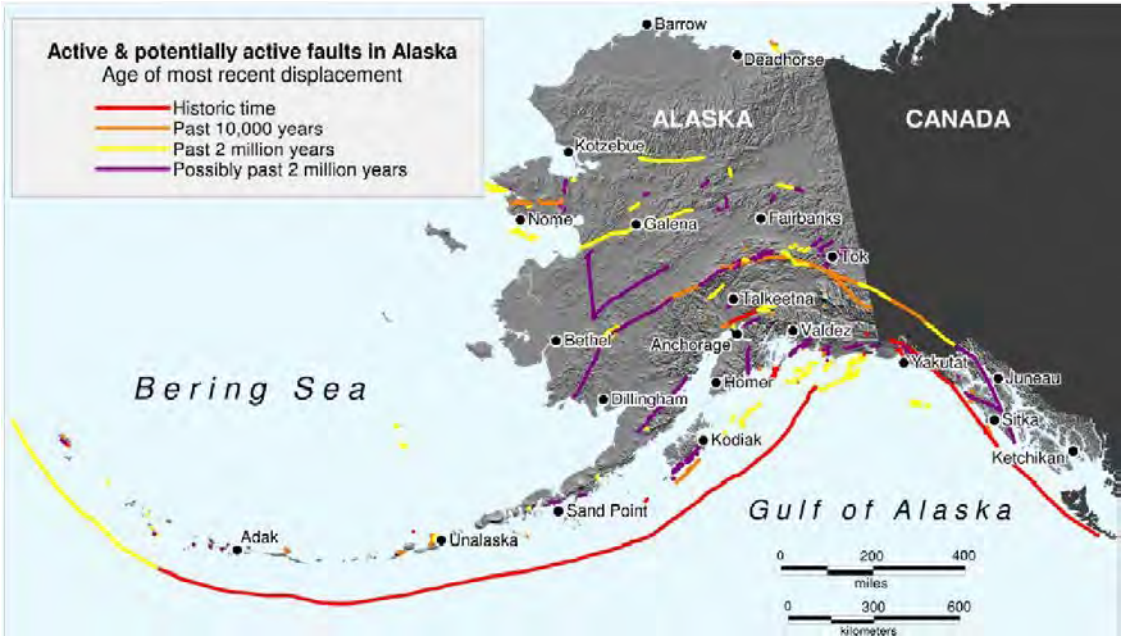
Drought – Hazard Profile Overview

- Drought seasons have a direct negative impact on subsistence practices and tend to exacerbate wildfires.
- Last drought seasons were in 1989 and 1995.
- Droughts are considered “Possible” with 1 in 5 year’s chance of occurring.

Are there other impacts of Drought on Kaltag?

How frequently do droughts occur?

Earthquake – Hazard Profile Overview



- One earthquake over Magnitude 5.0 within 100 miles of Kaltag recorded in 1978, more distant events of greater magnitude can shake community.
- Impact of earthquakes on Kaltage is considered "negligible"
- Probability of future severe earthquakes is unlikely, with less than 10% chance of occurring.

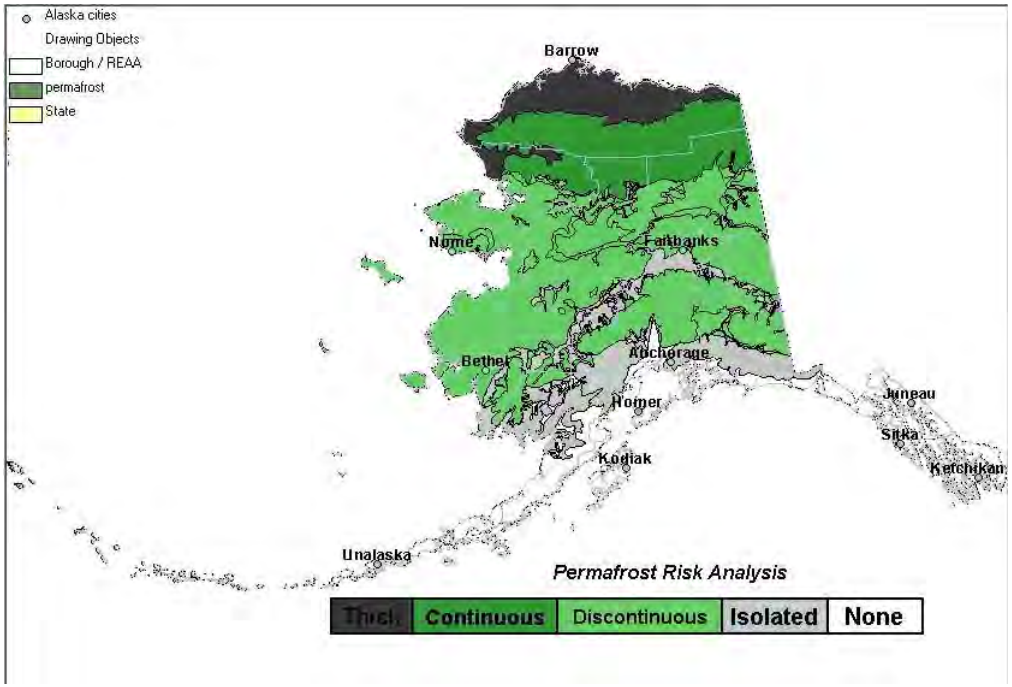
Erosion – Hazard Profile Overview

- Erosion occurs along banks of Kaltag and Yukon river. It threatens multiple houses, a road, and a bridge in the community.
- The potential impact on the community is considered “negligible,” with less than 10% of the community being impacted.
- Future erosion and land loss is likely, although the rate of future erosion may vary.

Flooding – Hazard Profile Overview

- Kaltag's elevation reduces its vulnerability to flooding. There are still areas of the community that are susceptible to flooding from the Yukon river.
- The last flood that affected the community occurred in 1989.
- Flooding has a "limited" impact on the community.
- Future flooding events are "likely" to occur.

Permafrost – Hazard Profile Overview

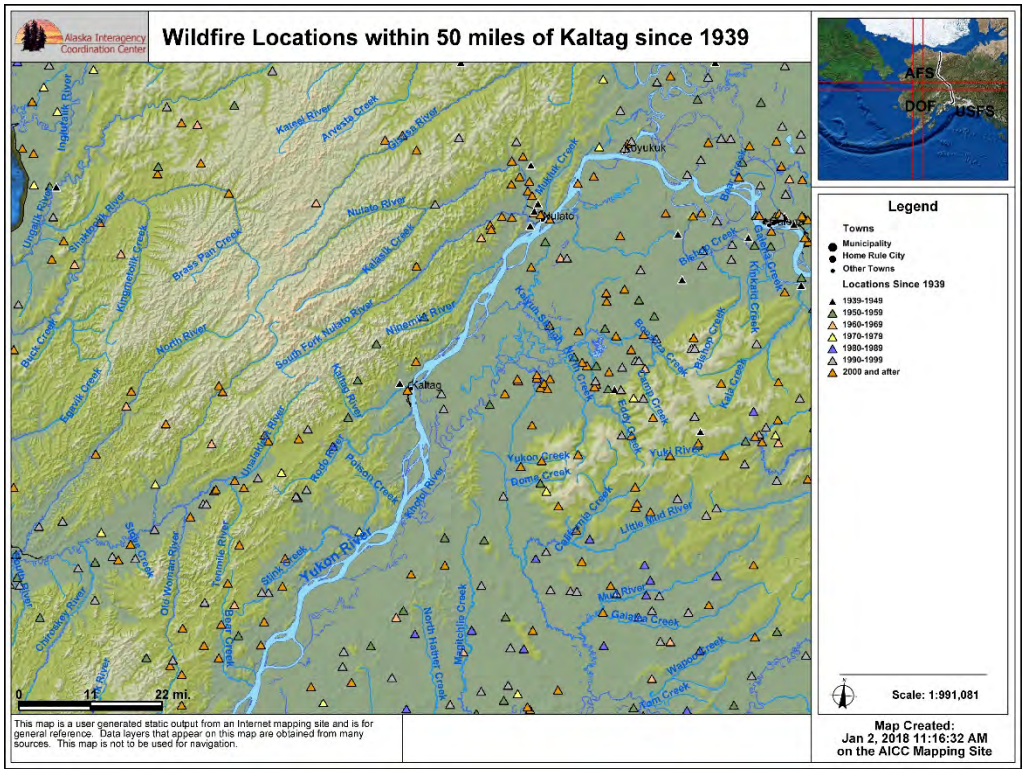


- Kaltag is underlain with discontinuous permafrost.
- Melting permafrost is affecting homes, water pipes, and the water treatment facility.
- Permafrost degradation has a “limited” extent and has a “likely” probability of occurring.

Severe Weather – Hazard Profile Overview

- Severe weather for Kaltag includes:
  - Heavy Drifting Snow
  - Freezing Rain/Ice Storm
  - Extreme Cold
  - High Winds
- Severe weather has a “likely” probability of occurring within the next 3 years with a “limited” extent of impacts.

Wildland Fire – Hazard Profile Overview



- 300 Wildfires within 50 miles of the community since 1939, 75 of these fires were larger than 3,000 acres.
- The probability of future wildland fires is “likely,” with a “limited” extent of impacts.

Climate Change – Hazard Profile Overview

- Climate Change affects the subsistence lifestyle of residents and increases severity of other natural hazards.
- Residents noted changes in seasonal timing, later freezing of river, wetter and cooler summers, warmer winters, and more permafrost melting.
- What are other ways climate change is affecting Kaltag?

Mitigation Actions

A mitigation action is a planned activity that will reduce the community's vulnerability to natural hazards. Mitigation actions are broadly categorized as:

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Emergency Services
- Structural Projects

Mitigation Action Plan

Mitigation Goal #1: Promote recognition and mitigation of all-natural hazards that affect the City and Tribe.

Mitigation Actions
Hold an annual or biennial “hazard meeting” to provide information to residents about recognizing and mitigating all- natural hazards that affect the City and Tribe.

Mitigation Action Plan (Continued)

Mitigation Goal #2: Promote cross referencing Mitigation Goals and Actions with other City and Tribe planning mechanisms and projects.

Mitigation Actions
Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate community-wide mitigation actions. (Make a City and Tribe agenda item – a living document for continuous evaluation)
The City and Tribe will aggressively manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
Integrate the Mitigation Plan findings for enhanced emergency planning.

Mitigation Action Plan (Continued)

Mitigation Goal #3: Reduce possibility of losses from all-natural hazards that affect the City and Tribe.

Mitigation Actions
Identify and pursue funding opportunities to implement mitigation actions.
Identify potential outside agencies to fund identified mitigation projects (ANTHC, DCCED, ADOT, and HUD etc.).
Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design.
Perform hydrologic and hydraulic engineering to determine most cost effective alternative energy resources.

Mitigation Action Plan (Continued)

Mitigation Goal #4: Reduce possibility of damage and losses from drought.

Mitigation Actions
Monitor drought and climate change using a web-based camera system recording water levels at Kaiyuh Slough.

Mitigation Action Plan (Continued)

Mitigation Goal #5: Reduce vulnerability of structures to earthquake damage.

Mitigation Actions
Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
Develop a Memorandum of Agreement to encourage AVEC and Telephone utilities to share utility pole resources. This will allow elevating telephone lines from the ground, dramatically reducing damage and repair expenses

Mitigation Action Plan (Continued)

Mitigation Goal #6: Reduce possibility of damage and losses from erosion.

Mitigation Actions
Relocate buildings that are at risk of being affected by erosion.
Apply for grants/funds to implement riverbank protection methods.
Harden culvert entrance bottoms with asphalt, concrete, rock, etc. to reduce erosion or scour.

Mitigation Action Plan (Continued)

Mitigation Goal #7: Reduce the possibility of damage and losses from flooding.

Mitigation Actions
Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate compliance with the NFIP.
Elevate the road to the Cemetery to reduce vulnerability of the road surface, well head and water piping, and the sewer system.
Promote community involvement and public awareness of the River-Watch program.

Mitigation Action Plan (Continued)

Mitigation Goal #8: Reduce possibility of damage and losses from permafrost.

Mitigation Actions
Identify and map existing permafrost areas to assist in critical facility relocation siting.
Promote permafrost sensitive construction practices in permafrost areas.

Mitigation Action Plan (Continued)

Mitigation Goal #9: Reduce vulnerability of structures to severe weather damage.

Mitigation Actions
Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.
Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
Coordinate Utility Company tree harvesting with personal use needs to maximize essential fire wood use and debris management.

Mitigation Action Plan (Continued)

Mitigation Goal #10: Reduce possibility of damage and losses from wildland fires.

Mitigation Actions
Identify critical facilities and vulnerable populations based on mapped high hazard areas.
Provide wildland fire information in an easily distributed format for all residents.
Develop an outreach program to educate residents about under-ground wildfire causes, their long duration, and fuels because of the extensive peat moss type ground cover.
Encourage homeowners to clear land to reduce fuels around homes.
Improve the firebreak around the community.

Take Action

- Remember the HMP is a plan. It is ultimately the responsibility of the community to initiate projects and seek out funding.
- The HMP should be also referenced and incorporated into other community planning mechanisms to create a cohesive strategy for future actions.

Keeping the HMP Current

- Perform annual reviews using the review sheet in Appendix E of plan
- Gather public information about hazards using survey in Appendix E of plan
- Initiate HMP update process before 2022

Questions/comments about the HMP Update

If you have any questions/comments about the HMP or its update please contact the planning team leaders:

Mayor Violet Burnham
Tribal Administrator Donna Esmailka

They can forward all questions to the relevant entity.

LeMay Engineering & Consulting, Inc.

Patrick M. LeMay, P.E.
President
4272 Chelsea Way
Anchorage, AK 99504
(907) 250-9038
patrick.lemay@lemayengineering.com

January 30, 2018

Brent A. Nichols, EMSII, CFM
Emergency Management Specialist (EMS) II & Certified Floodplain Manager (CFM)
Department of Military and Veterans Affairs (DMVA)
Division of Homeland Security and Emergency Management (DHS&EM)
P.O. Box 5750
JBER, AK 99505-5750

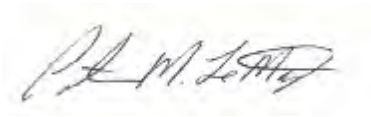
Subject: **Hazard Mitigation Plan Public Hearing**
City of Kaltag and the Kaltag Traditional Council, Alaska

On January 29, 2018, John Farr, EIT of LeMay Engineering & Consulting, Inc. traveled to Kaltag, Alaska. The purpose of this trip was to update the Kaltag City Council and the Kaltag Traditional Council, and to record public comments on the draft Plan. Notice of the Public Meeting was advertised on the public bulletin boards at both the City and Tribal offices, and the City Administrator called many residents to encourage participation in the meeting.

The Public Meeting was held at 7 pm in the City office. The Kaltag Mayor, City Administrator, and four City Council members were in attendance. Comments were provided by the Mayor and two City Council members. The comments included suggested revisions to the Flood, Wildland fire, and Climate Change hazard profiles, and the Development Trends section.

The suggested revisions to the hazard profiles included clarifying historic hazard information and adding historic events. The suggested revisions to the Development Trends section included rephrasing a section to better represent development trends and support the goals of the community. The meeting was productive and resulted in many small improvements to the draft Plan.

If you have any questions, please do not hesitate to call me at (907) 250-9038.



01/30/18
Patrick M. LeMay, P.E./Date
LeMay Engineering & Consulting, Inc.

Appendix D: Benefit-Cost Analysis Fact Sheet

Benefit-Cost Analysis Fact Sheet

Hazard mitigation projects are specifically aimed at reducing or eliminating future damages. Although hazard mitigation projects may sometimes be implemented in conjunction with the repair of damages from a declared disaster, the focus of hazard mitigation projects is on strengthening, elevating, relocating, or otherwise improving buildings, infrastructure, or other facilities to enhance their ability to withstand the damaging impacts of future disasters. In some cases, hazard mitigation projects may also include training or public-education programs if such programs can be demonstrated to reduce future expected damages.

A Benefit-Cost Analysis (BCA) provides an estimate of the "benefits" and "costs" of a proposed hazard mitigation project. The benefits considered are avoided future damages and losses that are expected to accrue as a result of the mitigation project. In other words, benefits are the reduction in expected future damages and losses (i.e., the difference in expected future damages before and after the mitigation project). The costs considered are those necessary to implement the specific mitigation project under evaluation. Costs are generally well determined for specific projects for which engineering design studies have been completed. Benefits, however, must be estimated probabilistically because they depend on the improved performance of the building or facility in future hazard events, the timing and severity of which must be estimated probabilistically.

All Benefit-Costs must be:

- Credible and well documented
- Prepared in accordance with accepted BCA practices
- Cost-effective (BCR $\geq$ 1.0)

General Data Requirements:

- All data entries (other than Federal Emergency Management Agency [FEMA] standard or default values) MUST be documented in the application.
- Data MUST be from a credible source.
- Provide complete copies of reports and engineering analyses.
- Detailed cost estimate.
- Identify the hazard (flood, wind, seismic, etc.).
- Discuss how the proposed measure will mitigate against future damages.
- Document the Project Useful Life.
- Document the proposed Level of Protection.
- The Very Limited Data (VLD) BCA module cannot be used to support cost-effectiveness (screening purposes only).
- Alternative BCA software MUST be approved in writing by FEMA HQ and the Region prior to submittal of the application.

Damage and Benefit Data

- Well documented for each damage event.
- Include estimated frequency and method of determination per damage event.
- Data used in place of FEMA standard or default values MUST be documented and justified.

- The Level of Protection MUST be documented and readily apparent.
- When using the Limited Data (LD) BCA module, users cannot extrapolate data for higher frequency events for unknown lower frequency events.

Building Data

- Should include FEMA Elevation Certificates for elevation projects or projects using First Floor Elevations (FFEs).
- Include data for building type (tax records or photos).
- Contents claims that exceed 30 percent of building replacement value (BRV) MUST be fully documented.
- Method for determining BRVs MUST be documented. BRVs based on tax records MUST include the multiplier from the County Tax Assessor.
- Identify the amount of damage that will result in demolition of the structure (FEMA standard is 50 percent of pre-damage structure value).
- Include the site location (i.e., miles inland) for the Hurricane module.

Use Correct Occupancy Data

- Design occupancy for Hurricane shelter portion of Tornado module.
- Average occupancy per hour for the Tornado shelter portion of the Tornado module.
- Average occupancy for Seismic modules.

Questions to Be Answered

- Has the level of risk been identified?
- Are all hazards identified?
- Is the BCA fully documented and accompanied by technical support data?
- Will residual risk occur after the mitigation project is implemented?

Common Shortcomings

- Incomplete documentation.
- Inconsistencies among data in the application, BCA module runs, and the technical support data.
- Lack of technical support data.
- Lack of a detailed cost estimate.
- Use of discount rate other than FEMA-required amount of 7 percent.
- Overriding FEMA default values without providing documentation and justification.
- Lack of information on building type, size, number of stories, and value.
- Lack of documentation and credibility for FFEs.
- Use of incorrect Project Useful Life (not every mitigation measure = 100 years).

Appendix E: Plan Maintenance Documents

Annual Review Questionnaire

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done more efficiently?			
	Has the Task Force undertaken any public outreach activities regarding the MHMP or implementation of mitigation actions?			
HAZARD PROFILES	Has a natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this HMP and should be?			
	Are additional maps or new hazard studies available? If so, what have they revealed?			
VULNERABILITY ANALYSIS	Do any new critical facilities or infrastructure need to be added to the asset lists?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
MITIGATION STRATEGY	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning within the			
	Are the goals still applicable?			
	Should new mitigation actions be added to the a community's Mitigation Action Plan?			
	Do existing mitigation actions listed in a community's Mitigation Action Plan need to be reprioritized?			
	Are the mitigation actions listed in a community's Mitigation Action Plan appropriate for available resources?			

Mitigation Action Progress Report

Progress Report Period: _____ (date) to _____ (date)

Project Title: _____ Project ID# _____

Responsible Agency: _____

Address: _____

City: _____

Contact Person: _____ Title: _____

Phone #(s): _____ email address: _____

List Supporting Agencies and Contacts:

_____

_____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase): _____

_____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal (s) Addressed:

Goal: _____

Indicator of Success: _____

_____

_____

_____

Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed*

*explain: _____

_____

☐ Project canceled

Project Cost Status

☐ Cost unchanged

☐ Cost overrun*

*explain: _____

_____

☐ Cost underrun*

*explain: _____

_____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

_____

_____

_____

_____

B. What obstacles, problems, or delays did you encounter, if any?

_____

_____

_____

_____

C. How was each problem resolved?

_____

_____

_____

_____

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other Comments:

Community Local Hazard Mitigation Plan Survey

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information that you provide will help us better understand your concerns for hazards and risks, which could lead to mitigation activities that will help reduce those risks and the impacts of future hazard events.

The hazard mitigation process is not complete without your feedback. All individual responses are strictly confidential and will be used for mitigation planning purposes only.

Please help us by taking a few minutes to complete this survey and return it to:

City Mayor or Tribal Administrator, Kaltag

Vulnerability Assessment

The following questions focus on how vulnerable the community or its facilities are to damage from a particular hazard type using the following vulnerability scale:

0= Don't Know 1 =Minimally Vulnerable 2=Moderately Vulnerable 3=Severely Vulnerable

1. How vulnerable to damage are the *structures* in the community from:

a. Flooding?	0 1 2 3
b. Wildfire?	0 1 2 3
C. Earthquakes?	0 1 2 3
d. Volcanoes?	0 1 2 3
e. Snow Avalanche?	0 1 2 3
f. Tsunami/Seiches?	0 1 2 3
g. Severe weather storms?	0 1 2 3
h. Ground failure (landslide, permafrost)?	0 1 2 3
i. Coastal erosion?	0 1 2 3
j. Climate change?	0 1 2 3
k. Other hazards?	0 1 2 3
Please Specify:	

2. How vulnerable to damage are the *critical facilities* within our community from:

[Critical facilities include airport, community shelter, bulk fuel storage tanks, generators, health clinic, law enforcement office (VPO, VPSO, police department), school, public works, e.g. washeteria/water treatment, reservoir/water supply, satellite dish, communications tower, landfills, sewage lagoons, and stores.]

a. Flooding?	0 1 2 3
b. Wildfire?	0 1 2 3

C. Earthquakes?	0 1 2 3
d. Volcanoes?	0 1 2 3
e. Snow Avalanche?	0 1 2 3
f. Tsunami/Seiches?	0 1 2 3
g. Severe weather storms?	0 1 2 3
h. Ground failure (landslide, permafrost)?	0 1 2 3
i. Coastal erosion?	0 1 2 3
j. Climate change?	0 1 2 3
k. Other hazards?	0 1 2 3

Please Specify:

3. How vulnerable to displacement, evacuation or life-safety is the community from:

a. Flooding?	0 1 2 3
b. Wildfire?	0 1 2 3
C. Earthquakes?	0 1 2 3
d. Volcanoes?	0 1 2 3
e. Snow Avalanche?	0 1 2 3
f. Tsunami/Seiches?	0 1 2 3
g. Severe weather storms?	0 1 2 3
h. Ground failure (landslide, permafrost)?	0 1 2 3
i. Coastal erosion?	0 1 2 3
j. Climate change?	0 1 2 3
k. Other hazards?	0 1 2 3

Please Specify:

4. Do you have a record of damages incurred during past flood events? Yes No

If yes, please describe:_____

_____

_____

Preparedness

Preparedness activities are often the first line of defense for protection of your family and the community. In the following list, please check those activities that you have done, plan to do in the near future, have not done, or are unable to do. *Please check one answer for each preparedness activity*.

Have you or someone in your household:	Have Done	Plan to do	Not Done	Unable to do
Attended meetings or received written information on natural disasters or emergency preparedness?	☐	☐	☐	☐
Talked with family members about what to do in case of a disaster or emergency?	☐	☐	☐	☐
Made a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	☐	☐	☐	☐
Prepared a "Disaster Supply Kit" extra food, water, medications, batteries, first aid items, and other emergency supplies)?	☐	☐	☐	☐
In the last year, has anyone in your household been trained in First Aid or CPR?	☐	☐	☐	☐

5. Would you be willing to make your home more resistant to natural disasters? ☐ Yes ☐ No

6. Would you be willing to spend more money on your home to make it more disaster resistant? ☐ Yes ☐ No ☐ Don't know

7. How much are you willing to spend to better protect your home from natural disasters? *(Check only one)*

☐	Less than $100	☐	Desire to relocate for protection
☐	$100-$499	☐	Other, please explain
☐	$500 and above		
☐	Nothing / Don't know		
☐	Whatever it takes		

Mitigation Activities

A component of the Local Hazard Mitigation Plan activities is developing and documenting additional mitigation strategies that will aid the community in protecting life and property from the impacts of future natural disasters.

Mitigation activities are those types of actions you can take to protect your home and property from natural hazard events such as floods, severe weather, and wildfire. Please check the box

for the following statements to best describe their importance to you. Your responses will help us determine your community's priorities for planning for these mitigation activities.

Statement	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	☐	☐	☐	☐	☐
Protecting critical facilities (clinic, school, washeteria, police/fire department, water/sewer, landfill)	☐	☐	☐	☐	☐
Preventing development in hazard areas	☐	☐	☐	☐	☐
Protecting natural environment	☐	☐	☐	☐	☐
Protecting historical and cultural landmarks	☐	☐	☐	☐	☐
Promoting cooperation within the community	☐	☐	☐	☐	☐
Protecting and reducing damage to utilities, roads, or water tank	☐	☐	☐	☐	☐
Strengthening emergency services (clinic workers, police/fire)	☐	☐	☐	☐	☐

8. Do you have other suggestions for possible mitigation actions/strategies?

_____

_____

_____

_____

_____

General Household Information

9. Please indicate your age: _____

and Gender: ☐ Male ☐ Female

10. Please indicate your level of education:

☐	Grade school/no schooling	☐	College degree
☐	Some high school	☐	Postgraduate degree

☐	High school graduate/GED	☐	Other, please specify
☐	Some college/trade school		

11. How long have you lived in your community?

☐ Less than 5 years ☐ 5 to 10 years ☐ 11 to 20 years ☐ 21 or more years

12. Do you have internet access? ☐ Yes ☐ No

13. Do you own or rent your home? ☐ Own ☐ Rent

If you have any questions regarding this survey or would like to learn about other ways that you can participate in the development of the Local Hazard Mitigation Plan, please contact the City Mayor or Tribal Administrator.

Thank You for Your Participation!

This survey may be submitted anonymously; however, if you provide us with your name and contact information below we will have the ability to follow up with you to learn more about your ideas or concerns (optional):

Name: _____

Address: _____

_____

Phone: _____