City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan Update

Source: Alaska ShoreZone, 2019.

Prepared by the City of Alakanuk and the Native Village of Alakanuk Mitigation Planning Team

March 2021

LeMay Engineering & Consulting, Inc.

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Acronyms/Abbreviations

°F	Degrees Fahrenheit
ACS	American Community Survey
ADEC	Alaska Department of Environmental Conservation
AICC	Alaska Interagency Coordination Center
ANTHC	Alaska Native Tribal Health Consortium
APA	American Planning Association
ARC	American Red Cross
AVCP	Association of Village Council Presidents
AVEC	Alaska Village Electric Cooperative
AWOS	Automated Weather Observation System
BIA	Bureau of Indian Affairs
BRIC	Building Resilient Infrastructure and Communities
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
City	City of Alakanuk
DCCED	Department of Commerce, Community, and Economic Development
DCRA	Division of Community and Regional Affairs
DHS	Department of Homeland Security
DHS&EM	Division of Homeland Security and Emergency Management
DGGS	Division of Geological and Geophysical Survey
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
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
FP&S	Fire Prevention and Safety
FY	Fiscal Year
g	gravity as a measure of peak ground acceleration
GIS	Geospatial Information System
IGAP	Indian General Assistance Program
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

IHBG	Indian Housing Block Grant
IHS	Indian Health Service
IMPACT	Infrastructure Management Planning Assistance for Coastal Towns
INAP	Indian and Native American Programs
IRS	Internal Revenue Service
M	Magnitude
MAP	Mitigation Action Plan
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
MMI	Modified Mercalli Intensity
mph	miles per hour
NAHASDA	Native American Housing Assistance and Self Determination Act
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NVA	Native Village of Alakanuk
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
PGA	peak ground acceleration
P.L.	Pubic Law
PWs	Public Worksheets
REAA	Regional Educational Attendance Area
SAFER	Staffing for Adequate Fire and Emergency Response
SBA	U.S. Small Business Administration
Sq.	Square
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VFA-RFA	Volunteer Fire Assistance and Rural Fire Assistance Grant

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1.0 Introduction

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 (MJHMP). This MJHMP is an Update of the 2018 Hazard Mitigation Plan (HMP) for the City of Alakanuk (City) and a new HMP developed for the Native Village of Alakanuk (NVA). As part of this planning process, the 2021 MJHMP includes both the City and NVA as jurisdictions.

1.1 HAZARD MITIGATION PLANNING

Hazard mitigation, as defined in Title 44 of the Code of Federal Regulations (CFR), Part §201, 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. Implementation of the mitigation actions, which include long-term strategies that may include planning, policy changes, programs, projects, and other activities, is the result of this process. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage reconstruction and repeated damage. As such, State, Local, and Tribal governments are encouraged to take advantage of funding provided by Federal Hazard Mitigation Assistance (HMA) programs.

1.2 PLANNING REQUIREMENTS

1.2.1 Mitigation Plans

On October 30, 2000, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) [Public Law (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). Section 322 directs State, Local, and Tribal entities to closely coordinate mitigation planning and implementation efforts. Additionally, it establishes the HMP requirement for the Federal Emergency Management Agency's (FEMA) HMA.

On October 2, 2015, FEMA published the Mitigation Planning Final Rule in the Federal Register, [Docket ID: FEMA-2015-0012], 44 CFR Part 201, effective November 2, 2015. Planning requirements for Local and Tribal entities are described in detail in Sections §201.6 and §201.7. Locally- and Tribally-adopted and State- and FEMA-approved HMPs qualify jurisdictions for several HMA grant programs. This MJHMP for the City and NVA complies with Title 44 CFR Sections §201.6 and §201.7 and applicable FEMA guidance documents as well as the 2018 State of Alaska HMP.

Section 322 of the Stafford Act (42 USC 5165) as amended by P.L. 106-390 provides for State, Local, and Tribal governments to undertake a risk-based approach to reducing risks from natural hazards through mitigation planning. The National Flood Insurance Act of 1968 (42 USC 4001 et seq.) as amended, further reinforced the need and requirement for HMPs, linking Flood

Mitigation Assistance (FMA) programs to State, Local, and Tribal HMPs. This change also required participating National Flood Insurance Program (NFIP) communities' risk assessments and mitigation strategies to identify and address repetitively flood damaged properties.

1.3 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

FEMA HMA grant programs provide funding to States, Local, and Tribal entities that have a FEMA-approved State, Local, or Tribal Mitigation Plan. Two of the grants are authorized under 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 Hazard Mitigation Grant Program (HMGP) is a competitive, disaster-funded grant program whereas the Unified Mitigation Assistance Programs (Pre-Disaster Mitigation [PDM] and FMA, though competitive) rely on specific grant pre-disaster grant funding sources, sharing several common elements. As a result of amendments by the Disaster Relief and Recovery Act of 2018, the PDM program is being replaced with the new Building Resilient Infrastructure and Communities (BRIC) program.

"The Department of Homeland Security and Emergency Management (DHS&EM) 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 PDM/BRIC grants annually to State, Local, and Tribal 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/BRIC 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 is authorized by the National Flood Insurance Act and focuses on reducing claims against the NFIP" (FEMA, 2019h).

1.3.1 HMA Unified Programs

The HMGP provides grants to State, Local, and Tribal 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 disaster declaration is limited. FEMA may provide a State, City, or Village 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/BRIC grant program provides funds to State, Local, and Tribal entities for hazard mitigation planning and mitigation project implementation prior to a disaster event. PDM/BRIC grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM/BRIC 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 Years (FY) 2018 and 2019, PDM program funding totaled approximately $235 and $250 million each year. 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. Emphasis for this program is placed on mitigating repetitive loss 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 most of the program's total funding, are awarded to State, Local, and Tribal entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2018, FMA funding totaled $160 million. In FY 2019, FMA funding totaled $210 million.

The City of Alakanuk and the Native Village of Alakanuk do not currently participate in the NFIP, and are therefore, ineligible for National Flood Insurance Act Grant Programs until they become a NFIP participant.

1.4 MJHMP DESCRIPTION

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

Prerequisites

Section 2 addresses the prerequisites of MJHMP adoption, which include adoption by the City and NVA. The adoption resolutions are included in Appendix B.

Community Description

Section 3 provides a general history and background of the Alakanuk community, including historical trends for population, and the demographic and economic conditions that have shaped the area. Location figures of the Alakanuk area with relation to the various surrounding water bodies are included in Section 5 with hazard areas identified.

Planning Process

Section 4 describes the planning process and identifies the Planning Team members, the meetings held as part of the planning process, the LeMay Engineering & Consulting, Inc. planner, 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 characteristics, history, location, extent, impact, and recurrence probability for each hazard. In addition, historical and hazard location figures are included when applicable.

Vulnerability Analysis

Section 6 identifies potentially vulnerable assets—people, residential and nonresidential buildings, and critical facilities and infrastructure—in the Alakanuk community. The resulting information identifies the full range of hazards that the Alakanuk community could face and potential social impacts, damages, and economic losses. Trends in land use and development are also discussed.

Mitigation Strategy

Section 7 defines the mitigation strategy which provides a blueprint for reducing the potential losses identified in the vulnerability analysis. The Project Team developed a list of mitigation goals and potential actions to address the risks facing Alakanuk. Mitigation actions include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities.

Plan Maintenance

Section 8 also describes the Planning Team's formal plan maintenance process to ensure that the MJHMP remains an active and applicable document. This process includes monitoring, evaluating, and updating the MJHMP (Appendix E); implementation of the mitigation process 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 Local Mitigation Plan Review Tool for the City and the FEMA Tribal Mitigation Plan Review Tool for the NVA; both review tools document compliance of this MJHMP with FEMA criteria.

Appendix B

Appendix B provides the adoption resolutions for the City and NVA as well as the final approval letters from FEMA for this 2021 MJHMP.

Appendix C

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

Appendix D

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

Appendix E

Appendix E provides plan maintenance documents, such as an annual review sheet, a progress report form, and a community survey.

2.0 Prerequisites

2.1 ADOPTION BY LOCAL GOVERNING BODIES AND SUPPORTING DOCUMENTATION

The DMA 2000 requirements for the adoption of this MJHMP by the local governing bodies are described below.

DMA 2000 Requirements
Local and Tribal Plan Adoptions **§201.6(c)(5)** and **§201.7(c)(5** and **6):** [The 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, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the Plan must document that it has been formally adopted.
1. REGULATION CHECKLIST
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? E2. For multi-jurisdictional Plans, has each jurisdiction requesting approval of the Plan documented formal Plan adoption? E3. Does the Plan include assurances that the Tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR Parts 200 and 3002, and will amend its Plan whenever necessary to reflect changes in Tribal or Federal laws and statutes?
Source: FEMA, 2015.

The City of Alakanuk and the Native Village of Alakanuk are represented in this MJHMP that meets the requirements in Section 322 of DMA 2000 and Sections 44 CFR §201.6 and §201.7. The City Council represents the governing body of the City. The NVA Traditional Council represents the governing body of the NVA.

The NVA Traditional Council 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 2 CFR Parts 200 and 3002, and will amend this MJHMP whenever necessary to reflect changes in Tribal or Federal laws and statutes. The NVA Traditional Council adopted this MJHMP on June 14, 2021, and the Alakanuk City Council adopted this MJHMP on October 26, 2021. A scanned copy of the formal adoption resolutions and FEMA's final approval letters are included in Appendix B.

3.0 Community Description

This section describes the location, geography, and history; demographics; and economy of the Alakanuk community.

3.1 LOCATION, GEOGRAPHY, AND HISTORY

"Alakanuk is located at the east entrance of Alakanuk Pass, the major southern channel of the Yukon River, 15 miles from the Bering Sea (Figure 1). It is part of the Yukon Delta National Wildlife Refuge. It lies eight miles southwest of Emmonak, approximately 162 air miles northwest of Bethel at approximately 62.6871, North Latitude and -164.6216, West Longitude (Sec. 14, T030N, R082W, Seward Meridian). It is the longest village on the lower Yukon - the development stretches over a three-mile area along the Alakanuk Pass (Slough). Alakanuk is in the Bethel Recording District" (Department of Community, Commerce, and Economic Development [DCCED], Division of Community and Regional Affairs [DCRA], 2021).

Figure 1. Alakanuk Location Map

The community covers approximately 32.4 square (sq.) miles of land and approximately 8.7 sq. miles of water. Alakanuk falls within the transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers. Heavy winds are frequent during the fall and winter. The Yukon River is used as an ice road during freeze-up, from November through May.

Alakanuk is a Yup'ik word meaning "wrong way," aptly applied to a village on this maze of watercourses. Alakanuk is a Yup'ik Village active in commercial fishing and subsistence. A State-owned and managed gravel airstrip is available. Alakanuk is easily accessible from the Yukon River and Bering Sea by barge and riverboat. Most passengers and mail arrive by air. There are no roads connecting Alakanuk with other population centers in the region, but ice roads are used in winter. Snow machines and boats are used for local travel (DCCED/DCRA). The following is a brief sketch of the community's history:

1899 First reported and mapped by G.G. Putnam of the U.S. Coast & Geodetic Survey. It was originally settled by a Yup'ik shaman named Anguksuar and his family. A Catholic mission school was built near the village.

1946 United States (U.S.) Post Office opened.

1948 The school was relocated to St. Mary's, and many families moved from the old school site to Alakanuk.

1969 The City was incorporated as a second-class city in the State's Unorganized Borough.

3.2 DEMOGRAPHICS

The 2010 U.S. Census population was 677 residents. The most recent 2019 DCCED certified population is 704 of which the median age was 20.5, indicating a relatively young population. The population of Alakanuk is expected to remain steady because 59.9% of the population is between 16 and 59 years of age. Alakanuk is recognized as a Yup'ik Eskimo community with approximately 99% of residents identifying themselves as Alaska Native. The male and female composition is approximately 52.8% and 47.2%, respectively. The 2019 American Community Survey (ACS) identified 160 occupied housing units out of a total of 179 units with the average household having approximately five individuals. Figure 2 illustrates the historic population of the community.

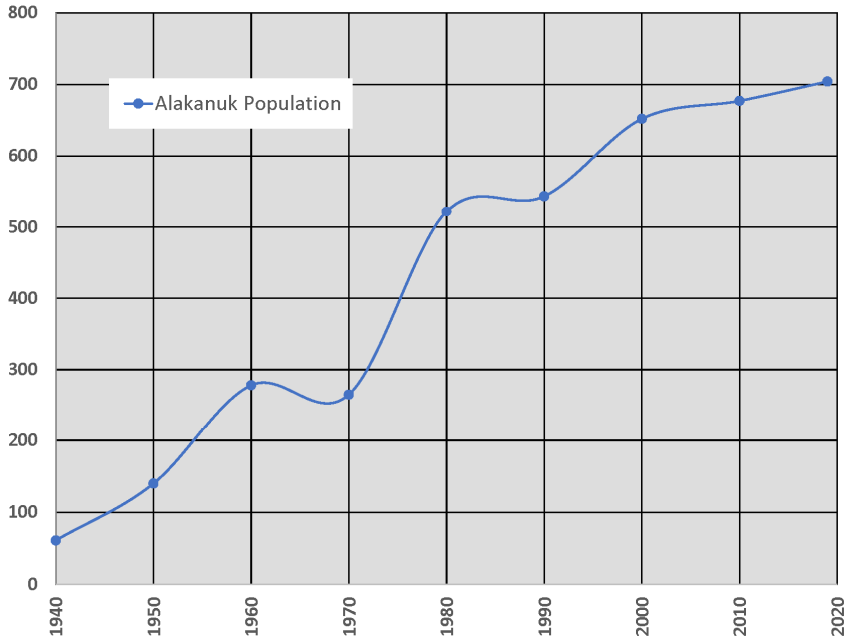


Figure 2. Alakanuk Historic Population

3.3 ECONOMY

The economy of the area is seasonal in nature, such that it is generally more active in the summer than in the winter. This economic instability is one reason for such modest population growth. A limited amount of permanent employment is provided by the government and local businesses. Other primary sources of income include revenue from seasonal commercial fishing and governmental assistance. Villagers also provide for themselves by hunting, fishing, trapping, and making native crafts.

The economy in Alakanuk is primarily subsistence-based, including hunting, trapping, fishing, and gathering. Some cash income is generated by commercial fishing in the Yukon River and the Bering Sea during the summer. Only a few full- or part-time year-round jobs are available. Primary employers include the government, the Village Safe Water facility, the school, utilities, and local businesses. Nearly all households are represented at subsistence fish camps during the summer months (DCRA, 2021).

According to the 2019 ACS, the per capita income in Alakanuk is $9,812. The median family income is $36,250, and the mean family income is $48,766. The potential work force (those aged 16 years or older) in the community was estimated to be 487, of which 269 were actively employed (ACS, 2019). Alakanuk is considered a distressed community per the 2020 Department of Labor (DOL) and Workforce Development, Research, and Analysis Section (Denali Commission, 2020).

Figure 3 depicts a community map obtained from the DCCED/DCRA community profile.

Figure 3. Community Map

4.0 Planning Process

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 Project 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
1. REGULATION CHECKLIST
Local and Tribal Planning Process **§201.6(b)** and **§201.7(b):** 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 A components in the Plan.
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? **[Requirements §201.6(c)(1) and §201.7(c)(1)]** A2. Does the Plan document how the public was involved in the planning process during the drafting stage? **[Requirements §201.6(b)(1) and §201.7(c)(1)(i)]** A3. 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? **[Requirements §201.6(b)(2) and §201.7(c)(1)(ii)]** A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? **[Requirements §201.6(b)(3) and §201.7(c)(1)(iii)]** A5. Does the Plan include a discussion on how the planning process was integrated to the extent possible with other ongoing Tribal planning efforts as well as other FEMA programs and initiatives? **[Requirement §201.7(c)(1)(iv)]** A6. Is there a description of the method and schedule for keeping the Plan current (monitoring, evaluating, and updating the Plan within a 5-year cycle?) **[Requirements §201.6(c)(4)(i) and §201.7(c)(4)(i)]** A7. Is there discussion of how the City and Tribe will continue public participation in the Plan maintenance process? **[Requirements §201.6(c)(4)(iii) and §201.7(c)(4)(iv)]**
Source: FEMA, 2015.

4.1 OVERVIEW OF PLANNING PROCESS

During the 2021 planning process, the City updated their 2018 HMP and the NVA developed their new HMP and incorporated both documents into this MJHMP with funding from the Bureau of Indian Affairs (BIA) Tribal Resilience Program. Updates to the 2021 MJHMP included:

- Addition of the NVA as a jurisdiction.
- A review of the local hazards facing the City and NVA.
- An assessment of the progress made towards minimizing those hazards from the 2018 City HMP.
- A revised hazard vulnerability assessment that updates the City information and adds NVA information.
- Revised community demographic and economic information.

LeMay Engineering & Consulting, Inc. was hired by the NVA to assist the City with their 2018 HMP Update and the NVA with their HMP development. The planning process began with Jennifer LeMay coordinating a local Planning Team kick-off meeting on October 12, 2020. The Planning Team identified applicable City and NVA resources and capabilities during the meeting. The Planning Team then discussed the City's and NVA's roles such as: acting as an advocate for the planning process, assisting with gathering information, and supporting public participation opportunities. There was also a brief discussion about hazards that affect the community such as changes in the cryosphere, flooding/erosion, earthquake, severe weather, and fires (Section 5). Changes in the cryosphere and flooding/erosion have increased in intensity from the 2018 City HMP.

The Planning Team updated critical facilities and evaluated mitigation goals and actions from the 2018 City HMP. Some mitigation goals were changed due to a change in priorities. Some mitigation actions are no longer a priority and were deleted. Current statuses were added to mitigation actions from the 2018 City HMP, and new projects were developed. All remaining projects were then prioritized.

In summary, the following five-step process occurred from November 2020 through March 2021.

1. Organize resources: Members of the Planning Team identified information resources, such as local experts and various organizations capable of providing the technical expertise and historical information necessary for a thorough MJHMP.
2. Monitor, evaluate, and update the MJHMP: The Planning Team developed their implementation process to ensure compatibility with community needs and involved the population in deciding how they would assess how well the implementation process worked.
3. Assess risks: The Planning Team reviewed the hazards specific to the community and the associated risk assessment to include the vulnerability analysis.
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 the mitigation strategy: The Planning Team updated the status of the City's mitigation actions from the 2018 HMP and developed their joint mitigation goals and

actions in this 2021 MJHMP. Subsequently, the City and NVA prioritized future projects into a Mitigation Action Plan (MAP) strategy.

4.2 MULTI-JURISDICTIONAL HAZARD MITIGATION PROJECT TEAM

Table 1 identifies the Planning Team members. Table 2 summarizes Planning Team meetings.

Table 1. Planning Team

Name	Title	Organization	Phone
Thomas Alstrom	Mayor	City of Alakanuk	238.3313
Juanita Joseph	Tribal Administrator	Alakanuk Tribal Council, Association of Village Presidents (AVCP)	238-3419
Penny Alstrom	City Administrator	City of Alakanuk	238-3313
Angelica Damian	City Clerk	City of Alakanuk	238-3313
Steve Augline	City Council Member	City of Alakanuk	238-3313
Melvin Joseph	City Council Member	City of Alakanuk	238-3313
Ben Phillip	City Council Member	City of Alakanuk	238-3313
Edgar Andrews	City Council Member	City of Alakanuk	238-3313
Eusebia Augline	City Council Member	City of Alakanuk	238-3313
Elizabeth Augline	City Council Member	City of Alakanuk	238-3313
Agusta Edmund	Indian General Assistance Program (IGAP) Coordinator	NVA	238-3490
Raymond Oney	Tribal Council President and City Resident	NVA	238-2082
Tiffany Andrew	Tribal Council Member and City Resident	NVA	238-2319
Max Agayar	Tribal Council Member and City Resident	NVA	238-2228
Gabriel Buster	Tribal Council Member and City Resident	NVA	238-2010
Cecelia Tucker	Tribal Council Member and City Resident	NVA	545-2463
Martina Stern	Tribal Council Member and City Resident	NVA	238-2151
Jonathan Damian	Tribal Council Member and City Resident	NVA	238-2245
Chris James	Land Officer	Native Corporation	238-3117
Jennifer LeMay, PE, PMP	Hazard Mitigation Planner	LeMay Engineering & Consulting, Inc.	350.6061
Rick Dembroski	PDM/BRIC Program Manager	DHS&EM	428.7015
Terrence Murphy	State Hazard Mitigation Officer	DHS&EM	428.7085

4.3 PUBLIC INVOLVEMENT & OPPORTUNITY FOR INTERESTED PARTIES TO PARTICIPATE

Table 2 below summarizes the public involvement process. An invitation was extended to individuals and entities via a project newsletter describing the planning process and announcing the upcoming public meeting. Newsletter #1 was posted on February 19, 2021 at the City Office, Tribal Office, and the U.S. Post Office, announcing the February 23, 2021 meeting.

The Planning Team held a Tribal Council meeting that was open to the public on February 23, 2021. During the meeting, Jennifer LeMay led the attending public through a hazard identification and screening exercise. The attendees developed a list of hazards which have the potential to impact the community: flood/erosion, severe weather, changes in the cryosphere, earthquake, and wildland/conflagration fire.

LeMay Engineering & Consulting, Inc. 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, a risk assessment was completed that illustrated the assets that were exposed and vulnerable to specific hazards. Mitigation actions were also developed and prioritized.

Another newsletter was developed and posted at the City Office, Tribal Office, the community bulletin board at the store, and the U.S. Post Office on February 26, 2021 announcing a meeting on March 4. On March 4, a blizzard occurred that cancelled school, and the meeting was postponed to March 9. Newsletter #3 was developed and posted at the City Office, Tribal Office, the community bulletin board at the store, and the U.S. Post Office. The City posted the 2021 Draft MJHMP on its Facebook page. The NVA does not have a Facebook page. The City, NVA, and the Corporation were all provided with the 2021 Draft MJHMP and a brief presentation slidedeck, summarizing the 2021 Draft MJHMP was provided to residents in a COVID-19 safe manner. No public comments were received.

Alakanuk is a remote, isolated Alaska community. Alakanuk is eight miles southwest of Emmonak, and travel occurs via the iced over Yukon River in winter. The City and Tribal contacts for Emmonak were emailed the 2021 Draft MJHMP as well as the Alaska Native Tribal Health Consortium (ANTHC); Association of Village Council Presidents (AVCP); Alaska Department of Environmental Conservation (ADEC); CRW Engineering Group, LLC; Alaska Department of Transportation and Public Facilities (DOT&PF); Alaska Department of Natural Resources (DNR), Division of Geological & Geophysical Surveys (DGGS); Village Safe Water; and the United States Army Corps of Engineers (USACE) have all been present in the community within 2020 and/or will be present in 2021 to evaluate potential hazard impacts, conduct a Threatened Infrastructure Survey, and develop mitigation actions and were provided with the opportunity to comment on the Draft MJHMP. Comments were incorporated accordingly into this MJHMP. These comments have been provided in Appendix C.

Table 2. Planning Team Meetings

Date	Type	Subject	Summation
October 12, 2020	Initial Communications	MJHMP Development and Update Process	Team began learning the MJHMP planning process.
Alakanuk was under lockdown multiple times to prevent the spread of COVID-19. The NVA raised the lockdown on February 18, 2021.			
February 19, 2021	Flyers posted announcing Public Meeting #1	Community Awareness	Flyers were posted at the Tribal and City Offices as well as at the U.S. Post Office.
February 23, 2021	Public Meeting #1: HMP Kickoff Meeting	Community Awareness and Data Gathering	Team discussed community hazards and identified critical facilities.
February 26, 2021	Flyers posted announcing Public Meeting #2	Community Awareness	Flyers were posted at the Tribal, City, and Corporation Offices as well as at the U.S. Post Office. A flyer was also posted on the community bulletin board at the store.
March 5, 2021	Flyers posted postponing Public Meeting #3 due to a blizzard that caused the school to close	Community Awareness	Flyers were posted at the Tribal, City, and Corporation Offices as well as at the U.S. Post Office. A flyer was also posted on the community bulletin board at the

			store.
March 9, 2021	Public Meeting #2: Mitigation Actions Plan Summary and Review	Project Review & Prioritization	Team reviewed and prioritized their projects to meet their goals. Team and community provided information.
March 5-26, 2021	Review and Outreach – Email Distribution of the Draft MJHMP for an agency and public comment period.	Hazards and Goals	The City; NVA; Corporation; and agencies working within the community as well as the City and Tribal contacts in the nearest village of Emmonak were provided the opportunity to review the Draft 2021 MJHMP and provide comments.
March 29, 2021	Incorporation of Public Review Comments	Draft MJHMP Review	Finetuning of MJHMP.
March 29, 2021	Submittal of Draft MJHMP to DHS&EM and FEMA	Draft MJHMP Review	Agency review and approval.

4.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Planning Team reviewed and incorporated information from existing plans into this MJHMP. Table 3 summarizes existing plans that were used. Section 9 provides a complete list of references.

Table 3. Incorporated Planning Documents

Existing Plans, Studies, Reports & Ordinances	Contents Summary
State of Alaska, DCCED/DCRA *Community Profile*, 2021	This website provided historical and demographic information.
DGGS, Draft *Erosion Infrastructure Management Planning Assistance for Coastal Towns (IMPACT) Map for Alakanuk, Alaska*, 2020	This IMPACT map is a geospatial data analysis tool and forecasts the impacts of erosion on infrastructure 60 years into the future.
DGGS, *Shoreline* Change (1951 – 2015), Alakanuk, Alaska, 2020	This *Shoreline Change* study determined that the maximum rate of erosion in Alakanuk along the Alakanuk Pass was -13.8 feet/year.
Shoreline Change at Alaska Coastal Communities: Alaska Division of Geological & Geophysical Surveys Report of Investigation, 2020	This report summarized statewide analyses of long-term shoreline change at 48 Alaska communities. Shoreline datasets were compiled from previously published U.S. Geological Survey (USGS) assessments for Alaska, as well as created from historical and recent aerial images by DGGS.
Alaska Coastal Mapping Gaps and Priorities for the Assessment of Coastal Flood & Erosion Hazards, Alaska DGGS Information Circular 72, 2018	This presentation summarized the mission of the Coastal Hazards Program and defined coastal baseline data, provided guidance on which communities lack baseline data, identified missing data, and provided decision-making products to which baseline data can contribute.
Denali Commission, *Statewide Threat Assessment*, 2019	This assessment identified Alakanuk as one of the Alaskan communities most vulnerable to infrastructure impacts associated with erosion, flooding, and permafrost.
City of Alakanuk Hazard Mitigation Plan, 2018	This plan addressed the City of Alakanuk's vulnerability to potential hazards, summarized risk, and developed mitigation actions to implement as preventative

	measures.
State of Alaska DHS&EM, *HMP*, October 2018	This HMP defined Statewide hazards and potential risks.
State of Alaska DHS&EM, *Disaster Cost Index*, June 2018	The cost index identified State Disaster Declarations.
USACE, Alaska District, Baseline *Erosion Assessment: Alakanuk, Alaska*, 2009	This report documented Alakanuk's erosion problem and predicted that most of the community would be impacted within the next 50 years. The USACE estimated that the impact from erosion had the potential for over $49.9 million in damages (average annual value of $1.1 million).

5.0 Hazard Profiles

This section identifies and profiles the hazards that have the potential to affect Alakanuk.

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 MJHMP. 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.

Hazard profiling is accomplished by describing hazards in terms of their characteristics, history, breadth, magnitude, location, extent, impact, and recurrence probability. Hazards are identified through historical and anecdotal information, review of existing plans and studies, and preparation of hazard maps of 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 DMA 2000 requirements for hazard identification are described below.

DMA 2000 Requirements
Identifying Hazards **§201.6(c)(2)(i)** and **§201.7(c)(2)(i):** The risk assessment shall include a] description of the type, location and extent of all-natural hazards that can affect the jurisdictions. The Plan shall include information on previous occurrences of hazard events and on the recurrence probability of future hazard events for each jurisdiction. **§201.6(c)(2)(ii)** and **§201.7(c)(2)(ii):** 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 and planning area? **§201.6(c)(2)(ii):** Does the Plan address NFIP-insured structures that have been repetitively damaged by floods?
1. REGULATION CHECKLIST
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? B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? 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? B4. Does the Plan address NFIP-insured structures that have been repetitively damaged by floods?
Source: FEMA, 2015.

During the February 23, 2021 meeting, the Planning Team evaluated hazards for Alakanuk identified for the Lower Yukon region in the 2018 *State of Alaska HMP*. They then evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of their threat and 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 4). The Planning Team determined that five hazards pose the greatest threat to the community: changes in the cryosphere, earthquake, flood/erosion, severe weather, and wildland/conflagration fires. The remaining hazards excluded through the screening process were considered to pose a lower threat to life and property in the community due to the low likelihood of occurrence or the low probability that life and property would be significantly affected.

Table 4. Identification and Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Avalanche	No	This hazard does not exist for Alakanuk per the 2018 *State of Alaska HMP*.
Changes in the Cryosphere	Yes	Changes in the cryosphere are affecting Alakanuk. Thawing permafrost impacts community structures and causes structures to shift due to ground sinking and upheaval. The community's thawing permafrost accelerates erosion damage along the Alakanuk Pass embankment. Permafrost is present discontinuously throughout the community where thawing and upheaval periodically cause houses to shift and damage the airport runway. Additionally, Alakanuk Pass is tidally influenced from the Bering Sea (15 miles away), and wave action is increasing the rate of bank erosion.
Earthquake	Yes	Periodic, unpredictable occurrences. Cracks form on the runway. The community experienced no damage from the 11/2002 Denali Earthquake, and felt the 1964 Good Friday Earthquake.
Flood/Erosion	Yes	Storm-generated coastal erosion along the north and west shorelines occurs at a rate of five to 13.8 feet per year. Primary types of flooding occur in the community including: storm surge, rainfall-runoff, ice jam, and snowmelt flooding.
Ground Failure (Landslide/Debris Flow)	No	Ground failure due to thawing permafrost does pose a threat to the community; however, permafrost is included in the Changes in the Cryosphere section.
Tsunami & Seiche	No	This hazard does not exist for Alakanuk per the 2018 *State of Alaska HMP*.
Volcano	No	This hazard does not exist for Alakanuk per the 2018 *State of Alaska HMP*.
Weather, Severe	Yes	Extreme weather (winds, storms, and cold), rain: 122 days annual average. Annual weather patterns, severe cold, freezing rain, and snow accumulations are the predominant threats. Severe weather events cause fuel price increases and frozen pipes. Heavy snow loads potentially damage house roofs. Winds potentially remove or damage roofs. Severe cold can potentially freeze #2 heating oil.
Wildland/ Conflagration Fires	Yes	Alakanuk has identified tundra fire potential stemming from lightning and human-caused events. The community is experiencing more overgrowth than ever before and sees the fire danger increasing in the foreseeable future.

5.3 HAZARD PROFILE

The Planning Team reviewed their local hazards using the following criteria:

- Characteristics (Type);
- History (Previous Occurrences);
- Location;
- Extent (to include breadth, magnitude, and severity);
- Impact (Section 5 provides general impacts associated with each hazard. Section 6 provides detailed impacts and a vulnerability summary of potential hazards to Alakanuk's residents and critical facilities); and
- Recurrence probability.

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 Changes in the Cryosphere

5.3.1.1 Hazard Characteristics

The "cryosphere" is defined as those portions of Earth's surface and subsurface where water is in solid form, including sea, lake, and river ice, snow cover, glaciers, ice caps and ice sheets, and frozen ground (e.g., permafrost) (Figure 4). The components of the cryosphere play an important role in climate. Snow and ice reflect heat from the sun, helping to regulate the Earth's temperature. They also hold Earth's important water resources, and therefore, regulate sea levels and water availability in the spring and summer. The cryosphere is one of the first places where scientists can identify global climate change.

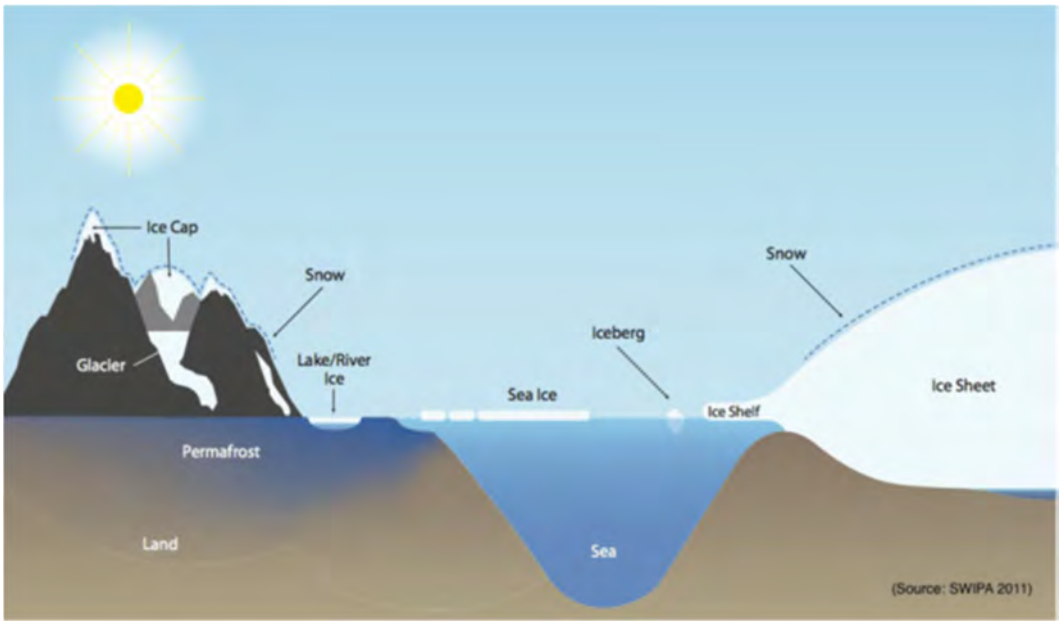


Figure 4. Cryosphere Components Diagram (DHS&EM, 2018a)

Hazards of the cryosphere can be subdivided into four major groups:

- Glaciers;

- Permafrost and periglacial features;
- Sea ice; and
- Snow avalanche.

Of these four major groups, only permafrost applies to the Alakanuk community. Changes in the cryosphere such as warmer temperatures and greater precipitation are exasperating current continued threats to Alakanuk. Related hazards to the cryosphere include flood/erosion and thawing permafrost which are significantly affecting the Alakanuk community.

Permafrost, defined as ground with a temperature that remains at or below freezing [32 degrees Fahrenheit (°F)] for two or more consecutive years, can include rock, soil, organic matter, unfrozen water, air, and ice. Regions with permafrost are typically categorized by the percentage of surface area underlain by permafrost (Figure 5): continuous (>90%), discontinuous (50-90%), sporadic (10-50%), and isolated (<10%) permafrost. Alakanuk has discontinuous permafrost. Permafrost is naturally relatively warm and will begin to degrade if the thermal regime is impacted by modifications to the ground surface. The thickness of the active layer is largely dependent upon soil type, ground cover, and snow depth. As permafrost melts, the ground slumps and becomes unstable, buckling roads, buildings, houses, and the water and sewer systems. Permafrost in combination with flooding and erosion forms a new hazard caused Usteq, from the Yup'ik word meaning "surface caves in," which is a catastrophic form of permafrost thaw collapse that occurs when frozen ground disintegrates under the compounding influences of thawing permafrost, flooding, and erosion. See Section 5.3.3.

Figure 5. Permafrost Hazard Areas Distribution Map

5.3.1.2 Climate Factors

Climate has a major effect on changes in the cryosphere hazards because these hazards are

closely linked to snow, ice, and permafrost. Changes can modify natural processes and increase the magnitude and recurrence frequency of certain geologic hazards (e.g., floods, erosion, and permafrost thaw), which if not properly addressed, could have a damaging effect on Alaska's communities and infrastructure, as well as on the livelihoods and lifestyles of Alaskans.

During the last several decades, Alaska has warmed twice as fast as the rest of the U.S. Permafrost is at an increased risk of thawing as a result of climate change. The major climatic factor leading to warming and thawing permafrost is an increase in air temperature. Another important factor is the potential increase in snow depth predicted by most climate models. Snow insulates permafrost from low winter temperatures, which leads to an increase in ground temperatures and diminishes permafrost stability. When soils are warm, permafrost becomes unstable and is sensitive to catastrophic collapse in conjunction with flooding and erosion. Even in non-ice-rich soils, process-driven models show more material is available for erosion and transport when the soil is thawed, which leads to increased exposure of underlying or adjacent frozen material to thermal and physical stressors.

5.3.1.3 Cryosphere Hazard History

There is no written record defining changes in the cryosphere in Alakanuk.

Alakanuk is being impacted by more moderate temperatures and changing seasonal timing. The community relies heavily on fishing and subsistence practices to provide food and resources that supplement store-bought goods. In recent years, residents have had to alter their subsistence practices because of a changing climate. Residents provided the following observations during a community meeting in January 2018:

- The rivers are freezing later, and ice is thinner, which makes overland travel in the winter more difficult and dangerous.
- Warmer water temperatures are impacting commercial fishing with lower average salmon runs and different species of fish beginning to come to the Alakanuk area.
- The community has experienced more fierce storms with higher winds and more severe storm surges.
- The ice coverage on the Bering Sea is receding further north each year.
- Wetlands are drying up around the community, and ponds are generally shrinking.
- More tall brush is growing around the community, which increases the potential for fires. Some of the residents stated that the increased brush height indicates that the permafrost is melting because the brush can have deeper root systems.
- More moose are inhabiting the area than before, partially due to increased brush.
- Lower river water levels are occurring, which result in fewer trees floating down Alakanuk Pass for wood collecting.

Residents provided the following observations during a community meeting in February 2018:

- Lightning is occurring more frequently.

- Permafrost degradation is affecting home elevations.

Residents in 2021 provided the following observations during a community meeting in March 2021:

- River ice seems to be thinner and thinner every year. Ice jam floods have not occurred because ice has mostly already melted by the time it reaches Alakanuk. Water levels are higher as a result, and there is more concern with potential overflow of the river into the community.
- Erosion of the river bank is increasing. The AVEC power pole that is located on the north side of the bank that transports power to Emmonak is within 20 feet of the shoreline. This pole could erode into the river.
- There is more erosion along the beach where boats are anchored.
- There are at least two fall floods every year. High water that used to disappear in a few days now stays for several weeks.
- Roads get washed out and seem to have water moving up from underneath them. This softens the roads and makes them squishy.

The complete local impact of climate change on the community is difficult to quantify because there is not 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 provided by Alakanuk residents.

5.3.1.4 Location, Extent, Impact, and Recurrence Probability

Location

Cryosphere hazards can impact any place in Alaska where water occurs seasonally or permanently in solid form, including snow cover and storm-water surges from the tidally-connected Alakanuk Pass to the Bering Sea. The elevation of the land in Alakanuk lies approximately three feet above sea level. The entire community of Alakanuk and the surrounding area are within the flood plain of the Yukon River delta. All existing foundations, gravel pads, and pilings will experience disruption from changes in the cryosphere. Figure 6 indicates that Alakanuk is located in a low to moderate permafrost hazard area.

Extent

Permafrost is found beneath nearly 85% of Alaska. Thawing causes ground subsidence, flooding, and erosion. Historical climate data shows that the average annual temperature in Alaska has warmed about 4°F since the 1950s and 7°F in winter. The growing season has lengthened by about 14 days. Models predict continued warming, including an increase in temperature by 1.5 to 5°F by 2030 and 5 to 18°F by 2100. 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

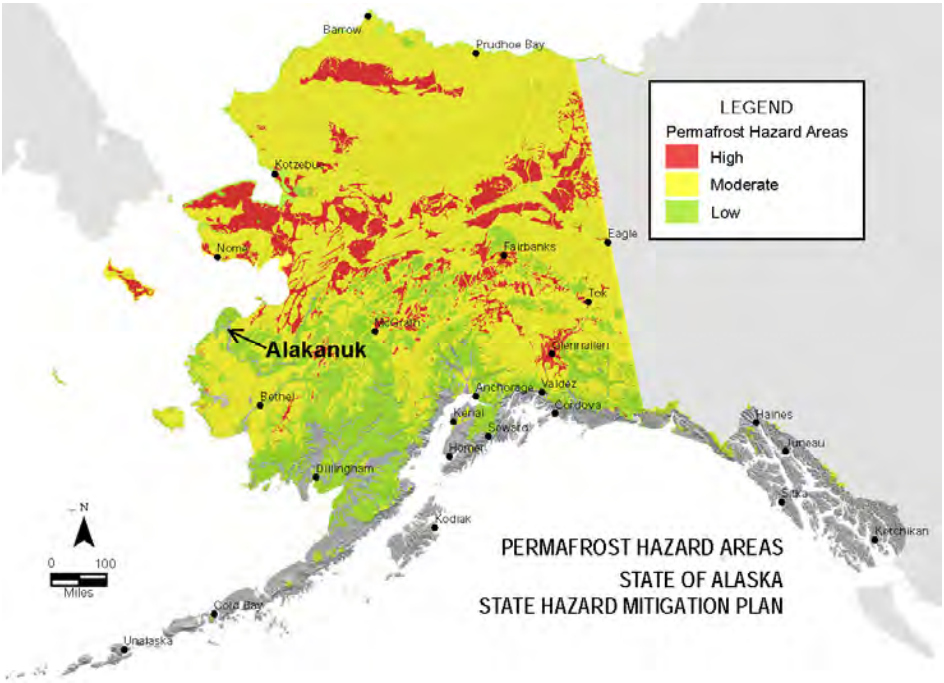


Figure 6. Permafrost Hazard Areas Distribution Map

and transportation was affected.

The University of Alaska Fairbanks and ANTHC recently submitted a grant application to the National Science Foundation Coastlines and People. If the grant is awarded, a permafrost threat assessment would be conducted in Alakanuk to predict the future impact of permafrost thaw on community infrastructure. This information would be available to include in the 2026 MJHMP Update. Additionally, a permafrost threat assessment specific to Alakanuk would be especially useful to compare with the 2019 *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities* data. In this assessment, Alakanuk received a community ranking of number 6 out of 187 communities in Alaska. A closer examination of the individual threat ranking shows Alakanuk ranked fourth overall for the threat of flooding, 14th overall for the threat of erosion, and 18th for the threat of thawing permafrost (Denali Commission, 2019). Usteq is a subset of the combined erosion, flooding, and thawing permafrost threats but was not separated for the purpose of the 2019 study. The occurrence of usteq does not conflict with the combined scores. When the threat of permafrost thaw is high in a location also subject to erosion and flooding, the occurrence of usteq may be high, and it would be ideal to evaluate the combined subset of data (Denali Commission, 2019).

Impact

Impacts associated with thawing the active layer of permafrost include surface subsidence, infrastructure, building, and/or road damage. Changes in the cryosphere do not pose a sudden and catastrophic hazard, but improperly designed and constructed buildings can settle as permafrost thaws and the ground subsides, resulting in loss of the structure or expensive repairs. Additional information about the flooding and erosion impacts are provided in Section

Recurrence Probability

Changes to the cryosphere in Alakanuk are occurring and will continue to be monitored. The active layer of permafrost continues to thaw because of warmer summers and winters than what was typically experienced in the past. The probability of future events is likely.

5.3.2 Earthquakes

5.3.2.1 Characteristics

Earthquakes are 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 earthquakes can be felt far beyond the site of their occurrences. Earthquakes usually occur without warning and after only a few seconds, can cause massive damage and numerous casualties. The most common effect of earthquakes is ground motion.

Ground motion generally increases with the amount of energy released and decreases with distance from its epicenter. An earthquake generates seismic waves from the earth's interior and surface waves travelling along the earth's crust. 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), 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. 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 feet, but up to 100 feet), 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 rock falls, rockslides, and soil slides. Debris flows are created when surface soil on a steep slope 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 upon the damage and observed effects on people and the natural and built environment. The intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The epicenter is the point on the earth's surface directly above the earthquake's origin. The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale. As shown in Table 5, the MMI Scale consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction.

Magnitude (M) is the measure of the earthquake's 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).

5.3.2.2 Earthquake History

The Planning Team determined Alakanuk has not experienced damaging effects from their historical earthquake events. According to the USGS earthquake database, Alakanuk has had 34 earthquake events greater than M 2.5 within a 100-mile (160 km) radius of the community within the last 61 years. Of those 34, none have exceeded M 5.0 with the greatest being a M 4.5 in 1985. Table 6 lists all historical earthquakes from 1957 to the present which exceeded M 4.0 within 100 miles of the community. These earthquakes did not induce any major damage due primarily to the community's structure types and foundation support system designs.

North America's strongest recorded earthquake occurred on March 27, 1964, in Prince William Sound, measuring M 9.2 and was felt by many residents throughout Alaska. Alakanuk felt ground motion resulting from this historic event; however, no local damage occurred.

5.3.2.3 Location, Extent, Impact, and Recurrence Probability

Location

Alakanuk is located in an area that is less active with earthquakes than others in the State. Although the effects of earthquakes centered elsewhere are expected to be felt in Alakanuk, 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.

Extent

Only a few documented earthquakes of magnitude 6.0 or greater have been recorded in western Alaska, of which the 1958 Huslia earthquake (M 7.3) was the largest. This shock reportedly produced extensive failure in surficial unconsolidated deposits. The second largest (M 6.9) occurred in the Chukchi Sea in 1928. The nearest M 6 or greater earthquake occurred more than 130 miles northeast of Alakanuk in the southern Seward Peninsula. In general, the seismicity in western Alaska in the M 2.0 to 5.0 range appears to be widespread and confined to relatively shallow crustal depths. The Yukon-Kuskokwim Delta appears to be the least seismically area active in western Alaska, noted by the lack of active faults in the area (see

Figure 7).

Impact

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.

Table 5. Magnitude/Intensity/Ground-Shaking Comparisons

Modified Mercalli Intensity	Magnitude	Description	Perceived Shaking
I	1.0 – 2.0	Not Felt	Felt by very few people; barely noticeable.
II	2.0 – 3.0	Weak	Felt by a few people, especially on upper floors.
III	3.0 – 4.0		Noticeable indoors, especially on upper-floors, but may not be recognized as an earthquake.
IV	4.0	Light	Felt by many indoors, few outdoors. May feel like heavy truck passing by.
V	4.0 – 5.0	Moderate	Felt by almost everyone, some people awakened. Small objects moved; trees and poles may shake.
VI	5.0 – 6.0	Strong	Felt by everyone. Difficult to stand. Some heavy furniture moved; some plaster falls. Chimneys may be slightly damaged.
VII	6.0	Very Strong	Slight to moderate damage in well-built, ordinary structures. Considerable damage to poorly-built structures. Some walls may fall.
VIII	6.0 – 7.0	Severe	Little damage in specially-built structures. Considerable damage to ordinary buildings, severe damage to poorly-built structures. Some walls collapse.
IX	7.0	Violent	Considerable damage to specially-built structures, buildings shifted off foundations. Ground cracked noticeably. Wholesale destruction. Landslides.
X	7.0 – 8.0	Extreme	Most masonry and frame structures and their foundations destroyed. Ground badly cracked. Landslides. Wholesale destruction.
XI	8.0		Total damage. Few, if any, structures standing. Bridges destroyed. Wide cracks in ground. Waves seen on ground.
XII	8.0 or greater		Total damage. Waves seen on ground. Objects thrown up into air.

(MMI, 2011)

Table 6. Earthquakes Greater than M 4.0 within 100 Miles of Alakanuk (USGS, 2021)

Date / Time	Latitude	Longitude	Depth (km)	Magnitude	Place
03/08/2015 20:23	64.06	-165.265	19.3	4.3	49km S of Nome, AK
06/20/2009 11:15	63.307	-166.836	10	4.3	Bering Strait
12/19/2004 02:35	63.526	-165.745	6.9	4.2	Bering Strait
04/01/1989 09:25	63.561	-164.27	33	4.1	Northern Alaska
09/15/1985 08:23	63.33	-166.146	15	4.5	Bering Strait

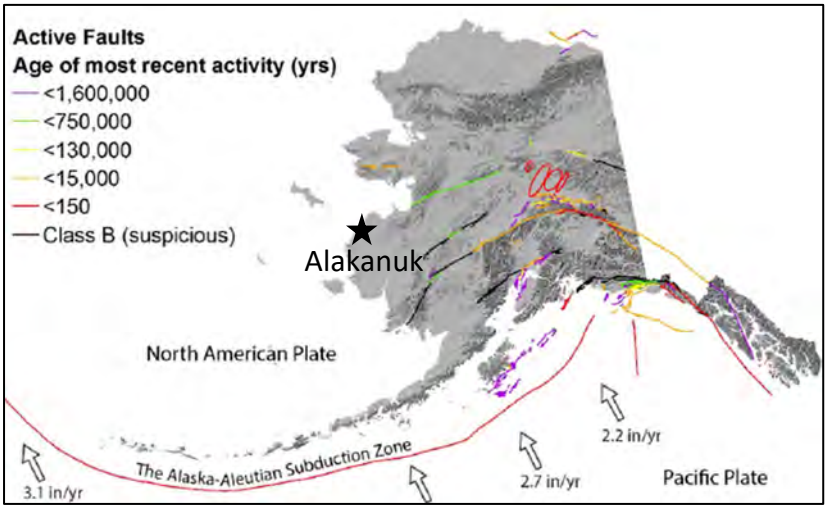
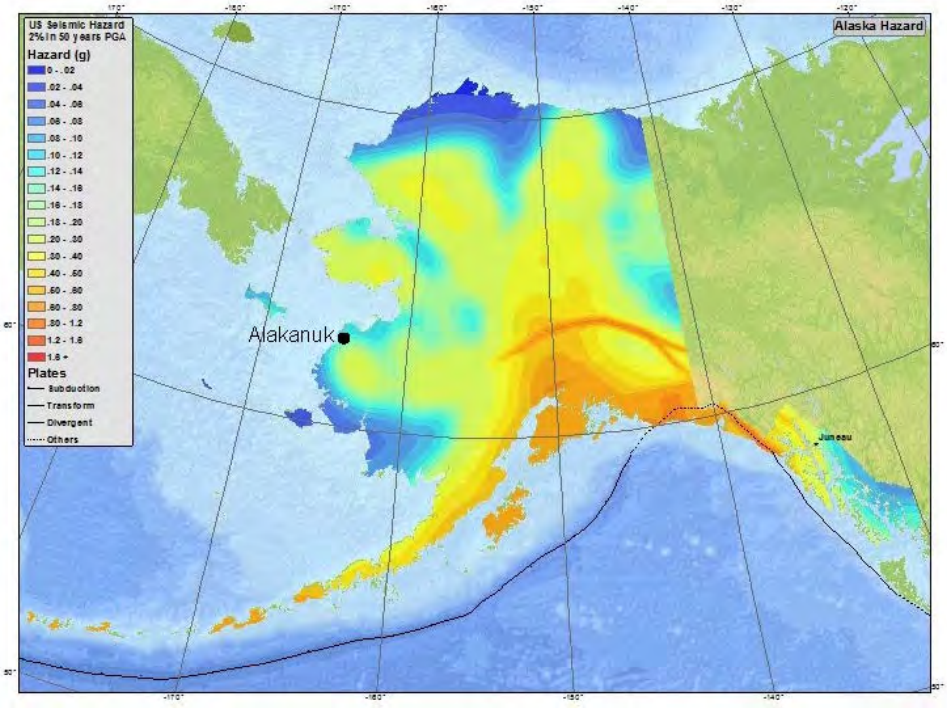


Figure 7. Active and Potentially Active Faults in Alaska (DHS&EM, 2018a)

Recurrence Probability

Alakanuk 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 on Figure 8, Alakanuk has a 2% probability of ground acceleration of 0.16-0.18 *g* occurring in 50 years. A 2% probability in 50 years is a rare, large earthquake, and statistically, it happens on average every 2,500 years. The probability of an earthquake affecting Alakanuk is possible, but not likely. The Planning Team decided not to carry earthquakes forward in the risk assessment or mitigation strategy of this 2021 MJHMP.

Figure 8.Alakanuk's Earthquake Probability (USGS, 2020)



5.3.3 Flood and Erosion

5.3.3.1 Hazard Characteristics

Approximately 6,600 miles of Alaska's coastline and many low-lying areas along Alaska's riverbanks are subject to severe flooding and erosion. The U.S. Government Accountability Office (GAO) reported in 2003 that flooding and erosion affected 184 out of 213 (86%) of Alaska Native villages because of rising temperatures. Alakanuk was also included in the 2009 GAO Report 09-551 as one of the 31 Alaska Native Villages imminently-threatened by flooding and erosion. In addition, the GAO suggested bundling funds from agencies to address erosion and flooding in Alaska Native villages. Many of the problems are long-standing although studies indicate that increased flooding and erosion are being caused in part by changes in the cryosphere (DHS&EM, 2018a).

In 2009, the USACE published the Alaska *Baseline Erosion Assessment* (BEA) which identified 178 communities in Alaska as having erosion problems ranging from minor to severe. Alakanuk was included in the *BEA*, which was funded by Congress to coordinate, plan, and prioritize erosion responses in Alaska from 2005 to 2009. The USACE has since been directed by Congress to begin considering non-monetary benefits (Section 116 of the Energy and Water Development and Related Agencies Appropriations Act of 2010, P.L. 111-85) for Alaska communities when determining federal interest in a potential project (Denali Commission, 2019).

The 2019 Denali Commission *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities* identified Alakanuk as a "threatened" community. The vulnerability of 187 communities to three infrastructure threats—erosion, flooding, and thawing permafrost—were evaluated individually in this threat assessment. These threats generally operate at different timescales and impact infrastructure through different processes. Any of these threats can be catastrophic to a community. When combined, the impacts can be exacerbated, resulting in usteq (Denali Commission, 2019).

As a result, the *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities* presented a combined score as an aggregate of these three individual threats. Of 187 communities throughout Alaska, Alakanuk received a community ranking of number 6. Communities ranking higher than Alakanuk were Shaktoolik, Shishmaref, Kivalina, Golovin, and Napakiak. These top six communities were attributed with notably higher normalized scores than the other 181 Alaska communities. A closer examination of the individual threat ranking shows Alakanuk ranked fourth overall for the threat of flooding, 14th overall for the threat of erosion, and 18th for the threat of thawing permafrost (Denali Commission, 2019).

Of the three threats, erosion is the most readily-observed and identified. The erosion process is continuously observable at the point of impact, although the rates may vary according to conditions. Prediction of erosion usually involves observations of current rates and consideration of potential changes to those rates. Flooding, on the other hand, is readily observed during a flood event, but is a discontinuous process. Prediction of future floods is based upon the frequency of past floods, sometimes in conjunction with predictions of

potential changes in climatic conditions. The threat of damage via thawing permafrost is highly dependent upon subsurface conditions, which are themselves often poorly characterized. Moreover, thawing permafrost damage is also dependent upon a host of other factors including engineering design and climatic conditions. Thus, thawing permafrost is not only difficult to observe until after the infrastructure has been damaged, but is also relatively difficult to predict in areas where damage has not yet occurred. Usteq is the most difficult to predict because it incorporates the uncertainties associated with each individual threat. Usteq is a subset of the combined threats but was not separated for the purpose of this study. The occurrence of usteq does not conflict with the combined scores. When the threat of permafrost thaw is high in a location also subject to erosion and flooding, the occurrence of usteq may be high (Denali Commission, 2019).

While the processes at Alakanuk provide one example of usteq, usteq should not be considered a process limited to coastal or riverine sites. Water conducts heat much more readily than air, for example. Thus, any contact of water with ice rich permafrost in coastal, riverine, or terrestrial environments may cause rapid thaw and resultant infrastructure damage (Denali Commission, 2019).

The interactions between erosion, flooding, and thawing permafrost often become clear after the onset of usteq, but their combined impacts are rarely considered beforehand. This is due to a lack of knowledge regarding how best to predict the interaction between the threats. Predictions of erosion, flood, and thawing permafrost damage are themselves fraught with uncertainty and are highly-dependent upon the location and design of the infrastructure within each community. When attempting to predict the interactions between these threats, this uncertainty is compounded (Denali Commission, 2019).

Flooding

Flooding is the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, or 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.

Primary types of flooding that occur in the community of Alakanuk: rainfall-runoff, snowmelt runoff, ice jam floods, and storm surge flooding.

The highest risk to rainfall-runoff flooding occurs during late summer and early fall seasons. Most of the annual precipitation occurs April through October with August typically being the wettest month. The risk to rainfall generated floods corresponds to this cycle. The rainfall intensity, duration, distribution, and geomorphic characteristics of the watershed all play a role in determining the magnitude of the flood.

Snowmelt floods typically occur from April through June. Snowpack depths, spring weather patterns, and geomorphic characteristics of the watershed determine the magnitude of flooding.

Ice jam floods occur after an ice jam develops on a river and blocks the path of flowing water. The depth of the ice jam snowpack and break-up weather patterns upriver influence the

volume of water entering the Yukon River drainage. When an ice jam occurs, water collects upstream from the jam, flooding an area by creating a lake-like effect, analogous to a dam. Once the jam is breached, there is usually a rapid draining of the water from behind the jam. Not only does the downstream water level rise significantly once the jam is breached, but there is substantial current which can cause erosion and extensive damage. Additionally, the rising water causes the ice to float, and the increased velocities move the ice further downstream. The motion of large solid blocks of ice is often very destructive. In Alakanuk, the highest risk to ice jams and snow melt flooding occurs in early summer, also referred to as breakup season.

Erosion

Erosion is a process that involves the gradual wearing away, transportation, and movement of land. However, not all erosion is gradual. It is usually gradual but can occur rapidly as the result of floods, storms, or other events or slowly as the result of long-term environmental changes. Most of the geomorphic change that occurs in a river system is in response to a peak flow event. Erosion is a natural process, but its effects can be exacerbated by human activity.

Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure. Three main types of erosion affect human activity in Alaska:

- Coastal erosion;
- Riverine erosion; and
- Wind erosion.

In Alaska, coastal erosion is the most destructive, riverine erosion a close second, and wind erosion a distant third.

The Alakanuk Pass Slough is tidally influenced by the Bering Sea. Coastal erosion is primarily due to ocean current, wave action, and/or storm surge. Wave action is the most common cause. Coastal erosion is usually described in terms of sediment transport, which is identified by the volume and direction of material moved along a coastline, longshore or cross-shore. The rate of sediment transport is dependent upon wave energy and direction along a section of coastline, as well as the material composition of a shoreline. Most dynamic shorelines are composed of coarse to fine sand, which is more easily transported by wave action. In some high energy environments, beaches are formed of gravel, cobbles, and boulders, which are only transported by larger wave action. Longshore sediment transport occurs when waves approaching the coastline at an angle move beach material down the shoreline in the same direction as the waves, an action also known as the direction of sediment drift. This process is dependent on the availability of sediment from updrift locations and on the wave-energy affecting a site. When considering a section of coastline, if the volume of material being transported into an area is the same as the volume transported out, the beach is in equilibrium, and no erosion or accretion occurs. If more material enters the section of coastline than leaves it, accretion occurs, with the beach width and elevation increasing and dune formations, if present, increasing in size. If more sediment leaves the area than enters it, a sediment deficit occurs, and the shoreline retreats inland (Denali Commission, 2019).

Cross-shore sediment transport occurs when material along the beach profile is moved either

onshore to higher elevations, or offshore to lower elevations, depending on the wave conditions. During mild wave conditions, typically during summer months in Alaska, material is deposited on the upper slopes of the beach, which builds up the shoreline. During fall and early winter, storm events produce more energetic wave conditions, which tend to erode material from the shore and deposit it in an offshore bar. When net transport over time is offshore, the shoreline retreats inland (Denali Commission, 2019).

Storm surge is the most common cause of flooding in coastal Alaska. The National Weather Service (NWS) defines storm surge as the abnormal rise of water generated by a storm, over and above the normal highest astronomical tide; a surge is expressed in terms of height above predicted or expected tide levels. Storm surge severity depends on strength and duration of the driving storm event as well as coastline geometry and bathymetric profile. Topography beyond the beachline also determines how much land is susceptible to such surges. While storm surge is an issue throughout western Alaska, Bering Sea communities experience some of the most severe events (Denali Commission, 2019).

As relative sea level change is realized, the depth of storm surge flooding may increase in areas that experience rising relative mean sea level. The changes in shore-fast ice extent also affect the period of time that the shoreline is exposed to storm surge. If local shore-fast ice decreases, the community's infrastructure, which historically has been shielded by shore-fast ice, may be at risk due to storm events.

Shore-fast ice that forms in the fall protects the shoreline from damaging energetic fall storms. Between 1976 and 2007, the extent of shore-fast ice in the Arctic decreased by approximately 0.7% per year. In 2006, the National Oceanic and Atmospheric Administration (NOAA) began publishing an annual peer-reviewed Arctic Report Card. In the 2018 Report Card, researchers reported that "pan-Arctic observations suggest a long-term decline in coastal landfast (herein referred to as *shore-fast*) sea ice since measurements began in the 1970s, affecting this important platform for hunting, traveling, and coastal protection for local communities." With decreasing shore-fast ice extent, coastal communities could be exposed to ocean currents, wave action, and storm surge for a longer period, putting infrastructure at greater risk of being undermined by erosion (Denali Commission, 2019).

Riverine erosion is primarily due to river currents. Rivers and streams are dynamic systems that respond to changes in flow and sediment. Usually, these changes alter the course of a stream or the shape of its banks. The current of a river typically flows fastest over the deepest portion of the channel, called the thalweg. Most streams in Alaska are meandering streams that follow sinuous paths. At river bends, the thalweg is located along the outside bend, often called the cut bank. At the cut bank, higher velocity currents flow adjacent to the bank and result in erosion. Along the inside bank, or point bar, the current is slowest. These slower currents tend to cause deposition. By these two processes, rivers tend to meander toward the outside banks of their bends. Over time, the channel of the river will shift laterally. Many communities in Alaska build infrastructure on the cut bank of a channel to take advantage of the greater water depth along the thalweg. Deeper water enables the use of barges to deliver goods and materials to a community; however, it also makes ground near the barge landing susceptible to erosion that can undermine infrastructure. Boat wakes also contribute to this process, though

wakes can cause erosion on both banks of a channel. In areas of high boat traffic, channels generally become wider over time as waterline erosion causes steepening and calving of the riverbanks (Denali Commission, 2019).

Flow conditions on rivers constantly change. Seasonal changes due to precipitation and freezing can cause dramatic changes in channel flow, moving from virtually no flow (freezing) to flood stage (large rainstorm or thawing events). While erosion can be a continuous process in streams, it is usually most significant during high-flow events. Flow velocity is greatest when a reach is at stream-forming flow, when the water level is at the top of the bank but not in the floodplain. This stage causes the greatest rates of erosion. Beyond seasonal changes, long-term climatic trends can either increase or decrease the amount of water a river carries. Rivers react to changes in flow by altering channel geometry to best accommodate the water. A channel experiencing increasing flow may become wider and straighter to allow it to carry the water to its terminus more quickly. Where flows are reduced, the channel may become braided as velocities decrease, causing suspended material to settle out more quickly (Denali Commission, 2019).

In braided river systems, such as the Yukon River, the amount of sediment available to the system far exceeds the water's ability to transport it downstream. The channel extents are defined by a braided plain that developed where the channel has historically run. The main flow of these rivers is unpredictable, and channel avulsion can rapidly change the river course within the braided plains. When the channel runs against the edge of the braided plain, erosion will occur, potentially very rapidly, depending on the material at the braided plain boundary.

Rivers constantly alter their course, changing shape and depth, trying to find a balance between the sediment transport capacity of the water and the sediment supply. This process, called riverine erosion, is usually seen as the wearing away of riverbanks and riverbeds over a period of time.

Riverine erosion is often initiated by high sediment loads or heavy rainfall. This generates high volume and velocity run-off which concentrates in the lower drainages within the river's catchment area. Erosion occurs when the force of the flowing water exceeds the resistance of the riverbank material. The water continues to increase its sediment load as it flows downstream. Eventually, the river deposits its sediment in slower moving sections such as dams or reservoirs. The river may eventually change course or develop a new channel. In less stable braided channel reaches, erosion and deposition are constant issues. In more stable meandering channels, erosion episodes may infrequently occur.

Alakanuk is primarily vulnerable to riverine erosion, which results from the force of flowing water 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 in Alakanuk threatens the embankment, structures (both critical and non-critical facilities) and the subsistence livelihood of residents. Not only do high river flow rates (such as during breakup) contribute to increased erosive scour, climate change has accelerated the normal

process along the Yukon River; warmer temperatures degrade the soil, and heavier rains produce more floods and swollen rivers that wash away the soil (DHS&EM, 2018a). Riverine erosion is a concern for Alakanuk where disappearing land threatens development and infrastructure from spring snowmelt run-off and increased water flow when ice jams back-up, and the rapidly increased water column overflows into the community.

Wind erosion occurs when wind is responsible for the removal, movement, and redepositing of land. It occurs when soils are exposed to high-velocity wind. Wind will pick up the soil and carry it away. Wind erosion can cause a loss of soil. Loess, deposits of silt laid down by wind action, can reduce visibility, cause accidents, hinder machinery, and have a negative effect on air and water quality, creating animal and human health concerns. Wind erosion also causes damage to public utilities and infrastructure.

Wind erosion is not a current concern for the Alakanuk community, but winds are increasing, and it is a concern for the future. It is anticipated that as the cryosphere changes, dust from the Yukon River drainage systems will cause dust storms that could greatly exceed national health-based standards and contribute to increased erosion rates. Sources of particulate come from river drainages, gravel pits, wood stoves, open burning, unpaved roads, and bare soil/erosion.

5.3.3.2 History

Because Alakanuk is threatened during spring melt/high river level, the DHS&EM *Disaster Cost Index* (DHS&EM, 2018b) is included as a historical index of historical flood/erosion events affecting Alakanuk. The nature of these storms has progressively gotten more intense, causing more damage to the community. The index lists the following events:

28. Alakanuk, June 13, 1984: *Ice jam caused flooding caused extensive damage to the village road system. Subsequent to the Governor's Proclamation, the State awarded a categorical grant to the City to repair the roads.*

132-142. Fairbanks/North Star Borough, Aniak, McGrath, Red Devil, Anvik, Grayling, Emmonak, Holy Cross, Alakanuk, Shageluk, Galena. The Governor declared on May 3-23, 1991; then FEMA declared May 30, 1991: *Record snowfalls in the interior combined with sudden Spring melt caused flooding all along the Yukon and Kuskokwim River systems. Numerous State Declarations were combined into a single Presidential Declaration of Major Disaster (FEMA-0909-AK) that authorized assistance for repair of public property only. State Disaster Relief Funds were used to implement the Individual and Family Grant Program in all of the communities included in the federal declaration.*

176. Yukon Kuskokwim Delta: *On June 5, 1995, the Governor declared a condition of disaster emergency existed in the Cities of Akiak, Kwethluk, Napaskiak, Emmonak, and* ***Alakanuk****, as a result of inundation. As a result of this disaster roads, boardwalks, and other public works essential to vital community services were damaged.*

02-200 02 Interior Floods (AK-DR-1423) Declared May 29, 2002 by Governor Knowles; then, FEMA-Declared (DR-1423) on June 26 2002: *Flooding occurred in various interior and western Alaska river drainages, including the Tanana, Kuskokwim, Nushagak, Susitna and Yukon River drainages beginning on April 27, 2002 and continuing. The floods caused widespread damage to and loss of property in the Fairbanks North Star Borough (Tanana River drainage); in McGrath, Lime Village, Sleetmute, Red Devil, Crooked Creek, Aniak and Kwethluk (Kuskokwim River drainage); Ekwok and New Stuyahok (Nushagak River drainage); in the Susitna River drainage from Chase to Montana Creek; and in Emmonak (Yukon*

River drainage). The following conditions existed as a result of this disaster: widespread damage to public facilities and infrastructure, including damage to public airports, roads, and buildings; to public utilities, including water, sewer, and electrical utilities; to personal residences, in some areas requiring evacuation and sheltering of residents; to commercial operations; and to other public and private real and personal property. Public & Individual Assistance provided as well as the 404 Mitigation Program. The Governor's amendment dated July 12, 2002 added ***Alakanuk*** *to the State Declaration. The total for this disaster was $6.13 million.*

05-213 2005 Spring Floods (AK-05-213) declared July 20, 2005 by Governor Murkowski: *Beginning May 13, 2005, a large ice jam blocked the mouth of the Lower Yukon River and caused widespread flooding to the cities of Emmonak and* ***Alakanuk****. In both cities, several roads were inundated and eroded by the floodwaters. Floodwaters also inundated City infrastructure to include the above-ground circulating water and vacuum sewage systems which were displaced and/or knocked off their mounting supports. Both cities have submitted local disaster declarations requesting State assistance. There were no life safety issues during this event. Floodwaters subsequently subsided to normal levels within the river banks on or about May 18, 2005. Individual Assistance totaled $300K for 75 applicants. Public Assistance totaled $1.06 million for three applicants with eight project worksheets (PWs). The total for this disaster was $1.55 million.*

06-218 2006 Spring Floods (AK-06-218) declared June 27, 2006 by Governor Murkowski; then, FEMA-declared (DR-1657) on August 04, 2006*: Beginning May 5, 2006 continuing through May 30, 2006, the NWS issued flooding warnings and watches across the state as excessive snowmelt and ice jams caused flooding along the Yukon, Kuskokwim, and Koyukuk river drainages. The most serious impacts were reported in the communities of Hughes, Koyukuk, Kwethluk,* ***Alakanuk****, and Emmonak, along with substantial damage to State-maintained airports, roads, and highways. In each community, large portions of the village, city infrastructure, and several roads were inundated and eroded by the floodwaters.*

09-227 2009 Spring Flood declared by Governor Palin on May 6, 2009; then, FEMA-declared under DR-1843 on June 11, 2009: *Extensive widespread flooding due to snow melt and destructive river ice jams caused by rapid spring warming combined with excessive snow pack and river ice thickness beginning April 28, 2009 and continuing. The ice jams and resultant water backup along with flood waters from snow melt left a path of destruction along 3,000 miles of interior rivers, destroying the Native Village of Eagle and forcing the evacuation of multiple communities. The following jurisdictions and communities in Alaska were also impacted: the Copper River REAA including the Village Community of Chisotchina; the Matanuska-Susitna Borough; the Yukon Flats REAA including the City of Circle, City of Fort Yukon, the Villages Communities of Chalkyistik, Beaver, Stevens Village, and Rampart; the Yukon-Koyukuk REAA including the Cities of Tanana, Ruby, Galena, Koyukuk, Nulato, and Kaltag; the Iditarod Area REAA including the Cities of McGrath, Grayling, Anvik, and Holy Cross; the Northwest Arctic Borough including the Cities of Kobuk, and Buckland; the Lower Yukon REAA including the Cities of Russian Mission, Marshall, Saint Mary's, Mountain Village, Emmonak,* ***Alakanuk****, and Pilot Station and the Community of Ohogamiut; the Lower Kuskokwim REAA including the Cities of Bethel, Kwethluk, Napakiak, Napaskiak, and the Village Community of Oscarville; the Yupiit REAA including the City of Akiak, and the Villages of Akiachak, and Tuluksak; the Kuspuk REAA including the Cities of Aniak, Upper Kalskag, Lower Kalskag, and the Villages Communities of Stony River, Sleetmute, Red Devil, Crooked Creek, and Napaimute; the Fairbanks North Star Borough including the City of North Pole and Community of Salcha; and the Bering Strait REAA including the City of Nome area.*

13-242 2013 Spring Floods declared by Governor Parnell on May 30, 2013; then, FEMA-declared on June 25, 2013 (DR-4122): *Beginning on May 17, through June 10, 2013, excessive snow pack and ice*

*thickness, combined with rapid spring warming caused ice jams and severe flooding. The following jurisdictions and communities in Alaska have been impacted: Alaska Gateway REAA including the City and Village of Eagle; the Copper River REAA including the Village Communities of Chisotchina and Gulkana; the Yukon Flats REAA including the Community of Circle and City of Fort Yukon; the Yukon-Koyukuk REAA including the Cities of Galena; and the Lower Yukon REAA including the Cities of Emmonak and **Alakanuk**. The impact of the flooding resulted in severe damage to approximately 194 homes (requiring evacuations and sheltering) to include loss and damage to personal property, multiple businesses (including loss of revenue), and public infrastructure to include: hazardous and non-hazardous debris removal, emergency protective measures (leading to ongoing mass care operations), damage to city and state roads, bridges, water and sewer systems, electrical generation and distribution systems, recreation areas and fuel storage facilities.*

Flooding

Table 7 shows a history of major flood events impacting Alakanuk that provide more detail than the DHS&EM Disaster Cost Index (DHS&EM, 2018b) and events that may not have been declared at a State level.

Table 7. Historic Flood Events

Date	Magnitude
1952	Highest water level on record. Approximately five feet deep in the highest part of the old village.
1971	All buildings flooded except for the store.
1972	Approximately two feet of water in the highest part of the old village. 70 houses were flooded.
1975	49 houses flooded. Electrical transformers were underwater.
1984	Two or three houses flooded; most houses were surrounded.
1985	High-water mark six feet below the top of the deck on the upstream, landward side of the high school.
2005	Flood damage caused approximately $700,000 in damage to public roads including the subdivided road in the AVCP housing area.
2006	Flood damage to public roads, many homes causing approximately $750,000 in damage.
2009	Several homes along the river were flooded with one to three feet of water. A preliminary estimate of property damage was estimated at $35,000.
2011	Coastal flood/storm surge caused water levels to rise significantly in lower Yukon river. No damage was reported in Alakanuk.
2013	Water was two to three feet deep in spots in Alakanuk. Three or four homes had water in them and the residents of these homes were evacuated. The sewage lagoon was inundated, and it was noted that some propane tanks were floating in town.

(DHS&EM, 2018b)

Erosion

Erosion in Alakanuk is episodic, occurring during two times of the year: spring break-up and fall storm season. During breakup, the Yukon River experiences high flows due to thawing snow and ice as well as surges caused by the failure of ice jams upriver. These higher flows increase the hydraulic friction of water against the soil of the bank. This particularly affects the scour hole where erosion is caused by direct impingement of the current against the bank.

In 1975, riverine erosion destroyed the cannery in Alakanuk and forced the relocation of many homes. In 1993, 20 feet of bank eroded in one day.

Alakanuk was designated a Priority Action community by the USACE in 2009, meaning that erosion issues warrant immediate and substantial Federal, State, or other intervention. This

designation means that “erosion is threatening the viability of the community, significant resources are being expended to minimize such threats, or both conditions are present.”

Alakanuk is at the entrance to Alakanuk Pass, a major southern channel for the Yukon River. The most serious erosion problems are at a large scour hole along the riverbank at the midpoint of the community. Too deep to fill, the scour area threatens several homes, community buildings, and a wide range of utilities. The community received grants to relocate residences: 14 were relocated in 1999, six in 2006, and two in 2016. In the near term, five homes and the Tribal Hall are threatened by erosion and are identified to be relocated.

It is likely that changes associated with a warming climate will cause erosion to accelerate. Examples of factors that may contribute to increased erosion include: the average annual temperature in Western Alaska is predicted to increase 7-13°F by 2100; heavy precipitation events are expected to increase, sea level is expected to rise, and permafrost is expected to degrade. To best adapt to future conditions, Alakanuk has sought and been awarded funding to relocate structures threatened by erosion, complete a comprehensive riverine erosion assessment, and collect data to inform the assessment of long-term flood risk, among other ongoing and future projects. These actions are listed in Sections 7.3 and 7.4 and Table 17.

5.3.3.3 Location, Extent, Impact, and Recurrence Probability

Location

Flooding

The USACE has designated the Alakanuk area as a high-flood hazard community. The entire community of Alakanuk is vulnerable to the effects of flooding. Conversations with residents indicate that flooding usually occurs during spring break-up and typically covers the entire community to a depth of two to four feet. High water marks were established at two locations by the USACE based on the water level of the 1952 flood (Figures 9 and 10).

- The downstream shore side of the support piling of John Hanson's house (northwest corner).
- The utility pole downstream and inland approximately 100 yards southwest of John Hanson's house.

The estimated zero damage elevation is approximately three feet below the established highwater mark at John Hanson's house. The recommended building elevation is one foot above the established highwater level. Alakanuk passed an ordinance in 1993 that requires all future buildings to be constructed above the 1952 high-water mark.

Erosion

Alakanuk is located along the banks of Alakanuk Pass, a major southern channel of the Yukon Delta, and is 15 miles from the Bering Sea. All of the structures located along the banks of the river are subject to the effects of erosion. Figure 11 and Figure 12 show the USACE erosion assessment maps, which indicate the locations of erosion and show the predicted future shorelines.

Many of the problems are long-standing, although studies indicate that increased flooding and

HWM #1(RP-1) Located on teh downstream, shoreside of the support piling of John Hanson's house (NW corner).

HWM #2(Rp-2) Located on the utility pole downstream and inland (approximately 100 yards SW) of John Hanson's house.

Figure 9. High Water Marks #1 and #2 (USACE, 1997)

Flood Gauge Location

Flood Gauge

Figure 10. Alakanuk Flood Gauge (USACE, 2011)

erosion occur together in Alakanuk because of increased water currents that get raised above the normal riverbank. Due to the low elevation of the community, flooding effects can occur throughout the community.

The entire community of Alakanuk can potentially be impacted by flood/erosion events. The State of Alaska has had 32 federal disaster declarations since 1953; 15 for flooding and none for erosion (GAO 2009). In 2002, Alakanuk received $208,898 to relocate and elevate 15 homes and 1 city building after a flood in association with funding from FEMA's Hazard Mitigation Grant Program (GAO, 2009).

DGGS completed an Alaska Coastal Mapping Gaps and Priorities Study for the assessment of coastal flood and erosion hazards of Alaska in 2018. They used small fixed-wing aircraft and drones to collect high-resolution aerial imagery, particularly in remote regions of Alaska that

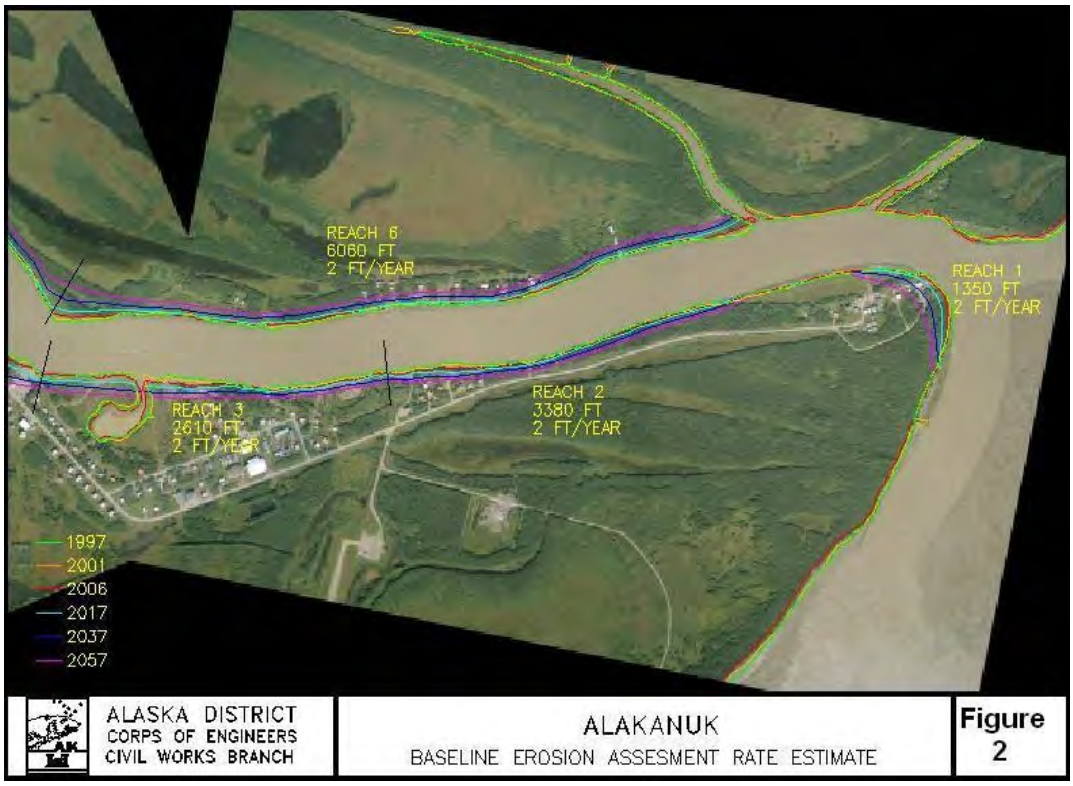


Figure 11. Alakanuk Erosion Reaches 1, 2, 3, and 6 (USACE, 2009)

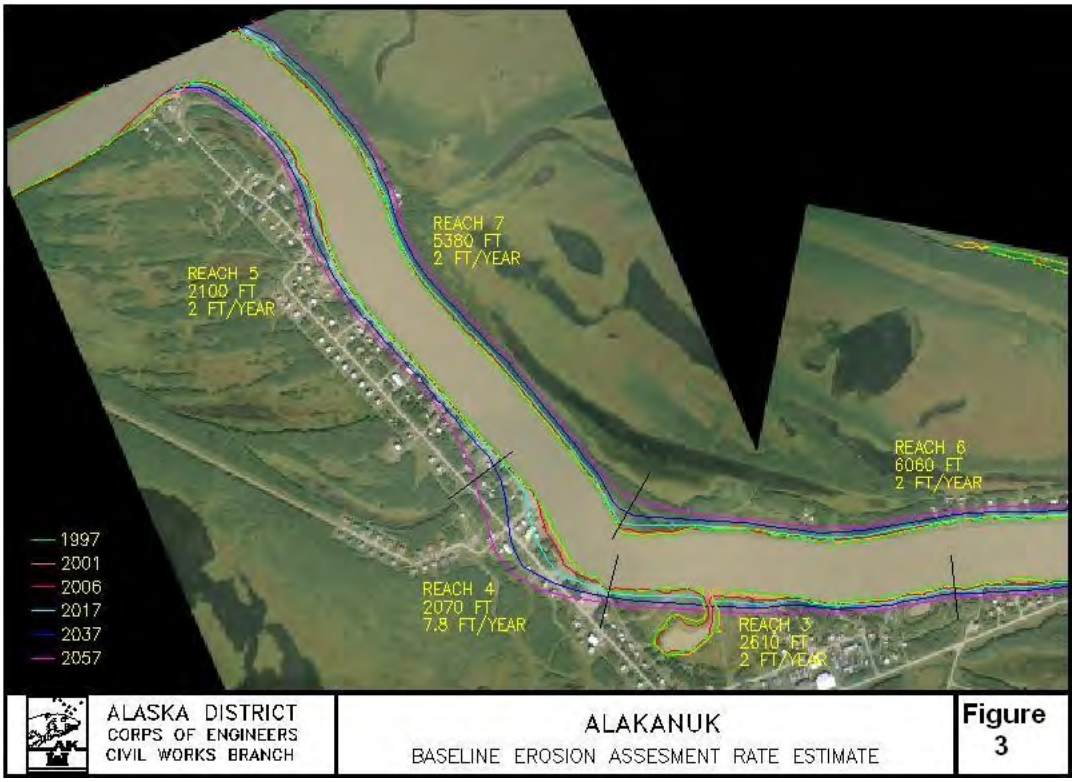


Figure 12. Alakanuk Erosion Reaches 3, 4, 5, 6, and 7 (USACE, 2009)

have been logistically challenging to reach. Advances in processing digital aerial photographs using "Structure-from-Motion computer algorithms have lowered the barriers to producing high-resolution orthoimagery. Figure 13 shows the extent of coastal orthoimagery collected during this project.

Figure 13. DGGS Orthoimagery (DGGS, 2020)

Erosion at Alakanuk is occurring from the Yukon River. Figures 14, 15, and 16 show rates of erosion. Figure 15 is in draft form, but preliminarily identifies critical infrastructure that may be impacted by erosion with forecasted timelines with color coding. Imagery of the Alakanuk Pass's channel movement from 1951, 1980, and 2015 shows historic erosion, and erosion that is forecast by 2075. Homes, powerlines, waterlines, roads, and the Tribal Hall and Offices are at risk. Other critical infrastructure is shown in an area of uncertainty. Figure 16's gray areas represent shorelines that are considered stable. Orange and yellow highlighted shorelines indicate actively eroding shorelines with erosion rates of one to 13.8 feet per year. These actively eroding shorelines are co-located with Alakanuk's critical infrastructure.

Flooding and erosion are the number one hazard of concern in Alakanuk, and several studies are underway to prepare updated flood and erosion hazard assessment maps. Valuable information will be available to be included in the 2026 MJHMP Update that will include the following:

- The DGGS Draft Erosion IMPACT Map will be finalized.
- Flooding and erosion hazard assessment maps will be prepared. Strong southerly storms in combination with changes in the cryosphere have accelerated erosion of the riverbanks in the last five to seven years.

- A Threatened Infrastructure Survey will be conducted to enable both jurisdictions to apply for funding to relocate or elevate structures or infrastructure in danger.
- The USACE is collecting data to assess long-term flood risk due to climate change.
- A comprehensive riverine erosion assessment will be developed to forecast impacts and develop solutions. Topographic, bathymetric, and river flow surveys will be conducted to gather baseline data necessary to conduct hydrologic and hydraulic modeling of the river system. Modeling will be conducted to analyze river hydraulics and interpret areas of concern under expected future climate conditions. Recommended non-structural best practices as well as structural solutions to mitigation the community from erosion impacts will be developed.
- A grant has been applied for, and if awarded, Notre Dame would conduct flood modeling to support DGGS in developing an inundation map for flooding.

Waste Erosion Assessment and Review (WEAR) reports dated May 2015 identified the Old BIA School (Figures 17 and 18) and the Alakanuk South Side Dump Site (Figures 19 and 20) as possible contamination risk sources within the drinking water protection zone for the community water system, which is a surface water supply whose summer intake is downstream of both sites. Both locations may contain asbestos-containing materials. Both sites are actively eroding into the Alakanuk Pass which is a subsistence area. The Threatened Infrastructure Survey should include these sites, and the comprehensive riverine erosion assessment should include erosion solutions for these sites as well as others along the banks of the Alakanuk Pass (ADEC, 2015a and 2015b).

The community is also concerned about flooding that occurs when floodwaters come from water bodies behind the Alakanuk Landfill and then floods into the community (Figure 21).

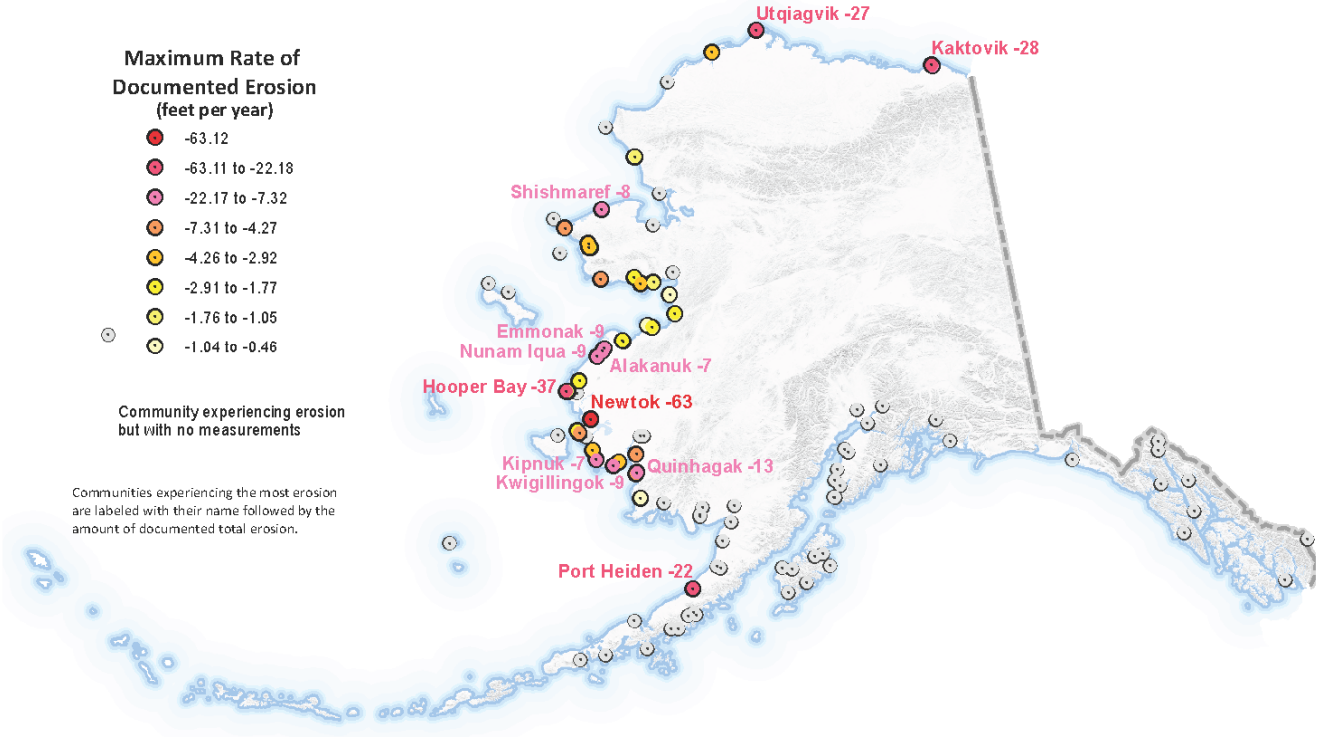


Figure 14. DGGS Rate of Documented Erosion

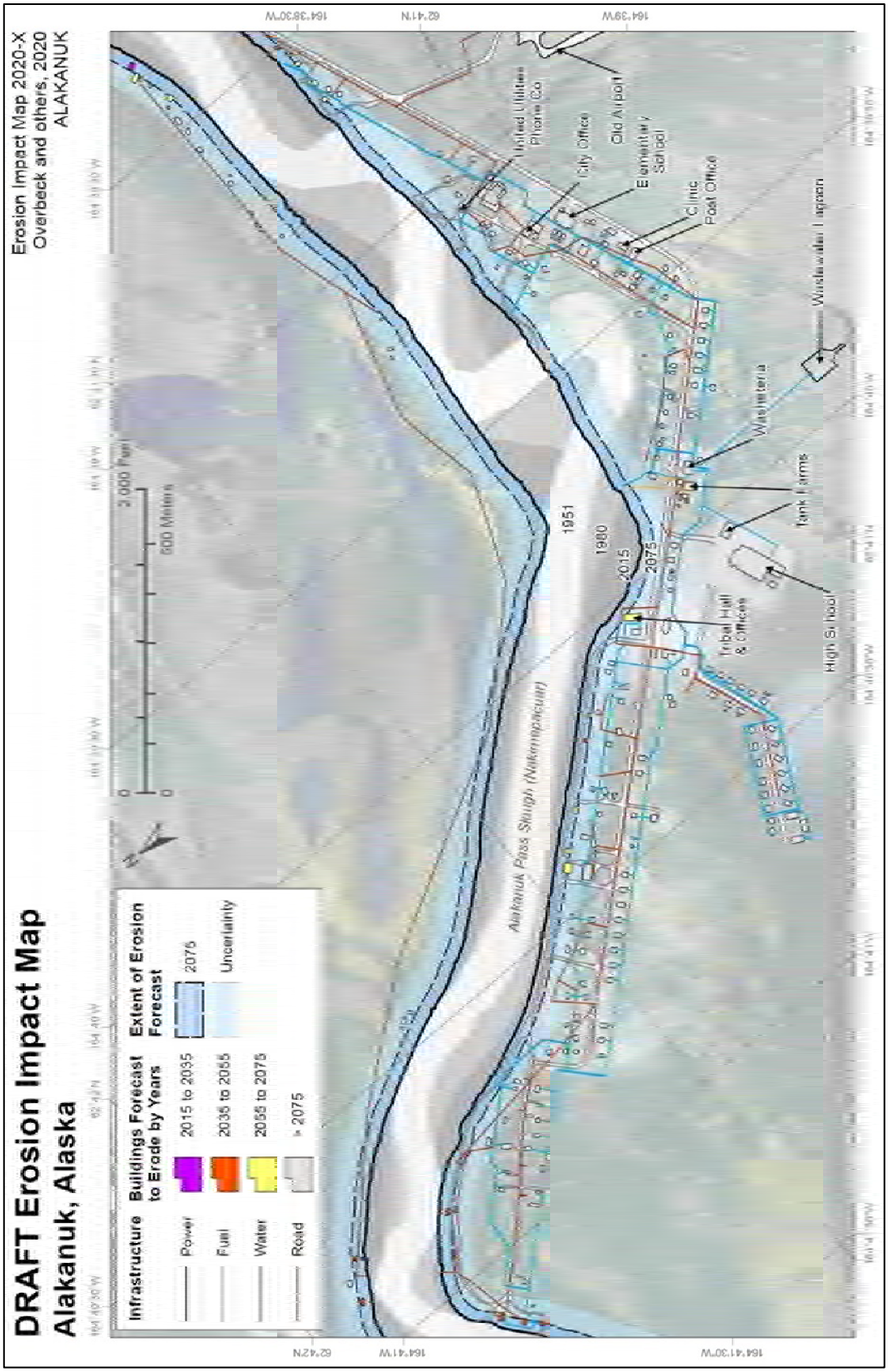


Figure 15. Erosion Impact Map

Figure 16. Shoreline Change

Figure 17. Old BIA School Location

Figure 18. North Shore Erosion of the Alakanuk Pass Bank at Old BIA School in 2012 and 2014

Extent

Flooding

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 severity:

- Rainfall intensity and duration.
- Watershed conditions, including terrain steepness, soil types, amount, vegetation type, and development density.

Figure 19. South Side Dump Site Location

Figure 20. South Side Old Dump Site Erosion in 2012 and 2014

- The attenuating feature existence in the watershed, including natural features such as swamps and lakes and human-built features.
- Flow velocity.
- Availability of sediment for transport, and the bed and embankment watercourse erodibility; and
- City location related to the base flood elevation as indicated with their certified high-water mark.

Figure 21. 2018 Landfill Pictures from ADEC

Alakanuk's location adjacent to the Yukon River makes Alakanuk prone to flood and erosion. Also, refer to Section 5.3.1.4 for the extent of changes in the cryosphere as that natural hazard is influencing floods/erosion.

Flooding is the inundation of infrastructure or the impassibility of airstrips and roads due to elevated water levels along a coast or river. Flooding becomes a risk to the viability of a community when it threatens use of and access to critical infrastructure. Flooding also poses risk to life when inhabited areas become inundated with moving water, which can carry residents downstream or offshore (Denali Commission, 2019).

Erosion

Rivers constantly alter their course, changing shape and depth, seeking a balance between the sediment transport capacity of the water and the sediment supply. This process, called riverine erosion, is usually seen as the wearing-away of riverbanks and riverbeds over a long period of time.

Riverine erosion is often initiated by high sediment loads or heavy rainfall. This generates high volume and velocity run-off that concentrates in the lower drainages within the river's catchment area. When the stress of the river flow exceeds the resistance of the riverbank material, erosion occurs. Fast-flowing rivers use the increased sediment load to further scour their banks downstream. Eventually, the river deposits its sediment in slower moving sections leading to the deposition of sediment further downstream or in dams and reservoirs. The deposition may eventually lead to the river developing a new channel.

While all rivers change in the long-term, short-term rates of change vary significantly. 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. The erosion rate depends on the sediment supply and amount of run-off reaching the river. These variables are affected by many things including floods, changes to the cryosphere, and loss of bank vegetation.

Erosion along the banks of Alakanuk Pass is generally caused by a combination of factors per the 2009 USACE *BEA*:

- The natural process of a river to find the path of least resistance. Based on a review of historic aerial photographs, the river appears to be trying to straighten itself out. This is most noticeable on the north bank where it forms the "S" bend. Over the last 20 years, the "S" bend has straightened, causing the south bank in front of the community to erode.
- Possible increased flow into Alakanuk Pass resulting from flow changes in the Yukon River.
- Increased boat traffic close to the shoreline.
- Ice scouring during spring break-up.
- Runoff from snowmelt and rainfall.

Figure 22 depicts the erosion problem adjacent to River Street where 20 feet of shoreline was lost in one day in 1993. Figure 23 and Figure 24 display the extent of the physical damage along the shoreline.

Figure 22. Shoreline Erosion

Figure 23. Typical Shoreline, Reach 6. (USACE, 2009)

Figure 24. Looking at Reach 1. The bank immediately downstream is accreting. (USACE, 2009)

Impact

Flooding

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

- Structure flood inundation, causing water damage to structural elements and contents;
- Erosion or scouring of river banks, roadway embankments, foundations, and other features;
- Damage to structures, roads, culverts, and other features from high-velocity flow and debris carried by floodwaters. Such debris may also accumulate in culverts, increasing loads on these features or causing overtopping or backwater damages; and
- Sewage and hazardous or toxic materials released 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 erosion (Figure 16). Deposition is the accumulation of soil, silt, and other particles on a river bottom or delta. Deposition leads to the destruction of fish habitat, presents a challenge for navigational purposes, and prevents access to historical boat and barge landing areas. Deposition also reduces channel capacity, resulting in increased flooding or bank erosion. Riverbank erosion involves the removal of material from the bank. When bank erosion is excessive, it becomes a concern because it results in loss of vegetation, loss of fish habitat, and loss of land and property (BKP, 1988).

Flood events not only impact communities with high water levels, or fast flowing waters, but sediment transport also impacts infrastructure and barge and other river vessel access limitations. Dredging may be the only option to maintain an infrastructure's viability and longevity.

Erosion

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 following is from the 2009 *USACE BEA* to provide a potential financial impact of erosion/flooding damages:

"The period of analysis for this evaluation is 50 years and all damage categories have net present values calculated based on the federal FY 2009 discount rate of 4 5/8 percent. The sections below detail expected losses with a summary provided in Table 8.

Alakanuk is losing approximately 61,650 square feet of land per year (1.42 acres) throughout the aforementioned seven reaches. It is expected that 72.18 acres will be lost over the 50-year period of analysis. Estimated land losses include 3.16 acres in Reach 1, 7.91 acres in Reach 2, 6.11 acres in Reach 3, 18.90 acres in Reach 4, 9.30 acres in Reach 5, 14.19 acres in Reach 6, and 12.60 acres in Reach 7. Total land damages in Alakanuk for the period of analysis are expected to be $722,000 with a net present value of $288,000. This represents an average annual loss of about $14,900.

The residential damages in Alakanuk are spread out along the entire community and are located in all seven reaches. There are 59 outbuildings, including 30 residences, fish camps, and related structures at risk within the project area.

Projected commercial damages in Alakanuk are spread throughout the community and lie within Reaches 4, 5, and 6. There are five buildings at risk: one of the retail stores, two native store buildings, and two old fuel farm buildings. The old fuel farm is abandoned and located at the upstream end of the development across Alakanuk Pass.

Ten public buildings are at risk in Alakanuk over the 50-year period of analysis. Six of these structures are associated with the City including a storage building, workshop, City offices, garage, fire department, and a utility building associated with water and sewer. The Catholic Church has all three of its buildings at risk, including one outbuilding. The last at-risk structure is the Tribal hall and its offices. All of these public structures are located in Reach 4.

Total structural damages in Alakanuk for the period of analysis are expected to be $17.2 million with a net present value of $5.8 million and an average annual loss of about $298,500.

The portion of Alakanuk's infrastructure that sits within the 50-year erosion profile includes the following: 47,320 feet of roads (including the barge landing), 230 feet of boardwalks, 3,880 feet of water lines, 2,750 feet of sewer lines, 24 utility poles with associated power and phone lines, and 14 fuel storage tanks with an estimated combined volume of 63,730 gallons. Damages to roads and the barge landing have a total value of $19.4 million and a net present value of $12.6 million. Damages to boardwalks have a combined value of about $67,000 and a net present value of $11,000. Estimated water line damages have a total value of $1.1 million and a net present value of $215,000. There are several instances where erosion is likely to affect the midpoints of these pipes first, in which case large sections of the system would be compromised at the same time. This preliminary analysis does not attempt to differentiate these effects or to assign damages to the loss of services provided.

The sewer lines have a total value of $828,000 and a net present value of $186,000. Sewer lines are subject to the same considerations as water lines regarding the erosion of midpoints in the system.

The expected damages to fuel tanks have a total value of about $341,000 and a net present value of $156,000. Utility poles have a total value of about $8.5 million and a net present value

of $2.1 million, each of these is valued at $354,000; this includes the value of associated power and communication lines.

In total, Alakanuk has $30.2 million of infrastructure at risk of erosion. The combined net present value of these items is $15.2 million. The average annual loss of infrastructure is valued at $786,600.

Alakanuk has numerous fuel tanks spread throughout the community. Each of these is considered an environmental hazard as their surrounding soils are likely contaminated and could harm the local ecosystem and fish stocks were they to erode away. Decommission and closure of these facilities will be needed to avoid these harmful effects.

Total fuel decommissioning and closure costs in Alakanuk are expected to be $1,834,000 over the 50-year period of analysis. The net present value of these costs is about $636,000 and the average annual loss for this damage category is about $32,800.

Table 8. Expected Damages over 50-Year Period of Analysis

Damage category	Quantity	Time Span			Total value (50 years)	Net Present Value	Average Annual Loss
		0-10	11-30	31-50			
Land (acres lost)	72.18	$ 156,000	$ 283,000	$ 283,000	$ 722,000	$ 288,000	$ 14,900
Residential	30	$ 96,000	$4,720,000	$ 4,643,000	$9,460,000	$2,714,000	$140,200
Commercial	5	--	$ 1,261,000	$ 820,000	$2,081,000	$601,000	$31,000
Public Buildings	10	$2,525,000	$ 535,000	$ 2,566,000	$5,626,000	$2,466,000	$127,300
Infrastructure	--	$11,895,000	$8,133,000	$ 10,180,000	$30,208,000	$15,234,000	$786,600
Environmental Hazards	--	--	$ 1,004,000	$ 830,000	$1,834,000	$636,000	$32,800
Total damages	--	**$14,672,000**	**$15,936,000**	**$19,322,000**	**$49,931,000**	**$21,939,000**	**$1,132,800**

(USACE, 2009)

Recurrence Probability

Flooding and erosion will continue in Alakanuk. Climate change is also contributing to increased flooding and coastal/riverine erosion. It is highly likely that future populations, homes, and critical infrastructure will be impacted at a higher rate.

5.3.4 Weather (Severe)

5.3.4.1 Hazard Characteristics

Severe weather occurs throughout Alaska with extremes experienced by the community of Alakanuk that includes high winds, heavy and drifting snow, freezing rain/ice storm, extreme cold, and heavy rain. The community experiences periodic severe weather events such as the following:

Winter weather includes heavy snows, ice storms, extreme cold, and high winds.

Heavy Snow generally means:

- Snowfall accumulating to four inches or more in depth in 12 hours or less.
- Snowfall accumulating to six inches or more in depth in 24 hours or less.

Snow Squalls are periods of moderate to heavy snowfall, intense, but of limited duration, accompanied by strong, gusty surface winds and possibly lightning.

A **Snow Shower** is a short duration of moderate snowfall.

Snow Flurries are an intermittent light snowfall of short duration with no measurable accumulation.

Blowing Snow is wind-driven snow that reduces surface visibility. Blowing snow can be falling snow or snow that already has accumulated but is picked up and blown by strong winds.

Drifting Snow is an uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall.

A **Blizzard** means that the following conditions are expected to prevail for a period of three hours or longer:

- Sustained wind or frequent gusts to 35 mph or greater.
- Considerable falling and/or blowing snow, reducing visibility to less than 1/4 mile.

Freezing Rain occurs when rain or drizzle freezes on surfaces. Excessive accumulation may immobilize a community and hamper rescue efforts.

Ice Storms describe occasions when damaging accumulations of ice are expected during a freezing rain event. Freezing rain most commonly occurs in a narrow band within a winter storm that is also producing heavy amounts of snow and sleet in other locations.

Extreme Cold varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." In Alaska, extreme cold usually involves temperatures less than -40°F. Excessive cold may accompany winter storms or high barometric pressure and clear skies.

High Winds occur in Alaska when there are winter low-pressure systems in the Bering Sea. Alaska's high winds can equal cyclonic force. In Alaska, high winds (winds in excess of 60 mph) occur frequently over coastal areas. They can also combine with loose snow to produce ground blizzards.

5.3.4.2 History

Western Alaskan communities experience severe winter storm conditions annually. The NWS's severe weather database lists 133 storm events for Alakanuk's Weather Zone (AKZ214) between 2001 and late 2020, which may or may not have directly impacted the community. Table 11 provides a representative sample of the major storm events identified for Alakanuk's Weather Zone (AK214) since 2001. Each weather event may not have specifically impacted the community, but it is listed due to Alakanuk's close proximity to listed communities or by location within the identified zone.

Table 9. Severe Weather Events

Location	Date	Event Type	Magnitude
AKZ214	4/02/2001	Blizzard	A system brought blizzard conditions to the west coast of Alaska and heavy snow to some parts of Western Alaska. Blizzard conditions were reported in Zone 214 at Emmonak and Saint Mary's.
AKZ214	4/05/2001	Blizzard	Blizzard conditions occurred in Zone 214 at Saint Mary's and Emmonak.
AKZ214	3/28/2003	Blizzard	High winds were reported at Emmonak Automated Weather Observation System (AWOS).
AKZ214	3/31/2003	Blizzard	Wind speeds topped out at 55 mph at Emmonak and Cape Romanzof, dropping the visibility at these locations to near zero for several hours in blowing snow.
AKZ214	10/18/2004	Strong Wind	Emmonak and Saint Mary's AWOS stations reported gusts to 51 mph.
AKZ214	10/18/2004	Storm Surge/Tide	A significant and damaging storm surge accompanied this storm in addition to high winds: Strong winds at Emmonak and Saint Mary's AWOS stations reported gusts to 51 mph. Coastal flooding reported in Zone 214 at Alakanuk and Kotlik, surge heights unknown. Alakanuk and Emmonak had damages to power poles and lines.
AKZ214	5/15/2005	Flood	An ice jam on the Yukon River produced minor flooding throughout the village of Alakanuk. Roads were flooded, but no structures were flooded or impacted. Damage amount unknown.
AKZ214	2/18/2006	High Wind	High winds were reported at Emmonak AWOS with a gust to 60 mph.
AKZ214	5/28/2006	Flood	An ice jam formed 5-10 river miles downstream of the villages of Alakanuk and Emmonak on the Yukon River, causing moderate flooding at these villages. At Alakanuk, moderate flooding with water up to three feet in depth occurred, soaking some of the lowest portions of homes, causing large village fuel tanks to tilt, some ice chunks may have hit several buildings. The apron at the airport was partially flooded, though the airstrip remained dry. The sewage lagoon was flooded. Damages were $227,000 in Emmonak and $306,100 in Alakanuk.
AKZ214	2/15/2009	Heavy Snow	Heavy snow occurred in parts of the Yukon Delta for approximately 24 hrs. Six inches of snow fell in parts of the Yukon Delta. In addition, along the coast, local blizzard conditions were observed.
AKZ214	3/7/2009	High Wind	Blizzard conditions were observed along the Yukon Delta. The visibility was frequently reduced to one quarter mile or less in snow and blowing snow. Peak wind gusts were 43 mph at the Emmonak AWOS.
AKZ214	5/22/2009	Flood	A significant amount of water and ice combined with ice jams in the vicinity of the village as well as downriver to produce flooding in Alakanuk. The flooding was compounded by two to five miles of shore-fast ice at the mouth of the Yukon River. Water inundated many of the low-lying structures, and several homes along the river were flooded with one to

			three feet of water.
AKZ214	11/11/2009	High Wind	High winds accompanied snow. The visibility was reduced to one quarter to one half mile at times. Winds at Emmonak AWOS gusted to 67 mph.
AKZ214	11/11/2009	Flood	Strong southeasterly winds combined with high astronomical tide, resulted in coastal flooding.
AKZ214	1/01/2011	Winter Storm	A total of 15 inches of snow was observed at Emmonak. Northeast winds of 20 to 35 mph with gusts to 45 mph produced significant blowing and drifting snow with near blizzard conditions at times. The snow mixed with or changed to freezing rain in spots along the Yukon Delta coast.
AKZ214	2/19/2011	Blizzard	Blizzard conditions were observed at Emmonak for approximately three hours. The visibility was reduced to one quarter mile in snow and blowing snow. There was a peak wind gust of 46 mph at the Emmonak AWOS.
AKZ214	2/24/2011	Blizzard	The City office in Emmonak indicated that there were blizzard conditions during the storm. The visibility at the Emmonak AWOS remained one half mile or better; however, there were wind gusts as high as 64 mph. The City office indicated that there was high water due to overflow during the storm, but there were no reports of flooding.
AKZ214	4/06/2011	Winter Storm, Blizzard	Short period of blizzard conditions observed at Emmonak. The visibility was reduced to one quarter mile or less in snow and blowing snow for 2.5 hours. There was a peak wind gust of 47 mph at the Emmonak AWOS.
AKZ214	11/05/2011	Winter Storm	Heavy snowfall across much of the Yukon Delta. Snow accumulations of around eight inches were observed at Emmonak and Scammon Bay. The snowfall was estimated due to strong winds.
AKZ214	11/08/2011	Blizzard, High Winds	Blizzard conditions and high winds were observed across much of the Yukon Delta. At Emmonak, blizzard conditions were observed for five hours. The visibility was reduced to one quarter mile or less in snow and blowing snow. There was a peak wind gust of 62 mph at the Emmonak AWOS. Antennas in the village were blown down, and communications were intermittent.
AKZ214	6/04/2013	Flood	An ice jam formed downstream of Alakanuk causing water to rise in Alakanuk and Emmonak on the 4th into the morning of the 6th. Water flowed over the road to the airport in each village....it was 2-3 feet deep in spots at Alakanuk. The taxi way at the Emmonak airport was washed out. At Alakanuk, 3 to 4 homes had water in them, and the residents of these homes were evacuated. The sewage lagoon was inundated and it was noted that some propane tanks for home heating were floating in town. By mid-morning on the 6th, the ice jam had moved out and river levels had fallen.
AKZ214	11/18/2015	Heavy Snow	An estimated 12 inches of snow fell at Emmonak.
AKZ214	3/31/2016	Blizzard	Blizzard conditions were observed at Emmonak with wind gusts to 41 mph.
AKZ214	11/21/2017	Blizzard	Strong winds developed out ahead of an approaching frontal boundary along the west coast of Alaska on November 19th. The strong winds continued into the 23rd. Blizzard conditions and high winds along the Bering Strait and along the west coast and north slope were observed.
AKZ214	2/01/2020	Blizzard	Blizzard conditions were observed at the Cape Romanzof AWOS. Visibility was reduced to one quarter mile or less at times in snow and blowing snow. There was a peak wind gust of 40 mph at the Cape Romanzof AWOS.
AKZ214	3/01/2020	Blizzard	Blizzard conditions were observed at the Marshall AWOS. Visibility was reduced to one quarter mile or less at times in snow and blowing snow. There was a peak wind gust of 42 mph at the Marshall AWOS.
AKZ214	4/05/2020	Blizzard	Blizzard conditions were observed at the Cape Romanzof AWOS. Visibility was reduced to one quarter mile or less at times in snow and blowing snow. There was a peak wind gust of 62 mph at the Cape Romanzof AWOS.

(NWS, 2021)

5.3.4.3 Location, Extent, Impact, and Recurrence Probability

Location

Alakanuk experiences periodic severe weather impacts. The intensity, location, and the land's topography influence the impact of severe weather conditions.

The entire community is affected. Severe weather is a normal part of living in Alaska. However, sometimes the confluence of elements produces extreme conditions. Being prepared is the key to survival. Alternate forms of home heat and lighting, stored food, appropriate clothing, and advance planning are critical.

In the community, there is potential for weather disasters. High winds can damage roofs and windows, and result in power outages. Heavy snow can cause power outages or collapse roofs of buildings. Storms can ground mail and grocery flights into and out of Alakanuk. Extreme weather is most prevalent during the winter with any combination of cold temperatures, strong winds, storm surge, and heavy snow.

Extent

Alakanuk is equally vulnerable to severe weather effects. Alakanuk experiences severe storm conditions with heavy snow depths, reaching up to 15 inches per storm event; wind speeds can exceed 69 mph; and low temperatures have reached -50°F.

Common forms of damage to structures as a result of severe wind include loss of roofing materials, damage to doors and hinges, broken water lines due to freezing, and structural failure of out-buildings, fallen or damaged exterior lights, flag or light poles, and antennae. Overhanging signs on businesses and satellite dishes can become airborne projectiles.

Heavy snow brings another set of damages. Structural deflection or collapse of structures is common. Deflection causes cracks or breakage of interior walls and finishes. Falling ice from roof eaves can cause injury, damage modes of transportation, break windows, and threaten injury to passersby. Sliding snow can cause damages described above as well as cause damage to roof-mounted vents and other equipment. Wind-packed snow and ice can block windows and emergency exits.

Impact

Structures and infrastructure have largely been constructed to withstand annual occurrences of severe winter storms. High winds resulting from the storms pose the greatest risk. They can combine with loose snow to produce blinding blizzard conditions and dangerous wind chills. In addition, high winds have the potential to reach hurricane speed. Such winds may damage community facilities and infrastructure.

Heavy snow can immobilize a community by bringing transportation to a halt. Until the snow can be removed, airports and roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Heavy snow can sink small boats. A quick thaw after a heavy snow can cause substantial flooding.

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.

Injuries and deaths related to heavy snow usually occur as a result of snow machine accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

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. If extreme cold conditions are combined with low or no snow cover, the ground's frost depth can increase, disturbing buried pipes.

Heavy snowfall can also damage infrastructure and critical facilities. High numbers of injuries and fatalities are not expected with a heavy snow event. Heavy snow can have a greater impact on people who need access to medical services in regional hubs, emergency services, pedestrians, and people who rely on air travel. The cost of fuel to heat homes during times of heavy snow can be a financial burden on populations with low or fixed incomes. Residents most vulnerable to the hazard of severe weather are those on fixed incomes who may not be able to adequately heat their homes.

Recurrence Probability

Severe winter storms occur annually along the western coast of Alaska; therefore, the probability of a severe winter storm impacting Alakanuk is highly likely.

5.3.5 Wildland and Conflagration Fire

5.3.5.1 Characteristics

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. A conflagration fire involves man-made structures.

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

Topography describes slope increases, which influences 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, ridgetops may mark the end of wildland fire spread since fire spreads more slowly or may even be unable to spread downhill.

Fuel is the type and condition of vegetation and plays a significant role in the occurrence and spread of 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. The fuel load continuity, both horizontally and vertically, is also an important factor.

Weather is the most variable factor affecting fire behavior. 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 fire activity. By contrast, cooling and higher humidity often signal reduced fire occurrence and easier containment.

If not promptly controlled, 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, fires may severely affect livestock and pets. Such events may require emergency water/food, evacuation, and shelter.

Conflagration fires are very difficult to control. Complicating factors are wind, temperature, slope, proximity of structures, and community firefighting capability, as well as building construction and contents. Additional factors facing response efforts are hazardous substance releases, structure collapse, water service interruptions, unorganized evacuations, and loss of emergency shelters. Historical national conflagration examples include the Chicago City Fire of 1871 and the San Francisco City Fire following the 1906 earthquake. In 2018, the deadliest and most destructive wildfire and conflagration fire in California encompassed 20,000 acres, killed 85 people, and almost completely incinerated the town of Paradise. The fire was sparked by transmission lines owned by Pacific Gas & Electric. Dry vegetation and high winds caused extreme rates of spread.

Many wildland firefighters are neither equipped nor trained for conflagration fires. When wildland firefighters encounter structure, vehicle, dump or other non-vegetative fires during the performance of their wildland fire suppression duties, firefighting efforts are often limited to wildland areas.

5.3.5.2 History

Wildland and conflagration fires have not been documented within the boundaries of Alakanuk; however, wildland fires have occurred in the vicinity. There have been 35 recorded wildfires within approximately 60 miles of Alakanuk since 1939, the largest of which occurred 56 miles from the community and burned 15,031.9 acres from the community. Table 10 lists the 35 historic wildfires that have occurred within 60 miles of the community, and Figure 25 shows the locations of these wildfires. There have been no conflagration fires.

Table 10. Wildfire Locations Since 1939 within 60 Miles of Alakanuk

Fire Name	Year	Estimated Acres	Latitude	Longitude	Cause
Pastolik 2	2017	0.1	62.63783	-163.0235	Lightning
Pastolik 3	2017	0.1	62.60717	-163.1012	Lightning
Allen	2017	2583.5	62.55517	-163.1535	Lightning
Pastolik	2017	11.5	62.70861	-163.0353	Lightning
Section 18	2017	0.1	62.95372	-162.8238	Lightning
Takwaklanuk Slough	2016	1	62.68122	-164.0835	Human
Pikmiktalik	2015	3	63.01017	-162.9458	Lightning
Apoon	2015	15031.9	63.03333	-162.9833	Lightning
Igokluk Slough	2015	5645	62.41742	-164.4365	Lightning

Kotlik River	2007	71	62.89222	-163.3392	Lightning
Pastolik River	2007	692	62.58000	-163.0961	Lightning
Golly	2005	3	62.36666	-164.8833	Lightning
Pastolik River	2004	17	62.91667	-163.1167	Lightning
Andreafsky River	2004	3.6	62.73333	-162.9833	Lightning
New Hamilton	2002	10	62.73333	-163.9167	Human
Pastolik River	2002	101	62.88000	-163.2733	Lightning
Pastolik River	2000	95	62.86666	-163.2333	Campfire
Pastoliak River	2000	12891	62.96667	-162.8500	Exhaust
Pastoliak River	1999	27	62.98333	-163.0000	Lightning
NANVARANAK LAKE	1997	480	62.48333	-163.4667	Lightning
PASTOLIK RIVER	1997	440	62.58333	-163.2333	Lightning
KOT S 20	1996	3	62.93333	-163.5667	Lightning
532217	1995	50	62.43333	-163.7833	Warming Fire
KSM N 15	1994	400	62.50000	-162.8667	Lightning
SMK SW 55	1993	1.5	62.75000	-163.3333	Lightning
132224	1991	0.5	62.63334	-163.4833	Lightning
132242	1991	10180	62.70000	-162.9667	Lightning
032022	1990	250	62.45000	-163.1667	Lightning
ANDREAFSKY	1974	2700	62.63334	-162.5833	Lightning
Marc	1974	300	62.93333	-162.9167	Lightning
PASTOLIK	1973	3000	62.75000	-163.0833	Lightning
FISH VILLAGE E-15	1962	2000	62.50000	-163.3333	Lightning

5.3.5.3 Location, Extent, Impact, and Recurrence Probability

Location

Under certain conditions, fires may occur in any area with fuel surrounding Alakanuk. All areas are considered to be vulnerable to fire impacts.

Under certain conditions, tundra and wildland fires may occur in any area with fuel surrounding structures within Alakanuk. Since fuels data is not readily available, for the purposes of this MJHMP, all outside structures and areas adjacent to the community limits are considered to be vulnerable to tundra/wildland fire impacts. Over the past 81 years, 35 significant fire events have occurred within 60 miles of Alakanuk (see Figure 25). The format for the AICC Mapping Site used for Figure 25 has since changed, but the 2018 map is used for this MJHMP as it shows greater detail in historic fires and their locations. No wildland fires have occurred since Figure 25 was generated.

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. Weather is the most variable factor. 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.

Impact

Impacts of a tundra/wildland fire that interfaces with the population center of the community could grow into an emergency or disaster if not properly controlled. An uncontrolled fire in a rural Alaska community can spread quickly and destroy everything in its path. Many communities in rural Alaska have literally burned away, leaving the residents to move to an existing community and start over, or to rebuild.

Indirect impacts of tundra/wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying other natural resources, 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 streams and water sources, thus increasing erosion potential, harming aquatic life, and degrading water quality.

Recurrence Probability

Based on the history of fires in the community, it is possible future fire events will occur in the area but not likely.

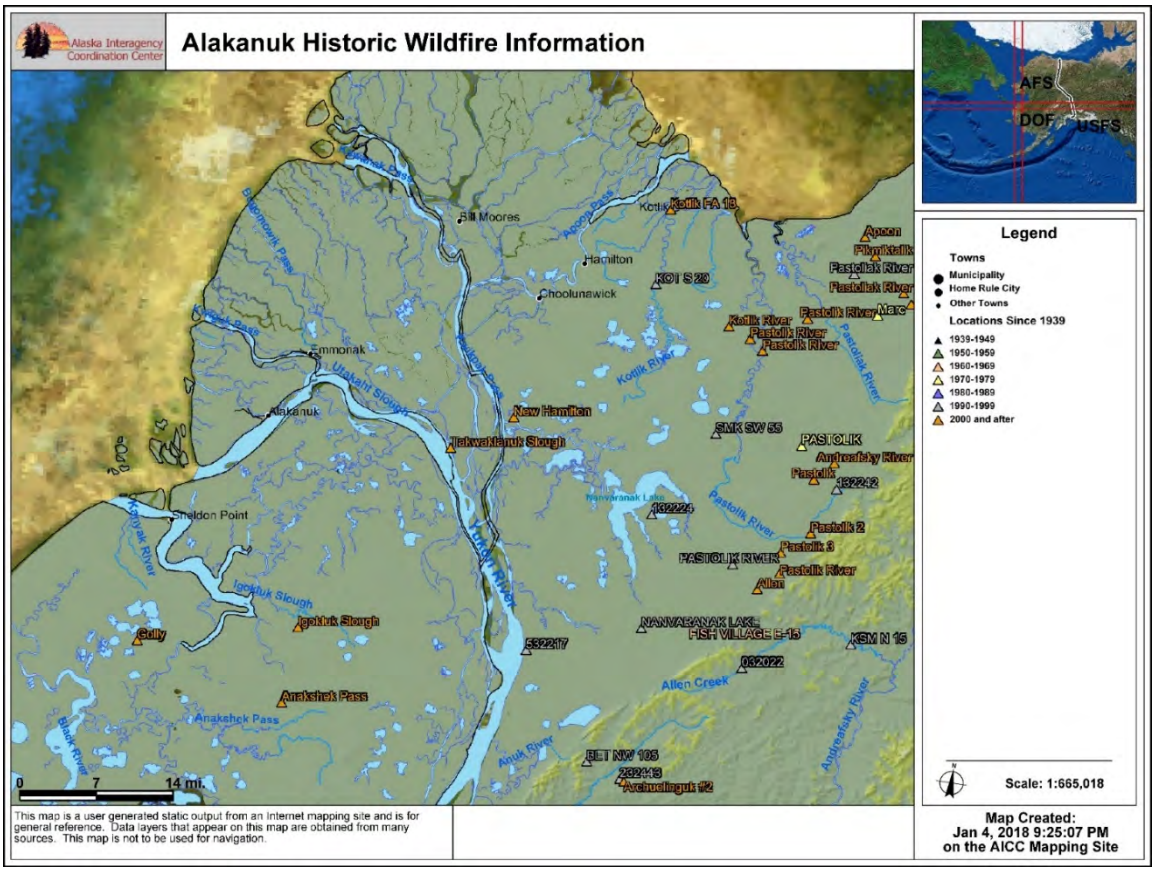


Figure 25. Historic Wildfire Locations Since 1939 (AICC, 2018)

6.0 Vulnerability Analysis

This section provides an overview of the vulnerability analysis.

DMA 2000 Recommendations
Assessing Risk and Vulnerability, and Analyzing Development Trends **§201.6(c)(2)(ii)** and **§201.7(c)(2)(ii):** The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described. This description shall include an overall summary of each hazard and its impact on the community. The Plan should describe vulnerability in terms of: **§201.6(c)(2)(ii)(A)** and **§201.7(c)(2)(ii)(A):** The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; **§201.6(c)(2)(ii)(B)** and **§201.7(c)(2)(ii)(B):** An estimate of the potential dollar losses to vulnerable structures identified in … this section and a description of the methodology used to prepare the estimate. **§201.6(c)(2)(ii)(C)** and **§201.7(c)(2)(ii)(C):** 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. **§201.7(c)(2)(ii)(D):** Cultural and sacred sites that are significant, even if they cannot be valued in monetary terms.
1. REGULATION CHECKLIST
ELEMENT B. Risk Assessment, Assessing Vulnerability, Analyzing Development Trends
B3 for City. 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? B3 for Village. Does the Plan include a description of each hazard's impact as well as an overall summary of the vulnerability of the Tribal planning area? B4 for City. Does the Plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods? C2 for City. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements as appropriate?
Source: FEMA, 2015.

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 planning 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 eight steps:

1. Asset Inventory;
2. Asset Exposure Analysis;
3. Repetitive Loss Properties;

4. Existing Critical Facilities and Infrastructure;
5. Future Critical Facilities and Infrastructure;
6. Vulnerability Analysis Methodology;
7. Data Limitations; and
8. Vulnerability Exposure Analysis.

The City and NVA define their public as the same which is all residents of Alakanuk. DCRA defines the community as covering approximately 32.4 sq. miles of land and approximately 8.7 sq. miles of water. The City and NVA are co-located in Alakanuk within the same boundaries. The Alakanuk Native Corporation is the majority land owner and has given some land to the City, but the City does not know the acreage. The NVA does not own any land.

The only cultural site is the graveyard on the north side of Alakanuk Pass.

6.2 VULNERABILITIY 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 Alakanuk are identified in the following sections.

6.2.2 Population and Building Stock

The U. S. Census reported Alakanuk's population for 2010 as 677, and the 2019 DCCED data reported a population of 704.

Table 11. Estimated Population and Building Inventory

Population		Residential Buildings	
2010 Census	**DCCED 2019 Data**	**Total Building Count**	**Total Value of Buildings[1]**
677	704	179	Census: $6,885,000 Community: $19,200,000

Sources: The City of Alakanuk, NVA, U.S. Census 2010, and 2019 DCCED/DCRA Certified population data.

[1]The 2010 U.S. Census estimated $42,500 per housing unit. The 2018 City HMP estimated that the value of a residential structure is $120,000.

Alakanuk is situated along the banks of Alakanuk Pass, from its confluence with the Yukon River and westward approximately 2.5 miles. The majority of the housing units and commercial and industrial properties are located on the southern bank of the Alakanuk Pass, although several residential houses, a store, the cemetery, and the closed cannery are located on the northern bank. Most of the developed areas are north of Anderson Road on the southern bank of the Pass.

Alakanuk does not have known structure values as there are no property taxes. Estimated replacement values for structures are provided. A total of 179 single-family residential buildings were considered in this analysis based on the 2019 ACS. Of these homes, 160 are occupied.

6.2.3 Repetitive Loss Properties

Alakanuk does not participate in the NFIP. It has investigated enrolling in the NFIP, but lacks resources to support the program at this time.

6.2.4 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 Alakanuk and fulfilling important public safety, emergency response, and disaster recovery functions. All facilities and infrastructure are considered critical in a small, remote, and isolated community such as Alakanuk. Critical facilities are listed in Table 12.

Table 12. Critical Facilities and Infrastructure

Facility Name	Facility Type	Latitude	Longitude
Airport	Airport	62.685925	-164.717354
Airport Snow Removal Equipment Storage Building	Community Storage Shed	62.685364	-164.716249
Church - Alakanuk Catholic Church	Church	62.68746	-164.66708
Church - Alakanuk Catholic Church Rectory	Church		
Church - Assembly of God Church	Church	62.69608	-164.677
Church - Assembly of God Parsonage	Church		
AVEC Connex Parts Storage	Community Storage Shed		
Corporation Garage	Community Storage Shed		
GRB Building	Community Storage Shed		
Warehouse 1	Community Storage Shed		
Warehouse 2	Community Storage Shed		
Warehouse 3	Community Storage Shed		
Fire Hall	Fire Station	62.68836	-164.66478
AVEC Fuel Storage Facility	Fuel Storage Tanks (>500gal)	62.684719	-164.664717
Fuel Storage 1	Fuel Storage Tanks (>500gal)		
Fuel Storage 2	Fuel Storage Tanks (>500gal)		
Fuel Storage 3	Fuel Storage Tanks (>500gal)		
Cemetery	Cemetery		
LYSD Generator/Warehouse Building	Generator		
Health Clinic	Clinic	62.68372	-164.65307
Landfill Class III Municipal	Landfill/Incinerator	62.68284	-164.64346
Armory 1	National Guard	62.684	-164.65526
Armory 2	National Guard		
April Aistrone Trailer	Offices		
City Office	Offices	62.68787	-164.66524
John Strongheart Trailer	Offices		
Native Corp Office	Offices	62.6876	-164.62022
Tribal Building	Offices		
Police Department	Police Station	62.68799	-164.66574
Post Office	Post Office	62.69106	-164.67008
AVEC Back Up Power Generator	Power Generation Facility	62.684719	-164.664717
Generator Room 4	Power Generation Facility		
AVEC Alakanuk-Emmonak Intertie	Power Transmission Line		
Head Start School	School	62.68433	-164.65287
LYSD K-12 School	School	62.69353	-164.67464
LYSD Ramone Classroom	School	62.68404	-164.65224

Facility Name	Facility Type	Latitude	Longitude
City Shop	Service/Maintenance Shop	62.68809	-164.66551
LYSD - Shop	Service/Maintenance Shop		
LYSD - Mechanical Building	Service/Maintenance Shop		
LYSD - Truck Garage	Service/Maintenance Shop		
Public Shop	Service/Maintenance Shop		
Sewage Lagoon	Sewage Lagoon	62.6847	-164.65104
Alakanuk City Lodge	Store		
Alakanuk Deli	Store		
Annex Store	Store		
Jorgenson Warehouse	Store		
Jorgenson Store	Store	62.69161	-164.67121
Native Corp Store	Store	62.68752	-164.61969
LYSD Teachers Quarters	Teachers Quarters	62.68451	-164.65183
LYSD Trailer 1	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 2	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 3	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 4	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 5	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 6	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 7	Teachers Quarters	62.6843	-164.6529
LYSD Trailer 8	Teachers Quarters	62.6843	-164.6529
LYSD Triplex Housing	Teachers Quarters	62.68473	-164.64903
United Utilities Telephone	Telephone	62.68548	-164.64868
Washeteria/Sauna	Washeteria	62.6847	-164.65104
Water Sewer Plant	Waste Water Treatment Facility		

6.2.5 Future Critical Facilities and Infrastructure

Assuming the average growth trend over the past 20 years continues, the population of Alakanuk should continue to grow at a modest rate between 1-2% annually.

The area surrounding Alakanuk is designated as the Yukon Delta National Wildlife Refuge and is primarily wetlands. There are no adequate sources of construction borrow materials nearby, and any new road construction would probably require importing borrow material from upriver at a significant expense. The nearest borrow material sites are Platinum or Nome. Many of the areas along the existing roads are not currently developed. No new construction is planned.

Ownership of lands in the project area is generally divided between private individuals or businesses, the Calista Native Corporation, and government entities. Private or public property transfers subsequent to the original transfer from the federal government may not necessarily be recorded with the Bureau of Land Management and would not have been discovered during research.

6.2.6 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.

Replacement structure and contents values were developed for physical assets (Table 13). These value estimates were provided by the 2013 Planning Team. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be 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 estimated. A similar analysis was used to evaluate the proportion of the population at risk.

According to the 2019 ACS, there are 179 residential housing units. Several structures are in danger of being destroyed because of erosion problems caused by Alakanuk Pass. Figure 15 shows structures are forecast to be impacted by erosion. Updated flooding and erosion hazard assessment maps are currently funded and will be included in the next MJHMP. A Threatened Infrastructure Survey will be conducted this year and will also be included in the next MJHMP to identify all structures and infrastructure that need to be either relocated or elevated to mitigate flooding and erosion hazards. It is anticipated that this survey will have updated replacement costs to include in the 2026 MJHMP Update.

The analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

6.2.7 Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in a risk approximation. 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).

Table 13. Vulnerability Assessment – Population, Residential Structures, and Critical Facilities

		Residential Structures				Critical Facilities			
Hazard	Population	#	Structure Value	Contents Value	Total Value	#	Structure Value	Contents Value	Value
Climate Change	142 (20%)	33	$3,888,000	$ 1,944,000	$5,832,000	12	$13,352,796	$6,676,396	$2,002,919
Erosion	35	8	$960,000	$480,000	$1,440,000	2	$140,000	$ 180,000	$320,000
Flooding	71 (10%)	33	$2,140,000	$972,000	$3,112,000	6	$6,676,398	$3,338,198	$10,014,596
Severe Weather	248 (35%)	57	$6,840,000	$3,402,000	$10,242,000	21	$23,367,393	$11,683,693	$35,051,086
Wildfire	71 (10%)	33	$2,140,000	$972,000	$3,112,000	6	$6,676,398	$3,338,198	$10,014,596

6.2.8 Hazard Narrative Vulnerability Summaries

Population Percentages

The population that could be affected by each of the identified hazards is used in determining the anticipated loss. Many older residents remain active in subsistence activities, while village youth have become dependent on modern infrastructure and commercial food supplies. It was the consensus that in a worst-case scenario, even residents living a more traditional lifestyle will be affected due to the isolation of the community and the dire needs of their relatives and neighbors. Should all critical facilities be lost, some residents may find relocation is their only option.

Critical and Essential Facilities

Alakanuk is an isolated village. Emmonak, the nearest community with resources, is eight air miles away. During a natural disaster, outside resources may be unavailable due to weather and accessibility. Additionally, surrounding villages may also be suffering from the same disaster. In a worst-case scenario, Alakanuk will need to rely only on local resources.

Also, flooding/erosion and changes in the cryosphere are the community's highest priority concerns. Hazards are listed in the order of priority assigned by the Alakanuk community.

Erosion and Flooding

The USACE stated the entire community of Alakanuk is located in a high flood hazard risk area. Based on local knowledge, areas within Alakanuk affected by erosion are located adjacent to the Alakanuk Pass (see Section 5.3.3). Table 8 has much higher expected damages from the 2009 *BEA*. Table 13 uses a vulnerability assessment that was prepared in the 2013 legacy HMP and assumes that 10% of the population from Table 11 will be affected from flooding. It is anticipated that the *Threatened Infrastructure Survey* will have "real time" damage and occupancy figures. Figure 15 is a Draft *Erosion IMPACT* Figure of Alakanuk showing houses and critical infrastructure locations adjacent to Alakanuk Pass with forecasts of which buildings may erode in twenty-year increments. The extent of the erosion forecasts is based on historical records. Additionally, in 2021 and 2022, DGGS and the USACE will conduct an assessment of current flood and erosion hazards and prepare hazard assessment maps and a flooding inundation map. As part of this project, a Threatened Infrastructure Survey will be performed for all structures with the potential to be impacted by erosion and flooding in Alakanuk. This information will be extremely beneficial as it will be data in "real time" and used to update the Table 13 Vulnerability Assessment in the 2026 MJHMP Update and the adaptation strategies to protect the population and infrastructure in Section 7.

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, reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (barge landings, electric and water/wastewater utilities), and economic impacts associated with costs trying to prevent or control erosion sites. Only the building's location can lessen its vulnerability to erosion in Alakanuk.

Impacts associated with flooding in the community is 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 (see Section 5.3.3).

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at an increased impact level because climate change is causing storm surges on Alakanuk Pass, increasing wave action. Impacts could also be lessened if affected properties could be relocated.

Changes in the Cryosphere

Changes in the cryosphere cause thawing of the active layer of permafrost. These hazards periodically cause buildings and water/sewer systems to shift due to ground shifting, sinking, and upheaval. According to mapping completed by DGGS, the entire community is underlain by and exposed to sporadic and discontinuous permafrost impacts (see Section 5.3.1). Additionally, the Bering Sea tidally influences Alakanuk Pass and causes wave action that is accelerating erosion. The 2019 *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities* presented a combined score of number six for Alakanuk as an aggregate of these three individual threats out of 187 communities throughout Alaska. A closer examination of the individual threat ranking shows Alakanuk ranked fourth overall for the threat of flooding, 14th overall for the threat of erosion, and 18th for the threat of thawing permafrost (Denali Commission, 2019). The NVA has funding to assess erosion and flooding impacts, and if a grant application that has recently been submitted to the National Science Foundation Coastlines and People is awarded, a permafrost threat assessment would be conducted in Alakanuk to predict the future impact of permafrost thaw on community infrastructure and develop mitigation actions. The combination of these studies would be beneficial to determine if usteq is also occurring in Alakanuk. This combined information will be available to include in the 2026 update of this MJHMP.

Table 13 assumes that 20% of the population from Table 11 will be affected from permafrost thawing and storm surge. Information in ongoing studies now will be extremely beneficial as it will be data in “real time” and used to update the Table 13 Vulnerability Assessment in the 2026 MJHMP Update and the adaptation strategies to protect the population and infrastructure in Section 7.

Impacts associated with changes in the cryosphere 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 ground movement associated with building on permafrost and other land subsidence and impacts are more vulnerable to damage. Storm surges will continue to accelerate flooding and erosion rates.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at an increased impact level. Impacts could also be lessened if affected properties could be

relocated away from the river and in permafrost-free zones.

Severe Weather

Using information provided by the NWS, the entire existing and future Alakanuk population, residences, and critical facilities are equally exposed to the effects of a severe weather event. For this vulnerability analysis, it is assumed that 35% of the population and residential structures from Table 11 will be affected.

Impacts associated with severe weather events includes roof collapse, power lines falling, damage to light aircraft and sinking small boats, injury and death resulting from snow machine or vehicle accidents, and overexertion while shoveling all due to heavy snow. 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, utility disruptions, frozen pipes, and carbon monoxide poisoning. Section 5.3.4 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, Alakanuk could institute and enforce building codes to accommodate the effects of severe weather on structures.

Fires

For this vulnerability analysis, it is assumed that 10% of the population and residential structures from Table 11 will be affected. Impacts associated with a fire event include the potential for loss of life and property. Buildings constructed with wood are more vulnerable to the impacts of fire.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. Prepared response personnel and firefighting equipment would be beneficial investments in Alakanuk.

6.3 LAND USE AND DEVELOPMENT TRENDS

The requirements for land use and development trends, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements
Plan Review and Updates **§201.6(d)(3)** and **§201.7(d)(3)]:** Local and Tribal governments must review and revise their Plan to reflect changes in development, progress in mitigation efforts, and changes in priorities.
1. REGULATION CHECKLIST
ELEMENT D. HMP Updates
D1. Was the Plan revised to reflect changes in development?

D2. Was the Plan revised to reflect progress in Tribal mitigation efforts?
D3. Was the Plan revised to reflect changes in priorities?
Source: FEMA, 2015.

Land use in Alakanuk is predominantly residential with limited area for commercial services and community (or institutional) facilities. Suitable developable vacant land is in short supply within the boundaries, and open space and various hydrological bodies surround the community. One area of town is classified as airport land use.

Development Trends

The City's *Comprehensive Strategic Development Plan* known as the LEDP realistically describes local community develop trends (stating both positive as well as negative aspects) to enable them to accurately assess their mitigation situation (City, 2018). Their environmental needs include:

- ***Positive***:
  - *Understand how military hazardous materials affect the environment and effect health/cancer related deaths. Work with statewide organizations such as the Alaska Center for Appropriate Technology, ADEC, and the Environmental Protection Agency (EPA) to address these issues.*
  - *More local people are getting involved with addressing sensitive community issues such as environmental impacts.*
- ***Negative***:
  - *The environment continues to change.*
  - *Foreign debris washing up on the shore and beach. Understand their effects to marine mammals, sea life, and subsistence impacts (drift or trawl nets, other Bering Sea pollutants and toxic waste).*
  - *Dump/landfill is full and has reached useful life.*
  - *Island experiences severe storms, wind, and cold.*
  - *Island is too far from mainland –remoteness requires supply delivery by plane or barge.*
  - *Increasing freight costs.*
  - *Island shoreline erosion.*
- ***Strengths***:
  - *Consistent wind creates a potential for electricity generation.*
  - *Island has good gravel and rock resources.*
  - *Community has strong traditional knowledge (environment-changes, event history, understanding, and recognition)*.

A new school has been built in Alakanuk since the 2018 City *HMP*. No new development is anticipated at the present time.

7.0 Mitigation Strategy

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

- Developing Mitigation Goals;
- Identifying Mitigation Actions;
- Evaluating Mitigation Actions; and
- Implementing Mitigation Action Plan (MAP) Strategies.

DMA 2000 Requirements
Identification and Analysis of Mitigation Actions **§201.6(c)(3):** 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? **§201.6(c)(3)(ii):** Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? **§201.7(c)(3)** and **§201.7(c)(3)(iv):** Does the Plan include a discussion of the Tribal government's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including an evaluation of tribal laws and regulations related to hazard mitigation as well as to development in hazard-prone areas? **§201.7(c)(3)(iv)** and **§201.7(c)(3)(v):** Does the Plan include a discussion of Tribal funding sources for hazard mitigation projects and current and potential sources of Federal, Tribal, or private funding to implement mitigation actions? **§201.6(c)(3)(ii)** and **§201.7(c)(3)(i):** Does the Mitigation Strategy include goals to reduce or avoid long-term vulnerabilities to the identified hazards? **§201.6(c)(3):** [The Plan shall include the following:] A mitigation strategy that provides the jurisdiction'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. **§201.6(c)(3)(ii)** and **§201.7(c)(3)(iv):** [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. **§201.6(c)(3)(iii** and **iv)** and **§201.7(c)(3)(iii):** [The hazard mitigation strategy shall include an] action plan, describing how the action identified will be prioritized, implemented, and administered by the Local and Tribal jurisdictions. **§201.6(c)(4)(ii)** and **§201.7(c)(4)(ii, iii, and v):** [The Plan shall include a] process by which Local and Tribal governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
ELEMENT C. Mitigation Strategy
C1 City. 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? C1 Tribe. Does the Plan include a discussion of the Tribal government's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including an evaluation of tribal laws and regulations related to hazard mitigation as well as to development in hazard-prone areas? C2 City. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? *(Addressed in Section 6.2.3)*

C2 Tribe. Does the plan include a discussion of tribal funding sources for hazard mitigation projects and identify current and potential sources of Federal, tribal, or private funding to implement mitigation activities? C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 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? 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? 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? C7 Tribe. Does the plan describe a system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy, including monitoring implementation of mitigation measures and project closeouts?
Source: FEMA, 2015

7.1 DEVELOPING MITIGATION GOALS

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, goals were developed to reduce or mitigate long-term vulnerabilities to identified hazards. On February 23, 2021, the Planning Team modified the goals from the 2018 HMP.

Because the rate of erosion has been increasing over the past five to ten years and is tied to storm surge and wave action, changes in the cryosphere has been added to the erosion goal. Erosion is the community's top priority hazard followed by flooding and severe weather. The City and NVA already have an established good working relationship and will work together on these mitigation goals.

Table 14. Mitigation Goals

No.	Goal Description
1	Reduce the possibility of damage and losses from erosion and changes in the cryosphere.
2	Reduce the possibility of damage and losses from flooding.
3	Reduce the possibility of damage and losses from wildland and conflagration fire.
4	Reduce vulnerability of structures to severe weather damage.
5	Develop and maintain mechanisms of response (i.e., heavy equipment and trained personnel) to nature hazards.

7.2 IDENTIFYING MITIGATION ACTIONS

On February 23 and March 9, 2021, the Planning Team reviewed their mitigation actions for this MJHMP (Table 15). The Planning Team placed particular emphasis on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure.

Table 15. Mitigation Goals and Potential Actions

Goals		Actions	
No.	Description	ID	Description
1	Reduce the possibility of damage and losses from erosion and changes in the cryosphere.	**A**	Update erosion hazard mapping.
		B	Relocate buildings and infrastructure that are at risk of being affected by erosion.
		C	Work with agencies, Native corporations, and organizations to identify new and emerging riverbank protection methods and grants (or other types of funding mechanisms). Apply for grants/funds to implement these riverbank protection methods.
2	Reduce the possibility of damage and losses from flooding.	A	Adopt and enforce floodplain management ordinances by joining the NFIP, which regulates development in floodplains and provides federally-backed insurance to individuals who live in communities that have joined the program.
		B	Relocate, acquire, elevate, or otherwise flood-proof identified properties.
		C	Relocate, acquire, elevate, or otherwise flood-proof critical facilities.
		D	Complete a detailed inventory of community structures and infrastructure, including all critical facilities that are susceptible to flooding in GIS.
		E	Install new streamflow and rainfall measuring gauges.
		F	Develop "real-time" internet access and interagency cooperation to speed flood warning times.
3	Reduce the possibility of damage and losses from wildland and conflagration fires.	A	Identify methods of alerting the community if wildfire threat develops; development an evacuation plan for the community; Maintain Project Code Red equipment; Schedule and perform "fire drills" at least twice per year.
		B	Promote FireWise building design, siting, and materials for construction by developing workshops for builders.
		C	Promote FireWise building design, siting, and materials for construction by retrofitting structures with FireWise building design materials.
		D	Support training for volunteers on the fire department. Identify funding sources for training. Send at least two volunteer fire department members to the Code Red equipment training, rural basic firefighter certification, or basic incident command system knowledge.
4	Reduce the vulnerability of structures to earthquake damage.	A	Encourage use of earthquake resistant materials and construction practices by implementing uniform international and state building codes.
		B	Ensure that all future development meets all requirements for seismic protection. Inspect or have certified all new construction.
5	Reduce the vulnerability of structures to severe winter storm damage.	**A**	Install thaw systems and weatherize pipes, particularly sewage return pipes, to prevent damage from extreme cold.
6	Develop and maintain mechanisms of response (i.e. heavy equipment and trained personnel) to natural hazards.	**A**	Acquire and maintain equipment to respond to natural hazards.
		B	Organize and train groups of first responders in the community.
Note: Bolded IDs are potential actions that are carried forward as mitigation actions in Table 17.			

7.3 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

The Planning Team evaluated and prioritized each of the mitigation actions on February 23, 2021 to determine which actions would be included in the MAP. The MAP represents mitigation projects and programs to be implemented through the cooperation of the community. Neither

the City or NVA has laws, regulations, policies, and programs that pertain to hazard mitigation.

The Planning Team reviewed the simplified social, technical, administrative, political, legal, economic, and environmental (STAPLEE) evaluation criteria (shown in Table 16) and the Benefit-Cost Analysis Fact Sheet (Appendix D) to consider the opportunities and constraints of implementing each 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 or NVA chooses to implement.

Table 16. 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
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 Federal Emergency Management Agency (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 2021 Planning Team reprioritized the planning actions into Table 17 which combined mitigation actions from 2018 and 2021 into one list. Priorities were jointly agreed upon by the City and the Tribe. Progress statements were added to each mitigation action. 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. The 2021 Planning Team reprioritized the planning actions with flooding, erosion, and changes in the cryosphere being the first priority, severe weather being the second priority, and wildfires being the third priority.

7.4 IMPLEMENTING A MITIGATION ACTION PLAN

Table 17 is Alakanuk's MAP Matrix that shows how the mitigation actions were prioritized, how the overall benefit/costs were taken into consideration, and how each mitigation action will be implemented and administered by the Planning Team. If no mitigation actions from Table 17 are implemented, Alakanuk will continue to be vulnerable to all hazards identified in Section 5 and the risks associated with those hazards in Section 6. This would have devastating consequences to the people and their way of life in Alakanuk. If mitigation actions from Table 17 are implemented, Alakanuk will become a resilient community that is prepared for potential hazards identified and profiled in Section 5 and the risks associated with those hazards in Section 6. Table 17 contains statuses, priorities, responsible agencies, potential funding sources, and timelines for mitigation actions selected to be implemented. Any mitigation actions that start with 1.x are studies that were awarded this year that will be completed before the next MJHMP Update. These studies are significant, and their recommendations and maps will be added as mitigation actions to the next MJHMP Update. Any mitigation actions that start with 2.x are mitigation actions that were retained from the 2018 City HMP. 2021 statuses of each mitigation action identified in 2018 are provided in Table 17.

The 2026 MJHMP will demonstrate the City's and Tribe's commitment to make policies by combining hazard data collected from a wide variety of ongoing projects funded by the BIA Tribal Resilience Program to assess the hazard impacts to Alakanuk (see Table 17). The results from these projects being conducted by DGGS, USACE, University of Alaska Fairbanks, ANTHC, and CRW Engineering Group LLC will allow for an integrated planning process for Alakanuk and provide data to apply for funding from FEMA programs and initiatives. HUD, (ICDBG Imminent Threat and CDBG), BIA (Tribal Resilience, Erosion/Climate Response), NRCS (Emergency Watershed Protection), ANTHC, and the Denali Commission.

Table 17. 2021 Mitigation Actions for the City and Native Village of Alakanuk Hazard Mitigation Plan

1.1 New in 2021	Action Item	Conduct Flood and Erosion Hazard Assessment for Alakanuk.
	Department / Agency	Tribal Administrator with DGGS
	Funding Source	BIA Tribal Resilience Program
	Implementation Timeline	Ongoing to 2022
	Benefit-Costs	The DGGS Draft Erosion IMPACT Map shows a forecast for when buildings will erode in 20-year increments. Buildings could erode into the river sooner than forecast. A flooding and erosion hazard assessment project is funded and in progress now. Strong southerly storms in combination with changes in the cryosphere have accelerated erosion of the riverbanks in the last five to seven years. One of the deliverables of this project will be a Threatened Infrastructure Survey to enable both jurisdictions to apply for funding to relocate or elevate structures from FEMA, HMGP, NRCS, HUD, AVCP, and BIA.
1.2 New in 2021	Action Item	Conduct Alakanuk Flood Study.
	Department / Agency	Tribal Administrator with USACE
	Funding Source	USACE Planning Assistance to the States
	Implementation Timeline	Ongoing to 2022
	Benefit-Costs	The USACE conducted a riverine erosion study for Alakanuk in 2009. This study is collecting data to assess long-term flood risk due to climate change. Funding is in hand, and the study is underway. The deliverables will be: a NOAA survey of the Alakanuk channel, a map indicating what locations in the village are expected to flood and the forecasted depth based on water level in the river and storm surge, and a report to include best practices to mitigate flood damage.
1.3 New in 2021	Action Item	Conduct a comprehensive riverine erosion assessment to forecast impacts. Implement riverbank protection methods.
	Department / Agency	Tribal Administrator with CRW Engineering Group LLC
	Funding Source	BIA Tribal Resilience Program
	Implementation Timeline	Ongoing to 2022
	Benefit-Costs	This mitigation action has the potential to identify short- and long-term strategies for the erosion hazard that is impacting the community. In 2020, funding was provided to CRW Engineering Group LLC to complete a comprehensive riverine erosion assessment to forecast impacts and develop solutions. As part of this assessment, topographic, bathymetric, and river flow surveys will be conducted to gather baseline data necessary to conduct hydrologic and hydraulic modeling of the river system. Modeling will be conducted to analyze river hydraulics and interpret areas of concern under expected future climate conditions. Recommended non-structural best practices as well as structural solutions to mitigation the community from erosion impacts will be developed.
1.4 New in 2021	Action Item	Conduct a Permafrost Risk Assessment for Alakanuk. Evaluate results with the assessment identified in 1.1 in regards to the usteq hazard and update the Threatened Infrastructure Survey.
	Department / Agency	Tribal Administrator with the assistance of University of Alaska Fairbanks and ANTHC
	Funding Source	National Science Foundation Coastlines and People

	Implementation Timeline	2026
	Benefit-Costs	This assessment would predict the future impact of permafrost thaw on community infrastructure and develop mitigation actions. The grant has been submitted, and the status is pending.
1.5 New in 2021	Action Item	Complete hydrodynamic flood modeling to support DGGS in developing an inundation map for flooding. Grant application has been submitted, and the status is pending.
	Department / Agency	Tribal Administrator with ANTHC
	Funding Source	National Science Foundation Coastlines and People
	Implementation Timeline	2026
	Benefit-Costs	This assessment would predict the future impact of flood modeling on community infrastructure and develop mitigation actions. The grant has been submitted, and the status is pending.
1.6 New in 2021	Action Item	Repair Riverfront Road to replace gravel that has eroded away.
	Department / Agency	Tribal Transportation Director
	Funding Source	DOT&PF, BIA Tribal Transportation Road Program
	Implementation Timeline	2021
	Benefit-Costs	This repair work is essential to prevent further erosion of the road when it rains. Without repair, this road will continue to erode and deteriorate.
1.7 New in 2021	Action Item	Implement dust control on roads for public health.
	Department / Agency	Tribal Transportation Director
	Funding Source	DOT&PF, BIA Tribal Transportation Road Program
	Implementation Timeline	2021
	Benefit-Costs	Dust of gravel roads continues to increase. The speed limit is 15 mph, and dust control is needed.
Mitigation Actions Selected in 2018		
2.1 High Importance	Action Item	Develop and maintain mechanisms of response (i.e., heavy equipment and trained personnel) to natural hazards.
	Department / Agency	City and Tribal Administrator
	Potential Funding Source	State Capital Improvements Program, BIA Tribal Resilience Program
	Implementation Timeline	2021
	Benefit-Costs	This action ensures Alakanuk has working equipment to response to a natural hazard. This activity will result in response capability for both jurisdictions. Lack of equipment is a barrier to hazard mitigation prevention and response.
	Update in 2021	In 2018, the City identified eight homes, a power pole, and the community hall, which are most immediately threatened by erosion. The City received a grant to relocate four homes but did not have the equipment to relocate the homes. In 2021, the City obtained a dozer, front-end loader, and 42-foot trailer to relocate homes. The City needs additional funding to procure a winch. The Tribe would like funding to procure a forklift.
2.2 High Importance	Action Item	Relocate or elevate buildings that are at risk of being affected by erosion and flooding. Some of these structures have already been identified. More structures will be identified when Mitigation Actions 1.1 and 1.2 deliverables are complete.

	Department / Agency	City and Tribal Administrator
	Potential Funding Source	BRIC, HMGP, FEMA, NRCS, HUD, AVCP, BIA, IHBG, INAP, NAHASDA
	Implementation Timeline	2026
	Benefit-Costs	This mitigation action addresses properties most at-risk of eroding into the river and flooding by reducing their vulnerability to flooding or removing them from high-risk areas. Elevation and relocation are less expensive than repairing or rebuilding a flood or erosion damaged structure. This mitigation action addresses high-risk situations – it is imperative that at-risk buildings (both residences and critical facilities) can function during and after a disaster.
	Update in 2021	No structures have been re-located. Adequate equipment to relocate structures and lack of funding have been barriers. Two homes are in imminent danger of eroding into the river with Winter Breakup that will occur in Spring 2021. Two of the landing poles at the dock have disappeared due to riverbank erosion and need to be replaced. On the north side of the river across from the landing dock, AVEC poles are very close to falling into the river and service not only Alakanuk but connect to Emmonak as well. Five homes and the Tribal Hall are also in danger of eroding into the river.
2.3 High Importance	Action Item	Relocate, acquire, elevate, or otherwise flood-proof critical facilities.
	Department / Agency	City and Tribal Administrator
	Potential Funding Source	BRIC, HMGP, FEMA, NRCS, HUD, AVCP, and BIA
	Implementation Timeline	2026
	Benefit-Costs	This mitigation action addresses critical facilities and infrastructure most at-risk of flooding by reducing their vulnerability to flooding or removing them from high-risk areas. Elevation and relocation are less expensive than repairing or rebuilding a flood damaged structure.
	Update in 2021	No action has been taken due to lack of funding and equipment. Results from Mitigation Actions 1.1 and 1.2 will be beneficial to determining which properties require action.
2.3 High Importance	Action Item	Improve drainage around roads in the community to decrease vulnerability to spring flood damage.
	Department / Agency	Tribal Transportation Director
	Potential Funding Source	DOT&PF, BIA Tribal Transportation Road Program
	Implementation Timeline	2026
	Benefit-Costs	Improving the community's drainage reduces the likelihood of repetitive damage to road surfaces or other infrastructure. The Planning Team indicated that many of the culverts around the community are undersized for the drainage needs of the area and often result in flooding.
	Update in 2021	Culverts were installed but were installed too high. This project needs funding to be redone.
2.4 High Importance	Action Item	Develop and implement solution to protect homes from ice flows associated with flooding.
	Department / Agency	City and Tribal Administrator
	Potential Funding Source	BRIC, HMGP, FEMA, NRCS, HUD, AVCP, and BIA
	Implementation Timeline	2026
	Benefit-Costs	Protecting against ice flows during spring flooding is imperative because they can damage structures, even if the structure is elevated. The cost of developing and installing a berm or other protection or relocating a home is

		likely less than the potential structural damage that is prevented. The City identified at least four homes in high-hazard areas that require protection.
	Update in 2021	No action has been taken due to lack of equipment and funding. Ice hasn't been as much of an issue in the past few years, but it is recommended to include these four homes on the Threatened Structures Survey that will be conducted in 2021.
2.5 High Importance	Action Item	Develop and implement a method to prevent river water contamination from the Landfill, South Side Dump site, and old BIA School adjacent to Alakanuk Pass during flooding.
	Department / Agency	IGAP Coordinator
	Potential Funding Source	EPA IGAP Program, ADEC, Village Safe Water, The Yukon Tribal River Intertrial Watershed Council
	Implementation Timeline	Ongoing
	Benefit-Costs	Environmental contamination due to the possible presence of asbestos-containing material in the Dump Site from river water entering the dump has the potential to harm residents, fisheries, and surrounding communities. The action would reduce the vulnerability of the community to long-term harm and environmental damage, and improve the health of the community.
	Update in 2021	Monthly monitoring has been occurring, and no contamination has been documented. There has been discoloration in the drainage creek and some vegetation has died. In 2021, Village Safe Water obtained grant funding to build a fence to keep landfill waste inside the landfill. The fence will be built in Summer 2021. ADEC provided the community in 2018 with a plan on how to maintain the landfill by using heavy equipment to push all waste to one area of the landfill and cover it as well as clearing brush inside the landfill.
2.6 High Importance	Action Item	Maintain sufficient firebreaks by clearing brush around homes and infrastructure. Equip Alakanuk with desperately needed firefighting equipment.
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM, DOF, AFG Program's Fire Prevention and Safety Grant
	Implementation Timeline	2022-2023
	Benefit-Costs	Firebreaks increase the likelihood a structure will survive a fire. This activity has the potential to save many structures in the event of a fire, since the community has little firefighting equipment. Additionally, the cleared brush may be used to heat homes.
	Update in 2021	Residents stated that there are willows, and the ground is swamp/marshy. Firebreaks have not been made, but this is still a priority. At least four homes have been lost in the past five years due to fire (causes were due to outdated wiring and electrical issues or child-related). Alakanuk fights fires with fire extinguishers and buckets. The community has no code red box or firefighting truck that can haul water, and the City's fire hydrants are outdated and no longer work.
2.7 High Importance	Action Item	Install thaw systems and weatherize pipes, particularly sewage return pipes, to prevent damage from extreme cold.
	Department / Agency	City and Tribal Administrator
	Potential Funding Source	HMGP, BRIC, Rasmussen Foundation
	Implementation Timeline	2022-2023

	Benefit-Costs	This action prevents damage to the waste-water treatment system. Damage to the system could result in spills of raw sewage and system shutdown, which may lead to unsanitary conditions around the City. This activity will improve the longevity of the system and decrease the vulnerability of the system to extreme cold.
	Update in 2021	No action has been done. There were freezing pipes in Winter 2020/2021 that resulted in damages to the Tribal Hall and various homes.
2.8 High Importance	Action Item	Organize and train groups of first responders in the community.
	Department / Agency	City and Tribal Administrator
	Potential Funding Source	AICC, AFG Program's Fire Prevention and Safety Grant, VFA-RFA
	Implementation Timeline	2022
	Benefit-Costs	This action ensures Alakanuk has trained responders to response to a natural hazard. This activity will result in response capability.
	Update in 2021	Lack of funding has prevented any progress with implementation of this mitigation action. The community has no trained firefighters. Tribal police officers completed a two-week training in Bethel on first response. City police officers will attend in May 2021.

8.0 Plan Maintenance

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:

1. Monitoring, evaluating, and updating the MJHMP;
2. Implementation through existing planning mechanisms; and
3. 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 **§201.6(c)(4)** and **§201.7(c)(4)(i):** A Plan maintenance process that includes: (i) a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle; (ii) a process by which Local and Tribal governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate; and (iii) discussion on how the community will continue participation in the plan maintenance process.
ELEMENT A. Planning Process (Continued)
A5. City. Is there discussion of how the community(ies) will continue public participation in the Plan maintenance process? [**Requirement §201.6(c)(4)(iii))]** A5. Tribal. Does the Plan include a discussion on how the planning process was integrated to the extent possible with other ongoing Tribal planning efforts as well as other FEMA programs and initiatives? **[44 CFR § 201.7(c)(1)(iv)]** A6. City. 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))]** A6. Tribal. Does the Plan include a description of the method and schedule for keeping the Plan current (monitoring, evaluating and updating the mitigation plan within the plan update cycle)? **[44 CFR § 201.7(c)(4)(i)]** A7. Tribal. Does the Plan include a discussion of how the Tribal government will continue public participation in the Plan maintenance process? **[44 CFR § 201.7(c)(4)(iv)]**
Source: FEMA, 2015.

The MJHMP was prepared as a collaborative effort. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the City and NVA will continue to use the Planning Team to monitor, evaluate, and update the HMP. Each authority identified in Table 17 will be responsible for implementing the MAP. The City Administrator and NVA Tribal Administrator will serve as the primary points of contact and will coordinate local efforts to monitor, evaluate, and revise the MJHMP.

The City Administrator and NVA Tribal Administrator will conduct an annual review during the anniversary week of the MJHMP's official FEMA approval date to monitor the progress in implementing the MJHMP, particularly the MAP. As shown in Appendix E, the Annual Review Worksheet will provide the basis for possible changes in the MJHMP MAP 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 City Administrator and NVA Tribal Administrator 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 MAP (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 MAP 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; and
- In addition to the annual review, the Planning Team will update the MJHMP every five years. To ensure that this update occurs, in the fourth year following adoption of the MJHMP, the Planning Team will undertake the following activities:
    - Request grant assistance for DHS&EM to update the MJHMP (this can take up to one year to obtain and one year to update the MJHMP);
    - 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 for the City and NVA;
    - 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 NVA; and

- Return adoption resolution to DH&EM and FEMA to receive formal approval.

8.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

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 City and NVA planning mechanisms. 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 capability assessment section (Tables Table 18, Table 19, and Table 20).
- Work with pertinent community departments to increase awareness of the MJHMP and provide assistance in integrating the mitigation strategy (including the MAP) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.
- The planning process from the 2021 MJHMP will be integrated into other Tribal planning efforts as opportunities to develop these plans and update plans are provided.
- The City and Tribal Administrators will be responsible for providing a copy of this MJHMP to contractors focused on developing new or updating existing City and Tribal Plans and ensuring that this MJHMP is incorporated into plans as applicable.

8.3 ALAKANUK CAPABILITY ASSESSMENT

The City's and NVA's capability assessment reviews the technical and fiscal resources available to the community. This section outlines the resources available to the Alakanuk community for mitigation and mitigation related funding and training.

Table 18. Alakanuk's Regulatory Tools

Regulatory Tools (ordinances, codes, plans)	Existing?	Comments (Year of most recent update; problems administering it, etc.)
Building code	No	Neither the City nor the NVA exercise this authority.
Zoning ordinances	No	
Subdivision ordinances	No	
Special purpose ordinances	No	
Community Plan	No	
Economic Development Plan	No	
Land Use Ordinance	No	
Land Use Plan	Yes	Last updated June 2008
Transportation Plan	No	
Emergency Response Plan	No	

Federal Resources

The Federal government requires City and Tribal Governments to have an HMP 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 Tribal and 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. Key resource documents are available from the FEMA Publication Warehouse (1-800-480-2520) 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.
  - 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, Tribal, 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, Tribal, 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, Tribal, and Local governments, the President's disaster assistance programs (administered by FEMA) are 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.
  - The FEMA Hazard Mitigation Assistance Guidance and Addendum, February 5, 2015. The guidance introduces the five HMA grant programs, funding opportunities, award

information, eligibility, application and submission information, application review process, administering the grant, contracts, additional program guidance, additional project guidance, and contains information and resource appendices (FEMA, 2015).

- 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, 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.
- Department of Housing and Urban Development (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.

- U.S. 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.
- 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.

State Resources

- DHS&EM is responsible for improving hazard mitigation technical assistance for Tribal and 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 the 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; and
    - 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 Program, 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). The DEC's 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) 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 its Planning, Design and Engineering, Maintenance and 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-modal transportation system operational following a natural disaster.
- The 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 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) 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 (CFP) and the Volunteer Fire Assistance and Rural Fire Assistance Grant (VFA-RFAG) programs.

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

Table 19. Alakanuk's Staff Resources

Staff/Personnel Resources	Y/N	Department/Agency and Position
Planner or engineer with knowledge of land development and land management practices	No	The City and NVA hire consultants with land development and land management knowledge.
Engineer or professional trained in construction practices related to buildings and/or infrastructure	No	The City and NVA hire consultants with engineering consulting services.
Planner or engineer with an understanding of natural and/or human-caused hazards	No	The City and NVA hire consultants with hazard mitigation knowledge.
Floodplain Manager	No	State Floodplain Manager.
Surveyors	No	Both the City and NVA hire surveying consulting services.
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	No	The City and NVA hire consultants with this knowledge.
Personnel skilled in Geospatial Information Systems	No	The City and NVA hire consultants with this knowledge.
Scientists familiar with the hazards of the jurisdiction	No	

Emergency Manager	Yes	City Administrator or Tribal Administrator (Situation-dependent)
Finance (Grant Writer)	Yes	City Administrator or Tribal Administrator (Situation-dependent)
Public Information Officer	Yes	City Administrator or Tribal Administrator (Situation-dependent)

Table 20. Financial Resources Available for Hazard Mitigation

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
General funds	Limited funding, can exercise this authority with voter approval.
Community Development Block Grants	Limited funding, can exercise this authority with voter approval.
Capital Improvement Projects Funding	Limited funding, can exercise this authority with voter approval.
Authority to levy taxes for specific purposes	Limited funding, can exercise this authority with voter approval.
Incur debt through general obligation bonds	Can exercise this authority with voter approval.
Incur debt through special tax and revenue bonds	Can exercise this authority with voter approval.
Incur debt through private activity bonds	Can exercise this authority with voter approval.
Hazard Mitigation Grant Program (HMGP)	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.
Pre-Disaster Mitigation (PDM) and Building Resilient Infrastructure and Communities (BRIC) grant programs	FEMA funding which is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects.
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.
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.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

8.4 CONTINUED PUBLIC INVOLVEMENT

The City and NVA is dedicated to involving the public directly in the continual reshaping and updating of the MJHMP. A paper copy of the plan and any proposed changes will be available at the City and Tribal Offices. The 2021 MJHMP will also be stored on DCCED/DCRA's plans website under Alakanuk for public reference.

The Planning Team will continue to raise community awareness about the MJHMP and the hazards that have the potential to affect Alakanuk. The City and NVA will jointly use community gatherings as opportunities to remind their population about the potential natural hazards that could affect Alakanuk as well as to provide an annual opportunity for residents to comment on their concerns. Before COVID-19, several events were held in the summer time with good community participation. Since COVID-19, community members have not been allowed to gather. Regardless of when restrictions are lifted, there is a monthly all-agency community meeting within the community. Each committee member could be emailed a copy of the community survey (see Appendix E) yearly for distribution to their members. Any public comments or completed community surveys received regarding the MJHMP will be collected by committee members and provided to the City and Tribal Administrators, included in the annual report, and considered during future MJHMP updates.

Through community outreach activities, the Planning Team will continue to raise awareness about their MJHMP. Outreach activities could include attendance and provision of flyers at City and/or Tribal-sponsored events, community outreach programs and surveys, and public mailings.

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Appendix A: FEMA Review Tools for City and Tribe

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U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

FEMA

December 7, 2021

The Honorable Thomas Alstrom
Mayor, City of Alakanuk
P.O. Box 167
Alakanuk, AK 99554-0167

Dear Mayor Alstrom:

On October 19, 2021, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10, approved the City of Alakanuk and Native Village of Alakanuk Hazard Mitigation Plan 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 grants projects through October 18, 2026, through your state:

City of Alakanuk	Native Village of Alakanuk	

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 programs. Approved mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System. For additional information regarding the Community Rating System, please visit: www.fema.gov/national-flood-insurance-program-community-rating-system or contact your local floodplain manager.

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 Erin Leaders, Hazard Mitigation Plan Manager with the Alaska Division of Homeland Security and Emergency Management, at 907-428-7055, who coordinates and administers these efforts for local entities.

Sincerely,

Kristen Meyers, Director
Mitigation Division

Enclosures

cc: Terry Murphy, Alaska Division of Homeland Security and Emergency Management

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 the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

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

Jurisdiction: Alakanuk, Alaska (Region 10)	**Title of Plan:** Draft City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan Update	**Date of Plan:** March 29, 2020
Local Point of Contact: Penny Alstrom	**Address:** P.O. Box 167 Alakanuk, AK 99554-0167	
Title: City Mayor		
Agency: City of Alakanuk		
Phone Number: (907) 238-3313/3316	**E-Mail:** cityofauk@yahoo.com	

State Reviewer:	**Title:**	**Date:**
JJ Little	DHS&EM Planner	19 April 2021
Erin Leaders	DHS&EM Planner	14 October 2021

FEMA Reviewer	John McCandless
Title	Mitigation Planner
Date:	
Date Received in FEMA Region 10	19 April 2021
Plan Not Approved	1 June 2021
Plan Approvable Pending Adoption	19 October 2021
Plan Approved	22 November 2021 (See note below)

Approval Note: This was a multi-jurisdictional plan that included just one tribal jurisdiction and one local jurisdiction. The tribe was approved on October 19, giving the whole MJHMP an approved status. FEMA received the city's resolution after, on 18 November, 2021.

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be 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 must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST	Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)			
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 20-24, Appendix C (PDF 121-136) Pg. 10 – 14	Met	
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 23, Appendix C (PDF 130-131, 135-136) Pg. 10 – 14	Met	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	PDF 21-24, Appendix C (PDF 123-134) Pg. 10 – 14	Met	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	PDF 24-25, 98-100 Pg. 14 – 15	Met	
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 96-97, Appendix E (PDF 148-152) pg. 86 - 87	Met	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement §201.6(c)(4)(i))	PDF 88-90 Appendix E (PDF 144-152) pg. 78 - 80	Met	

ELEMENT A: REQUIRED REVISIONS:

No Required Revisions

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))	Cryosphere: PDF 28-30, 31-32; Earthquakes: 33-36; Flooding/ Erosion: 37-42, 45-57; Severe Weather: 61, 64-65; Fires: 65-68	Met	
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))	Cryosphere: PDF 30-31, 33; Earthquakes: 34-36; Flooding/ Erosion: 42-45, 60; Severe Weather: 62-63, 65; Fires: 66-68	Met	
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))	Vulnerabilities: PDF 73; Cryosphere: 32, 75-76; Earthquakes: 35; Flooding/Erosion: 58-60, 74-75; Severe Weather: 64-65, 76; Fires: 68, 76	Met	
B4. Does the Plan address (National Flood Insurance Program (NFIP) insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	PDF 13, 71	Met	
ELEMENT B: REQUIRED REVISIONS **No 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 15, 18, 70, 80-82, 90, 95-96	Met	
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))	PDF 13, 71	Met	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	PDF 79	Met	
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 80-87	Met	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and	PDF 83-87, 139-141	Met	

administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))			
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 82, 90	Met	
ELEMENT C: REQUIRED REVISIONS **No Required Revisions**			
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 71-72, 76-77	Met	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	PDF 82-87	Met	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	PDF 79, 81-87	Met	
ELEMENT D: REQUIRED REVISIONS **No 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))	32, Adoption Resolutions to be included in Appendix B	Met	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	32, Adoption Resolutions to be included in Appendix B	Met	
ELEMENT E: REQUIRED REVISIONS **The plan is a multi-jurisdictional plan and includes only a city and a Tribe. The Tribe has already adopted their plan and has been sent a separate approval letter.**			
OPTIONAL: HIGH HAZARD POTENTIAL DAM (HHPD) RISKS			
HHPD1. Did Element A4 (planning process) describe the incorporation of existing plans, studies, reports, and technical information for high hazard potential dams?			
HHPD2. Did Element B3 (risk assessment) address HHPDs?			
HHPD3. Did Element C3 (mitigation goals) include mitigation goals to reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?			
HHPD4. Did Element C4-C5 (mitigation actions) address HHPDs prioritize mitigation actions to reduce vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?			
REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1. Develop a County Risk Assessment a) Identify WUI boundaries/areas			

b) Evaluate Fuel Hazards c) Risk of Wildfire Occurrence d) Homes, Business, Essential Infrastructure at Risk e) Other Community Values at Risk **Local Preparedness, Firefighting Capability**			
F2. Establish Fuels Reduction Priorities and Recommendations to **Reduce Structural Ignitability – Prioritize Local Preparedness Capability Needs**			
F**3**. Finalize County Wildfire Protection Plan – Core planning team agree on action plan. HFRA requires that three entities must mutually agree to the final contents and sign a CWPP:			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

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

Strengths

- A large group of stakeholders were invited to participate in the process and the comments were included in Appendix C. It's also good to see that some of these stakeholders (such as USACE) will be present to evaluate potential hazard impacts and develop mitigation actions.
- It's good to see that things like sign-in sheets and surveys were included in the appendix. This shows transparency throughout the process.
- Table 3 is a great way to show how the NVA and the City of Alakunak reviewed and incorporated existing plans, studies, reports, and technical information into the hazard mitigation plan.

Opportunities

- Consider adding event pictures for further transparency.

Element B: Hazard Identification and Risk Assessment

Strengths

- It's great to see that the Denali Commission's *Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities* was discussed, included, and integrated into the plan as Alakanuk was deemed a "threatened" community and ranked the 6th out of 187 for most threatened communities.
- Visuals, including maps, are used throughout the risk assessment, making the hazards easier to conceptualize.

Opportunities

- It's great to see that pictures (especially of the dump site) were included in the plan. If there would be one "improve" here, consider updating them so that they show current erosion (most updated picture said 2014) in order to comparatively highlight the change seen over the past 7 years.
- Flooding and erosion is deemed highly likely and the "previous occurrences/historical flood events" on pg. 34 show events happening every 2 or 3 years; however, the events stop in 2013. Update to show the most recent data – or, if no flooding events have happened over the past 7 years, try to articulate that in the plan.
- Similar to the statement above, some of the hazard data/information found throughout the plan appears to be outdated and has been copied over from the previous plan. Consider updating this for the next plan update.

Element C: Mitigation Strategy

Strengths

- The plan states that the town and Tribe do not presently participate in the NFIP but that they have interest in enrolling in the NFIP; this is then incorporated into the mitigation goals and potential actions identified in Table 15. This is a great way to ensure that the action is tracked and potentially implemented (or at the very least explored).
- The goals identified are great! They are overarching statements that are relevant to the hazards identified.

Opportunities

- There are some linkages between the mitigation strategy and Hazard Identification and Risk Assessment that could be better explained or be made more consistent. For example, fire events are listed as "not likely" in the probability description but then are deemed a high priority in one of the action items found in the mitigation strategy.

- The linkage between tables 15 and 17 is difficult to understand. Consider clarifying this or making a more distinct connection for future updates.
- The prioritization of actions is sometimes confusing and is hard to connect to each action identified. Consider adding a more thorough explanation for the reader.

Element D: Plan Review, evaluation, and Implementation

Strengths:

- I like that the Development Trends are listed as bullet points and highlight positive, negative, and environmental strengths.

Opportunities:

- The plan says that no new development is anticipated at the present time yet many of the action items identified include development. Consider linking these two entities for the next update so that the plan stays consistent.
- As the city/ANV is designated as a high-risk community, consider including goals that go beyond the 5-year update. Including long term goals will help establish a framework as the community adapts to changing conditions.
- Completed/deferred actions are listed and identified, but it can be hard to differentiate between ongoing and completed actions. Because that this is a plan update, consider making this connection more clear. If some actions are not completed or deferred, try to formally and clearly identify this in the plan.

B. 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

National Fire Adapted Communities Learning Network-https://fireadaptednetwork.org/about/

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, Terry Murphy at Terry.Murpy@alaska.gov , for more information.

SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, 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 should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

	Mulit- Juridiction	Summary	Sheet			Requirements:			(Met /Not Met)		
Line Number	**Jurisdiction Name**	**Jurisdiction Type (city/borough/township/village, etc.)**	**Plan Point of Contact**	**Mailing Address**	**Email**	**Phone**	**A. Planning Process**	**B. Hazard Identification and Risk Assessment**	**C. Mitigation Strategy**	**D. Plan Review, Evaluation and Implementation**	**E. Plan Adoption**	**F. State Requirements**
1	City of Alakanuk	City	Penny Alstrom	P.O. Box 167 Alakanuk, AK 99554-0167	cityofauk@yahoo.com	(907) 238-3313/3316	Met	Met	Met	Met	Met	Met
2	Native Village of Alakanuk	Tribe/Alaska Native Village	Juanita Joseph	P.O. Box 149 Alakanuk, AK 99554-0149	jcjoseph@avcp.org	(907) 238-3419	Met	Met	Met	Met	Met	Met
3												
4												
5												

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

FEMA

October 20, 2021

The Honorable Raymond Oney
President, Native Village of Alakanuk
P.O. Box 149
Alakanuk, Alaska 99554-0149

Dear President Oney:

Congratulations, on October 19, 2021, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10 approved the Native Village of Alakanuk Hazard Mitigation Plan as a Tribal Mitigation Plan, in accordance with Code of Federal Regulations Title 44 Part 201.

An approval provides the Native Village of Alakanuk eligibility to apply directly with FEMA for Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) programs, e.g. Building Resilient Infrastructure and Communities project grants, Public Assistance (Categories C-G), and Hazard Mitigation Grant Program projects through October 18, 2026. Recipients are required to develop and maintain hazard mitigation plans compliant with FEMA standards as a condition for receiving funds. To continue eligibility, within five years from date of this letter, tribes must review, revise as appropriate and re-submit plans for approval. For further assistance on hazard mitigation planning, please contact our acting Regional Mitigation Planning Program Manager, Kyle McCormick, at 202-856-2030.

FEMA evaluates applications for funding according to the specific requirements of the applicable program. A mitigation action identified in the plan may, or may not, meet a program's eligibility requirements. For assistance with hazard mitigation grant funding, please contact FEMA-R10-HMA@fema.dhs.gov.

We look forward to continuing a productive relationship between FEMA Region 10 and the Native Village of Alakanuk. Our Regional Tribal Liaison Ramona VanCleve, at 907-271-4302, is available to facilitate this relationship and delivery of our programs. You are also welcome to contact me directly at 425-487-4604.

Sincerely,

p.p.

Vincent Maykovich
Regional Administrator (Acting)

Enclosure

cc: Terry Murphy, Alaska Division of Homeland Security and Emergency Management

JM:vl

FEMA Region 10 Tribal Mitigation Plan Review Tool

The *Tribal Mitigation Plan Review Tool* records how the tribal mitigation plan meets the regulations in 44 CFR §§ 201.7 and 201.5 (if applicable) and offers FEMA plan reviewers an opportunity to provide feedback to the tribal government.

- **Section 1**: The Regulation Checklist documents FEMA's evaluation of whether the plan has addressed all requirements. If plan requirements are not met, FEMA uses each Required Revisions section to indicate necessary changes.
- **Section 2**: The Strengths and Opportunities for Improvement summary identifies plan's strengths as well as areas for improvement as part of the next plan update.

The FEMA mitigation planner must reference the *Tribal Mitigation Plan Review Guide* when completing the *Tribal Mitigation Plan Review Tool*.

NOTE:

Tribal Jurisdiction: Alakanuk, Alaska (Region 10)	**Title of Plan:** Draft City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan Update	**Date of Plan:** March 29, 2021
Tribal Point of Contact: Juanita Joseph	**Address:** P.O. Box 149 Alakanuk, AK 99554-0149	
Title: Tribal Administrator		
Agency: Native Village of Alakanuk		
Phone Number: (907) 238-3419	**Email:** jcjoseph@avcp.org	

State Review (if applicable): JJ Little	**Title:** DHS&EM Planner	**Date:** April 19, 2021

FEMA Reviewer: John McCandless	**Title:** Community Planner	**Date:** May 7, 2021
Date Received in FEMA Region 10		April 19, 2021
Plan Not Approved		
Plan Approvable Pending Adoption		June 4, 2021
Plan Approved		October 19, 2021

Section 1: REGULATION CHECKLIST

1. **Standard Regulation Checklist** **Regulation (44 CFR § 201.7 Tribal Mitigation Plans)**	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process? [44 CFR § 201.7(c)(1)]	PDF 20-24, Appendix C (PDF 121-136)	Met	
A2. Does the plan document an opportunity for public comment during the drafting stage and prior to plan approval, including a description of how the tribal government defined "public"? [44 CFR § 201.7(c)(1)(i)]	PDF 20-24, 70, Appendix C (PDF 121-136)	Met	
A3. Does the plan document, as appropriate, an opportunity for neighboring communities, tribal and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? [44 CFR § 201.7(c)(1)(ii)]	PDF 23, Appendix C (PDF 130-131, 135-136)	Met	
A4. Does the plan describe the review and incorporation of existing plans, studies, and reports? [44 CFR § 201.7(c)(1)(iii)]	PDF 24-25, 98-100	Met	
A5. Does the plan include a discussion on how the planning process was integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA programs and initiatives? [44 CFR § 201.7(c)(1)(iv)]	PDF 82; Alakanuk has several ongoing projects funded by the BIA Tribal Resilience Program	Met	
A6. Does the plan include a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within the plan update cycle)? [44 CFR § 201.7(c)(4)(i)]	PDF 88-90 Appendix E (PDF 144-152)	Met	
A7. Does the plan include a discussion of how the tribal government will continue public participation in the plan maintenance process? [44 CFR § 201.7(c)(4)(iv)]	PDF 96-97, Appendix E (PDF 148-152)	Met	
ELEMENT A: REQUIRED REVISIONS None			
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 the tribal planning area? [44 CFR § 201.7(c)(2)(i)]	Cryosphere: PDF 28-30, 31-32; Earthquakes: 33-36; Flooding/ Erosion: 37-42, 45-57; Severe Weather: 61, 64-65; Fires: 65-68	Met	

1. **Standard Regulation Checklist** **Regulation (44 CFR § 201.7 Tribal Mitigation Plans)**	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
B2. Does the plan include information on previous occurrences of hazard events and on the probability of future hazard events for the tribal planning area? [44 CFR § 201.7(c)(2)(i)]	Cryosphere: PDF 30-31, 33; Earthquakes: 34-36; Flooding/ Erosion: 42-45, 60; Severe Weather: 62-63, 65; Fires: 66-68	Met	
B3. Does the plan include a description of each identified hazard's impact as well as an overall summary of the vulnerability of the tribal planning area? [44 CFR § 201.7(c)(2)(ii)]	Vulnerabilities: PDF 73; Cryosphere: 32, 75-76; Earthquakes: 35; Flooding/Erosion: 58-60, 74-75; Severe Weather: 64-65, 76; Fires: 68, 76	Met	
ELEMENT B: REQUIRED REVISIONS None			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan include a discussion of the tribal government's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including an evaluation of tribal laws and regulations related to hazard mitigation as well as to development in hazard-prone areas? [44 CFR §§ 201.7(c)(3) and 201.7(c)(3)(iv)]	PDF 80-82	Met	
C2. Does the plan include a discussion of tribal funding sources for hazard mitigation projects and identify current and potential sources of Federal, tribal, or private funding to implement mitigation activities? [44 CFR §§ 201.7(c)(3)(iv) and 201.7(c)(3)(v)]	PDF 82-87	Met	
C3. Does the Mitigation Strategy include goals to reduce or avoid long-term vulnerabilities to the identified hazards? [44 CFR § 201.7(c)(3)(i)]	PDF 79	Met	
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure? [44 CFR § 201.7(c)(3)(ii)]	PDF 80-87	Met	
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by the tribal government? [44 CFR § 201.7(c)(3)(iii)]	PDF 83-87, 139-141	Met	
C6. Does the plan describe a process by which the tribal government will incorporate the requirements of the mitigation plan into other planning mechanisms, when appropriate? [44 CFR § 201.7(c)(4)(iii)]	PDF 82, 90	Met	
C7. Does the plan describe a system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy, including monitoring implementation of mitigation measures and project closeouts? [44 CFR §§ 201.7(c)(4)(ii) and 201.7(c)(4)(v)]	PDF 89, 145-148	Met	

1. **Standard Regulation Checklist** **Regulation (44 CFR § 201.7 Tribal Mitigation Plans)**	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT C: REQUIRED REVISIONS None			
ELEMENT D. PLAN UPDATES			
D1. Was the plan revised to reflect changes in development? [44 CFR § 201.7(d)(3)]	Not applicable: First Tribal Plan		
D2. Was the plan revised to reflect progress in tribal mitigation efforts? [44 CFR §§ 201.7(d)(3) and 201.7(c)(4)(iii)]	Not applicable: First Tribal Plan		
D3. Was the plan revised to reflect changes in priorities? [44 CFR § 201.7(d)(3)]	Not applicable: First Tribal Plan		
ELEMENT D: REQUIRED REVISIONS None			
ELEMENT E. ASSURANCES AND PLAN ADOPTION			
E1. Does the plan include assurances that the tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR Parts 200 and 3002, and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes? [44 CFR § 201.7(c)(6)]		Met	
E2. Does the plan include documentation that it has been formally adopted by the governing body of the tribal government requesting approval? [44 CFR § 201.7(c)(5)]		Met	
ELEMENT E: REQUIRED REVISIONS None			

2. **Enhanced Regulation Checklist** **Regulation (44 CFR § 201.5 Enhanced Tribal Mitigation Plans)**	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ENHANCED ELEMENT F. STANDARD PLAN REQUIREMENTS			
F1. Does the enhanced plan include all elements of the standard tribal mitigation plan? [44 CFR §§ 201.3(e)(3), 201.5(b), and 201.7]	Not applicable		
ENHANCED ELEMENT F: REQUIRED REVISIONS None			
ENHANCED ELEMENT G. INTEGRATED PLANNING			
G1. Does the enhanced plan demonstrate integration to the extent practicable with other tribal and/or regional planning initiatives and FEMA mitigation programs and initiatives? [44 CFR §§ 201.3(e)(3) and 201.5(b)(1)]	Not applicable		

2. **Enhanced Regulation Checklist** **Regulation (44 CFR § 201.5 Enhanced Tribal Mitigation Plans)**	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ENHANCED ELEMENT G: REQUIRED REVISIONS **None**			
ENHANCED ELEMENT H. TRIBAL MITIGATION CAPABILITIES			
H1. Does the tribal government demonstrate commitment to a comprehensive mitigation program? [44 CFR §§ 201.3(e)(3) and 201.5(b)(4)]	Not applicable		
H2. Does the enhanced plan document capability to implement mitigation actions? [44 CFR §§ 201.3(e)(3), 201.5(b)(2)(i), 201.5(b)(2)(ii), and 201.5(b)(2)(iv)]	Not applicable		
H3. Is the tribal government using existing mitigation programs to achieve mitigation goals? [44 CFR §§ 201.3(e)(3), 201.5(a) and 201.5(b)(3)]	Not applicable		
ENHANCED ELEMENT H: REQUIRED REVISIONS None			
ENHANCED ELEMENT I. HMA GRANTS MANAGEMENT PERFORMANCE			
I1. With regard to HMA, is the tribal government maintaining the capability to meet application timeframes and submitting complete project applications? [44 CFR §§ 201.3(e)(3), 201.5(b)(2)(iii)(A)]	Not applicable		
I2. With regard to HMA, is the tribal government maintaining the capability to prepare and submit accurate environmental reviews and benefit-cost analyses? [44 CFR §§ 201.3(e)(3) and 201.5(b)(2)(iii)(B)]	Not applicable		
I3. With regard to HMA, is the tribal government maintaining the capability to submit complete and accurate quarterly progress and financial reports on time? [44 CFR §§ 201.3(e)(3) and 201.5(b)(2)(iii)(C)]	Not applicable		
I4. With regard to HMA, is the tribal government maintaining the capability to complete HMA projects within established performance periods, including financial reconciliation? [44 CFR §§ 201.3(e)(3) and 201.5(b)(2)(iii)(D)]	Not applicable		
ENHANCED ELEMENT I: REQUIRED REVISIONS	**None**		

Section 2: STRENGTHS AND OPPORTUNITIES FOR IMPROVEMENT

INSTRUCTIONS:

The purpose of the ***Strengths and Opportunities for Improvement*** section is for FEMA to provide more comprehensive feedback on the tribal mitigation plan to help the tribal government advance mitigation planning. The intended audience is the tribal staff responsible for the mitigation plan update. FEMA will address the following topics:

1. Plan strengths, including specific sections in the plan that are above and beyond the minimum requirements; and
2. Suggestions for future improvements.

FEMA will provide feedback and include examples of best practices, when possible, as part of the *Tribal Mitigation Plan Review Tool,* or, if necessary, as a separate document. The tribal mitigation plan elements are included below in italics for reference. FEMA is not required to provide feedback for each element.

Required revisions from the **Regulation Checklist** are not documented in the **Strengths and Opportunities for Improvement** section. Results from the **Strengths and Opportunities for Improvement** section are not required for Plan Approval.

Describe the mitigation plan strengths areas for future improvements, including areas that may exceed minimum requirements.

Planning process

Strengths

- Table 3 is a great way to show how the NVA and the City of Alakunak reviewed and incorporated existing plans, studies, reports, and technical information into the hazard mitigation plan.
- A large group of stakeholders were invited to participate in the process and the comments were included in Appendix C. It's also good to see that some of these stakeholders (such as USACE) will be present to evaluate potential hazard impacts and develop mitigation actions.
- It's good to see that things like sign-in sheets and surveys were included in the appendix. This shows transparency throughout the process.

Opportunities for Improvement

- Consider adding event pictures for further transparency.

Hazard identification and risk assessment

Strengths

- It's great to see that the Denali Commission's Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities was discussed, included, and integrated into the plan as Alakanuk was deemed a "threatened" community and ranked the 6th out of 187 for most threatened.
- Visuals, including maps, are used throughout the risk assessment, making the hazards easier to conceptualize.

Opportunities for Improvement

- It's great to see that pictures (especially of the dump site) were included in the plan. If there would be one "improve" here, consider updating them so that they show current erosion (most updated picture said 2014) in order to comparatively highlight the change seen over the past 7 years.
- Flooding and erosion is deemed highly likely and the "previous occurrences/historical flood events" on pg. 34 show events happening every 2 or 3 years; however, the events stop in 2013. Update to show the most recent data – or, if no flooding events have happened over the past 7 years, try to articulate that in the plan.
- Similar to the statement above, some of the hazard data/information found throughout the plan appears to be outdated and has been copied over from the previous plan. Consider updating this for the next plan update.

Mitigation strategy (including Mitigation Capabilities)

Strengths

- The plan states that the town and Tribe do not presently participate in the NFIP but that they have interest in enrolling in the NFIP; this is then incorporated into the mitigation goals and potential actions identified in Table 15. This is a great way to ensure that the action is tracked and potentially implemented (or at the very least explored).
- The goals identified are great! They are overarching statements that are relevant to the hazards identified.

Opportunities for Improvement

- There are some linkages between the mitigation strategy and Hazard Identification and Risk Assessment that could be better explained or be made more consistent. For example, fire events are listed as "not likely" in the probability description but then are deemed a high priority in one of the action items found in the mitigation strategy.

- The linkage between tables 15 and 17 is difficult to understand. Consider clarifying this or making a more distinct connection for future updates.
- The prioritization of actions is sometimes confusing and is hard to connect to each action identified. Consider adding a more thorough explanation for the reader.

Plan updates (this is for the city only but is included in here for transparency)

Strengths

- I like that the Development Trends are listed as bullet points and highlight positive, negative, and environmental strengths.

Opportunities for Improvement

- The plan says that no new development is anticipated at the present time yet many of the action items identified include development. Consider linking these two entities for the next update so that the plan stays consistent.
- As the city/ANV is designated as a high-risk community, consider including goals that go beyond the 5-year update. Including long term goals will help establish a framework as the community adapts to changing conditions.
- As the city/ANV is designated as a high-risk community, consider including goals that go beyond the 5-year update. Including long term goals will help establish a framework as the community adapts to changing conditions.

Resources for Implementing Your Approved Plan

The Tribal Mitigation Planning Handbook (Handbook) provides practical approaches and advice for Tribal governments as they develop their hazard mitigation plans. The Handbook is organized around the seven recommended steps for developing a Tribal mitigation plan. It also provides considerations for how to implement the mitigation plan, advance mitigation activities, and incorporate risk reduction into other Tribal plans and programs. The Handbook is a companion to the Tribal Mitigation Plan Review Guide, released by FEMA in 2017.

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.

Resources for the Building Resilient Infrastructure Communities Program (BRIC)
https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities/resources

The **Integration Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned** resource is a 2014 ICLEI Local Governments for Sustainability 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

National Fire Adapted Communities Learning Network-https://fireadaptednetwork.org/about/
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.

Appendix B: Adoption Resolutions and FEMA Approval Letters

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RESOLUTION 2021-10-26

A RESOLUTION ADOPTING THE CITY OF ALAKANUK and THE NATIVE VILLAGE OF ALAKANUK MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the City Council of Alakanuk is the Municipal Governing body of Alakanuk, Alaska; and,

WHEREAS, the City Council, under its Constitutional authority and through its Governing body, is responsible for the safety and well-being of its residents; and

WHEREAS, the City is governed by a Council of elected representatives composed of a President, Vice-President, Secretary, Treasurer, and members; and

WHEREAS, the City recognizes the threat from natural disasters posed to residents and property; and

WHEREAS, undertaking hazard mitigation projects before disasters occur will reduce the potential for harm to residents and property; and

WHEREAS, the City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan has been sent to the Federal Emergency Management Agency for its approval; and

NOW THEREFORE BE IT RESOLVED, the Alakanuk City COUNCIL hereby adopts the City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Community of Alakanuk will submit the adopted City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan to the Federal Emergency Management Agency officials for final review and approval.

CERTIFICATION

PASSED and APPROVED BY A CONSITUTED QUORUM OF THE ALAKANUK CITY COUNCIL ON THE 26th DAY OF OCTOBER, 2021 BY A VOTE OF _7_ FOR, _0_ AGAINST, AND _0_ ABSTAIN.

ATTEST BY

Signed City of Alakanuk:

Penny Alstrom
City Administrator

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

FEMA

December 7, 2021

The Honorable Thomas Alstrom
Mayor, City of Alakanuk
P.O. Box 167
Alakanuk, AK 99554-0167

Dear Mayor Alstrom:

On October 19, 2021, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10, approved the City of Alakanuk and Native Village of Alakanuk Hazard Mitigation Plan 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 grants projects through October 18, 2026, through your state:

City of Alakanuk	Native Village of Alakanuk	

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 programs. Approved mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System. For additional information regarding the Community Rating System, please visit: www.fema.gov/national-flood-insurance-program-community-rating-system or contact your local floodplain manager.

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 Erin Leaders, Hazard Mitigation Plan Manager with the Alaska Division of Homeland Security and Emergency Management, at 907-428-7055, who coordinates and administers these efforts for local entities.

Sincerely,

Kristen Meyers, Director
Mitigation Division

Enclosures

cc: Terry Murphy, Alaska Division of Homeland Security and Emergency Management

Alakanuk Traditional Council
PO Box 149
Alakanuk, AK 99554

RESOLUTION 21-06-02

A RESOLUTION ADOPTING THE CITY OF ALAKANUK and THE NATIVE VILLAGE OF ALAKANUK MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the TRADITIONAL COUNCIL is a federally-recognized Tribal Governing body for the NATIVE VILLAGE OF ALAKANUK (NVA); and,

WHEREAS, the TRADITIONAL COUNCIL, under its Constitutional authority and through its governing body, is responsible for the safety and well-being of its Tribal Membership and the NVA; and

WHEREAS, the NVA is governed by a Council of elected representatives composed of a President, Vice-President, Secretary, Treasurer, and members; and

WHEREAS, the NVA recognizes the threat from natural disasters posed to residents and property; and

WHEREAS, undertaking hazard mitigation projects before disasters occur will reduce the potential for harm to residents and property; and

WHEREAS, the City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan has been sent to the Federal Emergency Management Agency for its approval; and

NOW THEREFORE BE IT RESOLVED, the NVA TRADITIONAL COUNCIL hereby adopts the City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Community of Alakanuk will submit the adopted City of Alakanuk and Native Village of Alakanuk Multi-Jurisdictional Hazard Mitigation Plan to the Federal Emergency Management Agency officials for final review and approval.

CERTIFICATION

PASSED and APPROVED BY A CONSITUTED QUORUM OF THE NVA TRADITIONAL COUNCIL ON THE 14th DAY OF JUNE, 2021 BY A VOTE OF __ FOR, __ AGAINST, AND __ ABSTAIN.

ATTEST BY:

Raymond J. Oney
President

Mary M. Ayunerak
Secretary

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, WA 98021-8627

FEMA

October 20, 2021

The Honorable Raymond Oney
President, Native Village of Alakanuk
P.O. Box 149
Alakanuk, Alaska 99554-0149

Dear President Oney:

Congratulations, on October 19, 2021, the United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10 approved the Native Village of Alakanuk Hazard Mitigation Plan as a Tribal Mitigation Plan, in accordance with Code of Federal Regulations Title 44 Part 201.

An approval provides the Native Village of Alakanuk eligibility to apply directly with FEMA for Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) programs, e.g. Building Resilient Infrastructure and Communities project grants, Public Assistance (Categories C-G), and Hazard Mitigation Grant Program projects through October 18, 2026. Recipients are required to develop and maintain hazard mitigation plans compliant with FEMA standards as a condition for receiving funds. To continue eligibility, within five years from date of this letter, tribes must review, revise as appropriate and re-submit plans for approval. For further assistance on hazard mitigation planning, please contact our acting Regional Mitigation Planning Program Manager, Kyle McCormick, at 202-856-2030.

FEMA evaluates applications for funding according to the specific requirements of the applicable program. A mitigation action identified in the plan may, or may not, meet a program's eligibility requirements. For assistance with hazard mitigation grant funding, please contact FEMA-R10-HMA@fema.dhs.gov.

We look forward to continuing a productive relationship between FEMA Region 10 and the Native Village of Alakanuk. Our Regional Tribal Liaison Ramona VanCleve, at 907-271-4302, is available to facilitate this relationship and delivery of our programs. You are also welcome to contact me directly at 425-487-4604.

Sincerely,

p.p.

Vincent Maykovich
Regional Administrator (Acting)

Enclosure

cc: Terry Murphy, Alaska Division of Homeland Security and Emergency Management

JM:vl

Appendix C: Public Outreach

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September 9, 2020

Rick Dembroski
State of Alaska Hazard Mitigation Officer
DMVA DHS&EM
P.O. Box 5750
Joint Base Elmendorf-Richardson, Alaska 99505-5750

Mr. Dembroski:

This letter serves as the City of Alakanuk's Letter of Commitment to support LeMay Engineering & Consulting, Inc. in the Native Village of Alakanuk's BIA Tribal Resilience Grant to update the current City Hazard Mitigation Plan. The update will include the addition of the Native Village of Alakanuk as an equal jurisdiction. The end goal of this grant is a State- and FEMA- approved multi-jurisdictional Hazard Mitigation Plan that the City of Alakanuk and the Native Village of Alakanuk will adopt.

Sincerely,

Penny Alstrom
City Administrator

September 9, 2020

Rick Dembroski
State of Alaska Hazard Mitigation Officer
DMVA DHS&EM
P.O. Box 5750
Joint Base Elmendorf-Richardson, Alaska 99505-5750

Mr. Dembroski:

This letter serves as the Native Village of Alakanuk's Letter of Commitment to support LeMay Engineering & Consulting, Inc. in the Native Village of Alakanuk's BIA Tribal Resilience Grant to update the current City Hazard Mitigation Plan. The update will include the addition of the Native Village of Alakanuk as an equal jurisdiction. The end goal of this grant is a State- and FEMA- approved multi-jurisdictional Hazard Mitigation Plan that the City of Alakanuk and the Native Village of Alakanuk will adopt.

Sincerely,

Juanita Joseph
Tribal Administrator

Hazard Mitigation Plan Update for Alakanuk, Alaska

Newsletter #1: February 19, 2021

The BIA Tribal Resilience Program has awarded the Village of Alakanuk a grant to update the 2018 City Hazard Mitigation Plan (HMP) for the City of Alakanuk and add the Tribe as a jurisdiction. This Plan will assist the City and Tribe as a valuable resource tool in making decisions. Additionally, communities must have a State- and FEMA-approved and community-adopted HMP to receive FEMA pre- and post- disaster grants.

LeMay Engineering & Consulting, Inc. was contracted to assist Alakanuk with preparing this 2021 HMP. 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 jenniferlemaype@gmail.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 February 23, 2021, Tribal Council Meeting at 4 pm at the Tribal Administrative Building Conference Room: The agenda will be a summary of the hazard mitigation plan process by Jennifer LeMay. You're invited to provide input to the planning process. Specifically, we'll be discussing which hazard mitigation actions should be added to the HMP. Examples of mitigation actions from the 2018 HMP are: relocating buildings that are at risk of being affected by erosion, flood-proof critical facilities, and improve drainage around roads in the community to decrease vulnerability to spring flood damage. Please provide additional suggestions.

For more information, contact:
Juanita Joseph, Tribal Administrator, (907) 238-3419
Penny Alstrom, City Administrator, (907) 238-3313
Jennifer LeMay, PE, PMP, Lead Planner, (907) 350-6061

Alakanuk Hazard Mitigation Plan Introductory Meeting

4 pm on February 23, 2021

Tribal Administrative Building Conference Room

Name	Organization	Contact Information (phone or email)
Raymond Oney	AUKTC	907-238-2082
Tiffany Andrew	AUKTC	(907) 238-2319
Max Agayar	AUK TC	907-238-2228
Gerald Baxter	AUK TC	907) 238-2010
Mary Ayunerak	Auk TC	907 238-2784
Cecelia Tucker	Auk TC	907) 545-2463
Juanita Joseph	" "	907.238.2200
Mat [illegible]	AUK TC	(907) 238-2151
Jonathan Damian	Auk TC	(907) 238-2245

Handout #1

2018 Mitigation Actions for the City of Alakanuk Hazard Mitigation Plan

1.2	Action Item	Relocate buildings that are at risk of being affected by erosion.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	Department of Homeland Security Preparedness Technical Assistance Program, PDM grants, HMGP
	Implementation Timeline	1-3 years
	Benefit-Costs	This mitigation action addresses high-risk situations – it is imperative that at-risk buildings (both residences and critical facilities) can function during and after a disaster.
	Update in 2018	The City has identified eight homes, a power pole, and the community hall, which are most immediately threatened by erosion. The City is in the process of seeking grant funding to relocate these structures.
1.3	Action Item	Apply for grants/funds to implement riverbank protection methods.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	Department of Homeland Security Preparedness Technical Assistance Program, HMGP, and PDM grants
	Implementation Timeline	1-3 years
	Benefit-Costs	This mitigation action is low-cost, but has the potential to prevent, curb, and mitigate future development in hazard prone areas.
	Update in 2018	The City is continuing to seek funding to study and implement solutions to protect the riverbank from erosion. The City successfully gained HMGP funding to elevate homes in 2015 and is seeking more funding for erosion mitigation.
		Mitigation Actions Selected in 2018
3.2	Action Item	Relocate, acquire, elevate, or otherwise flood-proof identified properties
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	PDM, HMGP, FMA, Lindbergh Grants Program
	Implementation Timeline	1-3 years
	Benefit-Costs	This mitigation action addresses properties most at-risk of flooding by reducing their vulnerability to flooding or removing them from high-risk areas. Elevation and relocation are less expensive than repairing or rebuilding a flood damaged structure.
3.3	Action Item	Relocate, acquire, elevate, or otherwise flood-proof critical facilities
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	PDM, HMGP, FMA, Lindbergh Grants Program
	Implementation Timeline	1-3 years
	Benefit-Costs	This mitigation action addresses critical facilities most at-risk of flooding by reducing their vulnerability to flooding or removing them from high-risk areas. Elevation and relocation are less expensive than repairing or rebuilding a flood damaged structure.
3.7	Action Item	Improve drainage around roads in the community to decrease vulnerability to spring flood damage.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	DOT&PF, HMGP, PDM

2018 Mitigation Actions for the City of Alakanuk Hazard Mitigation Plan

	Implementation Timeline	3-5 years
	Benefit-Costs	Improving the community's drainage reduces the likelihood of repetitive damage to road surfaces or other infrastructure. The Planning Team indicated that many of the culverts around the community are undersized for the drainage needs of the area and often result in flooding.
3.8	Action Item	Develop and implement solution to protect homes from ice flows associated with flooding.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM
	Implementation Timeline	1-3 years
	Benefit-Costs	Protecting against ice flows during spring flooding is imperative because they can damage structures, even if the structure is elevated. The cost of developing and installing a berm or other protection or relocating a home is likely less than the potential structural damage that is prevented. The City has identified at least four homes in high-hazard areas that require protection.
3.9	Action Item	Develop and implement a method to prevent river water contamination of the dump during flooding.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM, EPA/CWSRF, DEC
	Implementation Timeline	3-5 years
	Benefit-Costs	Environmental contamination from river water entering the dump has the potential to harm residents, fisheries, and surrounding communities. The action would reduce the vulnerability of the community to long-term harm and environmental damage, and improve the health of the community.
5.6	Action Item	Maintain sufficient firebreaks by clearing brush around homes and infrastructure.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM, DOF, AFG Program's Fire Prevention and Safety Grant
	Implementation Timeline	1-3 years
	Benefit-Costs	Firebreaks increase the likelihood a structure will survive a fire. This activity has the potential to save many structures in the event of a fire, since the community has little firefighting equipment. Additionally, the cleared brush may be used to heat homes.
10.8	Action Item	Install thaw systems and weatherize pipes, particularly sewage return pipes, to prevent damage from extreme cold.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM, VSW
	Implementation Timeline	2-4 years
	Benefit-Costs	This action prevents damage to the waste-water treatment system. Damage to the system could result in spills of raw sewage and system shutdown, which may lead to unsanitary conditions around the City. This activity will improve the longevity of the system and decrease the vulnerability of the system to extreme cold.

2018 Mitigation Actions for the City of Alakanuk Hazard Mitigation Plan

11.1	Action Item	Develop and maintain mechanisms of response (i.e., heavy equipment and trained personnel) to natural hazards.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM
	Implementation Timeline	2-4 years
	Benefit-Costs	This action ensures Alakanuk has working equipment to response to a natural hazard. This activity will result in response capability for the City.
11.2	Action Item	Organize and train groups of first responders in the community.
	Ranking	Positive
	Department / Agency	City Administrator
	Potential Funding Source	HMGP, PDM
	Implementation Timeline	1 year
	Benefit-Costs	This action ensures Alakanuk has trained responders to response to a natural hazard. This activity will result in response capability for the City.

Jennifer L. LeMay, PE, PMP
Vice President
4272 Chelsea Way
Anchorage, AK 99504
(907) 350-6061
jlemay@lemayengineering.com

February 24, 2021

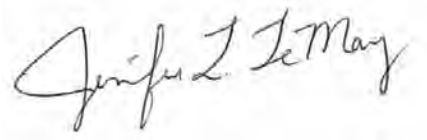
Rick Dembroski
PDM/BRIC Program Manager
Department of Military and Veterans Affairs
Division of Homeland Security and Emergency Management
P.O. Box 5750
JBER, AK 99505-5750

Subject: **Hazard Mitigation Planning Process Conference Call**
Alakanuk, Alaska

LeMay Engineering & Consulting, Inc. updated the City's Hazard Mitigation Plan (HMP) in 2018. The Native Village of Alakanuk received a grant from the Bureau of Indian Affairs Resilience Program to update the City's HMP and add the Native Village as a jurisdiction.

On February 23, 2021, the hazard mitigation planning process was an agenda item during the Tribal Council meeting in Alakanuk. The City and the public were also invited to attend the meeting via flyers posted on community bulletin boards, and I made a personal invitation to Penny Alstrom, City Administrator. The purpose of this meeting 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. Everyone agreed that the hazards remained the same as 2018 with flooding/erosion remaining the top priority. Several projects are funded and underway in 2021 and 2022 which will allow for a much more robust update in the 2026 MJHMP. We went through the hazard mitigation actions from the 2018 HMP and discussed current statuses.

If you have any questions, please do not hesitate to call me at (907) 350-6061.



02/24/21
Jennifer LeMay, PE/Date
LeMay Engineering & Consulting, Inc.

Hazard Mitigation Plan Update for Alakanuk, Alaska

Newsletter #2: February 26, 2021

The BIA Tribal Resilience Program awarded the Village of Alakanuk a grant to update the 2018 City Hazard Mitigation Plan (HMP) for the City of Alakanuk and add the Tribe as a jurisdiction. This Plan will assist the City and Tribe as a valuable resource tool in making decisions and obtaining grant funding to implement mitigation actions to protect lives and property from natural hazards. Natural hazards that are included in this Joint HMP are flooding/erosion, changes in the cryosphere which includes permafrost, severe weather, wildfires, and earthquakes.

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 350-6061 or jenniferlemaype@gmail.com or come to the meeting. The purpose of this newsletter is to provide an update on 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 March 4, 2021, Joint City, Tribal, and Native Corporation Meeting at 1 pm at the Tribal Administrative Building Conference Room: You're invited to provide input to the planning process. Specifically, we'll be looking at a map developed by the State's Department of Natural Resources forecasting the impact of erosion adjacent to the Alakanuk Pass Slough and discussing which hazard mitigation actions should be added to the HMP. Examples of mitigation actions from the 2018 HMP are: relocating buildings that are at risk of being affected by erosion, flood-proofing critical facilities, and improving road drainage in the community to decrease vulnerability to spring flood damage. Please provide additional suggestions as well as opinions on how you think climate change is affecting Alakanuk and impacting erosion and flooding hazards.

For more information, contact:
Juanita Joseph, Tribal Administrator, (907) 238-3419
Penny Alstrom, City Administrator, (907) 238-3313
Jennifer LeMay, PE, PMP, Lead Planner, (907) 350-6061

Gmail Jennifer LeMay <jenniferlemaype@gmail.com>

Draft Hazard Mitigation Plan

1 message

Jennifer LeMay <jenniferlemaype@gmail.com> Fri, Mar 5, 2021 at 12:30 PM
To: "Juanita C. Joseph" <jcjoseph@avcp.org>, cityofauk@yahoo.com

Good afternoon, Juanita and Penny,

I hope the blizzard has subsided. Please forward the attached Hazard Mitigation Plan to all City and Tribal council members on their personal email accounts and to anyone else in the community who would like to review the Plan. It would be very beneficial if you both could read the plan as well and provide comments. I welcome all comments.

Is this file size compressed enough for you to post it on the City and Tribal's Facebook pages?

Remember to post the flyers for Tuesday's meeting.

Thank you.

Jennifer LeMay
(907) 350-6061

210305 Draft 2021 Alakanuk MJHMP.pdf
6691K

Gmail Jennifer LeMay <jenniferlemaype@gmail.com>

Draft City of Alakanuk and Native Village of Alakanuk Hazard Mitigation Plan for Review

Jennifer LeMay <jenniferlemaype@gmail.com> Fri, Mar 5, 2021 at 12:14 PM
To: "Juanita C. Joseph" <jcjoseph@avcp.org>, cityofauk@yahoo.com, aukigap@gmail.com, auknative_corp148@yahoo.com
Cc: emkcity@gmail.com, emktribal@yahoo.com, POA.floodplain@usace.army.mil, philana.miles@alaska.gov, jessica.wutte-campoamor@alaska.gov, jfenton@denali.gov, "Cox Sally A (CED)" <sally.cox@alaska.gov>, malindac@apiai.org, aaron.hughes@alaska.gov, dewayne.cooper@bia.gov, skelly2@eda.gov, Fordham.Tami@epa.gov, vernon_born@fws.gov, Ann.Y.Gravier@hud.gov, Amy.Holman@noaa.gov, Asela_Calhoun@ykhc.org, Leif.E.Hammes@usace.army.mil, Rosalie.Debenham@bia.gov, kglund@anthc.org, jdschaeffer@anthc.org, mdneale@anthc.org, Andrea Meeks <ameeks@crweng.com>, SHalcomb@crweng.com, MHarrison@crweng.com, susan.randlett@alaska.gov, stephen.price@alaska.gov, "Overbeck, Jacquelyn R (DNR)" <jacquelyn.overbeck@alaska.gov>

Good afternoon,

The community of Alakanuk is in the final stages of developing their 2021 Hazard Mitigation Plan. You've been identified as someone who has recently worked with the community or have ongoing projects in the community. If I've inadvertently missed someone that would be interested in this plan or an agency, please feel free to forward this email.

We would appreciate your review of this document. Feel free to look at the area(s) that is/are specific to your expertise. Please make comments either directly in the PDF document or reply to this email with comments and an associated page number. You can also call me with comments as I am the contractor assisting with the plan. We request comments by COB on Friday, March 26. Comments will be incorporated as appropriate. The Draft will be submitted to the State and FEMA before March 31.

Thank you.

Jennifer LeMay, PE, PMP

LeMay Engineering & Consulting, Inc.

(907) 350-6061

210305 Draft 2021 Alakanuk MJHMP.pdf
17762K

Hazard Mitigation Plan Update for Alakanuk, Alaska

Newsletter #3: March 4, 2021

The BIA Tribal Resilience Program awarded the Village of Alakanuk a grant to update the 2018 City Hazard Mitigation Plan (HMP) for the City of Alakanuk and add the Tribe as a jurisdiction. This Plan will assist the City and Tribe as a valuable resource tool in making decisions and obtaining grant funding to implement mitigation actions to protect lives and property from natural hazards. Natural hazards that are included in this Joint HMP are flooding/erosion, changes in the cryosphere which includes permafrost, severe weather, wildfires, and earthquakes.

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 350-6061 or jenniferlemaype@gmail.com or come to the meeting. The purpose of this newsletter is to provide an update on this project and encourage public involvement during this process. The goal is to receive comments, identify key issues or concerns, and improve mitigation ideas.

Due to a blizzard and school being cancelled, the March 4, 2021 meeting has been moved to March 9, 2021 at 1:30 pm at the City Office Conference Room: You're invited to provide input to the planning process. Specifically, we'll be looking at a map developed by the State's Department of Natural Resources forecasting the impact of erosion adjacent to the Alakanuk Pass Slough and discussing which hazard mitigation actions should be added to the HMP. Examples of mitigation actions from the 2018 HMP are: relocating buildings that are at risk of being affected by erosion, flood-proofing critical facilities, and improving road drainage in the community to decrease vulnerability to spring flood damage. Please provide additional suggestions as well as opinions on how you think climate change is affecting Alakanuk and impacting erosion and flooding hazards.

The Draft Hazard Mitigation Plan is available for review and will be posted on the City's Facebook page and can be emailed to you by contacting the people in the blue box below. Your input is requested.

For more information, contact:
Juanita Joseph, Tribal Administrator, (907) 238-3419
Penny Alstrom, City Administrator, (907) 238-3313
Jennifer LeMay, PE, PMP, Lead Planner, (907) 350-6061

Alakanuk Hazard Mitigation Plan Mitigation Actions Joint City Council, Tribal Council, and Native Corporation Meeting

1 pm on March 9, 2021

City Office Conference Room

Name	Organization	Contact Information (phone or email)
Penny Alstrom	City of Alakanuk	(907) 238-3313
Thomas A[illegible]	City of Alakanuk	238 2641
Edgar Andrews	City of Alakanuk	238 2719
[illegible]	[illegible]	
[illegible]	City of Alakanuk	310-1985
[illegible]	City of Alakanuk	545-9158
[illegible]	Alakanuk Tribal	238-2010
Juanita Joseph	ANC Tribe	238-3419
Thurston Smith	City of Alakanuk	238-2318

Jennifer L. LeMay, PE, PMP
President
4272 Chelsea Way
Anchorage, AK 99504
(907) 350-6061
jlemay@lemayengineering.com

March 9, 2021

Rick Dembroski
PDM/BRIC Program Manager
Department of Military and Veterans Affairs
Division of Homeland Security and Emergency Management
P.O. Box 5750
JBER, AK 99505-5750

Subject: **Hazard Mitigation Planning Meeting #2**
Alakanuk, Alaska

On March 9, 2021, the hazard mitigation planning process was an agenda item during the City Council meeting in Alakanuk. The Tribe and the public were also invited to attend the meeting via flyers posted on community bulletin boards, and I made a personal invitation to Juanita Joseph, Tribal Administrator who sent text invitations to her Council members. Everyone agreed that the hazards remained the same as 2018 with flooding/erosion remaining the top priority. Several projects are funded and underway in 2021 and 2022 which will allow for a much more robust update in the 2026 MJHMP. We went through the hazard mitigation actions from the 2018 HMP and discussed current statuses.

The Draft Hazard Mitigation Plan was provided on March 5 to the City and Tribal Administrators, IGAP Coordinator, and Corporation as well as agencies working within the community. A public comment period from March 5 to 26, 2021 was implemented to allow the community time to review the plan.

If you have any questions, please do not hesitate to call me at (907) 350-6061.

3/9/21
Jennifer L. LeMay, PE, PMP/Date
LeMay Engineering & Consulting, Inc.

Gmail Jennifer LeMay <jenniferlemaype@gmail.com>

Draft City of Alakanuk and Native Village of Alakanuk Hazard Mitigation Plan for Review

Lund, Kathryn G <kglund@anthc.org> Tue, Mar 23, 2021 at 11:29 AM
To: Jennifer LeMay <jenniferlemaype@gmail.com>

Good morning Jennifer,

Attached is a PDF version with my comments in the document. Please reach out if you have any questions.

Best,

Katie Lund, Community Resilience Specialist

Center for Environmentally Threatened Communities

Alaska Native Tribal Health Consortium

Work: (907) 729-5684 // Cell: (608) 609-1220 // kglund@anthc.org // www.anthc.org/cetc

From: Jennifer LeMay [mailto:jenniferlemaype@gmail.com]
Sent: Friday, March 5, 2021 12:14 PM
To: Juanita C. Joseph <jcjoseph@avcp.org>; cityofauk@yahoo.com; aukigap@gmail.com; auknative_corp148@yahoo.com
Cc: emkcity@gmail.com; emktribal@yahoo.com; POA.floodplain@usace.army.mil; philana.miles@alaska.gov; jessica.wutte-campoamor@alaska.gov; jfenton@denali.gov; Cox Sally A (CED <sally.cox@alaska.gov>; malindac@apiai.org; aaron.hughes@alaska.gov; dewayne.cooper@bia.gov; skelly2@eda.gov; Fordham.Tami@epa.gov; vernon_born@fws.gov; Ann.Y.Gravier@hud.gov; Amy.Holman@noaa.gov; Calhoun, Asela (YKHC) <asela_calhoun@ykhc.org>; Leif.E.Hammes@usace.army.mil; Rosalie.Debenham@bia.gov; Lund, Kathryn G <kglund@anthc.org>; Schaeffer, Jacqualine D <jdschaeffer@anthc.org>; Neale, Max D <mdneale@anthc.org>; Andrea Meeks <ameeks@crweng.com>; SHalcomb@crweng.com; MHarrison@crweng.com; Randlett,Susan (VSW) <susan.randlett@alaska.gov>; stephen.price@alaska.gov; Overbeck, Jacquelyn R (DNR) <jacquelyn.overbeck@alaska.gov>
Subject: Draft City of Alakanuk and Native Village of Alakanuk Hazard Mitigation Plan for Review

WARNING: This email originated outside of ANTHC from **jenniferlemaype@gmail.com**.
CAUTION: Do not click on links or open attachments unless you recognize the sender and trust these links or attachments are safe. Report all suspicious emails using the **Phish Alert button** in Outlook.

Agency Comments Received:

1. Katie Lund, ANTHC, page 22: The application to NSF was submitted by UAF with ANTHC as a partner. *How was this comment incorporated?* The text was modified on pages 22 and 73 to include this information.
2. Katie Lund, ANTHC, Table 7 on page 34: Would it be possible to put monetary damage estimates to any of the other past events? This would be helpful for grant applications if so. *How was this comment incorporated?* Jennifer LeMay sent an email to Ms. Lund stating: I have not found a source that provides monetary damage estimates for all of the past events. I agree with you that these estimates would be powerful to include in grant applications and even hazard mitigation plans to truly determine which is the most expensive hazard. I include what I can find. I have yet to find a community that keeps a comprehensive list.
3. Katie Lund, ANTHC, Figures 15 and 16 on pages 40 and 41: If possible, it would be valuable to have a caption for this map and the next one on page 41 explaining what the map is showing (e.g., what infrastructure is impacted?). *How was this comment incorporated?* Explanatory information was added to the callouts for these figures on page 38.
4. Katie Lund, ANTHC, Table 17 on pages 72 - 76: Was the Tribal Hall also identified as a priority by the community to move due to erosion? If so, could be specifically added to the Mitigation Action Plan? *How was this comment incorporated?* Five homes and the Tribal Hall were included in Mitigation Action 2.2.
5. Katie Lund, ANTHC, Table 17 on pages 72 - 76: Should "Relocate or elevate structures and critical infrastructure that are likely to be impacted in the near future" be pulled out as its own mitigation action? The DGGS project would not complete this task but allow the community to apply for funding to do it. If so, could be specifically added to the Mitigation Action Plan? *How was this comment incorporated?* The structures identified as a result of completing the studies associated with Mitigation Actions 1.1 and 1.2 were included in Mitigation Action 2.2.
6. Katie Lund, ANTHC, Table 17 on pages 72 - 76: I suggest being detailed about what the deliverables of the USACE project will be. I recommend reaching out to Leif Hammes for details. As far as I know, the deliverables are: NOAA survey of the Alakanuk channel, a map indicating what locations in the village are expected to flood and depth based on water level in river and storm surge, and a report to include best practices to mitigate flood damage. *How was this comment incorporated?* Mr. Hammes did not return my communications. The deliverables were added to Mitigation Action 1.1.
7. Katie Lund, ANTHC, Table 17 on pages 72 - 76: For Action 1.5, I suggest it be "Complete Hydrodynamic Flood Modeling" because it doesn't necessarily have to be Notre Dame that completes this work, that is specific to the NSF grant that was submitted. Also, the benefit-cost is inaccurate – it should refer to the flood modeling. *How was this comment incorporated?* The text was modified for Action 1.4 to include this information.

Appendix D: Benefit-Cost Analysis Fact Sheet

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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. The timing and severity of benefits, however, must be estimated probabilistically because they depend on the improved performance of the building or facility in future hazard events.

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 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 (e.g., flood, wind, seismic).
- Discuss how the proposed measure will mitigate against future damages.
- Document the project's 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 FEMA Region 10 staff prior to submittal of the application.

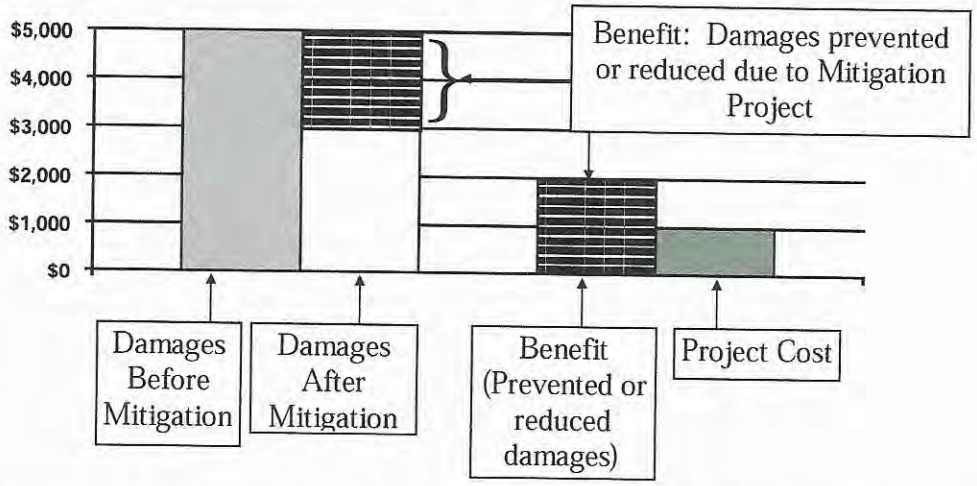
Damage and Benefit Data

- 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.

Benefit Cost Analysis Process

How to Determine Cost-Effectiveness of Mitigation Projects

When Congress enacted the Stafford Act's mitigation provisions, one of the criteria to determine priorities for mitigation funding was cost effectiveness. This cost effective provision was in response to the recognition that there would never be enough funding to completely mitigate against every hazard. To determine the cost effectiveness of proposed mitigation projects, FEMA implemented a benefit cost analysis (BCA) requirement to mitigation grant funding applications. The basic requirement of the BCA is that the benefit of the mitigation project must equal or exceed the cost, a benefit cost ratio (BCR) of 1:1 or greater. Over several years, FEMA developed a set standard values for use in BCA and custom software that establishes mitigation benefits and calculates the BCR. Benefit cost analysis submitted to FEMA to justify mitigation funding requires substantial documentation of project costs and benefits. FEMA provides the custom BCA software and training online at https://www.fema.gov/benefit-cost-analysis. An overview of the BCA process for a mitigation projects follows.



FEMA Basic Benefit-Cost Model. For more information about FEMA's Benefit-Cost Modules, please contact the FEMA Region X Mitigation Division at 425-487-4600.

It is important to understand that benefit-cost analysis is basically the same for each type of hazard mitigation project. The only differences are the types of data that are used in the calculations, depending on whether the project is for floods, earthquakes, or other natural hazards. For example, whereas the depth of flooding is used to estimate damage for flood mitigation projects, the severity of ground shaking is used to estimate damage for earthquake mitigation projects.

Calculating the Benefit – Cost Ratio

In the graph above, cost-effectiveness is determined by comparing the project cost of $1,000, to the value of damages prevented after the mitigation measure, which is $2,000. Because the dollar value of benefits exceeds the costs of funding the project, the project is cost-effective. This relationship is depicted numerically by dividing the benefits by the costs, resulting in a benefit-cost ratio (BCR). The BCR is simply a way of stating whether benefits exceed project costs, and

by how much. To derive the BCR, divide the benefits by the cost ($2,000 ÷ $1,000); if the result is 1.0 or greater, then the project is cost-effective. In this instance, the BCR is 2.0, which far exceeds the 1.0 level. On the other hand, if the cost of the project is $2,000 and the benefits are only $1,000, the project would have a BCR of 0.50 ($1,000 ÷ $2,000) and would not be cost-effective.

Conducting a benefit-cost analysis determines one of two things: either the project is cost-effective (BCR > 1.0), or it is not (BCR < 1.0). If the project is cost-effective, then no further work or analysis needs to be done, there is no third step other than to move the project to the next phase in the approval process. However, if the project is not cost-effective, then it is generally not eligible for FEMA mitigation grant funding.

There are four key elements to all benefit-cost analyses of hazard mitigation projects:

1. An estimate of damages and losses before mitigation
2. An estimate of damages and losses after mitigation
3. An estimate of the frequency and severity of the hazard causing damages (e.g., floods), and
4. The economic factors of the analysis (e.g., discount rate and mitigation project's useful lifetime)

These four key elements and their relationships to one another are detailed in the following example.

Consider a 1,500 square foot, one-story, single family residence located in the Acorn Park subdivision along Squirrel Creek. A proposed mitigation project will elevate the structure four feet at a cost of $20,000. Whether this project is cost-effective depends on the damages and losses from flooding without the mitigation project, the effectiveness of the mitigation project in reducing those damages and losses, the frequency that the house is flooded and the depth of the flood water, and the mitigation project's useful lifetime.

If the pre-mitigation damages are frequent and/or severe, then the project is more likely to be cost-effective. Even minor damage that occurs frequently can, over the life of a project, exceed the up-front costs of implementing a mitigation measure. On the other hand, if the building in the example above only flooded once, then it may not be cost-effective to elevate, unless the damages were significant in relation to the value of the structure and its contents.

Appendix E: Plan Maintenance Documents

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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 and Tribal Administrators

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/Erosion?	0 1 2 3
b. Wildfire?	0 1 2 3
C. Earthquakes?	0 1 2 3
d. Severe weather storms?	0 1 2 3
e. Changes in the cryosphere (storm surge, permafrost)	0 1 2 3
f. 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/Erosion?	0 1 2 3
b. Wildfire?	0 1 2 3
C. Earthquakes?	0 1 2 3
d. Severe weather storms?	0 1 2 3
e. Changes in the cryosphere (storm surge, permafrost)	0 1 2 3
f. Other hazards?	0 1 2 3

Please Specify:

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

a. Flooding/Erosion?	0 1 2 3
b. Wildfire?	0 1 2 3
C. Earthquakes?	0 1 2 3
d. Severe weather storms?	0 1 2 3
e. Changes in the cryosphere (storm surge, permafrost)	0 1 2 3
f. Other hazards?	0 1 2 3

Please Specify:

4. Do you have a record of damages incurred during past flood/erosion 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 <u>are you willing to spend</u> 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		

<u>Mitigation Activities</u>

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 Alakanuk?

□ 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 Hazard Mitigation Plan, please contact the City and Tribal Administrators.

Thank You for Your Participation!

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

Name: _____

Address: _____

_____

Phone: _____