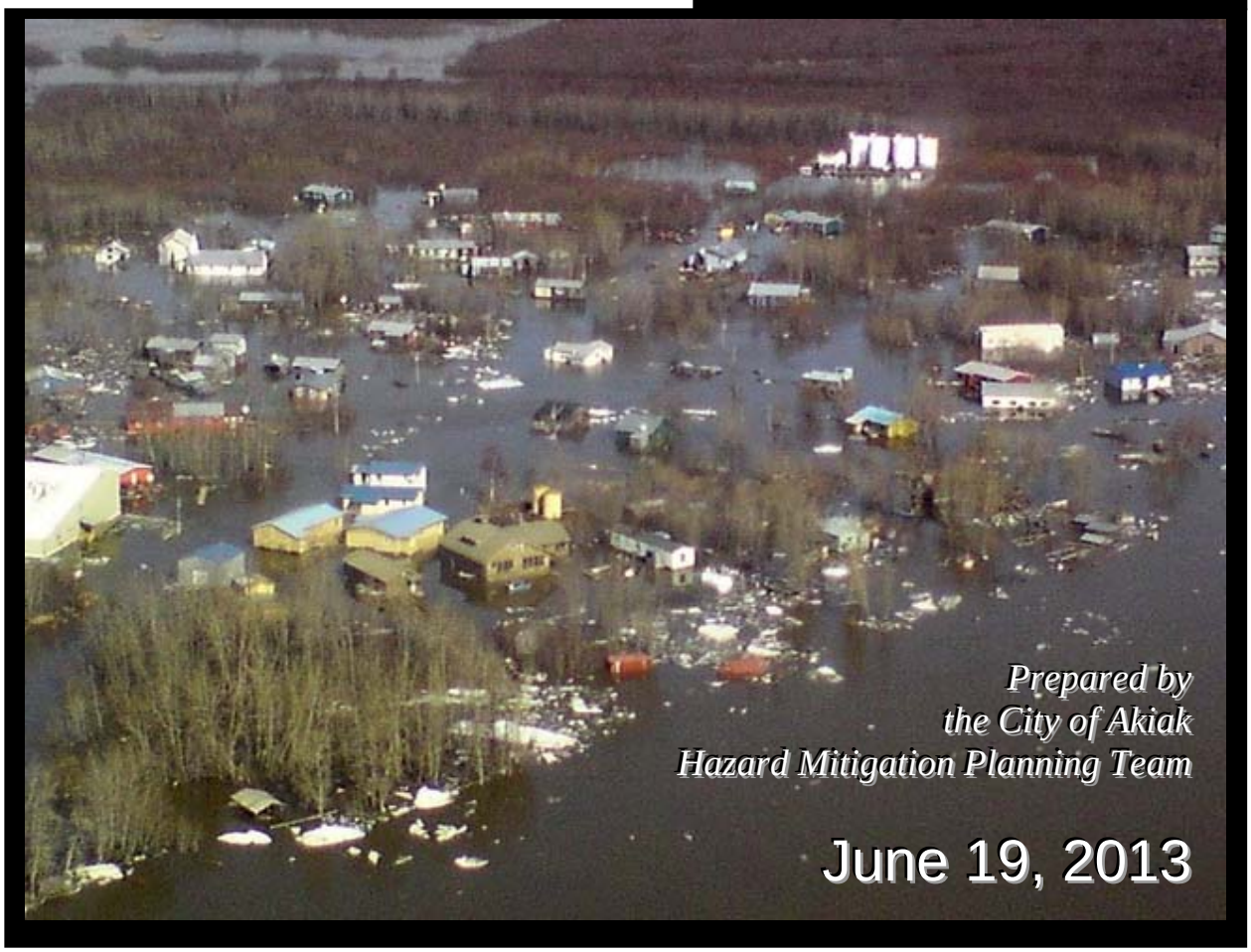
City of Akiak
Hazard Mitigation Plan



Prepared by
the City of Akiak
Hazard Mitigation Planning Team

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Acronyms/Abbreviations

°F	Degrees Fahrenheit
ACCIMP	Alaska Climate Change Impact Mitigation Program
ACWF	Alaska Clean Water Fund
ADWF	Alaska Drinking Water Fund
AEA	Alaska Energy Authority
AEEE	Alternative Energy and Energy Efficiency
AFG	Assistance to Firefighters Grant
AHFC	Alaska Housing Finance Corporation
AICC	Alaska Interagency Coordination Center
ANA	Administration for Native Americans
ANTHC	Alaska Native Tribal Health Consortium
ARC	American Red Cross
AVEC	Alaska Village Electric Cooperative
BF	Bulk Fuel
BIA	Bureau of Indian Affairs
CCP	Citizen Corps Program
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
CFP	Community Forestry Program
CGP	Comprehensive Grant Program
City	City of Akiak
CWSRF	Clean Water State Revolving Fund
DCCED	Department of Commerce, Community, and Economic Development
DCRA	Division of Community and Regional Affairs
DEC	Department of Environmental Conservation
DEED	Department of Education and Early Development
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
ECP	Emergency Conservation Fund
EMPG	Emergency Management Performance Grant
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EWP	Emergency Watershed Protection Program
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency

FMA	Flood Mitigation Assistance
FIPS	Federal Information Processing Standard
FP&S	Fire Prevention and Safety
ft	feet
FY	Fiscal Year
g	gravity as a measure of peak ground acceleration
GIS	Geospatial Information System
Hazus	Hazard United States – Multiple Hazards
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HSGP	Homeland Security Grant Program
HUD	Housing and Urban Development
IBHS	Institute for Business and Home Safety
ICDBG	Indian Community Development Block Grant
IG	Inspector General
IHS	Indian Health Service
INAP	Indian and Native American Programs
IRA	Indian Recognition Act
IRS	Internal Revenue Service
Kts	knots
Lft.	linear feet
M	Magnitude
MMI	Modified Mercalli Intensity
mph	miles per hour
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRF	National Response Framework
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
PGA	peak ground acceleration
PH or Ph	Phase
PNP	private non-profits
RCASP	Remote Community Alert Systems
RD	US Division of Rural Development
RDA	Rural Development Assistance
REAA	Regional Education Attendance Area
RL	repetitive loss
RPSU	Rural Power System Upgrade
SAFER	Staffing for Adequate Fire and Emergency Response
SBA	U.S. Small Business Administration
SHMP	Alaska State Hazard Mitigation Plan
SHSP	State Homeland Security Program
SNAP	Scenarios Network for Alaska & Arctic Planning

Sq.	Square
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
TBM	Temporary Bench Mark
URS	URS Corporation
US or U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFS	US Forest Service
USGS	United States Geological Survey
VFA-RFA	Volunteer Fire Assistance and Rural Fire Assistance Grant
VSW	Village Safe Water
WARN	Warning, Alert, and Response Network
WHIP	Wildlife habitat Incentives Program

1 Introduction

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

1.1 HAZARD MITIGATION PLANNING

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

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

FEMA's October 31, 2007, July 2008, and October 2012 changes to 44 CFR Part 201 combined and expanded flood mitigation planning requirements with local hazard mitigation plans (44 CFR §201.6). Furthermore, all hazard mitigation assistance program planning requirements were combined eliminating duplicated mitigation plan requirements. This change also required participating National Flood Insurance Program (NFIP) communities' risk assessments and mitigation strategies to identify and address repetitively flood damaged properties. Local hazard mitigation plans now qualify communities for several Federal Hazard Mitigation Assistance (HMA) grant programs.

This HMP complies with Title 44 CFR current as of September 28, 2012 and applicable guidance documents.

1.2 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

FEMA HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local Mitigation Plan. Two of the grants 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. The Hazard Mitigation Grant Program (HMGP) is a competitive, disaster funded, grant program. Whereas the other Unified Mitigation Assistance Programs: Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA) programs although competitive, rely on specific pre-disaster grant funding sources, sharing several common elements.

> *"Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage,*

reconstruction, and repeated damage. As such, States, Territories, Indian Tribal governments, and communities are encouraged to take advantage of funding provided by HMA programs in both the pre- and post-disaster timeframes.

Together, these programs provide significant opportunities to reduce or eliminate potential losses to State, Tribal, and local assets through hazard mitigation planning and project grant funding. Each HMA program was authorized by separate legislative action, and as such, each program differs slightly in scope and intent.

The Hazard Mitigation Grant Program (HMGP) may provide funds to States, Territories, Indian Tribal governments, local governments, and eligible private non-profits (PNPs) following a Presidential major disaster declaration. The Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA) programs may provide funds annually to States, Territories, Indian Tribal governments, and local governments. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards" (FEMA 2010).

1.2.1 Hazard Mitigation Assistance (HMA) Unified Programs

HMA grant program activities include:

Table 1-1 HMA Eligible Activities

Activities	HMGP	PDM	FMA
1. Mitigation Projects	√	√	√
Property Acquisition and Structure Demolition	√	√	√
Property Acquisition and Structure Relocation	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction			
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√
Minor Localized Flood Reduction Projects	√	√	√
Structural Retrofitting of Existing Buildings	√	√	
Non-Structural Retrofitting of Existing Buildings and Facilities	√	√	
Safe Room Construction	√	√	
Infrastructure Retrofit	√	√	
Soil Stabilization	√	√	
Wildfire Mitigation	√	√	
Post-disaster Code Enforcement	√		
5% Initiative Projects	√		
2. Hazard Mitigation Planning	√	√	√
3. Management Costs	√	√	√

(FEMA 2012)

The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem, for example, elevation of a home to

reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. FEMA may provide a State or Tribe with up to 20 percent of the total aggregate disaster damage costs to fund HMGP project or planning grants. In Fiscal Year (FY) 2006 was approximately $232 million, FY 2007 was $316 million, FY 2008 was $1.246 billion, FY 2009 was $359 million, and FY 2010 was $23 million. The cost-share for these grants is 75 percent Federal/25 percent non-Federal. Communities that fulfill "Impoverished Community" criteria and receive FEMA Regional Administrator approval may be funded at percent 90 percent Federal/10 percent non-Federal.

The PDM grant program provides funds to State, Tribes, and local entities, including universities, for hazard mitigation planning and mitigation project implementation prior to a disaster event. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM project's potential savings must be more than the cost of implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The total amount of PDM funding available is appropriated by Congress on an annual basis. In FY 2008, PDM program funding totaled approximately $114 million, FY 2009 was $90 million, and FY 2010 was $100 million. The cost-share for these grants is 75 percent Federal/25 percent non-Federal.

The goal of the FMA grant program is to reduce or eliminate flood insurance claims under the NFIP. Particular emphasis for this program is placed on mitigating repetitive loss (RL) properties. The primary source of funding for this program is the National Flood Insurance Fund. Funding is available for Planning and Project grants and are awarded to States, Tribes, and local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP.

The City of Akiak does not currently participate in the NFIP and is therefore ineligible for National Flood Insurance Act Grant Programs until they become a NFIP participant.

HMP Description

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

Introduction

Section 1 defines what a hazard mitigation plan is, delineates federal requirements and authorities, and introduces the Hazard Mitigation Assistance program listing the various grant programs and their historical funding levels.

Community Description

Section 2 provides a general history and background of the City, including historical trends for population and the demographic and economic conditions that have shaped the area.

Planning Process

Section 3 describes the planning process and identifies the Planning Team Members, the meetings held as part of the planning process, and the key stakeholders within the City and the

surrounding area. In addition, this section documents public outreach activities (Appendix D), the review and incorporation of relevant plans, reports, and other appropriate information, actions the City plans to implement to assure continued public participation, and their methods and schedule for keeping the plan current. It also defines the community's, State, and FEMA review, evaluation, and implementation processes.

This section also describes the Planning Team's formal plan maintenance process to ensure that the HMP remains an active and applicable document throughout its 5-year lifecycle. The process includes monitoring, reviewing, evaluating (Appendix F – Maintenance Documents), updating the HMP; and implementation initiatives.

Plan Adoption

Section 4 describes the City's HMP adoption process and supporting documentation

Hazard Analysis

Section 5 describes the process through which the Planning Team identified, screened, and selected the hazards to be profiled in this version of the HMP. The hazard analysis includes the nature, previous occurrences (history), location, extent, impact, and probability of future events for each hazard.

Vulnerability Analysis

Section 6 identifies potentially vulnerable assets—people, residential and nonresidential buildings dwelling units (where available), critical facilities, and critical infrastructure—in the City. The resulting information identifies the full range of hazards that the City could face and potential social impacts, damages, and economic losses. Land use and development trends 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. This section lists the City's governmental authorities, policies, programs and resources.

The Planning Team developed a list of mitigation goals and potential actions to address the risks facing the City. Mitigation actions include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities. Mitigation strategies were developed to address potential NFIP insurable properties (if applicable) while encouraging participation with the NFIP and the reduction of flood damage to flood-prone structures.

References

Section 8 lists the reference materials used to prepare this HMP.

Appendices

Appendix A: Delineates Federal, State, and other potential mitigation funding sources. This section will aid the City with researching and applying for funds to implement their mitigation strategy.

Appendix B: Provides the FEMA Local Mitigation Plan Review Tool, which documents compliance with FEMA criteria.

Appendix C: Provides the adoption resolution for the City.

Appendix D: Provides public outreach information, including newsletters.

Appendix E: Contains the Benefit-Cost Analysis Fact Sheet used to prioritize mitigation actions.

Appendix F**:** **P**rovides the plan maintenance documents, such as an annual review sheet and the progress report form.

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

2.1 LOCATION, GEOGRAPHY, AND HISTORY

"Akiak is located on the west bank of the Kuskokwim River, 42 air miles northeast of Bethel, on the Yukon-Kuskokwim Delta. It lies at approximately 60.912220 North Latitude and -161.213890 West Longitude. (Sec. 32, T010N, R067W, Seward Meridian.) Akiak is located in the Bethel Recording District." (Department of Community, Commerce, and Economic Development [DCCED], Division of Community and Regional Affairs [DCRA] 2012).

Figure 2-1 Akiak Location Map

The City covers approximately 2.0 square (sq.) miles of land and approximately 1.1 sq. miles of water. Extreme temperature changes occur throughout Alaska's interior. The City's temperatures range from a winter low of -2 degrees Fahrenheit (°F) to a high of 62 °F. The area receives approximately 16 inches of rain and 50 inches of snow.

Akiak was originally known by its Yup'ik name, Ackiagmute, which had a population of approximately 175 residents. "The name Akiak (Akiaq in Central Yup'ik) means 'the other side,' since this place was a crossing to the Yukon River basin during the winter for area Eskimos." (DCCED/DCRA). The following is a brief sketch of the City's history:

1880	A population of 175 lived in Ackiagmute
1916	The Akiak Post Office was established
1920s	The U.S. Public Health Service built the City's first hospital
1970	The city was incorporated as a second class city in the State's Unorganized Borough

2.2 DEMOGRAPHICS

Akiak is a Yup'ik Eskimo City who relies heavily on fishing, hunting, and wild food harvesting subsistence as food sources as well as income. The 2010 census recorded 346 residents, of which the median age was 25.6 indicating a relatively young population. The population of Akiak is expected to remain steady because the greatest percentage of the population is younger than 34 years of age. The City is principally a Yup'ik Eskimo community with approximately 94.8 percent of residents recognize themselves as Alaska Native. The male and female composition is approximately 48.8 and 51.1 percent respectively. The 2010 census revealed that there are 69 households with the average household having approximately 3.84 individuals. The most recent 2011 DCCED certified population is 367. Figure 2-2 illustrates the historic population of the City.

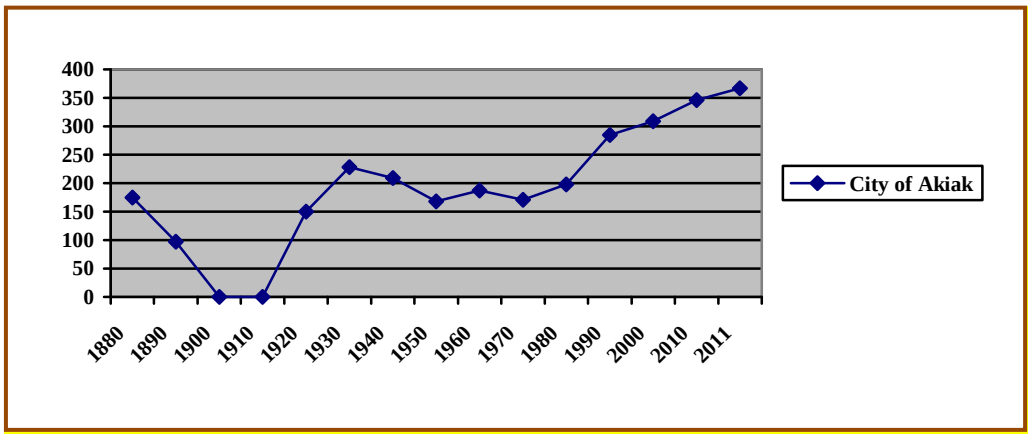

Figure 2-2 Akiak Historic Population

2.3 ECONOMY

There are limited employment opportunities in the City. Established government provides the bulk of the employment opportunities such as the City (70.4 percent), State (1.0 percent), the school district and health clinic (6.5 percent), and commercial fishing (4.5 percent), and other commercial enterprises (17.6 percent). (DCRA 2011)

According to the 2010 census, the median household income in Akiak was $35,833, whereas the per capita income was approximately $13,400. Approximately (21.9 percent) of the population were reported to be living below the poverty level. The potential work force (those aged 16 years or older) in the City was estimated to be 346, of which 194 were actively employed. In 2010 the unemployment rate was 23.9 percent; however, this rate included part-time and seasonal jobs, and practical unemployment or underemployment is likely to be significantly higher.

Figure 2-3 depicts a DCRA community profile aerial photograph of the City of Akiak.

Figure 2-3 Aerial Photograph of the City of Akiak. (DCRA)

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This section provides an overview of the planning process; identifies the Planning Team Members and key stakeholders; documents public outreach efforts; and summarizes the review and incorporation of existing plans, studies, and reports used to develop this HMP. Outreach support documents and meeting information regarding the Planning Team and public outreach efforts are provided in Appendix D.

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 Planning Process §201.6(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 §201.6(b)(1): An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; §201.6(b)(2): An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and nonprofit interests to be involved in the planning process; and §201.6(b)(3): Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved. §201.6(c)(4)(i): The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle. §201.6(c)(4)(iii): The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
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)) 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)) A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1)) A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3)) A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii)) A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle?) (Requirement §201.6(c)(4)(i))
Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process? (Not applicable until 2013 update).
Source: FEMA, October 2011.

3.1 OVERVIEW OF PLANNING PROCESS

The State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) provided funding and project oversight to URS Corporation to facilitate and guide Planning Team development and HMP development.

The planning process began with Debra Jackson City Mayor, coordinating a local Planning Team kick-off meeting to coincide with their City Council meeting on June 8, 2012. The Planning Team identified applicable City resources and capabilities during the meeting. URS explained how the HMP differed from current emergency plans. The Planning Team then discussed the City's rolls 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 City such as erosion, sediment deposition, and permafrost impacts, which are increasing in intensity.

The Planning Team further discussed the hazard mitigation planning process, asking participants to help identify hazards that affect the City, to identify impacts to residential and critical facilities, and for assisting the Planning Team with identifying and prioritizing mitigation actions for potential future mitigation project funding

In summary, the following five-step process took place from June 2012 through April 2013.

1. Organize resources: Members of the Planning Team identified resources, including staff, agencies, and local community members, who could provide technical expertise and historical information needed in the development of the hazard mitigation plan.
2. Monitor, evaluate, and update the plan: The Planning Team developed a process to ensure the plan was monitored to ensure it was used as intended while fulfilling City needs. The team then developed a process to evaluate the plan to compare how their decisions affected hazard impacts. They then outlined a method to share their successes with community members to encourage support for mitigation activities and to provide data for incorporating mitigation actions into existing planning mechanisms and to provide data for the plans five year update.
3. Assess risks: The Planning Team identified the hazards specific to Akiak, and with the assistance of a hazard mitigation planning consultant (URS), developed the risk assessment for the six identified hazards. The Planning Team reviewed the risk assessment, including the vulnerability analysis, prior to and during the developing the mitigation strategy.
4. Assess capabilities: The Planning Team reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards.
5. Develop a mitigation strategy: After reviewing the risks posed by each hazard, the Planning Team developed a comprehensive range of potential mitigation goals and actions. Subsequently, the Planning Team identified and prioritized the actions for implementation.

3.2 HAZARD MITIGATION PLANNING TEAM

The local Planning Team members are City Administrator Ivan M. Ivan (Planning Team Leader), Mayor David Gilila, City Clerk Charity Jasper, Bookkeeping Amelia Nicoli, City Council Members, President, Tribal Council Owen Ivan Sr., and Akiak School Principal Sherry McKenzie.

Table 3-1 identifies the hazard complete mitigation Planning Team.

Table 3-1 Hazard Mitigation Planning Team

Name	Title	Organization	Key Input
Ivan M. Ivan	City Administrator	City of Akiak	Planning Team Lead, HMP review.
David Gilila	City Mayor	City of Akiak	Planning Team Member, data input and HMP review.
Amelia Nicoli	Accountant	City of Akiak	Planning Team Member, data input and HMP review.
Charity Jasper	City Clerk	City of Akiak	Planning Team Member, data input and HMP review.
--	City Council Members	City of Akiak	Planning Team Member, data input and HMP review.
Owen Ivan Sr.	President	Native Village of Akiak	Planning Team Member, Tribal data input and HMP review.
Sherry McKenzie	Principal	Akiak School	Planning Team Member, data input and HMP review.
Scott Simmons	Emergency Management, Hazard Mitigation, and Climate Change Planner	URS Corporation, Alaska	Temporary Member during plan development. Responsible for HMP development, lead writer, project coordination

3.3 PUBLIC INVOLVEMENT & OPPORTUNITY FOR INTERESTED PARTIES TO PARTICIPATE

Table 3-2 lists the City's public involvement initiatives focused to encourage participation and insight for the HMP effort.

Table 3-2 Public Involvement Mechanisms

Mechanism	Description
Newsletter #1 Distribution (June 5, 2012)	In June 2012, the jurisdiction distributed a newsletter describing the upcoming planning activity. The newsletter encouraged the whole community to provide hazard and critical facility information. It was posted at the City and Tribal Offices and the Post Office to ensure everyone invited to participate during HMP development.
Newsletter Distribution #2 (February, 2013)	In February 2013, the jurisdiction distributed a newsletter describing the HMPs availability and present potential HMP projects for review. The newsletter encouraged the whole community to provide comments or input during the review process. It was posted at the City and Tribal Offices and the Post Office to encourage everyone to review the HMP.

On June 8, 2012, the City Administrator and DHS&EM's contractor, URS Corporation, discussed the hazard mitigation project and FEMA requirements. The City Administrator, Ivan M. Ivan then introduced the hazard mitigation planning project during January 2013 City

Council Meeting. Mr. Ivan extended an invitation to all individuals and entities identified on the project mailing list via a project newsletter describing the planning process and announcing the upcoming public meeting. The newsletter was either emailed or faxed to relevant academia, nonprofits, and local, state, and federal agencies and placed on the DSH&EM website to solicit their involvement when applicable. Signs were posted throughout the community announcing the HMP project's commencement.

The following agencies were invited to participate and review the HMP:

- University of Alaska Fairbanks, Geophysical Institute, Alaska Earthquake Information Center (UAF/GI/AEIC)
- Alaska Native Tribal Health Consortium-Community Development (ANTHC)
- Alaska Volcano Observatory (AVO)
- Association of Village Council Presidents (AVCP)
- Denali Commission
- Alaska Department of Environmental Conservation (DEC)
- DEC Division of Spill Prevention and Response (DSPR)
- DEC Village Safe Water (VSW)
- Alaska Department of Transportation and Public Facilities (DOT/PF)
- Alaska Department of Community, Commerce, and Economic Development (DCCED)
- DCCED, Division of Community Advocacy (DCRA)
- Alaska Department of Military and Veterans Affairs (DMVA)
- DMVA, Division of Homeland Security and Emergency Management (DHS&EM)
- US Environmental Protection Agency (EPA)
- National Weather Service (NWS) Northern Region
- NWS Southeast Region
- NWS Southcentral Region
- Natural Resources Conservation Service (NRCS)
- US Department of Agriculture (USDA)
- USDA Division of Rural Development (RD)
- US Army Corps Of Engineers (USACE)
- US Bureau of Indian Affairs (BIA)
- US Bureau of Land Management (BLM)
- US Department of Housing and Urban Development (HUD)
- US Fish & Wildlife Service (USFWS)

During the meeting, the Planning Team discussed the HMP development project and discussed the communities identified hazards who confirmed that the HMP's identified five hazards: earthquake, erosion, flood, severe weather, and wildland fire periodically impact the area.

The Planning Team then led the attendees through reviewing the identifying critical facilities in the community to ensure that specific information was complete and accurate for completing a viable risk assessment including the location, value, and population of residents and critical facilities in the City.

A Potential Mitigation Project Selection teleconference was held on February 22, 2013 to review and prioritize the mitigation actions identified based on the results of the risk assessment. A second newsletter was prepared and delivered on February 25, 2013 describing the process to date, presenting the prioritized mitigation actions, and announcing the availability of the draft HMP for public review and comment.

The Planning Team held a special meeting in April, 2013 to review the draft HMP for accuracy – ensuring it meets the City's needs. The meeting was productive with the Team highlighting several minor corrections or refinements. Changes were specifically targeted to plan development information, hazard impacts, community vulnerability analysis, and the mitigation strategy.

3.4 INCORPORATING EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Planning Team reviewed and incorporated information from existing plans, studies, reports, and technical reports into the HMP. The following were available from two of the City's websites and were reviewed and used as references for the jurisdiction information and hazard profiles in the risk assessment of the HMP for the City (DCCED 2012).

Table 3-5 Documents Reviewed

Existing plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)
The Akiak Rural Power System Upgrades. Prepared by Egor Esipov	*Explains the City's soil conditions, flood data, and future electrical system description.*
The US Army Corps of Engineers (USACE), Alaska Baseline Erosion Assessment, Study Findings and Technical Report	*Defines the State's erosion threats, lists threatened communities, and defines the various erosion categories*
The USACE, Alaska Baseline Erosion Assessment, Community Assessment Paper – Akiak Alaska, January 27, 200	*Provided a detailed report defining the City's erosion threat.*
The USACE Floodplain Manager's Flood Hazard Data, Current as of October 2011	*Indicates HWE survey, flood history, and Flood gauge locations for the City.*
State of Alaska, Department of Commerce, Community and Economic Development Community Profile	*Provided historical and demographic information. Provides detailed demographic, climatic, political, and socio-economic data for the City*
Erosion Assistance Request Letter from City of Akiak to DHS&EM	*Identified recent and future erosion impacts from 2012 flood season.*
State of Alaska Hazard Mitigation Plan, 2010 (SHMP)	*Defines statewide hazards and their potential locational impacts*

A complete list of references consulted is provided in Section 8.

3.5 PLAN MAINTENANCE

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

The following three process steps are addressed in detail here:

1. Implementation through existing planning mechanisms
2. Continued public involvement
3. Monitoring, reviewing, evaluating, and updating the HMP

3.5.1 Incorporating Into Existing Planning Mechanisms

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

DMA 2000 Requirements
1. REGULATION CHECKLIST
Incorporation into Existing Planning Mechanisms §201.6(b)(3): Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
ELEMENT A Planning Process (Continued)
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports3 and technical information?
Source: FEMA, October 2011.

Once the HMP is City adopted and receives FEMA's final approval, each Planning Team Member will ensure that the HMP, in particular each mitigation action or project, is incorporated into existing planning mechanisms. Each member of the Planning Team will achieve this incorporation by undertaking the following activities.

- The City will review specific regulatory tools to assess mitigation strategy integration. These regulatory tools are identified in Section Seven's Capability Assessment.
- Work with pertinent City departments and State and Federal agencies to increase awareness of the HMP and provide assistance in integrating the mitigation strategy (including the Mitigation Action Plan) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.

3.5.2 Continued Public Involvement

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

DMA 2000 Requirements
1. REGULATION CHECKLIST
Continued Public Involvement §201.6(c)(4)(iii): The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
ELEMENT A Planning Process (Continued)
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))
Source: FEMA, October 2011.

The City is dedicated to involving the public directly in the continual reshaping and updating of the HMP. A paper copy of the HMP and any proposed changes will be available at the Tribal Office. An address and phone number of the Planning Team Leader to whom people can direct their comments or concerns will also be available at the Tribal Office.

The Planning Team will continue to identify opportunities to raise community awareness about the HMP and the hazards that affect the area. This effort could include attendance and provision of materials at City-sponsored events, outreach programs, and public mailings. Any public comments received regarding the HMP will be collected by the Planning Team Leader, included in the annual report, and considered during future HMP updates.

3.5.3 Monitoring, Reviewing, Evaluating, and Updating the HMP

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

DMA 2000 Requirements
Monitoring, Evaluating and Updating the Plan §201.6(c)(4)(i): The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
1. REGULATION CHECKLIST
ELEMENT A. Planning Process (Continued)
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle?)
Source: FEMA, October 2011.

This section includes an explanation of how the City's Planning Team intends to organize their efforts to ensure that improvements and revisions to the HMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail here:

1. Review and revise the HMP to reflect development changes, project implementation progress, project priority changes, and resubmit for State and FEMA approval
2. HMP resubmittal at the end of the plan's five year life cycle for State and FEMA review and approval
3. Continued mitigation initiative implementation

3.5.3.1 Monitoring the HMP

The HMP was prepared as a collaborative effort. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the City will continue to use the Planning Team to monitor the HMP to determine whether action identified in the Mitigation Action Plan Matrix (Table 7-7) were effectively implemented. The Tribal President, the hazard mitigation Planning Team Leader, (or designee), will serve as the primary point of contact and will coordinate local efforts to monitor, evaluate, revise, and tabulate HMP actions' status.

3.5.3.2 Reviewing the HMP

The Planning Team's review will determine how community changes have either made hazard impacts worse or whether they have experienced reduced impacts. It will allow the team to review construction and community infrastructure conditions as well as weather pattern changes, and population increases or decreases to determine if their implemented mitigation projects have reduced hazard risks or vulnerabilities.

Each member of the Planning Team will conduct an annual review during the anniversary week of the HMP's official FEMA approval date to monitor the progress in implementing the HMP, particularly the Mitigation Action Plan.

3.5.3.3 Evaluating the HMP

As shown in Appendix F, the Annual Review Questionnaire will provide the basis for evaluating possible changes in the HMP Mitigation Action Plan by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the HMP implementation. The Planning Team Leader will initiate the annual review two months prior to the scheduled planning meeting date to ensure that all data is assembled for discussion with the Planning Team. The findings from these reviews will be presented at the annual Planning Team Meeting. Each review, as shown on the Annual Review Worksheet, will include an evaluation of the following:

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

3.5.3.4 *Updating the HMP*

In addition to the annual review, the Planning Team will update the HMP every five years. The following section explains how the HMP will be reviewed, evaluated, and implementation successes described.

DMA 2000 Requirements
Reviewing, Evaluating, and Implementing the Plan §201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.
ELEMENT D. Planning Process (Continued) *Update activities not applicable to the plan version*
D1. Was the Plan revised to reflect changes in development? (Requirement §201.6(d)(3))
D2. Was the Plan revised to reflect progress in local mitigation effort? (Requirement §201.6(d)(3))
D3. Was the Plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))
Source: FEMA, October 2011.

The City will annually review the HMP as described in Section 3.5.3 and update the HMP every five years (or when significant changes are made) by having the identified Planning Team review all Annual Review Questionnaires (Appendix F) to determine the success of implementing the HMP's Mitigation Action Plan.

The Annual Review Questionnaire will enable the Team to identify possible changes in the HMP Mitigation Action Plan by refocusing on new or more threatening hazards, resource availability, and acquiring stakeholder support for the HMP project implementation.

In the fourth year following adoption of the HMP, the Planning Team will undertake the following activities:

- Request grant assistance for DHS&EM to update the HMP (this can take up to one year to obtain and one year to update the plan).
- Ensure that each authority administering a mitigation project will submit a Progress Report (Appendix F) to the Planning Team.
- Determine the current status of the mitigation projects.
- Identify changes made to listed projects.
- Determine whether or not the project has helped achieve the appropriate goals identified in the plan.
- Develop a chart to identify those HMP sections that need improvement, the section and page number of their location within the HMP, and describing the proposed changes.
- Thoroughly analyze and update the natural hazard risks.
    - Determine the current status of the mitigation projects.

- Identify the proposed Mitigation Plan Actions (projects) that were completed, deleted, or delayed. Each action should include a description of whether the project should remain on the list, be deleted because the action is no longer feasible, or reasons for the delay.
- Describe how each action's priority status has changed since the HMP was originally developed and subsequently approved by FEMA.
- Determine whether or not the project has helped achieve the appropriate goals identified in the plan.
- Describe whether the community has experienced any barriers preventing them from implementing their mitigation actions (projects) such as financial, legal, and/or political restrictions and stating appropriate strategies to overcome them.
- Update ongoing processes, and to change the proposed implementation date/duration timeline for delayed actions the City of Akiak still desires to implement.
- Prepare a "new" Mitigation Action Plan Matrix for the City of Akiak.

- Prepare a new draft updated HMP.
- Submit the updated draft HMP to the Division of Emergency Management (DHS&EM) and FEMA for review and approval.

3.5.3.5 Formal State and FEMA HMP Review

Completed Hazard Mitigation Plans do not qualify the City for mitigation grant program eligibility until they have been reviewed and approved by the State and FEMA and received written final FEMA approval.

The City of Akiak will submit the draft HMP to the State Hazard Mitigation Officer (SHMO) for initial State review and preliminary approval. Once any corrections are made, the State will send the draft HMP to FEMA Regional X for formal review and tentative pre- approval.

Once the plan has fulfilled all FEMA criteria, the City will pass an HMP Adoption Resolution. A copy will be sent to FEMA for final HMP approval.

FEMA's final approval assures the City is eligible for applying for appropriate mitigation grant program funding. URS will then send the final FEMA approved HMP to the City of Akiak.

4.1 ADOPTION BY LOCAL GOVERNING BODIES AND SUPPORTING DOCUMENTATION

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

DMA 2000 Requirements
Local Plan Adoption §201.6(c)(5): [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, County commissioner, 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??) (Requirement §201.6(c)(5))
Source: FEMA, October 2011.

The City of Akiak, 2nd Class City, is the local jurisdiction represented in this HMP and meets the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000, and 44 CFR §201.6(c)(5).

The City Council adopted the HMP on June 14, 2013. A scanned copy of the City's Adoption Resolution is included in Appendix C.

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

5.1 HAZARD ANALYSIS OVERVIEW

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

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

DMA 2000 Requirements
Identifying Hazards §201.6(c)(2)(i): The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events. §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
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 within the jurisdiction that have been repetitively damaged by floods?
Source: FEMA, October 2011.

5.2 HAZARD IDENTIFICATION AND SCREENING

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

For the first step of the hazard analysis, on June 8, 2012 the Planning Team reviewed nine possible hazards that could affect the Bethel Census Area. 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 5-1). The Planning Team determined that five hazards pose the greatest threat to the City: earthquake, erosion, flood, severe weather, and wildland fire. The remaining hazards excluded through the

screening process were considered to pose a lower threat to life and property in the City due to the low likelihood of occurrence or the low probability that life and property would be significantly affected.

Table 5-1 Hazard Identification and Screening

Hazard Type	Should It Be Profiled?	Explanation
Earthquake	Yes	Periodic, unpredictable occurrences. The City experienced no damage from the 11/2003 Denali EQ.
Erosion	Yes	The City experiences "substantial" riverine erosion along the Kuskokwim River embankments from snow melt, high water flow, ice jam scour, wind, and surface run-off erosion.
Flood	Yes	Snowmelt and ice jam flooding occurs during spring thaw and the fall rainy season. Events occur from soil saturation. Several minor flood events cause damage. Severe damages could occur from major floods.
Ground Failure (Avalanche, Landslide/Debris Flow, Permafrost)	No	This hazard does not exist for the City.
Tsunami & Seiche	No	This hazard does not exist for the City.
Volcano	No	This hazard does not exist for the City.
Severe Weather	Yes	Annual weather patterns, severe cold, heavy rain, freezing rain, snow accumulations, and wind are the predominate threats. Severe cold, intense wind, and heavy rain are the primary weather impacts to the community. Severe cold events cause fuel price increases and frozen pipe damages. Heavy snow loads potentially damage house roofs. Winds potentially remove or damage roofs and moved houses off their foundations.
Tundra/Wildland Fire	Yes	The City and the surrounding areas become very dry in summer months with weather and human caused incidents igniting dry vegetation (i.e., lightning and trash burning).

5.3 HAZARD PROFILE

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

DMA 2000 Requirements
Profiling Hazards Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
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? (Requirement §201.6(c)(2)(i)) B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?
Source: FEMA, October 2011.

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

- Nature (Type)
- History (Previous Occurrences)
- Location
- Extent (to include magnitude and severity)
- Impact (Section 5 provides a description of general impacts associated with each hazard; Section 6 provides detailed impacts to Akiak's residents and critical facilities.)
- Future event probability

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

Table 5-2 Hazard Probability Criteria

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

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

Table 5-3 Hazard Magnitude/Severity Criteria

Magnitude / Severity	Criteria
4 - Catastrophic	• Multiple deaths. • Complete shutdown of facilities for 30 or more days. • More than 50 percent of property is severely damaged.
3 - Critical	• Injuries and/or illnesses result in permanent disability. • Complete shutdown of critical facilities for at least two weeks. • .More than 25 percent of property is severely damaged.
2 - Limited	• Injuries and/or illnesses do not result in permanent disability. • Complete shutdown of critical facilities for more than one week.

Table 5-3 Hazard Magnitude/Severity Criteria

Magnitude / Severity	Criteria
	• More than 10 percent of property is severely damaged.
1 - Negligible	• Injuries and/or illnesses are treatable with first aid. • Minor quality of life lost. • Shutdown of critical facilities and services for 24 hours or less. • Less than 10 percent of property is severely damaged.

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

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

5.3.1 Earthquake

5.3.1.1 Nature

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

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

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

- **Surface Faulting** is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (e.g., up to 20 feet [ft]), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to linear structures, including railways, highways, pipelines, and tunnels.
- **Liquefaction** occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Pore water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 ft, but up to 100 ft), flow failures (massive flows of soil, typically hundreds of ft, but up to 12 miles), and loss of bearing strength

(soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.

- **Landslides/Debris Flows** occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.

The severity of an earthquake can be expressed in terms of intensity and magnitude. Intensity is based on the damage and observed effects on people and the natural and built environment. It varies from place to place depending on the location with respect to the earthquake epicenter, which is the point on the earth's surface that is directly above where the earthquake occurred. The severity of intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale. As shown in Table 5-4, the MMI Scale consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location. PGA can be measured as acceleration due to gravity (g) (see Table 5-4) (MMI 2006).

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

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

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

(MMI 2012)

5.3.1.2 History

The Planning Team determined that the City of Akiak has a minimal concern for earthquake damages as they have not experienced damaging effects from their historical earthquake events and only needed to be concerned with earthquakes with a magnitude > M 5.0. Table 5-5 lists historical earthquakes from 1973 to present none of which exceeded M5.0 within 100 miles of the City.

Table 5-5 Historical Earthquakes of Akiak

(Highlight indicates the earthquake of record)

Year	Mo	Day	Origin Time	Latitude	Longitude	Depth (Miles)	Magnitude	Distance (Miles)
2011	1	26	6:14 PM	61.34	-159.53	12.43	2.5	102
2010	6	1	6:43 PM	61.04	-160.86	16.77	3.5	23
2009	9	10	12:57 PM	60.63	-159.21	2.48	2.9	113
2009	4	22	1:40 PM	61.52	-160.27	1.86	3.4	84
2004	4	4	8:24 AM	61.44	-159.67	11.18	3.8	101
1997	3	20	3:21 AM	60.9	-159.36	0	3.8	100
1991	9	21	3:21 AM	61.23	-158.59	6.21	2.7	145
1991	1	26	1:55 AM	61.88	-159.32	20.5	4.1	148
1983	1	30	12:00 AM	61.1	-159.22	20.5	4.6	110
1980	12	12	9:36 PM	60.38	-160.99	50.95	Undetermined	60

(USGS 2009)

Only 11 earthquakes have been recorded within a 100 mile radius of the City of Akiak since 1976. The average magnitude of these earthquakes is M 3.1. The largest recorded earthquakes within 100 miles of the City measured M4.6, occurring on January 30, 1983 (highlighted in Table 5-5). This earthquake did not cause any damage to critical facilities, residences, non-residential buildings, or infrastructure.

Planning Team members stated that Akiak experienced moderate to severe ground shaking from the November 3, 2002 M 7.9 Denali EQ located approximately 220 miles away. No significant damage occurred from this event. However, 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. Akiak felt ground motion resulting from this historic event; however, no local damage occurred.

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

Location

The entire geographic area of Alaska, and thus the City of Akiak, is prone to earthquake effects. Figure 5-1 indicates the locations of active and potentially active faults in Alaska.

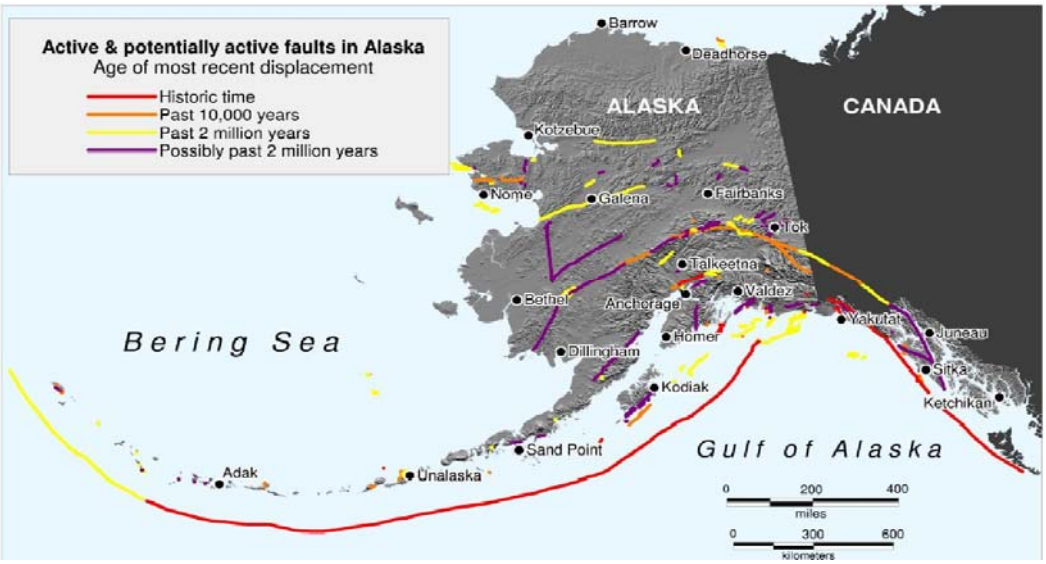

Figure 5-1 Active and Potentially Active Faults in Alaska

The Department of Geological and Geophysical Survey (DGGS) Neotectonic Map of Alaska (Figure 5-2) depicts Alaska's known earthquake fault locations. DGGS states,

> *"The Neotectonic Map of Alaska is the most comprehensive overview of Alaskan Neotectonics published to date; however, users of this map should be aware of the fact the map represents the author's understanding of Alaskan Neotectonics at the time of publication. Since publication of the Neotectonic map, our understanding of Alaskan Neotectonics has changed and earthquakes have continued to occur. For example, M7.9 Denali fault earthquake ruptured three faults, including the Susitna Glacier fault, which was previously undiscovered..."* (DGGS 2009).

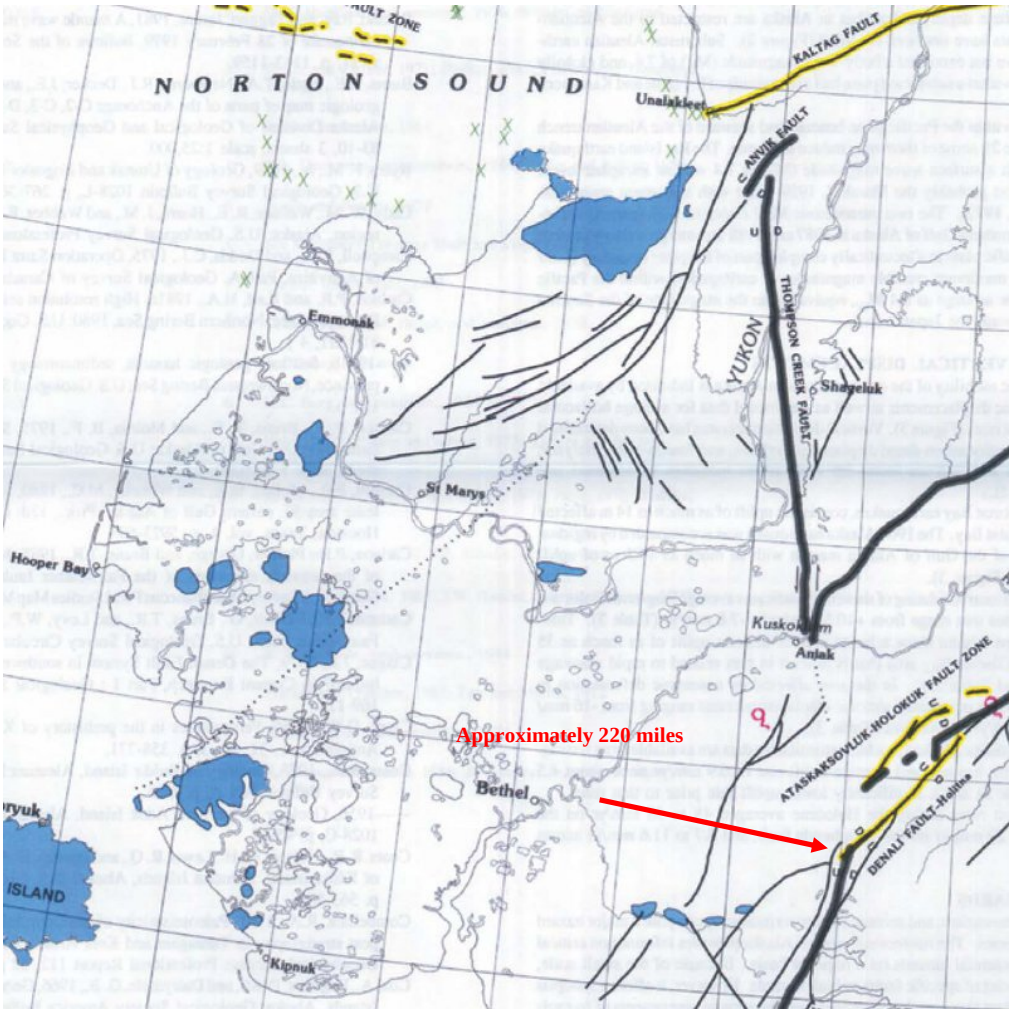

Figure 5-2 Image from the "Neotechtonic Map of Alaska" – Akiak Area (DGGS 2009)

The western extent of the Denali Fault is located about 220 miles southeast of the City. The Ataskaksovluk-Holokuk Fault Zone with many small unnamed faults to the south. The Thompson Creek Fault intersects the Iditarod-Nixon Fork Fault near Aniak to the northeast of Akaik. The City can expect to be impacted by future earthquake events (DGGS 2009). Of the 11 recorded earthquakes since 1976, none exceeded M 5.0. (USGS 2009)

Extent

Earthquakes felt in the Akiak area have not exceeded M 4.6 in the past 36 years, and damage has never been reported due to an earthquake event.

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

Impact

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

Probability of Future Events

The City 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, an earthquake probability analysis was generated using the United States Geological Survey (USGS) Earthquake Mapping model (Figure 5-3) and indicates a 0.20-0.25 percent probability of an M 5.0 or greater earthquake occurring within 100 years and 100 miles of the City.

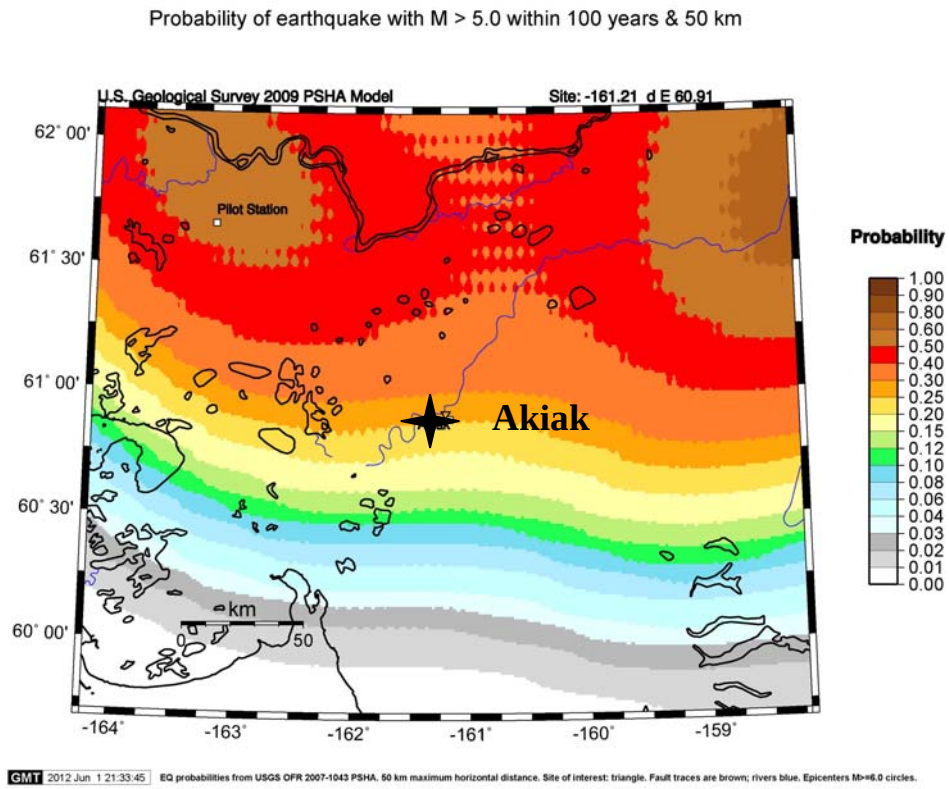

Figure 5-3 Akiak Earthquake Probability (USGS 2009)

This 2009 shake map is the most current map available for this area. However, it is a viable representation to support probability inquiries. According to Peter Haeussler, USGS, Alaska Region:

> *"The occurrence of various small earthquakes does not change earthquake probabilities. In fact, in the most dramatic case, the probability of an earthquake on the Denali fault was/is the same the day before the 2009 earthquake as the day afterward. Those are time-independent probabilities. The things that change the hazard maps is changing the number of active faults or changing their slip rate" (Haeussler, 2009).*

The earthquake probability indicates an event is probable within the next 3 years, event has up to 1 in 3 years chance of occurring (1/3=33 percent), history of events is greater than 20 per cent but less than or equal to 33 percent likely per year. Therefore the City's earthquake probability is classified as "Likely" to occur.

5.3.2 Erosion

5.3.2.1 Nature

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

Riverine erosion is a problem for communities 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 City.. Surface and ground water flow and freeze-thaw cycles may also play a role. Not all of these forces may be present at any particular location. g storms, particularly because the highest energy waves are generated under storm conditions.

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

Attempts to control erosion using shoreline protective measures such as groins, jetties, seawalls, or revetments can lead to increased erosion however the City Council feels that "no action leads to increased damages".

Land surface erosion results from flowing water across road surfaces due to poor or improper drainage during rain and snowmelt run-off which typically result from fall and winter sea storms.

The USACE completed a detailed erosion assessment for the City of Akiak which they published on January 27, 2009 which states,

> *The approach used to determine potential erosion damages is based on several assumptions as they pertain to the damage categories of residential, commercial, public infrastructure, and land values. This evaluation relies on previous reports and information gathered during site visits to determine appropriate values where data was unavailable. Assumptions used for the various damage categories are described more fully in the following discussion of future damages.*
>
> *Damages caused by erosion in Akiak fall into seven damage categories: land, residential structures, commercial structures, public structures, infrastructure, cemeteries, and environmental hazards. Structures were considered a loss when the bank line encroached within ten feet of the structure's foundation. Approximately 47 percent of erosion damages in Akiak are expected to occur within the first 10 years of the examined time period" (USACE 2009).*

5.3.2.2 History

The City experiences yearly erosion impact damage from spring thaw surface run-off, river ice break-up, and ice jam flooding. Sour is very strong along the entire length of the City's river bank. The 2012 flood season eroded away over 150 feet taking the community's original cemetery, fuel header protective embankment, and one house. The City stated they were able to relocate two houses before their land was lost; several essential infrastructure and residential properties still remain within the identified erosion threatened area. Table 5-6 identifies their erosion threatened facilities and their approximate distance from the Kuskokwim River. Figure 5-6 shows these infrastructure elements are within the proposed 2057 year erosion impact line.

Table 5-6 Critical Facilities' Distance from Eroding Embankment

Description	Distance (ft)
Fuel Tank Piping and Header	<10
National Guard Armory	75
Kokarmuit Corporation Office/ Multi-Purpose Office	100
Residence, Ralph Demantle	121
Teachers Trailer (School District)	200
Teacher's Quarters (City Building)	240
Akiak's City Office	250
Head Start Building	307
School Maintenance Building	326
Teachers Quarters (Corporation)	326
Robert Ivan Store	330
Kokarmuit Store #2 (Corporation Offices)	356
Old School (now Corporation offices)	441
Village Public Safety Office	558
Three, Teacher's Duplexes (Corporation)	730
Consolidated Fuel Storage Tank Farm	742
Ben Street	3
Doops Street (Corporation Housing)	72
Laps Street (Old School Road)	53
Mukluk Street (Armory)	25

As a result of this catastrophic severe flood impact and subsequent erosion damages, the City of Akiak and the Native Village of Akiak submitted a disaster declaration to the Governor on September 28, 2012, which stated:

> ***"CITY OF AKIAK AND AKIAK NATIVE COMMUNITY JOINTLY DECLARES DISASTER FOR RIVERFRONT EROSION OCCURJNG DUE TO HIGH WATER OF THE KUSKOKWIM RIVER.***
>
> *Consistent rains and winds all summer long have increased the level of water on the Kuskokwim River that impacted the waterfront of Akiak with the properties eroding quickly to the river. Approximately 150 feet of land have been consumed to date. One house is currently being moved to another location because it will fall into the* river. *Several houses are in danger of falling· into the river. The electrical poles and lines need to be removed and the fossil fuel lines are in danger along with the PCBs for the electrical system.*

The Kuskokwim Rivers' erosion has occurred in the last 50 years and the original village is now in the middle of the river. "We need immediate relief to prevent more properties lost and to save our present community" said current City Administrator Ivan M Ivan. "We have witnessed this continuous erosion over my short lifetime."

The Army Corp of Engineers predictions on our historical shorelines have reached the 2017 baseline erosion. So the eroding of our shorelines is faster than the predications…" (Akiak 2012a).

The City provided the following photos depicting the 2012 erosion event:

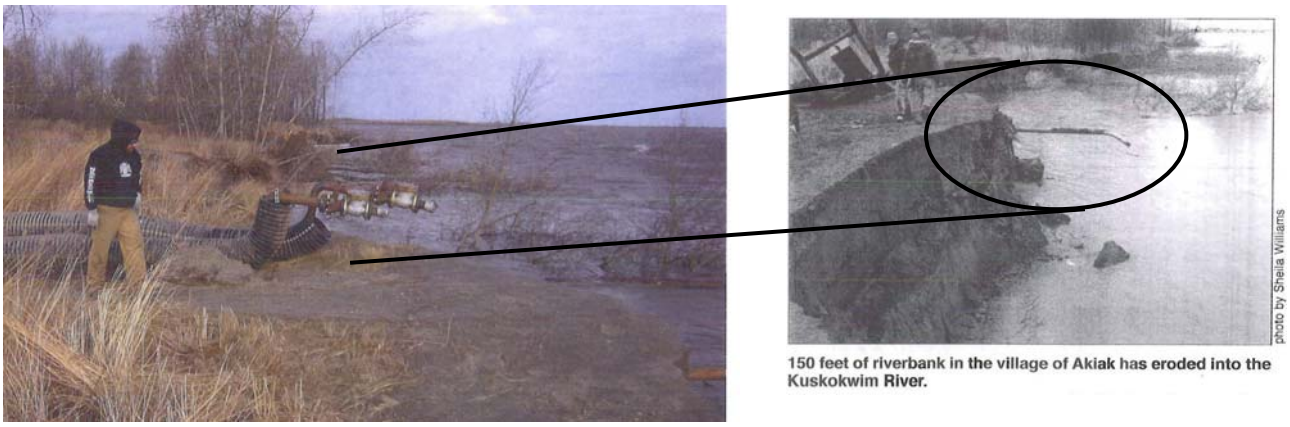

Figure 5-4 Fuel Header area erosion (Akiak 2012, Delta 2012)

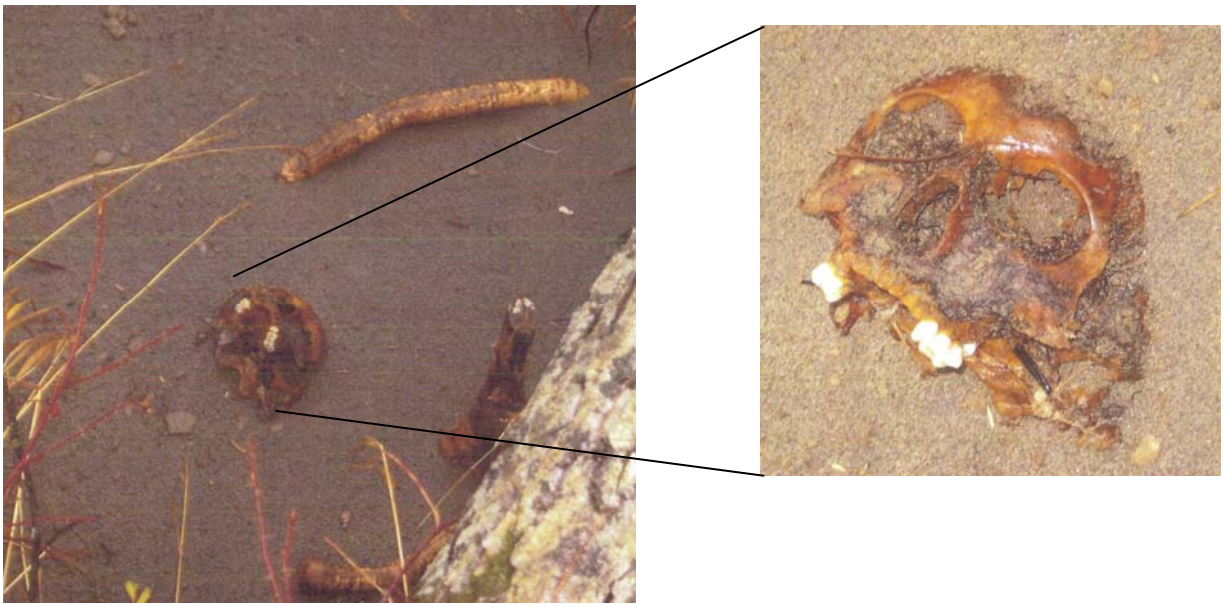

Figure 5-5 Erosion Exposed Cemetery Remains (Akiak 2012)

Figure 5-5 depicts exposed cemetery human remains resulting from the September 2012 flood and erosion event that washed away the City's original inhabitants' cemetery. Additional lost infrastructure included:

"On the last week of September 2012, the City of Akiak had to provide assistance with our meager funds to move two private homes away from the riverfront erosion. One home had to be dismantled and relocated to another site and one smaller house complete home was also moved to another safe location away from the erosion area. We lost one gravel road to erosion, moved three electrical utility poles with high tension wires, and fuel header connected to the community fuel storage tanks" (Akiak 2012b).

The USACE completed a detailed erosion assessment for the City of Akiak on January 27, 2009 which states,

"Erosion at Akiak generally occurs in the spring, when snowmelt and the breakage of ice jams cause[s] increased flow through the Kuskokwim River.

An attempt was made in the past to control erosion along the upstream bank of Akiak by placing two semi submerged jetties of cylindrical pile perpendicular to the bank. These jetties proved to be problematic as they were not marked with buoys and caused some damages to boats colliding with them while they were submerged. No evidence of the jetties' impact on the bank such as accretion deposits and scour pockets associated with this kind of structure was found during the site visit" (USACE 2009).

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

Location

Figure 5-6 and the following narrative describe the USACE's research location:

"For this study the area was divided into two reaches. Reach 1 is a 2,230-foot portion of riverbank that fronts the community and is eroding at a rate of 4.1 feet per year. Reach 2 is a 3,790-foot portion of riverbank directly upstream (and north) of Reach 2 and is eroding at a rate of 6 feet per year" (USACE 2009).

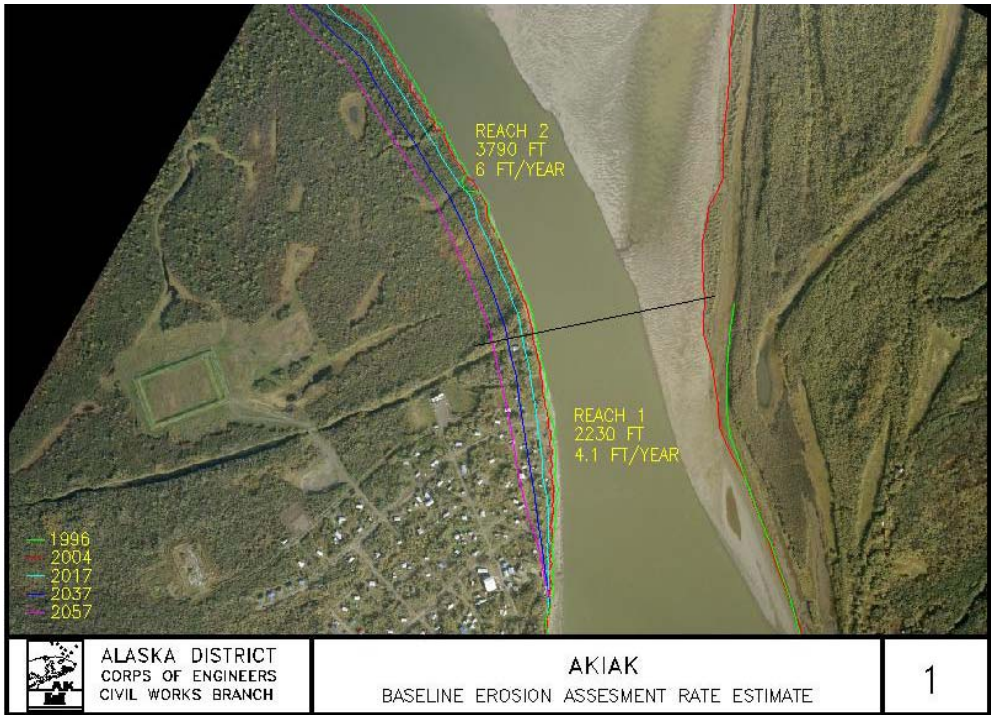

Figure 5-6 USACE Erosion Assessment Location. (USACE 2009)

An article from USA Today dated December 3, 2005 describes the City's erosion threat:

> *"Like most of Alaska's riverside villages, Akiak is literally losing ground. The Kuskokwim River, fueled by storms and swift water during the spring breakup, claims five to 20 feet of riverbank a year.*
>
> *"We've been concerned for ages," Akiak elder Andrew Jasper said.*
>
> *Jetties installed more than 20 years ago have long since failed and federal engineers once estimated that full-scale erosion control would cost more than $1 million.*
>
> *Villagers in the Yupik Eskimo village, population 350, don't need government studies to document erosion's toll: Their gauge is an orange Dodge pickup that broke down sometime in 1965 and today dangles over the 8-foot bank.*
>
> *"I'm told there used to be 200 feet of bank between that truck and river," said Andrew Oxford, a soil and water conservation scientist with the Department of Agriculture's Natural Resources Conservation Service" (USA 2005).*

Extent

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

- Embankment type
- Geomorphology
- Structure types along the embankment
- Encroachment amount of encroachment in the high hazard zone
- Proximity to erosion inducing riverine structures
- Development density
- Embankment exposure to wind and waves

Based on the USACE erosion analysis, historical impacts, and the criteria identified in Table 5-3, the magnitude and severity of erosion impacts in the City are considered "catastrophic" with potential for critical facilities to be shut down for30 days or more, and more than 50 percent of property or critical infrastructure being severely damaged.

Impact

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

The DCCED trip report describes the fall 2012 damages:

> *"Damage included the washing away of a grave site (exposing human remains) and an important city road. The erosion had also exposed buried water and wastewater lines and bulk fuel transfer lines and headers. One home had been washed away by the river; another home had to be moved to another location" (DCCED 2012).*

USACE's detailed erosion assessment estimated the following potential damage impacts and timelines:

> *"Expected residential damages in Akiak are widely dispersed throughout the community. At-risk structures include 21 outbuildings (fish camps and related structures) and eight residences. Each of the outbuildings is valued at $1,000 and each residence is valued at $205,000.*
>
> *Four commercial buildings are estimated to be subject to damages including the communications hub with an associated microwave tower as well as three other structures assumed to be commercial in nature based on analysis of on-site and aerial photographs.*
>
> *The communications hub is expected to be lost in years 11 to 30. The three other commercial structures are expected to be lost in years 31 to 50. Our estimates likely understate the commercial damages. Were these structures to be lost, it would compromise the income earning opportunities for the businesses and the workers they employ. In addition, communications for the community would be lost and relocation efforts would impact these facilities as well.*
>
> *One public building is at risk in Akiak. At this time, detailed information regarding this structure and its uses is not available. This building was assumed to be a public structure based on analysis of on-site and aerial photographs. The building is estimated to be lost in years 31 to 50.*
>
> *Building damages in Akiak are expected to total $4.5 million with a net present value of $1.4 million and an average annual cost of $73,300*
>
> *Infrastructure that lies within the 50-year erosion profile includes: 23,070 feet of roads, 270 feet of sewer lines, and the old bulk fuel farm. It is likely that phone lines associated with the communications hub are also at risk during the period of analysis; however, they have been omitted from these damage calculations as the quantity threatened is unknown.*
>
> *Based on engineering estimates for erosion, about 13,920 feet of roads will be affected in years 0 to 10, 8,580 feet will be affected in years 11 to 30, and 570 feet will be affected in years 31 to 50.*
>
> *It is estimated that 270 feet of sewers are expected to be lost in years 31 to 50. This number is understated as there are additional sewer lines buried in areas projected to be lost to erosion. As of August 2007 these lines had been installed but not connected. Damages to sewer lines would cause sewage and related materials to enter the Kuskokwim River. While it is unknown how significant the effects will be, it is possible that these harmful contaminants could pose significant damage to local fish stocks and their related environment as well as pose a threat to human health.*
>
> *As of August 2007, the fuel farm was 28 feet from the bank. It is estimated to be lost in years 0 to 10. There are environmental considerations that accompany this loss that are discussed later in this section.*

In total, Akiak has $9.7 million of infrastructure at risk due to erosion. The combined net present value of these items is $6.3 million. The average annual loss of infrastructure is valued at $323,400.

The primary environmental concern in Akiak is the old fuel farm. It is unknown if the tanks are empty or still contain fuel. The surrounding soils are likely contaminated and will pose a threat to the local ecosystem and related fish stocks when they are eroded away. Decommissioning and closure of the facility is essential to avoid these harmful effects. Based on our above assumptions, this will be necessary within the 0 to 10 year time frame. This process has a cost of $512,000 with a net present value of $444,000 and an average annual cost is $22,900.

Another environmental concern is the risk associated with eroding graves. Akiak was once a regional medical hub serving patients from many of the surrounding communities. Many of the patients who died were buried on-site due to the expense of shipping the remains back home. Many of the deceased buried in the cemetery are thought to have died during a tuberculosis outbreak. The State of Alaska Department of Health and Social Services confirms that tuberculosis was a significant problem in this area during the first half of the 1900's. Despite the passage of time, residents are concerned that they would be at risk of contracting the disease if these graves are exposed.

Akiak's cemetery was established in the early 1900's and associated with the first hospital in the area. It lies next to the river in a region where erosion is moving at an average rate of 6.0 feet per year and parts of the cemetery grounds have already been lost. While exact numbers are not known, individuals in the community indicate that between 1,000 and 1,500 graves existed in the original cemetery; we assume a total of 1,250 for this analysis. These discussions also suggested that between 50 to 75 percent of the graves have already been lost; for this analysis, we assume that 40 percent of the graves remain intact. Assuming even grave distribution and accounting for past losses, it is anticipated that 500 graves will need to be relocated over the 50-year period of analysis.

Environmental damages, as well as disaster avoidance, environmental remediation, and grave relocation costs are estimated to be in excess of $4.3 million with a net present value in excess of $3.2 million and an average annual cost in excess of $170,200" (USACE 2009).

The Alaska Department of Environmental Conservation Contaminated Sites Database indicates the Akiak Storage Tank (AST) farm was moved in 2009. However the site has contamination issues at the old AST site with the City working with DEC to determine the most appropriate remediation alternatives. (DEC 2012).

The City and Tribal Councils' emphatically expressed they overwhelmingly believe that "no action leads to increased damages". Inaction and project development delays have resulted in infrastructure losses that could have been avoided. It is imperative that the threatened sewage lagoon and water infiltration gallery have mitigation actions developed to assure their longevity. Loss of these critical infrastructures creates a strain on the community.

Probability of Future Events

USACE expects that,

"Damages caused by erosion in Akiak fall into seven damage categories: land, residential structures, commercial structures, public structures, infrastructure,

cemeteries, and environmental hazards. Structures were considered a loss when the bank line encroached within ten feet of the structure's foundation. ***Approximately 47 percent of erosion damages in Akiak are expected to occur within the first 10 years of the examined time period****…*

Akiak is losing approximately 31,900 square feet of land per year (0.73 acres). Estimated land losses for River Reach 1 are 10.70 acres with land losses for River Reach 2 expected to be 26.62 acres. It is expected that 37.33 acres will be lost over the 50-year period of analysis with a corresponding value of $373,000 and a net present value of $149,000…

Akiak has a definite erosion problem affecting the community over the next 50 years.

The community has the potential to have over $18 million in damages. Akiak will likely require some sort of assistance to stop the erosion from causing significant future damages as they are unable to solve their own erosion problems due to limited financial resources." (USACE 2009).

Based on the USACE erosion analysis, historical impacts, and the criteria identified in Table 5-2, it is highly likely that erosion will occur in the year (event has up to 1 in 1 years chance of occurring) as the history of events is greater than 33 percent likely per year.

5.3.3 Flood

5.3.3.1 Nature

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

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.

Four primary types of flooding occur in the City: rainfall and snowmelt run-off, storm surge, and ice jam floods.

Rainfall-Runoff Flooding occurs in late summer and early fall. The rainfall intensity, duration, distribution, and geomorphic characteristics of the watershed all play a role in determining the magnitude of the flood. Rainfall runoff flooding is the most common type of flood. This type of flood event generally results from weather systems that have associated prolonged rainfall.

Snowmelt Floods typically occur from April through June. The depths of the snowpack and spring weather patterns influence the magnitude of flooding.

Ice-Jam floods occur when warming temperatures and rising water flows causes the ice to break-up and disconnect from the embankment. The large ice chunks begin to flow and move down river. The ice does not flow easily, often impacting with adjacent blocks resulting in occasional ice jams. Some ice jams quickly break apart, however, larger jams occur which create small dams causing the water to exert increasing pressure on the jam creating a damming effect. Water subsequently begins to build depth and often overtops adjacent embankments which flood upstream communities.

When the ice-jam breaks the built-up water rushes downstream with great force. Ice blocks scour the embankment, destroying infrastructure such as fuel headers, barge landings, and boat mooring structures. Large house sized ice blocks may even be driven above the embankment destroying any structure in its path. Communities are virtually helpless against such devastation.

Timing of events

Many floods are predictable based on rainfall and seasonal thaw patterns. Most of the annual precipitation is received from April through October with August being the wettest. This rainfall leads to flooding in early/late summer and/or fall. Spring snowmelt increases run-off, which can cause flooding. It also breaks the winter ice cover, which causes localized ice-jam floods.

5.3.3.2 History

The US Army Corp of Engineers Flood Hazard Data reports "The flood of record was the 1964 ice-jam flood, which reached an elevation of 35.2 ft (mean sea level [MSL]). Flooding has occurred in 1920, 1964, 1971, 1982, 1984, 1987 and 1988." (USACE 2011).

The DHS&EM Disaster Cost Index delineates historical flood events affecting the City. The index lists the following events:

> ***"94. Spring Floods, FEMA declared (DR-0832) on June 10, 1989*** *Presidential Declaration of Major Disaster, incorporated sixteen local declarations and applied to all communities on Yukon, Kuskokwim and Kobuk rivers and their tributaries. Provided public and individual assistance to repair damage…*
>
> ***176. Yukon Kuskokwim Delta*** *On June 5, 1995, the Governor declared a condition of disaster emergency exist 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."*
>
> ***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 National Weather Service (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. Total eligible state damages (item V.C. Remaining Costs, $6,704,370) less ineligible repairs for Federal-Aid roads ($469,600), less IA funds ($485,000), less ERFO road costs ($240,500) still leaves approximately $5,509,270 that may be eligible under FEMA's Public Assistance program"*
>
> ***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 have been impacted: Alaska Gateway Rural Regional Educational Attendance Area (REAA) including the City of Eagle and Village of Eagle;*

the Copper River REAA including the Village Community of Chisotchina; the Matanuska-Susitna Borough; the Yukon Flats REAA including the City Community of Circle, and 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; the Bering Strait REAA including the City of Nome area."
(DHS&EM 2011).

Mr. Fred Broerman, Local Government Specialist for DCCED's trip report to the City of Akiak dated October 10, 2012 documents his findings

"To inspect and document the erosion occurring along the banks of the Kuskokwim River which is cutting into the community of Akiak. To meet with tribal and municipal leaders to discuss the disaster resolutions they had sent to state and federal agencies."

His observations included:

"During the fall of 2012 the Yukon-Kuskokwim Delta region experienced several significant wind and rainfall events. Two daily rainfall records were broken. On September 3, it rained 0.82" breaking the 2005 record of 0.72" and on October 7, it rained 0.88" breaking the 1970 record of 0.53". The rain has caused watersheds to swell and has accentuated erosion along the [Kuskokwim] Delta's river banks. Exposed river banks, consisting of layered deposits of silt and fine sand (termed "glacial flour" by geologists), [which] break away when subject to the strong currents associated with increased quantities and velocities of water. The community of Akiak is situated on a naturally occurring oxbow of the Kuskokwim River, 20 air miles northeast of Bethel. In recent years, but especially this fall, the Kuskokwim has been eroding away the community's land base, causing significant damage…

Immediately after landing in Akiak at 0930 hrs, we reviewed various aerial photo maps with tribal and city leaders who described in detail the extent of the erosion problems. The leaders also summarized efforts they had taken over the years to work with the Army Corps of Engineers and USDA-Natural Resources Conservation Service to deal with the erosion problem as well as contacting various other state and federal agencies for assistance..." (DCCED 2012).

The National Weather Service continued to modify their system for assigning weather zones to facilitate and more accurately confine weather patterns to relevant geographic areas. Consequently the data in Table 5-7 reflects different zone numbering patterns. Each weather event may not have specifically impacted the City but they are listed due to the City's close proximity to listed communities or by location within the identified zone.

Table 5-7 Historic Flood Events (NWS)

Location	Date	Event Type
AKIACHAK	5/7/2009	Ice Jam Flood ($2.6M Damages) The annual spring river ice break up resulted in extensive flooding along the Kuskokwim river over the 11 days it took for the river to open up from its head waters in the Kuskokwim Valley to the mouth of the Kuskokwim River on the Bering Sea coast. Damage estimates are from the State of Alaska disaster declaration request to the President.
Kuskokwim River Flood	May 2006	Ice Jam Flood 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.
Kuskokwim River Flood	1990	Severe storm compounded by high tides caused extensive flooding ... along the lower Kuskokwim River. The flooding caused damage to both public and private property. The disaster declaration authorized assistance to local governments, individuals and families affected by the flooding.
Kuskokwim River Flood	1989	Federal disaster declaration, applied to all communities on the Kuskokwim, Yukon, and Kobuk Rivers
Kuskokwim River Flood	1988	Ice Jam Flood
Kuskokwim River Flood	1987	Flood
Kuskokwim River Flood	1984	Flood
Akiak, Akiachak & Russian Mission	1982	Severe windstorms generating high waves caused extensive damage in the villages of Russian Mission, Akiak, and Akiachak.
Kuskokwim River Flood	1971	Flood
Kuskokwim River Flood	1964	Ice Jam Flood
Kuskokwim River Flood	1920	Flood

(NOAA 2012, DHS&EM 2010)

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

Location

The City of Akiak stated that the entire City is within the floodplain and potentially impacted by flood events.

The USACE Flood Hazard Database shows five High Water Elevation (HWE) sign locations for the City (Figures 5-7 through 5-11):

USACE HWE Sign #1 is on a power pole about 500 yards upstream of the high school and adjacent to the road that goes between the high school and the library.

Figure 5-7 **HWE Sign #1** (USACE 2012

USACE HWE Sign #2 is on a power pole about 300 yards upstream of the high school and adjacent to the road which goes between the high school and the library.

Figure 5-8 **HWE Sign #2** (USACE 2012)

USACE HWE Sign #3 is on the shoreward, downstream, corner of the Akiak library.

Figure 5-9 **HWE Sign #3** (USACE 2012)

USACE HWE Sign #4 is on the shoreward, downstream, corner of the old BIA school.

Figure 5-10 HWE Sign #4 (USACE 2012)

USACE HWE Sign #5 is on the upstream, streamward corner of Mary Jackson's house adjacent to the NWS staff gauge.

Figure 5-11 HWE Sign #5 (USACE 2012)

The USACE, Floodplain Management Flood Hazard Data report states

> *"The following references are based on the National Weather Service's slope gauge, which has an arbitrary base. The "A" marker on the slope gauge is a brass cap on a steel rod at the streamward, upstream corner of Mary Jackson's home. A NWS staff gauge is on the same corner. The elevation of the "A" marker is 30.81 ft. (Add 19.05 ft to the staff readings to correlate to the slope gauge data.)…*
>
> *The flood gauge was installed on the Akiak library. High Water Elevation (HWE) signs were also placed on utility poles adjacent to the road between the high school and the library about 300 and 500 yards upstream of the high school. HWE signs were placed on the shoreward, downstream corner of the library and on the shoreward, downstream corner of the old BIA school"* (USACE 2012)

The USACE reported the structure elevations depicted in Table 5-8 were accurate as of June 1998.

Table 5-8 USACE Community Flood Survey Elevations

Description	Elevations (ft)
Recommended building elevation	37.2
Front doorsill of the Clinic	36.4
Front doorsill of Arlicaq School	35.0
First floor of the city office building	34.2
Centerline of the runway at the tarmac	33.7
0.0 ft elevation on the flood gauge	31.8
Typical bottom of the school fuel tank farm	30.2
Water level of the Kuskokwim River on 6/18/98	19.5

Extent

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

The following factors contribute to riverine flooding frequency and severity:

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

The City's NWS base flood elevation gauges indicate a 0.0 elevation of 31.8 feet. Table 5-8 indicates the majority of the City's infrastructure is higher than the minimum elevation.

Figure 5-12 2007 New Teacher Housing, Under Construction (DCRA 2012)

The HWE markers infer that several structures are barely at or slightly above the HWE of record. The City recognizes the need to elevate or relocated structures to the recommended base flood elevation; however, there is limited City funding available to accomplish this goal.

Figure 5-13 NWS Elevation Gauge

The City's location adjacent to the very serpentine Kuskokwim River makes the City prone to flood and erosion; especially during Spring break-up when frequent ice jams form at the river bends causing water to back-up into adjacent communities.

Figure 5-14 depicts the City's susceptibility to flooding by its adjacent location to the Kuskokwim River and surrounding wetlands.

Figure 5-14 Akiak's Kuskokwim Upriver Ice Jam (DHS&EM 2011)

Impact

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

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

Impacts and problems also related to flooding are deposition and stream bank erosion (erosion is discussed in detail in Section 5.3.2). 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.

Stream bank erosion involves the removal of material from the stream bank. When bank erosion is excessive, it becomes a concern because it results in loss of streamside vegetation, loss of fish habitat, and loss of land and property (BKP 1988).

Probability of Future Events

Based on previous occurrences (the last recorded flood event occurred in 1988), USACE Floodplain Manager's report, and criteria in Table 5-2, there is a 1 in 1 year chance of occurring (1/1=100 percent). History of events is greater than 33 percent likely per year. There is no data identifying a 500-year (0.2 percent chance of occurring in a given year) flood threat in Akiak.

5.3.4 Severe Weather

5.3.4.1 Nature

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

- **Heavy Rain** occurs rather frequently over the coastal areas along the Bering Sea and the Gulf of Alaska. Heavy rain is a severe threat to Akiak
- **Heavy Snow** generally means snowfall accumulating to four inches or more in depth in 12 hours or less or six inches or more in depth in 24 hours or less
- **Drifting Snow** is the uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall
- **Freezing Rain and Ice Storms** occur when rain or drizzle freezes on surfaces, accumulating 12 inches in less than 24 hours. Ice accumulations can damage trees, utility poles, and communication towers which disrupts transportation, power, and communications
- **Extreme Cold** is the definition of extreme cold varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme". In Alaska, extreme cold usually involves temperatures between -20 to -50°F. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. Extreme cold accompanied by wind exacerbates exposure injuries such as frostbite and hypothermia
- **High Winds** occur in Alaska when there are winter low-pressure systems in the North Pacific Ocean and the Gulf of Alaska. Alaska's high wind can equal hurricane force but fall under a different classification because they are not cyclonic nor possess other hurricane characteristics. In Alaska, high winds (winds in excess of 60 mph) occur rather frequently over the coastal areas along the Bering Sea and the Gulf of Alaska. High winds are a severe threat to Akiak

  Strong winds occasionally occur over the interior due to strong pressure differences, especially where influenced by mountainous terrain, but the windiest places in Alaska are generally along the coastlines

(NWS 2011)

5.3.4.2 History

The City is continually impacted by severe weather. The University of Alaska Fairbanks (UAF), Scenarios Network for Alaska & Arctic Planning (SNAP) provides the following (Figures 5-15 and 5-16) historical and predicted precipitation and temperature data:

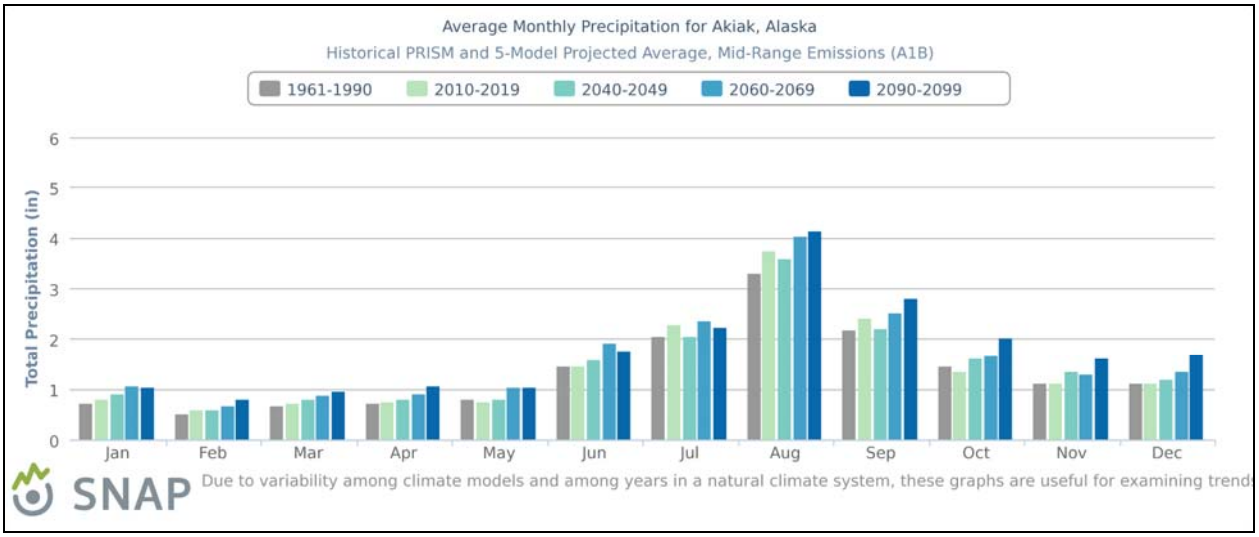

Figure 5-15 Akiak's Historic and Predicted Precipitation (SNAP 2012)

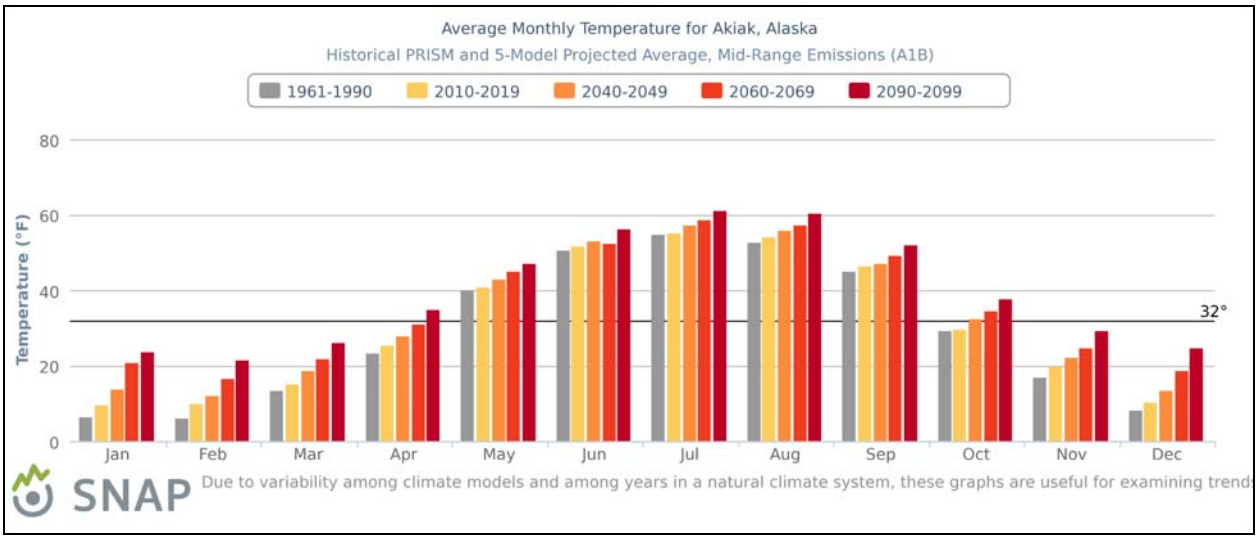

Figure 5-16 Akiak's Historic and Predicted Temperatures (NWS 2012)

Table 5-9 provides a representative sample of the 76 major storm events the National Weather Service identified for Akiak's Weather Zone (Kuskokwim Delta) since 2006. Each weather event may not have specifically impacted the City but they are listed due to the City's close proximity to listed communities or by location within the identified zone.

Table 5-9 Severe Weather Events

Location	Date	Event Type	Magnitude
Kuskokwim Delta, Kipnuk	11/8/2011	High Wind, Blizzard	49.7 mile per hour (mph) (80 kts) A storm crossed the western Aleutians and intensified as it moved through the Bering Sea toward the Bering Strait. This storm produced high wind along with blizzard conditions
Kuskokwim Delta	11/8/2011	High Wind, Blizzard, Storm Surge	37.9 mph (61 kts) A storm crossed the western Aleutians and intensified as it moved through the Bering Sea toward the Bering Strait. This storm produced high wind along with blizzard conditions and a storm surge that resulted in minor coastal flooding. Several ship reports were of wind around 80 KT in the Bering sea associated with this storm. The strong wind and long fetch resulted in a coast storm surge that produced minor coastal flooding in the Kuskokwim Delta region.
Kuskokwim Delta	4/6/2011	High Wind, Blizzard	37.9 mph (61 kts) A large intense Bering Sea storm impacted Alaska from the Aleutian Islands to south central Alaska April 5th through the 7th. Wind gust ranged from 72 to 78 mph along the Aleutian Islands, Alaska Peninsula and Pribilof Islands. This storm also produced blizzard conditions across the Pribilof Islands to the Bering Sea coast and Bristol Bay coast.
Kuskokwim Delta	1/23/2011	Blizzard	1 Death A strong storm produced strong wind and snow across the Pribilof Islands and Kuskokwim Delta resulting in blizzard conditions.
Kuskokwim Delta	2/8/2010	Blizzard	This storm produced blizzards across the central Aleutians to the Pribilof Islands and along the Bering Sea coast of the Kuskokwim Delta.
Kuskokwim Delta	1/10/2010	High Wind	37.9 mph (61 kts) A deep cold arctic air mass over the Alaska mainland combined with low pressure in the eastern Bering Sea produced strong wind in the Kuskokwim Delta.
Kuskokwim Delta	12/20/2009	High Wind	An intense Bering Sea Storm produced localized high wind along the Kuskokwim Delta and Bristol Bay coast of Alaska. The peak wind was 78 mph in this region.
Akiachak	5/7/2009	Ice Jam Flood, Ice Breakup	($2.6M Damages) The annual spring river ice break up resulted in extensive flooding along the Kuskokwim river over the 11 days it took for the river to open up from its head waters in the Kuskokwim Valley to the mouth of the Kuskokwim River on the Bering Sea coast. Damage estimates are from the State of Alaska disaster declaration request to the President.
Kuskokwim Delta	2/25/2009	Blizzard	A strong low brought high wind and snow to the Bering Sea coast the evening of February 25th that produced blizzard conditions.
Kuskokwim Delta	2/25/2009	High Wind, Blizzard	($200K Damages) 100 mph wind gusts (161 kts) An intense hurricane force storm moved across the Aleutians into the eastern Bering Sea February 24th and 25th. This storm produced hurricane force wind as it moved through the region. This storm produced blizzard conditions along the Bering Sea coast from Bristol Bay north across the Kuskokwim Delta. Wind gusts were reported in excess of 100 mph in the Pribilof Islands and in Bristol Bay. Extensive

Table 5-9 Severe Weather Events

Location	Date	Event Type	Magnitude
			damage occurred to many homes and buildings. This storm also produced a storm surge in the Bristol Bay region near Dillingham, Clarks Point and Ekuk.
Kuskokwim Delta	12/24/2008	Blizzard	A strong front moved into the Bering Sea coast producing strong wind and snow that resulted in a Blizzard Christmas eve and Christmas day.
Tuluksak, Kipnuk	7/5/2008	Thunderstorm, Wind	31 mph (50 kts) Very unstable atmospheric conditions in southwest Alaska produced severe thunderstorms in the Bethel area the evening of July 5th. Kipnuk reported gusts to 55 mph
Kuskokwim Delta	1/19/2008	High Wind, Blizzard	42.8 mph (69 kts) High Wind to Heavy Snow Aleutians to South Central 1-18 to 20 2008 An intense storm moved into the Bering Sea on the 18th. High wind in advance of this storm blew through portions of the Aleutians, then moved to the Bristol Bay Coast and eventually hit the south central portion of Alaska on the 20th. The strong southeast flow pushed ample moisture into the Alaska Range dumping 14 inches of snow in that region on the 20th.
Kuskokwim Delta	1/15/2008	Blizzard	An intense storm in the Bering Sea produced snow and strong wind over the Kuskokwim Delta that resulted in a Blizzard across the region.
Kuskokwim Delta	1/30/2007	High wind, Utility Disruptions	42.25 mph (68 kts) $100K Damages An secondary storm center south of the Alaska Peninsula delivered high wind swept through southwest and south central Alaska and along the central Aleutians and Alaska Peninsula. Wide spread power outages plagued the Kuskokwim Delta with this storm along with roofs being blown off two houses, two housed shifted on their foundation. Unconfirmed wind gusts were reported to 127 mph at Sand Point on the Alaska Peninsula with this storm.
Bethel	7/5/2007	Thunderstorm, Hail, Wind	60 mph (96.56 kts) A severe thunderstorm moved through the Kuskokwim Delta possibly producing large hail and strong gusty wind near . The severity of this storm is estimated from Radar returns and the magnitude of wind observed near the thunderstorm. While the actual observed wind was not 60 mph, it is reasonable to assume the wind did reach 60 mph due to the sparse data network in this region.
Kuskokwim Delta	1/9/2007	High Wind, Blizzard	56 mph (90 knots[kts]) A storm in the north Pacific and its associated weather front caused gusty south winds, snow, and blowing snow across southwest Alaska. Winds peaked at along the coast with visibilities reduced to near zero.

(NWS 2011, DHS&EM 2010)

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

Location

The City experiences periodic severe weather impacts. The National Weather Service has continued to modify their system for assigning weather zones to facilitate and more accurately confine weather patterns to relevant geographic areas. The data in Table 5-9 reflects different locations within close proximity to the City of Akiak and should be used to depict weather events that have historically impacted the area; some of which may not have impacted the City s as severely as other areas within the same zone.

Extent

The entire City is equally vulnerable to the severe weather effects. The City experiences severe storm conditions with heavy snow depths; wind speeds can reach 100 mph; and extreme low temperatures that reach -45ºF.

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

Impact

The intensity, location, and the land's topography influence the impact of severe weather conditions on a community.

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. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns.

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

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

Extreme cold also interferes with the proper functioning of a community's infrastructure by causing fuel to congeal in storage tanks and supply lines, stopping electric generation. Without electricity, heaters and furnaces do not work, causing water and sewer pipes to freeze or rupture. If extreme cold conditions are combined with low or no snow cover, the ground's frost depth can increase, disturbing buried pipes. The greatest danger from extreme cold is its effect on people. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. The risk of hypothermia due to exposure greatly

increases during episodes of extreme cold, and carbon monoxide poisoning is possible as people use supplemental heating devices.

Probability of Future Events

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

5.3.5 Tundra/Wildland Fire

5.3.5.1 Nature

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

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

- **Topography 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, ridge tops 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 plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the “fuel load”). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel load continuity, both horizontally and vertically, is also an important factor
- **Weather** is the most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. By contrast, cooling and higher humidity often signal reduced wildland fire occurrence and easier containment

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

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

5.3.5.2 History

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

The Alaska Interagency Coordination Center (AICC) lists 72 geographic information system (GIS)-based wildland fires that occurred within 50 miles of the City the since 1939.

Table 5-10 lists 33 fires that exceeded 50 acres; Figure 5-17 depicts AICC identified tundra/wildland fire locations; and Figure 5-18 depicts AICC identified fire perimeters.

Table 5-10 Akiak's Historic Wildfire Locations

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
Hawk River	2010	10766	60.48333	-161.083	Lightning
Nunap	2006	60	60.93333	-162.45	Lightning
Taksleksluk North	2006	4016.7	61.16667	-162.7	Lightning
Pikmiktalik	2005	649	61.08333	-162.167	Lightning
Johnson River	2005	57.5	61	-162.617	Children
Otter Creek	2005	3098.7	60.91667	-160.283	Lightning
Bethel 2	2003	75	60.75	-161.917	Human
Kalskag	2002	3390	61.5	-160.383	Human
South Bogus	1997	130	61.16667	-160.167	Lightning
Tundra George	1997	160	61.45	-161.433	Lightning
Fog	1997	50	60.9	-160.683	Lightning
304295	1993	110	60.71667	-161.017	Lightning
Kasigluk	1993	240	60.63334	-160.65	Lightning
Columbia	1991	180	60.7	-160.783	Lightning
Reindeer	1990	218	61.38334	-162.7	Lightning
Kushluk	1988	700	60.61666	-160.917	Lightning
Bet E 11	1984	1500	60.76667	-161.5	Human
Long Lake	1972	1800	61.33333	-162.417	Lightning
Benny`S Bog	1972	300	61.33333	-162.667	Lightning
Johnson River	1972	900	61.41667	-162	Lightning
Water	1971	2000	61.31667	-162.75	Lightning
Bethel 1/2s	1957	2491	60.75	-161.75	Debris Bng
Bethel 30-E	1957	1000	60.83333	-161.917	Lightning
Phillips	1954	160	61.3	-161.083	Miscellaneous
Bethel #2	1943	200	60.96667	-161.8	Lightning
Nunipitchuk	1941	1500	60.93333	-162.217	Lightning
Nunipitchuk #2	1941	1500	60.91667	-162.2	Lightning
Lomavik	1940	16000	60.58333	-162.117	Unknown

Table 5-10 Akiak's Historic Wildfire Locations

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
Napaiskak	1940	20000	60.66667	-161.917	Unknown
Whitefish Lake	1940	32000	61.33333	-160.15	Trappers
Ogilvik (Uknavik)	1940	10000	61.41667	-160.617	Unknown
Akiak	1940	204800	60.93333	-161.25	Unknown
Tuluksak	1940	102400	61.1	-161.083	Unknown

(AICC 2011)

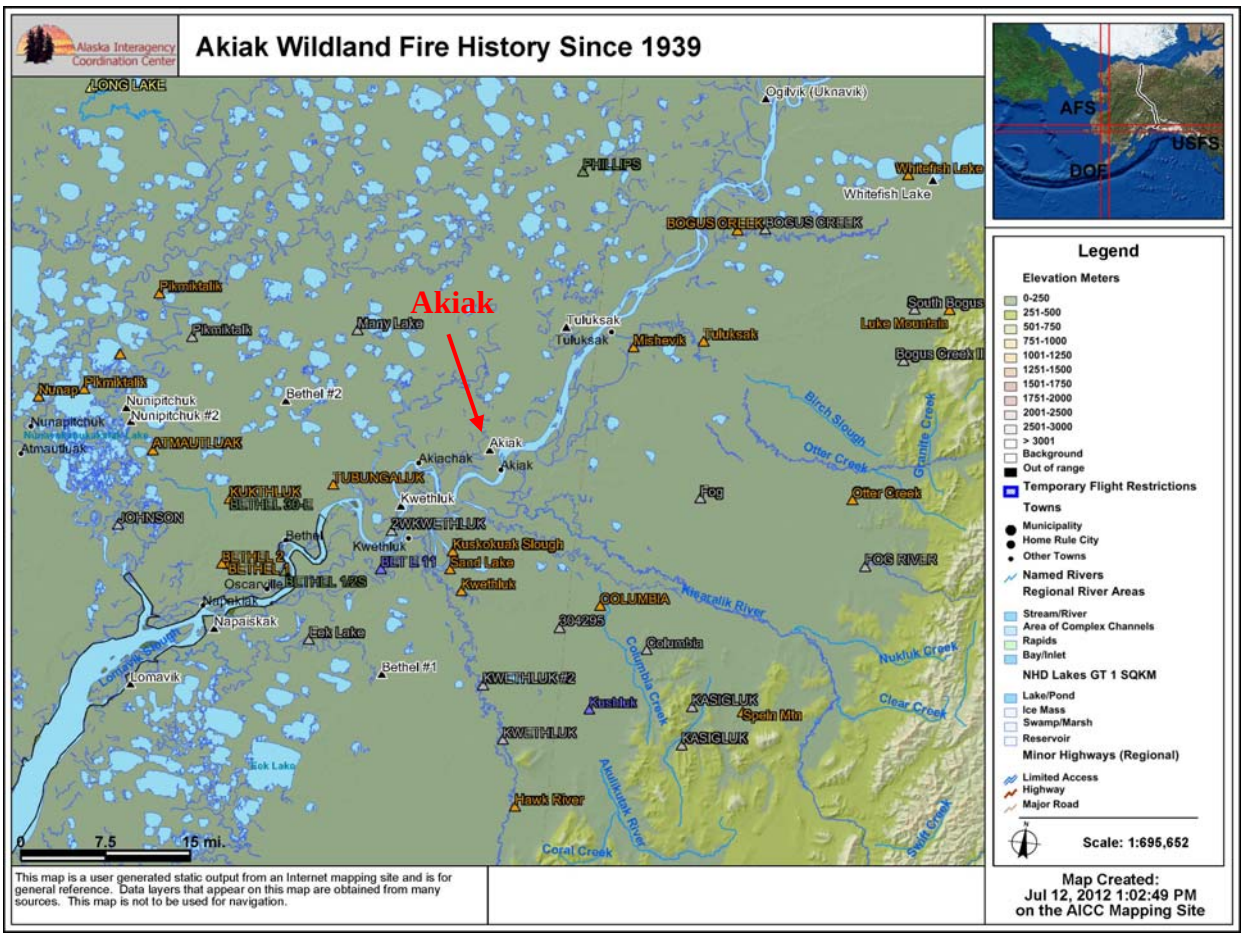

Figure 5-17 Akiak's Historical Wildfires (AICC 2011)

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

Location

Under certain conditions wildland fires may occur in any area with fuel surrounding the City of Akiak. Since fuels data is not readily available, for the purposes of this plan, all areas outside City limits are considered to be vulnerable to tundra/wildland fire impacts. Figure 5-18 depicts wildland fires and their perimeter areas within 50 miles of the City.

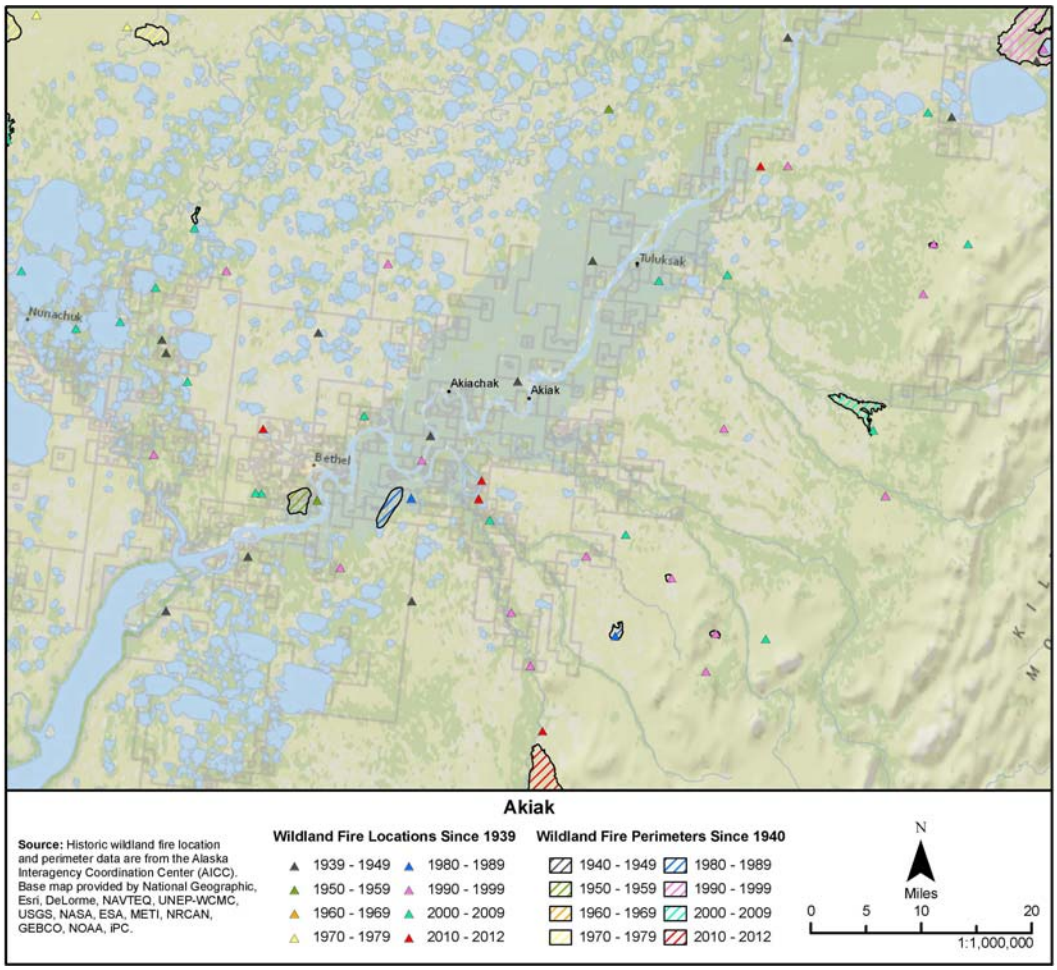

Figure 5-18 Akiak's Wildland Fire Perimeters since 1940 (URS 2012)

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.

As stated above, the AICC identifies 51 wildland fires with only 21 of those (Table 5-10) damaging more than 50 acres.

Based on the limited number of past wildland fire events and the criteria identified in Table 5-3, the magnitude and severity of impacts in the City of Akiak are considered negligible with minor injuries, there is potential for critical facilities to be shut down for less than 24 hours, less than 10 percent of property or critical infrastructure being severely damaged, and little to no permanent damage to transportation or infrastructure or the economy.

Impact

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

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

Probability of Future Events

Fire is recognized as a critical feature of the natural history of many ecosystems. It is essential to maintain the biodiversity and long-term ecological health of the land. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process and the full range of fire management activities is exercised in Alaska, to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighters, public safety and welfare; natural and cultural resources threatened; and the other values to be protected dictate the appropriate management response to the fire. In Alaska, and within 50 miles Akiak, the natural fire regime is characterized by a return interval of approximately 150 years due to their tundra vegetation, gently rolling topography, and riverine location.

Based on the history of wildland fires in the Akiak area and applying the criteria identified in Table 5-2, it is “Unlikely” but possible a wildland fire event will occur within in the next ten years. The event has up to 1 in 10 years chance of occurring and the history of events is less than or equal to 10 percent likely each year.

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6.1 VULNERABILITY ANALYSIS OVERVIEW

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

1. Asset Inventory
2. Exposure Analysis For Current Assets
3. Repetitive Loss Properties
4. Land Use and Development Trends
5. Vulnerability Analysis Methodology
6. Data Limitations
7. Vulnerability Exposure Analysis
8. Future Development

This section provides an overview of the vulnerability analysis for current assets and area future development initiatives.

DMA 2000 Recommendations
Assessing Risk and Vulnerability, and Analyzing Development Trends §201.6(c)(2)(ii): The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. *All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.* The plan should describe vulnerability in terms of: §201.6(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): 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): 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. §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
1. REGULATION CHECKLIST
ELEMENT B. Risk Assessment, Assessing Vulnerability, Analyzing Development Trends
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))
B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods?
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))
Source: FEMA, October 2011.

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

- A summary of the community's vulnerability to each hazard that addresses the impact of each hazard on the community.
- Identification of the types and numbers of RL properties in the identified hazard areas.
- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.
- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.

Table 6-1 lists the City's infrastructures' hazard vulnerability.

Table 6-1 Vulnerability Overview

Hazard	Area's Hazard Vulnerability			
	Percent of Jurisdiction's Geographic Area	Percent of Population	Percent of Building Stock	Number or Percent of Critical Facilities and Utilities
Earthquake	100	100	100	100
Erosion	10	~5	~15	~15
Flood	100	100	100	100
Severe Weather	100	100	100	100
Wildland Fire	100	100	100	100

6.2 LAND USE AND DEVELOPMENT TRENDS

6.2.1 Land Use

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

6.3 EXPOSURE ANALYSIS FOR CURRENT ASSETS

6.3.1 Asset Inventory

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

6.3.1.1 Population and Building Stock

Population data for the City were obtained from the 2010 U.S. Census. The City's total population for 2010 was 346 and 2010 DCCED/DCRA data reported a population of 367 (Table 6-2).

Table 6-2 Estimated Population and Building Inventory

Population		Residential Buildings	
2010 Census	DCCED 2012 Data	Total Building Count	Total Value of Buildings1
346	361	98	US Census: $17,453,800 City: $26,950,000

Sources: The City of Akiak, U.S. Census 2010, and 2011 DCCED/DCRA Certified population data.

[1] Planning Team determined that the average structural replacement value of all single-family residential buildings is $275,000 per structure.

On January 7, 2013, the Planning Team reviewed the 2010 U.S. Census, and DCCED/DCRA estimated housing values for the 98 structures listed in Table 6-1 at $178,100 each. However, the City determined that residential replacement values are generally understated as the cost for materials, shipping, and labor far exceed the US Census determined value. The Planning Team determined a more accurate replacement estimate for the average 30 ft by 40 ft house at approximately $275,000.

6.3.1.2 Existing Infrastructure

The City of Akiak has benefited from numerous funding opportunities to assist them with upgrading their infrastructure. The City had a new community well and water treatment plant developed in 1985 with subsequent years bringing sanitation facilities, solid waste upgrades, buried arctic water and wastewater, with force mains and lift stations.

The City's deteriorating electrical utility was upgraded in 1994 to bring the power lines from underground to overhead. This allowed the City to more easily and economically repair and replace damaged sections.

The City received an Airport extension and reconstruction project to lengthen the runway to approximately 3,000 feet, build a new access road and apron; a consolidated Bulk Fuel Facility pad, lining, and dike in 1998 and the tank farm was completed in 1999; school improvements occurred in 2003; 2004 brought a new health clinic design with construction completed in 2007.

Table 6-3 list the City's DCRA funded "completed" infrastructure improvement projects. They provide a depiction of the community's ongoing development trends and focus toward improving aging infrastructure.

Table 6-3 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
Alaska Native Tribal Health Consortium (ANTHC)	2008	Funded	Water and sewer service to 23 homes in Akiak, Alaska.	Complete	$1,321,000

Table 6-3 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
ANTHC	2008	Funded	Water and sewer service lines for teacher housing.	Complete	$40,000
ANTHC	2008	Funded	Complete sewage lagoon improvements and demobilization.	Complete	$310,000
ANTHC	2007	Funded	Completion of water and sewer service improvements.	Complete	$506,000
ANTHC	2007	Funded	Lift station and water treatment plant improvements.	Complete	$400,000
Division of Community and Regional Affairs (DCRA)	2007	Funded	Debt Repayment and Other Community Projects - Comments: Legislative Grant, Rural Residential (RR) from 01-MG-221.	Completed	$26,425
Denali Commission	2007	Funded	Teacher Housing - Yupiit School District - Comments: New construction of a teacher housing duplexes at 2,488 Sq Ft total.	Project Close-out Complete	$890,788
Denali Commission	2007	Funded	New Clinic Design - Comments: Design of 2500 Sq Ft primary care clinic in roadless community of 367 residents. See Also project number AN04-GA7 under Award 0146-DC-2004-I29 September 2004.	Project Close-out Complete	$51,400
Alaska Housing Finance Corporation (AHFC)	2007	Funded	Teacher Housing - Yupiit School District - Comments: Rural Teacher Housing. OTHER FUDING: Denali Commission $612,430. New construction of a teacher housing duplexes at 2,488 Sq Ft total.	Completed	$890,788
ANTHC	2006	Funded	Unidentified Project	Complete	$31,950
ANTHC	2006	Funded	Water Treatment Plant (WTP) upgrades	Complete	$757,500
Housing and Urban Development (HUD)	2006	Funded	Indian Housing Block Grant / Native American Housing Assistance and Self Determination Act (IHBG/NAHASDA) administration, operating & construction funds	Completed	$228,372
HUD	2005	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$223,253
DCRA	2005	Funded	Community Projects & Improvements - Comments: Capital Matching	Completed	$27,625
ANTHC	2005	Funded	Buried sewer and water service lines to Headstart building.	Complete	$35,100
Denali Commission	2004	Funded	New Clinic Construction - Comments: Scope of work includes construction of 2500 Sq Ft primary care clinic in roadless community of 367. Total project cost upon completion was $1,363,540. See project number AN04-G97 under Award 0071-DC-2002-I24 for project design/ planning, April, 2004.	Project Close-out Complete	$1,368,614
ANTHC	2004	Funded	Design and construction planning for new clinic. - Comments: Project design is complete. Construction is underway and anticipated to be complete in the Fall of 2005	Design *[Completed]*	$51,400

Table 6-3 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
ANTHC	2004	Funded	In-house plumbing.	Complete	$848,800
HUD	2004	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$239,449
ANTHC	2004	Funded	Construct new health clinic. - Comments: Description of project activities for quarter: April, May, and June Building has been completed and moved into for clinic operations. After being in operations for some time; they had their Grand opening on June 6, 2006.	Complete	$915,492
Federal Aviation Administration (FAA)	2003	Funded	Construct Snow Removal Equipment Building - Comments: OTHER FUNDING: Department of Transportation and Public Facilities (DOT/PF) Construct Snow Removal Equipment Building	Completed	$607,440
HUD	2003	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$267,073
Department of Education and Early Development (DEED)	2003	Funded	Akiak School Improvement - Comments: Funded by State GO Bond	Completed	$13,498,704
DCRA	2003	Funded	Community Projects & Improvements - Comments: Capital Matching	Completed	$26,316
HUD	2003	Funded	Health Clinic - Comments: Indian Community Development Block Grant (ICDBG) Program.	Completed	$259,434
ANTHC	2003	Funded	Water main and service lines to serve 42 homes.	Complete	$1,417,600
DEED	2002	Funded	School Repairs	Completed	$177,571
ANTHC	2002	Funded	Construct 6,900 feet of buried arctic sewer service lines to serve 69 homes.	Complete	$691,450
HUD	2002	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$238,034
ANTHC	2002	Funded	Energy efficiency items - 2 units	Completed	$44,378
ANTHC	2001	Funded	Unidentified Project	Complete	$1,920,000
ANTHC	2001	Funded	Sewer treatment lagoon primary cell, lagoon access road. - Comments: Project complete. Acknowledgement of Project Completion (AOPC) and Final Report completed. Final closeout will be done with combined projects in late 2005/early 2006	Complete	$1,015,000
ANTHC	2000	Funded	A lift station and force main between the lift station and proposed sewage lagoon.	Complete	$652,500
DCRA	2000	Funded	Garage Construction & Equipment Purchase - Comments: Capital Matching	Completed	$56,194
HUD	2000	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$227,122
DCRA	1999	Funded	Water and Sewer Project - Comments: Capital Matching; Grant has not been executed as of 12/30/98	Completed	$26,316

Table 6-3 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
AHFC	1999	Funded	Mutual help housing, 5 low income units - Comments: HUD NAHASDA	Completed	$1,256,022
HUD	1999	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$227,122
DCRA	1999	Funded	Pay Legal Costs - Comments: Legislative Grant	Completed	$11,000
ANTHC	1999	Funded	26 water service lines plus abandonment of 26 individual wells and sewage lagoon starter cell.	Complete	$1,003,000
HUD	1998	Funded	IHBG/NAHASDA administration, operating & construction funds.	Completed	$240,007
DCRA	1998	Funded	Native Community Building Addition - Comments: Magnuson-Stevens Act 1997 Fish Disaster Grant	Completed	$89,160
DCRA	1998	Funded	Kamp Kisaralik Marketing - Comments: Mini-Grant	Completed	$36,708
DOT/PF	1998	Funded	Airport Runway Extension/Reconstruction - Comments: FAA. Lengthen runway to 3,000', access road and new apron	Completed	$3,700,000
Alaska Energy Authority/Bulk Fuel (AEA/BF)	1998	Funded	New Consolidated Bulk Fuel Facility - Comments: OTHER FUNDING: HUD/Community Development Block Grant (CDBG) $500K. Pad, lining and dike completed in Summer 98. Resume construction Spring 1999. Local priority, from 1997 United States Department of Agriculture/Rural Development (USDA/RD) survey of Citys	Completed	$781,600
Department of Environmental Conservation/Village Safe Water (DEC/VSW)	1998	Funded	Water System, Phase (Ph) III - Comments: ANTHC lead. USDA/RD $405.5. Construct new sewage lagoon	Completed	$811,000
ANTHC	1998	Funded	6000 feet of water main for loop 1	Complete	$653,978
ANTHC	1997	Funded	Water treatment plant and foundation plus the start of loops 1 & 2 water main. - Comments: 2006 Q4: No work performed, project awaiting larger close out 2007 Q1: No work planned	Complete	$405,500
DCRA	1997	Funded	Health Clinic Renovations - Comments: Capital Matching	Completed	$44,773
HUD	1997	Funded	Bulk Fuel Storage Tank - Comments: ICDBG Program	Completed	$500,000
DEC/VSW	1997	Funded	Water Treatment and Sewer Upgrade Ph I - Comments: Construct water treatment plant and foundation; construct 3,160 ft. of water main	Completed	$594,000
DCRA	1996	Funded	Health Clinic Expansion - Comments: Capital Matching	Completed	$53,585
AEA	1994	Funded	Electrical Distribution System Upgrade - Comments: Correct overhead line safety	Completed	$64,500

Table 6-3 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
			violations Electrical Distribution System Upgrade		
HUD/CGP	1994	Funded	Housing Modernization - Comments: Foundations, water wells	Completed	$250,000
AEA-BF	1994	Funded	City Bulk Fuel Repair	Completed	$11,544
DCRA	1994	Funded	Akiak Head Start - Head Start Building Design & Construction - Comments: Legislative Grant. ED 39	Completed	$100,000
AEA-BF	1994	Funded	School Bulk Fuel Repair	Completed	$32,972
DEC/VSW	1993	Funded	Sewage Lagoon and Backwash Disposal - Comments: Construct septage lagoon (2 cells) and access road; construct filter backwash disposal system at Water treatment plant.	Completed	$500,000
HUD/Comprehensive Grant Program (CGP)	1993	Funded	Housing Modernization - Comments: Replace cook stoves - 20 units	Completed	$30,000
DEC/VSW	1989	Funded	Landfill Access Road - Comments: Construct 1,900 foot access road to new landfill	Completed	$160,000
DEC/VSW	1988	Funded	Landfill Construction - Comments: Design and construct new solid waste landfill	Completed	$200,000
DEC/VSW	1987	Funded	Solid Waste Disposal Study - Comments: Study recommended construction of combined septage and solid waste disposal facility	Completed	$10,000

(DCRA 2012)

6.3.1.3 Existing Critical Facilities

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

- Government facilities, such as city and tribal administrative offices, departments, or agencies
- Emergency response facilities, including police department and firefighting equipment
- Educational facilities, including K-12
- Care facilities, such as medical clinics, congregate living health, residential and continuing care, and retirement facilities
- Gathering places, such as community and youth centers
- Utilities, such as electric generation, communications, water and waste water treatment, sewage lagoons, landfills.

The Planning Team reviewed the City's current critical facilities and infrastructure (Table 6-4) on January 7, 2013 and determined the approximate number of occupants during any given time

during a typical business day, the facilities' location within the community, estimated value, HAZUS building type, and identifies those hazards which pose a potential threat to the facilities and residential properties.

Table 6-4 Critical Facilities and Infrastructure

Facilities	Number of Occupants	Facilities	Address	Latitude	Longitude	Estimated Value	Building Type	Earthquake	Erosion	Flood	Weather (Severe)	Tundra/Wildland Fire
Government	7	City Office	56 Niakpuk Road	Unknown	Unknown	$750,000	W1 (24x72)	X	X	X	X	X
	15	Akiak Tribal Office	80 Airport Road	Unknown	Unknown	$750,000	W2	X	X	X	X	X
	5	Kokarmuit Corporation Office/Multi-Purpose Office	Kilbuk Street	Unknown	Unknown	$500,000	W1 (24x32)	X	X	X	X	X
	0	National Guard Armory	12 Mukluk Street	Unknown	Unknown	$300,000	S1L (24x40)	X	X	X	X	X
	6	Post Office	Post Office Road	Unknown	Unknown	$750,000	S1L	X		X	X	X
	0	Old School now Corporation Offices	Kilbuk Street	Unknown	Unknown	$1,000,000	S1L	x	X	X	X	X
Transportation	0	Akiak Airport-gravel 03/21, 3,196' X 75', 30' Elevation	N/A	60.90481	-161.22701	$3,700,000	ARW	X		X	X	X
	0	Snow Equipment Removal Building	Airport	Unknown	Unknown	$607,440	AMF (30x40)	X		X	X	X
	0	Snow Equipment Removal Building	Airport	Unknown	Unknown	$500,000	S1L (30x40)	X		X	X	X
	2	School Maintenance Building	East side Kilbuk Street	Unknown	Unknown	$56,194	S1L	X	X	X	X	X
Emergency Response	5	Village Public Safety Office & Jail	Porks Street	60.91222	-161.21389	$400,000	W1	X	X	X	X	X
Educational	118	Arlicaq School (P-12)	Airport Road	Unknown	Unknown	$13,498,704	S1L	X		X	X	X
	20	Head Start Building	Doops Street	Unknown	Unknown	$550,000	W1, 3 sections	X	X	X	X	X
	15	Yupiit School District Office	Doops Road	Unknown	Unknown	$250,000	W1 (24x32)	X		X	X	X
Medical	20	Eadith Kawagley Memorial Clinic	Post Office Road	60.88744	-161.17347	$1,363,540	W1, Steel Siding	X		X	X	X

Table 6-4 Critical Facilities and Infrastructure

Facilities	Number of Occupants	Facilities	Address	Latitude	Longitude	Estimated Value	Building Type	Earthquake	Erosion	Flood	Weather (Severe)	Tundra/Wildland Fire
Community	0	Community Hall (Corp Office)	Kilbuk Street	Unknown	Unknown	$0	See Corp Office	X	X	X	X	X
	50	Moravian Church	Dummock Street	Unknown	Unknown	$800,000	W1 (40x60)	X		X	X	X
	20	Robert Ivan Store (#1)	Kilbuk Street	Unknown	Unknown	$500,000	W1 (24x30)	X	X	X	X	X
	20	Kokarmuit Store #2 (Corp Offices)	Kaku Street	Unknown	Unknown	$400,000	W1 (24x30)	X	X	X	X	X
	4	Teachers Quarters (City Building)	Kilbuk Street	Unknown	Unknown	$890,788	W2	X	X	X	X	X
	1	Teachers Trailer (School District)	Laps Street	Unknown	Unknown	$400,000	W2	X	X	X	X	X
	2	Teacher's Quarters	Laps Street	Unknown	Unknown	$250,000	W1 (24x32)		X			
	4	Teacher's Quarters (Village Corp)	Porks Street	Unknown	Unknown	$250,000	W1 (24x32)	X	X	X	X	X
	4	Teacher's Quarters (Village Corp)	Porks Street	Unknown	Unknown	$250,000	W1 (24x32)	X	X	X	X	X
	4	Teacher's Quarters Duplex (Village Corp)	Porks Street	Unknown	Unknown	$250,000	W1 (24x34)	X	X	X	X	X
	4	Teacher's Quarters Duplex (Village Corp)	Porks Street	Unknown	Unknown	$250,000	W1 (24x36)	X	X	X	X	X
	4	Teacher's Quarters Duplex (Village Corp)	Porks Street	Unknown	Unknown	$250,000	W1 (24x36)	X	X	X	X	X
	8	Teacher's Quarters 2-plex (Village Corp)	Airport Road	Unknown	Unknown	$400,000	W1 (24x36)	X		X	X	X
	0	ANTHC Storage	Doops Street	Unknown	Unknown	$150,000	W1	X		X	X	X
	0	Cemetery 1 (Original - Lost to erosion)	N/A	Unknown	Unknown	$0	N/A					
	0	Cemetery 2	Dummock Street	Unknown	Unknown	$20,000	N/A	X	X	X	X	X
Roads	0	Akiak Circle	N/A	N/A	N/A	$3,500,000	HRD2	X			X	X
	0	Airport Access Road		N/A	N/A			X			X	X
	0	Ben Street		N/A	N/A			X	X		X	X
	0	Doops Street		N/A	N/A			X	X		X	X
	0	Dummocks Street		N/A	N/A			X			X	X
	0	Jaup Street		N/A	N/A			X			X	X
		Kaku Street		N/A	N/A			X			X	X
	0	Kilbuk Street		N/A	N/A			X			X	X

Table 6-4 Critical Facilities and Infrastructure

Facilities	Number of Occupants	Facilities	Address	Latitude	Longitude	Estimated Value	Building Type	Earthquake	Erosion	Flood	Weather (Severe)	Tundra/Wildland Fire
	0	Landfill Access Road		N/A	N/A			X			X	X
	0	Laps Street		N/A	N/A			X	X	X	X	X
	0	Mukluk Street		N/A	N/A			X	X		X	X
	0	Nyukpuk Road		N/A	N/A			X			X	X
	0	Porks Street		N/A	N/A			X			X	X
	0	Post Office Road		N/A	N/A			X			X	X
Bridges	0	Old River Bridge (Kwiguaq)	Porks Street	Unknown	Unknown	$450,000	Steel, gravel	X			X	X
Utilities	0	Community Well	Doops Street	Unknown	Unknown	$75,000	PWE	X		X	X	X
	2	Akiak Community Water Treatment Plant	Doops Street	60.9123	-161.2124	$1,170,000	PWTS	X		X	X	X
	0	Potable Water Storage Tank	Doops Street	Unknown	Unknown	$500,000	PSTS	X		X	X	X
	0	Community Buried Waterline (9000')	Citywide	Unknown	Unknown	$9,609,528	PWPB	X	X	X	X	X
	0	Washeteria	Doops Street	Unknown	Unknown	$0	W1	X		X	X	X
	3	Akiak Power Utilities	Doops Street	Unknown	Unknown	$5,400,000	EPPS	X		X	X	X
	0	Consolidated Fuel Storage Tank Farm	Kilbuk Street	Unknown	Unknown	$781,600	OTF	X	X	X	X	X
		Fuel Tank Piping and Header	Kuskokwim River Bank	Unknown	Unknown	$25,000	OIPE	X	X	X	X	X
	0	Akiak Class III Municipal Landfill	Landfill Access Road	60.91126	-161.24034	$200,000	N/A	X		X	X	X
	0	Akiak Alternative Dumpsite #1	Dump Road	60.9158	-161.22678	$200,000	N/A	X		X	X	X
	0	Akiak Alternative Dumpsite #2	Dump Road	60.91571	-161.24176	$200,000	N/A	X		X	X	X
	0	Sewage Lagoon (2 Cell)	Doops Street	Unknown	Unknown	$1,015,000	WWTS	X		X	X	X
	0	Filter Backwash	Doops Street	Unknown	Unknown	$500,000	WWP1	X		X	X	X
	0	Lift Station and Force Main	Citywide	Unknown	Unknown	$400,000	WLSW	X		X	X	X
	0	Lift Station and Force Main	Citywide	Unknown	Unknown	$400,000	WLSW	X		X	X	X
	0	Buried Arctic Sewer Line (9000 ft)	Citywide	Unknown	Unknown	$9,199,550	WWP1	X	X	X	X	X
	0	ACS Telephone Receiver & Tower	Dump Road	Unknown	Unknown	$1,500,000	CBO	X		X	X	X

Table 6-4 Critical Facilities and Infrastructure

Facilities	Number of Occupants	Facilities	Address	Latitude	Longitude	Estimated Value	Building Type	Earthquake	Erosion	Flood	Weather (Severe)	Tundra/Wildland Fire
	0	United Utilities Telephone Satellite Dish	Dump Road	Unknown	Unknown	$2,000,000	CBO	X		X	X	X
Total Occ	343				**Total Damages:**	$53,162,794						

(Akiak 2012, DCRA 2012, DHS&EM 2009a)

6.3.1.4 Repetitive Loss Properties

This section estimates the number and type of structures at risk to repetitive flooding. (Properties list which have experienced RL claims and the extent of flood depth and damage potential.)

DMA 2000 Requirements
Addressing Risk and Vulnerability to NFIP Insured Structures §201.6(c)(2)(ii): The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. *All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.* The plan should describe vulnerability in terms of: §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of] the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; §201.6(c)(2)(ii)(B): The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; §201.6(c)(2)(ii)(C): The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions. §201.6(c)(3)(ii): The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.
1. REGULATION CHECKLIST
ELEMENT B. NFIP Insured Structures
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?
Source: FEMA, October 2011.

6.3.1.5 NFIP Participation

The City of Akiak does not participate in the NFIP neither do they have a repetitive flood property inventory that meets FEMA's RL criteria as the loss thresholds are substantially below FEMA values.

6.4 VULNERABILITY ANALYSIS 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 considering probability or damage levels.

The methodology used a two pronged effort. First, The Planning Team used the State's Critical Facility Inventory and locally obtained GPS coordinate data to identify critical facility locations in relation to potential hazard's threat exposure and vulnerability. Second this data was used to develop a vulnerability assessment for those hazards where GIS based hazard mapping information was available.

Replacement structure and contents values were developed for physical assets. These value estimates were provided by the 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 completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value for each structure or facility category was estimated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

6.5 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 HMP to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the HMP.

6.6 VULNERABILITY EXPOSURE ANALYSIS

There is limited GIS data available for the City of Akiak. The results of the GIS based exposure analysis for loss estimations in the City are summarized in Tables 6-4 and 6-5. The following discussion contains data from GIS analysis and information obtained from the Planning Team.

Table 6-4 Potential Hazard Exposure Analysis – Critical Facilities

		Government and Emergency Response		Educational		Medical		Community	
Hazard Type	Methodology	* # Bldgs/ # Occ	Value ($)	* # Bldgs/ # Occ	Value ($)	* # Bldgs/ # Occ	Value ($)	* # Bldgs/ # Occ	Value ($)
Earthquake	Descriptive	6/38	4,450,000	3/153	14,298,704	1/20	1,363,540	16/125	5,060,788
Erosion	Within 300 ft of erosion areas	5/32	3,700,000	1/20	550,000	0/0	0	12/67	3,710,786
Flood	Descriptive	6/38	4,450,000	3/153	14,298,704	1/20	1,363,540	16/125	5,060,788
Weather, Severe	Descriptive	6/38	4,450,000	3/153	14,298,704	1/20	1,363,540	16/125	5,060,788
Wildland Fire	descriptive	6/38	4,450,000	3/153	14,298,704	1/20	1,363,540	16/125	5,060,788

Table 6-5 Potential Hazard Exposure Analysis – Critical Infrastructure

		Highway		Bridges		Transportation Facilities		Utilities	
Hazard Type	Methodology	Miles	Value ($)	No.	Value ($)	# Bldgs/ # Occ	Value ($)	# Facilities /# Occ	Value ($)
Earthquake	Descriptive	Unknown	3,500,000	1	450,000	4/2	4,863,634	18/5	33,175,678
Erosion	Within 300 ft of erosion areas	0/0	0	0/0	0	1/2	56,194	4/0	19,615,678
Flood	Descriptive	Unknown	3,500,000	1	450,000	4/2	4,863,634	18/5	33,175,678
Weather, Severe	Descriptive	Unknown	3,500,000	1	450,000	4/2	4,863,634	18/5	33,175,678
Wildland Fire	descriptive	Unknown	3,500,000	1	450,000	4/2	4,863,634	18/5	33,175,678

6.6.1 Exposure Analysis – Hazard Narrative Summaries

Earthquake

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

Based on earthquake probability (PGA) maps produced by the USGS, the entire City area is at risk of experiencing moderate earthquake impacts a result of its proximity to the Denali Fault, Unnamed Pre-Neogene Fault, Thompson Creek Fault, and the Ataskaksovluk-Holokuk Fault Zone. However, the probability is low (see Section 5.3.1.3). Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. However, it is possible the entire existing and future Akiak population, residences, and critical facilities will continue to experience moderate earthquakes.

Based on local knowledge, the USGS Probability analysis (see Section 5.3.2.3) and the criteria in Table 5-2, the community should expect minimal to moderate earthquakes impacts that could affect:

- 367 people in 98 residences (approximate value $26,950,000),
- 38 people in six government and emergency response facilities (approximate value $4,450,000),
- 153 people in three educational facilities (approximate value $14,298,704),
- 20 people in one medical facility (approximate value $1,363,540),
- 125 people in 16 community facilities (approximate value $5,060,788),
- two people in four transportation facilities (approximate value $4,863,634),
- five people in 18 utility facilities (approximate value $33,175,678),
- one bridge (approximate value $450,000), and
- unknown road system miles (approximate value $3,500,000).

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

Erosion

Impacts from erosion include loss of land and any development on that land. Erosion can cause increased sedimentation of harbors and river deltas and hinder channel navigation, reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (docks, fuel resources, electric and water/wastewater utilities), and economic impacts associated with costs trying to prevent or control erosion sites (see Section 5.3.2.3). Only the facilities' locations can lessen their vulnerability to erosion in the City of Akiak.

Based on local knowledge, the USACE baseline erosion studies, their long historic erosion damages, and the criteria in Table 5-2, the community should expect continuous erosion damages that could impact:

- 32 people in five government and emergency response facilities (worth approximately $3,700,000),
- 20 people in one educational facilities (approximate value $550,000),
- 67 people in 12 community facilities (approximate value $3,710,786),
- two people in one transportation facilities (approximate value $56,194),
- four utility facilities (approximate value $19,615,678),
- one bridge (approximate value $450,000), and
- unknown road system miles (Unknown value).

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

Flood

The Tribal Council stated they believe "the entire City is located within the 100 year floodplain." However, no detailed 100 year flood analysis has been prepared for the City. The USACE information does not include floodplain map for the current townsite.

Impacts associated with flooding in the City 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 5.3.4.3).

No detailed flood analysis has been prepared for the City. Neither FEMA nor the USACE Floodplain Manager provide flood information or a 100 year floodplain map for the City of Akiak.

Flood impacts threaten the entire community which consists of:

- 367 people in 98 residences (approximate value $26,950,000),
- 38 people in six government and emergency response facilities (approximate value $4,450,000),
- 153 people in three educational facilities (approximate value $14,298,704),
- 20 people in one medical facility (approximate value $1,363,540),
- 125 people in 16 community facilities (approximate value $5,060,788),
- two people in four transportation facilities (approximate value $4,863,634),

- five people in 18 utility facilities (approximate value $33,175,678),
- one bridge (approximate value $450,000), and
- unknown road system miles (approximate value $3,500,000);

The City anticipates that impacts to future populations, residences, critical facilities, and infrastructure are at the same historical impact level.

Severe Weather

Impacts associated with severe weather events includes roof collapse, trees and power lines falling, damage to light aircraft and sinking small boats, injury and death resulting from snow machine or vehicle accidents, 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 5.3.5.3) provides additional detail regarding the impacts of severe weather. Buildings that are older and/or not constructed with materials designed to withstand heavy snow and wind (e.g., hurricane ties on crossbeams) are more vulnerable to the impacts of severe weather.

Using information provided by the City of Akiak and the National Weather Service, the entire existing and future City's population, residences, and critical facilities are equally exposed to the severe weather event impacts.

Severe Weather impacts threaten the entire community which consists of:

- 367 people in 98 residences (approximate value $26,950,000),
- 38 people in six government and emergency response facilities (approximate value $4,450,000),
- 153 people in three educational facilities (approximate value $14,298,704),
- 20 people in one medical facility (approximate value $1,363,540),
- 125 people in 16 community facilities (approximate value $5,060,788),
- two people in four transportation facilities (approximate value $4,863,634),
- five people in 18 utility facilities (approximate value $33,175,678),
- one bridge (approximate value $450,000), and
- unknown road system miles (approximate value $3,500,000);

The City anticipates that impacts to future populations, residences, critical facilities, and infrastructure are at the same historical impact level.

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

Wildland Fire

Impacts associated with a wildland fire event include the potential for loss of life and property. It can also impact livestock and pets and destroy forest resources and contaminate water supplies. Buildings closer to the outer edge of town, those with a lot of vegetation surrounding the structure, and those constructed with wood are some of the buildings that are more vulnerable to the impacts of wildland fire.

According to the Alaska Fire Service, there are no wildland fire areas within Akiak's boundaries. However, 51 wildland fires have occurred within a 50-mile radius of the City (see Section 5.3.6.3).

There is potential for wildland fire to interface with the population center of the City which consists of:

- 367 people in 98 residences (approximate value $26,950,000),
- 38 people in six government and emergency response facilities (approximate value $4,450,000),
- 153 people in three educational facilities (approximate value $14,298,704),
- 20 people in one medical facility (approximate value $1,363,540),
- 125 people in 16 community facilities (approximate value $5,060,788),
- two people in four transportation facilities (approximate value $4,863,634),
- five people in 18 utility facilities (approximate value $33,175,678),
- one bridge (approximate value $450,000), and
- unknown road system miles (approximate value $3,500,000);

6.7 FUTURE DEVELOPMENT

6.7.1 Future Critical Facilities

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

Future Critical Facilities and Infrastructure

Immediate plans for future development in the City includes:

- Akiak Hydro Study ($350,000) and Akiak Integrated Renewable Energy Projects ($142,000) (AEA 2011).

- Road rehabilitation and resurfacing approximately 2,000 feet of gravel road with 9,000 feet of water/sewer line installation (Denali 2012).

Division of Environmental Health and Engineering (DEHE) states that,

"Now every home in the community service area has access to a running water and sewer system. The entire system is constructed with arctic pipe and a circulating, heat-added water plant that ensures the system won't freeze even in the coldest conditions" (ANTHC 2009).

Figure 6-1 depicts Akiak's ANTHC construction project to install and connect new underground, heated, circulating water and sewer lines during the 2009 construction season.

Figure 6-1 Akiak's Arctic Pipe System (ANTHC 2009)

Future Development Trends

The City water and sewer infrastructure improvements began in 2006 followed by a rural power system upgrade and extensive community-wide water roads rehabilitation in 2009 and wastewater piping for the residential East Loop; education facilities such as a new Head Start facility, a school library, and extensive electric utility upgrades.

Table 6-6 delineates Akiak's most recently identified future, planned, and funded projects and their tentative project's stage.

Table 6-6 Planned and Funded Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
Housing and Urban Development (HUD)	2009	Funded	Indian Housing Block Grant / Native American Housing Assistance and Self Determination Act (IHBG/NAHASDA) administration, operating & construction funds	Contract	$226,630
Denali Commission	2009	Funded	Akiak Roads Rehabilitation - Comments: Rehabilitation and gravel resurfacing of major roads in Akiak; approximately 2,000 feet of gravel roads; 9,000 feet of water/sewer line installation have resulted in excessive surface fines and lack of adequate surfacing material. WFLHD # DTFH70-09-X-50024.	Planning/Design	$3,500,000
Division of Community and Regional	2009	Funded	Village Police Safety Building - Comments: Legislative Grant	Construction	$400,000

Table 6-6 Planned and Funded Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
Affairs (DCRA)					
HUD	2008	Funded	IHBG/NAHASDA administration, operating & construction funds	Design	$200,270
HUD	2007	Funded	IHBG/NAHASDA administration, operating & construction funds	Construction	$230,998
Alaska Energy Authority/Rural Power Systems Upgrade Program (AEA/RPSU)	2006	Funded	Rural Power System Upgrade - Phase (PH) 1 CDR - Comments: OTHER FUNDING: Denali Commission Upgrade from 60KW to 100 KW, replace engine of 140KW unit, switch gear	Preliminary	$80,000
HUD	2006	Funded	Water/Sewer Infrastructure - Comments: Indian Community Development Block Grant Water/Sewer Infrastructure	Construction	$500,000

(DCRA 2012)

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

1. Identifying each jurisdiction's existing authorities for implementing mitigation action initiatives
2. Developing Mitigation Goals
3. Identifying Mitigation Actions
4. Evaluating Mitigation Actions
5. Implementing Mitigation Action Plans

DMA 2000 Requirements
Identification and Analysis of Mitigation Actions §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)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards. §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. §201.6(c)(3)(iii): [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. §201.6(c)(3)(iv): [For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan. Requirement §201.6(c)(4): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate.
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?
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? *(Addressed in Section 6.4)*
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?
Source: FEMA, October 2011.

7.1 CITY OF AKIAK 'S CAPABILITY ASSESSMENT

The City's capability assessment reviews the technical and fiscal resources available to the community. This section outlines the resources available to the City of Akiak for mitigation and mitigation related funding and training. Tables 7-1, 7-2, and 7-3 delineate the City's regulatory tools, technical specialists, and financial resource available for project management within a Second Class City. Additional funding resources are identified in Appendix A.

Table 7-1 Akiak's Regulatory Tools

Regulatory Tools (ordinances, codes, plans)	Existing?
Comprehensive Plan	No
Land Use Plan	No
Tribal Corporation Land Use Plan	No
Emergency Response Plan	No
Wildland Fire Protection Plan	No
Building code	No
Zoning ordinances	Yes
Subdivision ordinances or regulations	Yes
Special purpose ordinances	No

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 7-2 Akiak's Technical Specialists for Hazard Mitigation

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

Table 7-2 Akiak's Technical Specialists for Hazard Mitigation

Staff/Personnel Resources	Y/N	Department/Agency and Position
System (GIS) and/or HAZUS-MH		knowledge
Scientists familiar with the hazards of the jurisdiction	No	U.S. Fish & Wildlife Service local office; Alaska Dept of Fish & Game local office
Emergency Manager	Yes	City Mayor or Tribal Chief (Situation dependent)
Finance (Grant writers)	Yes	City or Tribal Administrator (Situation dependent)
Public Information Officer	Yes	City Mayor or Tribal Chief (Situation dependent)

Table 7-3 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) grant program	FEMA funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
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. ***Not available to the City of Akiak as it does not participate in the NFIP.***
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.

The Planning Team developed the mitigation goals and potential mitigation actions (Section 7.3 and 7.4 respectively) for those hazards that could potentially impact the City of Akiak.

7.2 DEVELOPING MITIGATION GOALS

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

DMA 2000 Requirements
Local Hazard Mitigation Goals §201.6(c)(3)(i): The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
ELEMENT C. Mitigation Goals
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?
Source: FEMA, October 2011.

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, eight goals were developed to reduce or avoid long-term vulnerabilities to the identified hazards (Table 7-4).

Table 7-4 Mitigation Goals

No.	Goal Description
Multi- Hazard	
MH 1	Promote recognition and mitigation of all natural hazards that affect the City of Akiak.
MH 2	Promote cross-referencing mitigation goals and actions with other City planning mechanisms and projects.
MH 3	Reduce possibility of losses from all natural hazards that affect the City.
Natural Hazards	
EQ 4	Reduce vulnerability of structures to **earthquake** damage.
ER 5	Reduce possibility of damage and losses from **erosion**.
FL 6	Reduce the possibility of damage and losses from **flooding**.
SW 7	Reduce vulnerability of structures to **severe weather** damage.
WF 8	Reduce possibility of damage and losses from **wildland fires**.

7.3 IDENTIFYING MITIGATION ACTIONS

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

DMA 2000 Requirements
Identification and Analysis of Mitigation Actions §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.
ELEMENT C. Mitigation Actions
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?
Source: FEMA, October 2011.

After defining their mitigation goals, the Planning Team assessed the potential mitigation actions to carry forward into the mitigation strategy. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into three broad categories: property protection, public education and awareness, and structural projects. On February 22, 2012, the Planning Team selected 20 mitigation actions for potential implementation during the five-year life cycle of this HMP and identified ten mitigation actions that are currently ongoing within the community.

The Planning Team placed particular emphasis on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure. The City also discussed the benefits of NFIP programmatic participation and decided to consider actions that would support NFIP initiatives to preclude plan rewriting if they should decide to join the program (Table 7-5).

Table 7-5 Mitigation Goals and Potential Actions

(Bold ID items were selected for implementation by the Planning Team)

Goal		Actions	
No.	**Description**	**Status** *Considered* *Selected* *Ongoing*	**Description**
MH 1	Promote recognizing and mitigating all natural hazards that affect the City of Akiak (City).	O	Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the City of Akiak. Information should be presented in the form of a brochure or different form of written media so that residents can take information with them after the meeting. Topics should include (but are not limited to) the benefits of participating in the NFIP and safe fire practices while engaged in various activities (e.g., subsistence) in and around the community to help prevent wildland fires.

Table 7-5 Mitigation Goals and Potential Actions

(Bold ID items were selected for implementation by the Planning Team)

Goal		Actions	
No.	**Description**	**Status** *Considered* *Selected* *Ongoing*	**Description**
			City conducts spring flood preparedness and other outreach efforts two months before Spring Break-up.
		S	Establish a formal role for the Hazard Mitigation Planning Team to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions.
		O	Identify and pursue funding opportunities to implement mitigation actions.
		O	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all identified natural hazards.
		O	Identify critical facilities and vulnerable populations based on identified (and mapped where applicable) high hazard areas.
		O	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
		O	Acquire emergency warning methods to communicate critical emergency warnings and alerts. City uses Radios, cell phones, etc.
		C	Investigate benefits of, and potentially joining the National Flood Insurance Program (NFIP) to reduce monetary losses to individuals and the community.
MH 2	Cross reference Mitigation goals and actions with other City planning mechanisms and projects.	S	The City will strive to manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
		O	Develop, incorporate, and enforce building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic, and other hazards to ensure occupant safety.
		S	Develop and incorporate mitigation provisions and recommendations into all community plans and community development processes to maintain protect critical infrastructure, residences, and population from natural hazard impacts.
		O	Prohibit new construction in identified mitigatable hazard impact areas (erosion and flood, etc.) or require building to applicable building codes for other hazard impacts (earthquake, volcanic ash, weather, etc.).
		In – Process by NRCS	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.

Table 7-5 Mitigation Goals and Potential Actions

(Bold ID items were selected for implementation by the Planning Team)

Goal		Actions	
No.	**Description**	**Status** *Considered Selected Ongoing*	**Description**
		S	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
		C	Update Emergency Response Plans to discuss volcanic ashfall and stormwater management, prioritize response actions, and initiate actions to fill capability gaps.
		S	Require construction companies to provide as-built plans once facilities are constructed.
		S	Develop a community-wide as-built plan to enable the community to keep track of existing and future requirements. This will eliminate expensive procedures to determine if existing utility infrastructure exists prior to new construction.
MH 3	Reduce possibility of losses from all natural hazards that affect the City.	C	Increase power line wire size and incorporate quick disconnects (break-away devices) to reduce ice load and windstorm power-line failure during severe wind or winter ice storm events.
		S	Acquire (buy-out), demolish, or relocate structures from hazard prone area (erosion, flood, etc.) Property deeds "must be" restricted for open space uses for perpetuity to keep people from rebuilding in known hazard areas.
		S	Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
EQ 4	Reduce vulnerability of structures to earthquake damage.	S	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances to prevent toppling damage and resultant injuries to small children, elderly, and pets.
		S	Encourage building new wider tank frames or tank straps
ER 5	Reduce possibility of damage and losses from erosion.	S	Develop mitigation initiatives such as: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
		S	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.
		O	Install wing walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end- or wing-walls).
		S	Develop realistic and fundable river sediment management project within the main channel to divert water away from the "Short-cut" channel. This will keep the river in its main channel to reduce city erosion.
FL 6	Reduce the possibility of	C	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding, significant historical damages, or road closures.

Table 7-5 Mitigation Goals and Potential Actions

(Bold ID items were selected for implementation by the Planning Team)

Goal		Actions	
No.	**Description**	**Status** *Considered* *Selected* *Ongoing*	**Description**
	damage and losses from flooding.	S	Elevate residential, public, or critical facilities at least two feet above the Base Flood Elevation (BFE)
		C	Dry flood-proof historical, residential, and/or non-residential structures.
		C	Increase culvert sizes to increase their drainage capacity or efficiency.
		S	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
		S	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
SW 7	Reduce vulnerability of structures to severe weather damage.	S	Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
		S	Develop personal use and educational outreach training for a “safe tree harvesting” program. Implement along utility and road corridors to prevent or reduce potential winter storm damage.
WF 8	Reduce vulnerability of structures to severe wildland fire damage.	S	Develop, adopt, and enforce burn ordinances that controls outdoor burning, require burn permits, and restricts open campfires during identified weather periods (windy, dry, etc.).
		C	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high-risk areas.
		S	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
		S	Acquire fire hoses and construct a small building to protect pre-installed hoses from severe weather damage and freeze-up. Provide fire fighter recurring training to use equipment for fire and hazardous materials.

7.4 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

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

DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions
Implementation of Mitigation Actions §201.6(c)(3)(iii): [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
ELEMENT C. MITIGATION STRATEGY
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
Source: FEMA, October 2011.

The Planning Team evaluated and prioritized each of the mitigation actions on February 22, 2013 to determine which actions would be included in the Mitigation Action Plan. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities in the City. To complete this task, the Planning Team first prioritized the hazards that were regarded as the most significant within the community (earthquake, erosion, flood, severe weather, and wildland fire).

The Planning Team reviewed the simplified social, technical, administrative, political, legal, economic, and environmental (STAPLEE) evaluation criteria (shown in Table 7-6) and the Benefit-Cost Analysis Fact Sheet (Appendix E) to consider the opportunities and constraints of implementing each particular mitigation action. For each action considered for implementation, a qualitative statement is provided regarding the benefits and costs and, where available, the technical feasibility. A detailed cost-benefit analysis is anticipated as part of the application process for those projects the City chooses to implement.

Table 7-6 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

On February 22, 2013, the hazard mitigation Planning Team prioritized 31 mitigation actions that were chosen to carry forward into the Mitigation Action Plan (MAP). The hazard mitigation Planning Team considered each hazard's history, extent, and probability to determine each potential actions priority. A rating system based on high, medium, or low was used.

- High priorities are associated with actions for hazards that impact the community on an annual or near annual basis and generate impacts to critical facilities and/or people.
- Medium priorities are associated with actions for hazards that impact the community less frequently, and do not typically generate impacts to critical facilities and/or people.
- Low priorities are associated with actions for hazards that rarely impact the community and have rarely generated documented impacts to critical facilities and/or people.

Prioritizing the mitigation actions in the MAP matrix was completed to provide the City with an approach to implementing their selected mitigation actions.

7.5 IMPLEMENTING A MITIGATION ACTION PLAN

Table 7-7 delineates the acronyms used in the Mitigation Action Plan (MAP) (Table 7-8). See Appendix A for complete agency funding source descriptions.

Table 7-7 Potential Funding Source Acronym List

City of Akiak (City)

Akiak Tribal Council (Tribe)

Federal Management Agency (FEMA)/
Hazard Mitigation Assistance (HMA) Grant Programs,
Emergency Management Program Grant (EMPG)
Debris Management Grant
Flood Mitigation Assistance Grants
National Earthquake Hazards Reduction Program (NEHRP)
National Dam Safety Program (NDS)

US Department of Homeland Security (DHS)
Citizens Corp Program (CCP)
Emergency Operations Center (EOC)
Homeland Security Grant Program (HSGP)
Emergency Management Performance Grant (EMPG)
State Homeland Security Program (SHSP)

US Department of Commerce (DOC)/
Remote Community Alert Systems Program (RCASP)
National Oceanic and Atmospheric Administration (NOAA)

Denali Commission (Denali)
Energy Program,
Solid Waste Program,

Alaska Department of Military and Veterans Affairs (DMVA), Division of Homeland Security and Emergency Management (DHSEM)
Mitigation Section (for PDM & HMGP projects and plan development)
Preparedness Section (for community planning)
State Emergency Operations Center (SEOC for emergency response)

Alaska Department of Community, Commerce, and Economic Development (DCCED) Division of Community and Regional Affairs (DCRA)/
Community Development Block Grant (CDBG)
Alaska Climate Change Impact Mitigation Program (ACCIMP)
Flood Mitigation Assistance Grants (FMA)

Alaska Department of Transportation
State road repair funding

Alaska Energy Authority (AEA)
AEA/Bulk Fuel (ABF)
AEA/Alternative Energy and Energy Efficiency (AEEE)

Alaska Department of Environmental Conservation (DEC)/
Village Safe Water (VSW),
DEC/Alaska Drinking Water Fund (ADWF),
DEC/Alaska Clean Water Fund [ACWF],
DEC/Clean Water State Revolving Fund (CWSRF)

US Army Corp of Engineers (USACE)/
Planning Assistance
Capital Projects: Erosion, Flood, Ports & Harbors,

Alaska Division of Forestry (DOF)/
Volunteer Fire Assistance (VFAG)
Rural Fire Assistance Grant (RFAG),
Assistance to Firefighters Grant (AFG),
Fire Prevention and Safety (FP&S),
Staffing for Adequate Fire and Emergency Response Grants (SAFER)
Emergency Food and Shelter (EF&S)

US Department of Agriculture (USDA)/
Emergency Watershed Protection Program (EWP)
Emergency Conservation Fund (ECF),
Rural Development (RD)

US Geological Survey (USGS)
Alaska Volcano Observatory (AVO)

Assistance to Native Americans (ANA)
Native American Housing Assistance and Self Determination Act (NAFSMA),

Natural Resources Conservation Service (NRCS)/
Emergency Watershed Protection Program (EWP)
Wildlife Habitat Incentives Program (WHIP)
Watershed Planning

US Army Corps of Engineers (USACE)/
Planning Assistance Program

Lindbergh Foundation Grant Programs

Rasmuson Foundation Grants

The City's MAP, Table 7-8, depicts how each mitigation action will be implemented and administered by the Planning Team by delineating each selected mitigation action, its priorities, the responsible entity, the anticipated implementation timeline, and provides a brief explanation as to how the overall benefit/costs and technical feasibility were taken into consideration.

Table 7-8 City of Akiak's Mitigation Action Plan (MAP) Matrix

(See acronym and abbreviations list for complete titles)

Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department	Potential Funding Source(s) (See Appendix A)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
MH 1.1	Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the City of Akiak. City conducts spring flood preparedness and other outreach efforts two months before Spring Break-up.	Medium	City of Akiak (City), Akiak Tribal Council (Tribe)	City, Tribe, FEMA HMA, DOF AFG, FP&S, SAFER, ANA, EFSP, Lindbergh, Rasmuson, Denali Commission	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. TF: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
MH 1.2	Establish a formal role for the Hazard Mitigation Planning Team to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions.	Low	City, Tribe	City, Tribe	2-4 years	B/C: The existing team has gained experienced throughout this process which can provide invaluable insight for ensuring a sustained effort toward mitigating natural hazard damages. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.
MH 1.3	Identify and pursue funding opportunities to implement mitigation actions.	High	City, Tribe	City, Tribe	Ongoing	B/C: This ongoing activity is essential for the City as there are limited funds available to accomplish effective mitigation actions. TF: This activity is ongoing demonstrating its feasibility.
MH 1.4	Develop, produce, and distribute information materials concerning mitigation, preparedness, and	Low	City, Tribe	City, Tribe, FEMA, HMA, DOF	Ongoing	B/C: FEMA provides free publications for community education purposes.

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	safety procedures for all identified natural hazards.					TF: Low to no cost makes this a very feasible project to successfully educate large populations.
MH 1.5	Identify critical facilities and vulnerable populations based on identified (and mapped where applicable) high hazard areas.	High	City, Tribe	City, Tribe, DCRA, HMA, FP&S, SAFER, ANA, DHS/HSGP, CCP, EMPG, EOC, Lindberg	Ongoing	B/C: Identifying threatened population's and infrastructure's proximity to natural hazards (erosion and flood) is vital to their sustainability. There are currently few mapped hazard areas. This is a vital first step. This knowledge will help the community focus on activities to protect their vital resources. TF: Installing emergency generators is technically feasible for this community as they already have staff to maintain existing community power generation facilities. This project typically needs to be associated with essential facility upgrades for FEMA funding
MH 1.6	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.	Low	City, Tribe	City, Tribe, DCRA, Denali Commission	Ongoing	B/C: This project will ensure the community looks closely at their hazard areas to ensure they can safely evacuate their residents and visitors to safety during a natural hazard event. TF: This is technically feasible using existing city and tribal resources.
MH 1.7	Acquire emergency warning methods to communicate critical emergency warnings and alerts. City uses Radios, cell phones, etc.	Low	City, Tribe	City, Tribe, DCRA, DOC, RCASP, NOAA	Ongoing	B/C: This project will ensure the community looks closely at their hazard areas to ensure they can quickly notify and safely evacuate their residents and visitors to safety during a natural hazard event. TF: This is technically feasible using existing city and tribal resources.

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(See acronym and abbreviations list for complete titles)

Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department	Potential Funding Source(s) (See Appendix A)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
MH 2.1	The City will aggressively manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Low	City, Tribe	City, Tribe, DCRA, Denali Commission	1-3 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and residents. TF: This is feasible to accomplish as cost can be associated with plan reviews and updates. The action relies on staff and review committee availability and willingness to serve their community.
MH 2.2	Develop, incorporate, and enforce building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic, and other hazards to ensure occupant safety.	Low	City, Tribe	City, Tribe, DCRA, Denali Commission	Ongoing	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.
MH 2.3	Develop and incorporate mitigation provisions and recommendations into all community plans and community development processes to maintain protect critical infrastructure, residences, and population from natural hazard impacts.	Medium	City, Tribe	City, Tribe, DCRA, Denali Commission	2-4 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This is technically feasible because it requires application of knowledge of the hazard mitigation plan and other planning efforts. Feasibility is reliant on technical skills already possessed by employees holding positions that would implement this action.
MH 2.4	Prohibit new construction in identified mitigatable hazard impact	Medium	City, Tribe	City, Tribe, DCRA, Denali	Ongoing	B/C: Building code development, implementation and enforcement can

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Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department	Potential Funding Source(s) (See Appendix A)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
	areas (erosion and flood, etc.) or require building to applicable building codes for other hazard impacts (earthquake, volcanic ash, weather, etc.).			Commission		effectively reduce future losses to hazardous events. Building codes can actually assist bush communities through making maximum use of materials and shipping costs the first time. TF: This project is technically feasible as the community need only demonstrate cost savings by demonstrating losses from history utility impacts and down time.
MH 2.5	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for embankment protection feasibility determination and project design. This information should be a key component, directly related to an embankment stabilization and protection project.	High	City, Tribe	City, Tribe, HMA, NRCS, USACE, USDA/ EWP, ECF, DCRA/ACCIMP	In – Process by NRCS	B/C: The community's river embankment is rapidly being lost to riverine erosive forces. High water flows are being redirected by river sedimentation accumulation (formed a sand bar); this redirects water flow and ice jams into the City's embankment. TF: This project is technically feasible by the funding entities' that specialize in this complex hydrological / engineering project.
MH 2.6	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.	Medium	City, Tribe	City, Tribe, DCRA, Denali Commission	2-4 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This action is feasible with limited fund expenditures.
MH 2.7	Require construction companies to provide as-built plans once facilities are constructed.	Medium	City, Tribe	City, Tribe, DCRA, Denali Commission	2-4 years	B/C: Potential damage reduction is a high priority for FEMA and will therefore benefit the community greatly. Identifying threatened properties is the first step to reducing losses. Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to

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(See acronym and abbreviations list for complete titles)

Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department	Potential Funding Source(s) (See Appendix A)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
						reduce losses and damage to structures and City residents. TF: This is feasible to accomplish as no cost is associated with the action until appropriate mitigation actions are identified. This activity relies on community member availability and willingness to serve their community.
MH 2.8	Develop a community-wide as-built plan to enable the community to keep track of existing and future requirements. This will eliminate expensive procedures to determine if existing utility infrastructure exists prior to new construction.	Medium	City, Tribe	City, Tribe, DCRA, Denali Commission	1-3 years	B/C: Potential damage reduction is a high priority for FEMA and will therefore benefit the community greatly. Identifying threatened properties is the first step to reducing losses. Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This is feasible to accomplish as no cost is associated with the action until appropriate mitigation actions are identified. This activity relies on community member availability and willingness to serve their community.
MH 3.1	Acquire (buy-out), demolish, or relocate structures from hazard prone area (erosion, flood, etc.) Property deeds "must be" restricted for open space uses for perpetuity to keep people from rebuilding in known hazard areas.	High	City, Tribe	City, Tribe, HMA, NRCS, ANA, USACE, USDA, Lindbergh	1-3 years	B/C: This project would remove threatened structures from hazard areas, (river embankment) eliminating future damage while keeping land clear for perpetuity. F: This project is feasible using existing staff skills, equipment, and materials. Acquiring contractor expertise may be required for large facilities.
MH 3.2	Harden utility headers located along river embankments to mitigate	High	City, Tribe	City, Tribe, HMA, NRCS, ANA, USACE, USDA, Lindbergh	1-3 years	B/C: This project would ensure threatened infrastructures are available for use – there

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	potential flood, debris, and erosion damages.					loss would exacerbate potential damages and further threaten survivability. F: This project is feasible using existing staff skills, equipment, and materials.
MH 4.1	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances to prevent toppling damage and resultant injuries to small children, elderly, and pets.	Low	City, Tribe	City, Tribe, FEMA, HMA, NEHRP, ANA, EF&S, DOT/PF	1-5 years	B/C: Non-structural mitigation projects have minimal cost and will help the community reduce recurring earthquake impact damages from future events. TF: This project is technically feasible using existing Tribal Council staff
MH 4.2	Encourage residents to build new wider tank frames or install tank straps to prevent toppling during seismic events.	Low	City, Tribe	City, Tribe, NRCS, ANA, USACE, USDA, Lindbergh	1-5 years	B/C: This project is low cost and would effectively reduce tank frame collapse or toppling. If supplemented with a sustained mitigation outreach program will help build and support community capacity to enable the public to prepare for, respond to, and recover from disaster impacts. TF: This action is feasible with limited fund expenditures.
ER 5.1	Develop mitigation initiatives such as: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.	High	City, Tribe	City, Tribe, HMA, ANA, NRCS, USACE	1-3 years	B/C: Improving embankment and slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh replacement costs of lost facilities. TF: The community has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected.

Table 7-8 City of Akiak's Mitigation Action Plan (MAP) Matrix

(See acronym and abbreviations list for complete titles)

Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department	Potential Funding Source(s) (See Appendix A)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
ER 5.2	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.	High	City, Tribe	City, Tribe, HMA, ANA, NRCS, USACE	2-4 years	B/C: This retrofit project can be a very cost effective method for bush communities as materials and shipping costs are very high. This project is technically feasible as the community need only demonstrate cost savings by demonstrating losses from history utility impacts and down time.
ER 5.3	Install wing walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end- or wing-walls).	High	City, Tribe	City, Tribe, HMA, ANA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ACCIMP	Ongoing	B/C: This retrofit project can be a very cost effective method for bush communities as materials and shipping costs are very high. TF: This project is technically feasible as the community need only demonstrate cost savings by demonstrating losses from history utility impacts and down time.
ER 5.4	Develop realistic and fundable river sediment management project within the main channel to divert water away from the "Short-cut" channel. This will keep the river in its main channel to reduce city erosion.	High	City, Tribe	City, Tribe, HMA, ANA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ACCIMP	1-3 years	B/C: The community's river embankment is rapidly being lost to riverine erosive forces. High water flows are being redirected by river sedimentation accumulation (formed a sand bar); this redirects water flow and ice jams into the City's embankment. Improving embankment and slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh replacement costs of lost facilities. TF: The community has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected.
FL 6.1	Elevate residential, public, or critical facilities at least two feet above the Base Flood Elevation (BFE)	High	City, Tribe	City, Tribe, HMA, NRCS, ANA, USACE, US USDA, Lindbergh	1-3 years	B/C: This project would raise threatened structures from hazard impacts beyond FEMA's basic elevation requirement,

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						dramatically reducing future damages. F: This project is feasible using existing staff skills, equipment, and materials. Acquiring contractor expertise may be required for large facilities.
FL 6.2	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.	Medium	City, Tribe	City, Tribe, HMA, ANA, Denali Commission, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ACCIMP	2-4 years	B/C: Hardening infrastructure to reduce erosion and flood damages reduces potential future damages and replacement costs. TF: The City has the technical capability to manage and conduct this project.
FL 6.3	Install debris cribs over culvert inlets to prevent in-flow of coarse bed-load and light floating debris.	Medium	City, Tribe	City, Tribe, HMA, ANA, Denali Commission, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	2-4 years	B/C: Hardening infrastructure to reduce erosion and flood damages reduces potential future damages and replacement costs. TF: The City has the technical capability to manage and conduct this project.
SW 7.1	Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.	Medium	City, Tribe	City, Tribe, HMA, AFG, FP&S, SAFER, ANA, EFSP	3-5 years	B/C: This project would ensure threatened infrastructures are available for use – their loss would exacerbate potential damages and further threaten survivability. F: This project is feasible using existing staff skills, equipment, and materials.
SW 7.2	Develop personal use and educational outreach training for a "safe tree harvesting" program. Implement along utility and road corridors to prevent or reduce potential winter storm damage.	Low	City, Tribe	City, Tribe, FEMA AFG, FP&S, SAFER DOF: VFAG, RAGP, FireWise	Ongoing	B/C: This mitigation activity will reduce severe winter storm damages caused by heavy snow loads and icy rain by avoiding damage to structures and infrastructure. TF: This type activity is technically feasible within the community by implementing existing programs such as Fire Wise and

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						other State and Federal agency programs.
WF 8.1	Develop, adopt, and enforce burn ordinances that controls outdoor burning, requires burn permits, and restricts open campfires during identified weather periods (windy, dry, etc.).	Low	City, Tribe	City, Tribe, FEMA AFG, FP&S, SAFER DOF: VFAG, RAGP, FireWise	3-5 years	B/C: Ordinance development, implementation, and enforcement can effectively reduce future losses to hazardous events. TF: This project is technically feasible and enforceable.
WF 8.2	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.	Medium	City, Tribe	City, Tribe, FEMA AFG, FP&S, SAFER DOF: VFAG, RAGP, FireWise	2-4 years	B/C: This sustainable mitigation activity will greatly reduce the wildland/urban interface, have minimal cost, and will help build and support community capacity to respond to wildland fire disasters. TF: This project is technically feasible using existing Tribal Council staff.
WF 8.3	Acquire fire hoses and construct a small building to protect pre-installed hoses from severe weather damage and freeze-up. Provide fire fighter recurring training to use equipment for fire and hazardous materials.	Medium	City, Tribe	City, Tribe, VAFG, RFAG, FP&S	2-4 Years	B/C: This mitigation action will greatly reduce structural and wildland/urban fire damages, have minimal cost, and will help build and support community capacity to respond to wildland fire disasters. TF: This project is technically feasible using existing Tribal Council staff.

7.6 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

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

DMA 2000 Requirements
Incorporation into Existing Planning Mechanisms §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
ELEMENT C. Incorporate into Other Planning Mechanisms
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?
Source: FEMA, October 2011.

After the adoption of the HMP, each Planning Team Member will ensure that the HMP, in particular each Mitigation Action Project, is incorporated into existing planning mechanisms. Each member of the Planning Team will achieve this incorporation by undertaking the following activities.

- Review the community-specific regulatory tools to determine where to integrate the mitigation philosophy and implementable initiatives. These regulatory tools are identified in Section 7.1 capability assessment.
- Work with pertinent community departments to increase awareness for implementing HMP philosophies and identified initiatives. Provide assistance with integrating the mitigation strategy (including the Mitigation Action Plan) into relevant planning mechanisms (i.e. Comprehensive Plan, Capital Improvement Project List, Transportation Improvement Plan, etc.).
- Implementing this philosophy and activities may require updating or amending specific planning mechanisms.

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Appendix A

Federal, State, and Other Funding Resources

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Federal Funding Resources

The Federal government requires local governments to have a 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 local governments are also a valuable resource. FEMA may also provide temporary housing assistance through rental assistance, mobile homes, furniture rental, mortgage assistance, and emergency home repairs. The Disaster Preparedness Improvement Grant also promotes educational opportunities with respect to hazard awareness and mitigation.

- FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from FEMA Publication Warehouse (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 (http://www.fema.gov/plan/mitplanning/resources.shtm#1).
    - Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments. FEMA DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation and shows state and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.
    - A Guide to Recovery Programs FEMA 229(4), September 2005. The programs described in this guide may all be of assistance during disaster incident recovery. Some are available only after a Presidential declaration of disaster, but others are available without a declaration. Please see the individual program descriptions for details. (http://www.fema.gov/txt/rebuild/ltrc/recoveryprograms229.txt)
    - 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 (HMA Unified Guidance, June 1, 2010. 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 2009).

- FEMA also administers emergency management grants (http://www.fema.gov/help/site.shtm) and various firefighter grant programs (http://www.firegrantsupport.com/) such as
  - Emergency Management Performance Grant (EMPG). This is a pass through grant. The amount is determined by the State. The grant is intended to support critical assistance to sustain and enhance State and local emergency management capabilities at the State and local levels for all-hazard mitigation, preparedness, response, and recovery including coordination of inter-governmental (Federal, State, regional, local, and tribal) resources, joint operations, and mutual aid compacts state-to-state and nationwide. Sub-recipients must be compliant with NIMS implementation as a condition for receiving funds. Requires 50% match.
  - Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), and Assistance to Firefighters Station Construction Grant programs. Information can be found at: (http://forestry.alaska.gov/fire/vfarfa.htm).
- Department of Homeland Security provides the following grants:
  - Homeland Security Grant Program (HSGP), State Homeland Security Program (SHSP) are 80% pass through grants. SHSP supports implementing the State Homeland Security Strategies to address identified planning, organization, equipment, training, and exercise needs for acts of terrorism and other catastrophic events. In addition, SHSP supports implementing the National Preparedness Guidelines, the National Incident Management System (NIMS), and the National Response Framework (NRF). Must ensure at least 25% of funds are dedicated towards law enforcement terrorism prevention-oriented activities.
  - Citizen Corps Program (CCP). The Citizen Corps mission is to bring community and government leaders together to coordinate involving community members in emergency preparedness, planning, mitigation, response, and recovery activities.
  - Emergency Operations Center (EOC) This program is intended to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located, and fully interoperable Emergency Operations Centers (EOCs) with a focus on addressing identified deficiencies and needs. Fully capable emergency operations facilities at the State and local levels are an essential element of a comprehensive national emergency management system and are necessary to ensure continuity of operations and continuity of government in major disasters or emergencies caused by any hazard. Requires 25% match.
- U.S. Department of Commerce's grant programs include:
  - Remote Community Alert Systems (RCASP) grant for outdoor alerting technologies in remote communities effectively underserved by commercial mobile service for the purpose of enabling residents of those communities to receive emergency messages.

This program is a contributing element of the Warning, Alert, and Response Network (WARN) Act.

  - National Oceanic and Atmospheric Administration (NOAA), provides funds to the State of Alaska due to Alaska's high threat for tsunami. The allocation supports the promotion of local, regional, and state level tsunami mitigation and preparedness; installation of warning communications systems; installation of warning communications systems; installation of tsunami signage; promotion of the Tsunami Ready Program in Alaska; development of inundation models; and delivery of inundation maps and decision-support tools to communities in Alaska.

- Department of Agriculture (USDA). Disaster assistance provided includes: Emergency Conservation Program, Non-Insured Assistance, Emergency Forest Restoration Program, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service. (http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing)
- Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program (http://www1.eere.energy.gov/wip/wap.html). 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.
  - The Tribal Energy Program offers financial and technical assistance to Indian tribes to help them create sustainable renewable energy installations on their lands. This program promotes tribal energy self-sufficiency and fosters employment and economic development on America's tribal lands. (http://www1.eere.energy.gov/wip/tribal.html)
- US Environmental Protection Agency (EPA). Under EPA's Clean Water State Revolving Fund (CWSRF) program, each state maintains a revolving loan fund to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects, including: municipal wastewater treatment projects; non-point source projects; watershed protection or restoration projects; and estuary management projects. (http://yosemite.epa.gov/R10/ecocomm.nsf/6da048b9966d22518825662d00729a35/7b68c420b668ada5882569ab00720988!OpenDocument)
  - Public Works and Development Facilities Program. This program provides assistance to help distressed communities attract new industry, encourage business expansion, diversify local economies, and generate long-term, private sector jobs. Among the types of projects funded are water and sewer facilities, primarily serving industry and commerce; access roads to industrial parks or sites; port improvements; business incubator facilities; technology infrastructure; sustainable development activities; export programs; brownfields redevelopment; aquaculture facilities; and other infrastructure projects. Specific activities may include demolition, renovation, and construction of public facilities; provision of water or sewer infrastructure; or the development of stormwater control mechanisms (e.g., a retention pond) as part of an

industrial park or other eligible project. (http://cfpub.epa.gov/fedfund/program.cfm?prog_num=51)

- 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. (http://www.acf.hhs.gov/programs/ana/programs/program_information.html)
- Department of Housing and Urban Development (HUD) provides a variety of disaster resources. They also partner with Federal and state agencies to help implement disaster recovery assistance. Under the *National Response Framework* the FEMA and the Small Business Administration (SBA) offer initial recovery assistance. (http://www.hud.gov/info/disasterresources_dev.cfm)
    - 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. (http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/index.cfm)
    - HUD, Office of Homes and Communities, Section 184 Indian Home Loan Guarantee Programs. The Section 184 Indian Home Loan Guarantee Program is a home mortgage specifically designed for American Indian and Alaska Native families, Alaska Villages, Tribes, or Tribally Designated Housing Entities. Section 184 loans can be used, both on and off native lands, for new construction, rehabilitation, purchase of an existing home, or refinance.
    - Because of the unique status of Indian lands being held in Trust, Native American homeownership has historically been an underserved market. Working with an expanding network of private sector and tribal partners, the Section 184 Program endeavors to increase access to capital for Native Americans and provide private funding opportunities for tribal housing agencies with the Section 184 Program. (http://www.hud.gov/offices/pih/ih/homeownership/184/)
    - 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 (http://www.hud.gov/offices/cpd/communitydevelopment/programs/)
- 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. (http://www.workforcesecurity.doleta.gov/unemploy/disaster.asp)
    - The Workforce Investment Act contains provisions aimed at supporting employment and training activities for Indian, Alaska Native, and Native Hawaiian individuals.

The Department of Labor's Indian and Native American Programs (INAP) funds grant programs that provide training opportunities at the local level for this target population. (http://www.dol.gov/dol/topic/training/indianprograms.htm)

- U.S. Department of Transportation (DOT), Hazardous Materials Emergency Preparedness Grant. To increase State, Territorial, Tribal and local effectiveness in safely and efficiently handling hazardous materials accidents and incidents, enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986, and encourage a comprehensive approach to emergency training and planning by incorporating the unique challenges of responses to transportation situations, through planning and training. Requires a 20% local match.
- 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), Disaster Tax Relief. Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous year's tax returns (http://www.irs.gov/newsroom/article/0,,id=108362,00.html).
- Natural Resources Conservation Service (NRCS) has several funding sources to fulfill mitigation needs. Further information is located at: http://www.ak.nrcs.usda.gov/sitemap.html
    - The Emergency Watershed Protection Program (EWP). This funding source is designed is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.
    - Wildlife habitat Incentives Program (WHIP). This is a voluntary program for conservation-minded landowners who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and Indian land.
    - Watershed Planning. NRCS watershed activities in Alaska are voluntary efforts requested through conservation districts and units of government and/or tribes. The watershed activities are lead locally by a "watershed management committee" that is comprised of local interest groups, local units of government, local tribal representatives and any organization that has a vested interest in the watershed planning activity. This committee provides direction to the process as well as provides the decision-making necessary to implement the process. Technical assistance is provided to the watershed management committee through a "technical advisory committee" comprised of local, state and federal technical specialist. These specialists provide information to the watershed management committee as needed to make sound decisions. NRCS also provides training on watershed planning organization and process.
- U.S. Small Business Administration (SBA) Disaster Assistance (http://www.sba.gov/category/navigation-structure/starting-managing-

business/managing-business/running-business/emergency-preparedness-and-disaster-) provides information concerning disaster assistance, preparedness, planning, cleanup, and recovery planning.

  - May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. (http://www.sba.gov/category/navigation-structure/loans-grants/small-business-loans/disaster-loans). Requests for SBA loan assistance should be submitted to DHS&EM.

- United States Army Corps of Engineers (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 (http://www.poa.usace.army.mil/en/cw/index.htm). The USACE is a member and co-chair of the Alaska Climate Change Sub-Cabinet.

State Funding Resources

- Department of Military and Veterans Affairs (DMVA): Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits. (http://veterans.alaska.gov/links.htm)

  - DHS&EM within DMVA is responsible for improving hazard mitigation technical assistance for local governments for the State of Alaska. Providing hazard mitigation training, current hazard information and communication facilitation with other agencies will enhance local hazard mitigation efforts. DHS&EM administers FEMA mitigation grants to mitigate future disaster damages such as those that may affect infrastructure including elevating, relocating, or acquiring hazard-prone properties. (http://www.ak-prepared.com/plans/mitigation/mitigati.htm)

    DHS&EM also provides mitigation funding resources for mitigation planning on their Web site at http://www.ak-prepared.com/plans/mitigation/localhazmitplan.htm.

- Division of Senior Services (DSS): Provides special outreach services for seniors, including food, shelter and clothing. (http://www.hss.state.ak.us/dsds/seniorInfoResources.htm)

- Division of Insurance (DOI): Provides assistance in obtaining copies of policies and provides information regarding filing claims. (http://www.dced.state.ak.us/insurance/)

- 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 division also administers programs for State "distressed" and "targeted" communities. (http://www.commerce.state.ak.us/dca/)

  - DCRA Planning and Land Management staff provide Alaska Climate Change Impact Mitigation Program (ACCIMP) funding to Alaskan communities that meet one or more of the following criteria related to flooding, erosion, melting permafrost, or

other climate change-related phenomena: Life/safety risk during storm/flood events; loss of critical infrastructure; public health threats; and loss of 10% of residential dwellings.

The Hazard Impact Assessment is the first step in the ACCIMP process. The HIA identifies and defines the climate change-related hazards in the community, establishes current and predicted impacts, and provides recommendations to the community on alternatives to mitigate the impact. The community may then pursue these recommendations through an ACCIMP Community Planning Grant. (http://commerce.alaska.gov/dca/planning/accimp/hazard_impact.html)

- Department of Environmental Conservation (DEC). The DEC primary roles and responsibilities concerning hazards mitigation are ensuring safe food and safe water, and pollution prevention and pollution response. DEC ensures water treatment plants, landfills, and bulk fuel storage tank farms are safely constructed and operated in communities. Agency and facility response plans include hazards identification and pollution prevention and response strategies. (http://dec.alaska.gov/)
  - The Division of Water's Village Safe Water Program works with rural communities to develop sustainable sanitation facilities. Communities apply each year to VSW for grants for sanitation projects. Federal and state funding for this program is administered and managed by the State of Alaska's Village Safe Water (VSW) program. VSW provides technical and financial support to Alaska's smallest communities to design and construct water and wastewater systems. In some cases, funding is awarded by VSW through the Alaska Native Tribal Health Consortium, who in turn assist communities in design and construct of sanitation projects.
  - Municipal Grants and Loans Program. The Department of Environmental Conservation / Division of Water administer the Alaska Clean Water Fund (ACWF) and the Alaska Drinking Water Fund (ADWF). The division is fiscally responsible to the Environmental Protection Agency (EPA) to administer the loan funds as the EPA provides capitalization grants to the division for each of the loan funds. In addition, it is prudent upon the division to administer the funds in a manner that ensures their continued viability.
  - Under EPA's Clean Water State Revolving Fund (CWSRF) program, each state maintains a revolving loan fund to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects, including: municipal wastewater treatment projects; non-point source projects; watershed protection or restoration projects; and estuary management, [and stormwater management] projects. (http://yosemite.epa.gov/R10/ecocomm.nsf/6da048b9966d22518825662d00729a35/7b68c420b668ada5882569ab00720988!OpenDocument)

    Alaska's Revolving Loan Fund Program, prescribed by Title VI of the Clean Water Act as amended by the Water Quality Act of 1987, Public Law 100-4. DEC will use the ACWF account to administer the loan fund. This Agreement will continue from year-to-year and will be incorporated by reference into the annual capitalization grant agreement between EPA and the DEC. DEC will use a fiscal year of July 1 to June 30

for reporting purposes. (http://www.epa.gov/region10/pdf/water/srf/cwsrf_alaska_operating_agreement.pdf)

- 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.
  - 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 the safe, efficient, economical, and effective State highway, harbor, and airport operation. DOT/PF uses it's Planning, Design and Engineering, Maintenance and Operations, and Intelligent Transportation Systems resources to identify hazards, 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 temporary bridge replacements and materials necessary to make the multi-modal transportation system operational following natural disaster events.
- 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 Alaska's mineral, land, and water resources use, development, and earthquake mitigation collaboration.

    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 information to the public. Information is available at: (http://www.dggs.dnr.state.ak.us/index.php?menu_link=publications&link=publications_search#)
  - 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. (http://forestry.alaska.gov/pdfs/08FireSuppressionMediaGuide.pdf)
  - DOF also manages various wildland fire programs, activities, and grant programs such as the FireWise Program (http://forestry.alaska.gov/fire/firewise.htm), Community Forestry Program (CFP) (http://forestry.alaska.gov/community/), Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), and Volunteer Fire Assistance and Rural Fire Assistance Grant (VFA-RFA) programs (http://forestry.alaska.gov/fire/vfarfa.htm). Information can be found at http://forestry.alaska.gov/fire/current.htm.

Other Funding 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. (http://dialoguemakers.org/Resourses4states+Nonprofits.htm)
- Denali Commission. Introduced by Congress in 1998, the Denali Commission is an independent federal agency designed to provide critical utilities, infrastructure, and economic support throughout Alaska. With the creation of the Denali Commission, Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities. Since its first meeting in April 1999, the Commission is credited with providing numerous cost-shared infrastructure projects across the State that exemplifies effective and efficient partnership between federal and state agencies, and the private sector. (http://www.denali.gov/index.php?option=com_content&view=section&id=1&Itemid=3)
    - The Energy Program primarily funds design and construction of replacement bulk fuel storage facilities, upgrades to community power generation and distribution systems, alternative-renewable energy projects, and some energy cost reduction projects. The Commission works with the Alaska Energy Authority (AEA), Alaska Village Electric Cooperative (AVEC), Alaska Power and Telephone and other partners to meet rural communities' fuel storage and power generation needs.
    - The goal of the solid waste program at the Denali Commission is to provide funding to address deficiencies in solid waste disposal sites which threaten to contaminate rural drinking water supplies.
- Lindbergh Foundation Grants. Each year, The Charles A. and Anne Morrow Lindbergh Foundation provides grants of up to $10,580 (a symbolic amount representing the cost of the Spirit of St. Louis) to men and women whose individual initiative and work in a wide spectrum of disciplines furthers the Lindberghs' vision of a balance between the advance

of technology and the preservation of the natural/human environment. (http://www.lindberghfoundation.org/docs/index.php/our-grants)

- Rasmuson Foundation Grants. The Rasmuson foundation invests both in individuals and well-managed 501(c)(3) organizations dedicated to improving the quality of life for Alaskans.

  The Foundation seeks to support not-for-profit organizations that are focused and effective in the pursuit of their goals, with special consideration for those organizations that demonstrate strong leadership, clarity of purpose and cautious use of resources.

The Foundation trustees believe successful organizations can sustain their basic operations through other means of support and prefer to assist organizations with specific needs, focusing on requests which allow the organizations to become more efficient and effective. The trustees look favorably on organizations which demonstrate broad community support, superior fiscal management and matching project support. (http://www.rasmuson.org/index.php)

Appendix B

Local Mitigation Plan Review Tool

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APPENDIX A:
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: Akiak	**Title of Plan:** Hazard Mitigation Plan	**Date of Plan:** April 2013

Local Point of Contact: Ivan Ivan	**Address:** City of Akiak PO Box 52028 Akiak, AK 99552
Title: City Administrator	
Agency: City of Akiak	
Phone Number: 907-765-2071	**E-Mail:** akianniu@yahoo.com

State Reviewer: Scott Nelson	**Title:** Mitigation Planner	**Date:** 4/30/2013

FEMA Reviewer: Brett Holt	**Title:** Mitigation Planner	**Date:** June 10, 2013
Date Received in FEMA Region 10	April 30, 2013	
Plan Not Approved		
Plan Approvable Pending Adoption	June 12, 2013	
Plan Approved	June 20, 2012	

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 **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	3-2 & 3-3	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	3-3 & 3-4	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	3-3 & 3-4, Appendix D	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	3-4 & 3-5	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	3-6	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	3-7 to 3-10, Appendix F	X	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	5-1 to 5-33	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	6-1 to 6-47	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	6-49 to 6-53	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	6-48	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	7-1 to 7-3	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	6-47 & 6-48	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	7-4	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	7-5 to 7-8	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	7-9 to 7-22	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	7-23	X	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	N/A		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	N/A		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	N/A		
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	4-1	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	N/A		
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

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

Element A: Planning Process

Plan Strengths:

- The public outreach newsletters provide good detail on the reasons for the mitigation plan and how to be involved.

Opportunities for Improvement:

- List any comments received from the public and how they were addressed.

Element B: Hazard Identification and Risk Assessment

Plan Strengths:

- It's good to see the Councils state the following on page 5-16: "The City and Tribal Councils' emphatically expressed they overwhelmingly believe that 'no action leads to increased damages'". This is encouraging for political support in project implementation.

Opportunities for Improvement:

- Reviewing historical earthquake information for only the past 36 years is a very short window. Earthquakes may not have for hundreds of years (Cascadia for example). Consider researching a longer earthquake historical record.

Element C: Mitigation Strategy

Plan Strengths:

- The City developed a comprehensive list of actions to pursue.

Opportunities for Improvement:

- The capabilities assessment does a good job at identifying what the city currently has, but should take it another step to say how the identified capabilities gaps will be addressed. This could be in terms of additional staffing, expertise, and/or training.
- The city should review how to implement the following action identified on page 7-16, "prohibit new construction in identified mitigatable hazards impacts or required building to applicable building codes…." since, according to page 7-2, they are no building codes in the city.

B. Resources for Implementing Your Approved Plan

- The **Local Mitigation Plan Review Guide and Tool** resource is available through FEMA's Library and should be referred to for the next plan update. http://www.fema.gov/library/viewRecord.do?id=4859
- The **Local Mitigation Planning Handbook** is available. While the requirements under §201.6 have not changed, the *Handbook* provides guidance to local governments on developing or updating hazard mitigation plans to meet the requirements is available through the FEMA Library website. http://www.fema.gov/library/viewRecord.do?id=7209
- 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. http://www.fema.gov/library/viewRecord.do?id=6938
- 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. http://www.fema.gov/library/viewRecord.do?id=7130
- The FEMA Region X Risk Mapping, Analysis, and Planning program (RiskMAP) 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, email rxnewsletter@starr-team.com.
- The mitigation strategy includes projects that are eligible for FEMA's grant programs. Contact the State Hazard Mitigation Officer, Ann Gravier, at ann.gravier@alaska.gov for application 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).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
1	Akiak						Y	Y	Y	Y	Y	N/A
2												
3												
4												
5												
6												
7												

Appendix C
Adoption Resolution

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City of Akiak
P.O. Box 52028
Akiak, Alaska 99552
Telephone (907) 765-7411 Fax (907) 765-7414

RESOLUTION 13-06-02

A RESOLUTION OF THE AKIAK CITY COUNCIL ADOPTING IT'S HAZARD MITIGATION PLAN DRAFTED ON FEBRUARY 2013 WITH CHANGES MADE TO SECTION 3.2 FROM FORMER MAYOR DEBRA JACKSON TO CURRENT MAYOR DAVID GILILA AND NAME CHANGE FROM OWEN A. IVAN TO IVAN M. IVAN, SR, AKIAK NATIVE COMMUNITY CHIEF ON APRIL 10, 2013. CITY OF AKIAK, UNORGANIZED BORUOGH OF THE STATE OF ALASKA, HAZARD MITIGATION PLAN.

WHEREAS, the Akiak City Council reviewed a draft Hazard Mitigation Plan at their special meeting of April 10, 2013 as drafted, recommended, and proposed by Mr. Scott Simmons, Emergency, Management/ Hazard Mitigation/Climate Change Adaptation Planner of URS Alaska; and,

WHEREAS, Mr. Scott Simmons of URS Alaska by their June 14, 2013 electronic mail has informed the City of Akiak that our HMP is now ready for formal City Council Adoption and provided a sample resolution for our use with edits entered as needed and had attached FEMA conditional HMP approval; and,

WHEREAS, the Akiak City Council met again on June 14, 2013 and reapproved their April 10, 2013 Hazard Mitigation Plan and adopted this resolution as proposed again by Ms. Ann Gravier, State Hazard Mitigation Planner in the Alaska Division of Homeland Security and Emergency Management office on her June 12, 2013 letter; and,

*WHEREAS, Ms. Ann Gravier stated on her letter that as requested by her office, the U. S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has completed a pre-adoption review of the **Akiak Hazard Mitigation Plan** and that her letter dated June 12, 2013 serves as Region 10's commitment to approve the plan upon receiving documentation of adoption by the Community or the Akiak City Council; and,*

WHEREAS the HMP will not be formally approved by FEMA until it is adopted and that the City of Akiak is not eligible for mitigation project grants until the plan is formally Approved by FEMA; and,

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

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

*WHEREAS, the Plan recommends hazard mitigation actions that will protect people and property affected by natural hazards that face the "**City of Akiak**" that will reduce future public, private, community, and personal costs of disaster response and recovery; and that will reinforce the "**City of Akiak's**" leadership in emergency preparedness efforts; and,*

*WHEREAS, the Disaster Mitigation Act of 2000 (P.L. 106-390) (DMA 2000) and associated Federal regulations published under 44 CFR Part 201 require the **"City of Akiak"** to formally adopt a Hazard Mitigation Plan subject to the approval of the Federal Emergency Management Agency to be eligible for federal hazard mitigation projects*

and activities funds; and,

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

*NOW THEREFORE BE IT RESOLVED by the City Council of the **"Akiak City Council"** that;*

1. *The Plan is hereby adopted as an official plan of the **"Akiak City Council".***
2. *The **"City of Akiak"** officials identified in the Mitigation Action Plan (Section 8) are hereby directed to implement the recommended actions assigned to them. These officials will report quarterly on their activities, accomplishments, and progress to the city council.*
3. *The **"City of Akiak" 's** Hazard Mitigation Planning Team will provide annual progress reports on the status of the implemented Mitigation Action Plan's project to the Planning Team Leader. This report shall be submitted to the City Council annually by the Plan's adoption anniversary date.*
4. *The **"City of Akiak"'s** Planning Team will complete periodic updates of the Plan as indicated in the Plan Maintenance Section (Section 8), but no less frequently than every five years.*

*NOW THEREFORE, BE IT RESOLVED by the City Council that the **"City of Akiak"** adopts the **"City of Akiak" Hazard Mitigation Plan,** dated **June 14, 2013** as this jurisdiction's Hazard Mitigation Plan, and resolves to execute the actions in the Plan.*

CERTIFCIATION

This resolution was passed and approved by a duly called regular meeting and quorum of the Akiak City Council in which a quorum was established this 14th of June, 2013 by a vote of 5 for, 0 against, and 0 abstaining.

David Gilila, Mayor

Anna Ivan, Secretary/Treasurer

Appendix D

Public Outreach

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City of Akiak
P.O. Box 52028
Akiak, Alaska 99552
Telephone (907) 765-7411 Fax (907) 765-7414

Resolution 2011-12-14

A RESOLUTION OF THE CITY OF AKIAK REQUESTING IMMEDIATE HOMELAND PROTECTION AND ASSISTANCE FROM THE STATE OF ALASKA AND THE UNITED STATES TO PREVENT, STOP, OR CONTROL THE COMMUNITY OF AKIAK'S RIVERFRONT EROSION TO PREVENT LOSS OF COMMUNITY HOMES, BUSINESSES, AND EXISTING INFRASTRUCTURE.

Whereas, the City of Akiak is the municipal corporation incorporated under the State of Alaska laws for the community of Akiak to provide necessary governmental services for the well-being of its citizens, and;

Whereas, the Community of Akiak is located along the Kuskokwim River thirty (30) miles upriver of Bethel, located on the Yukon-Kuskokwim delta region, and;

Whereas, the community of Akiak had expressed its concerns by letters for this on-going erosion in previous years to the attention of the State of Alaska and the Corp of Engineers, and;

Whereas, the Akiak Native Community had led efforts and recovered some of the human bones and skulls and have relocated human skeletons remains to the new graveyard during the fall of October/November 2010, and;

Whereas, the current status of the Akiak's riverfront erosion is becoming the gravest concern of individual citizens, community organizations, and businesses of the community of Akiak, and;

Whereas, the governing bodies of the Akiak Native Community, City of Akiak, Kokarmiut Corporation, Local Advisory School Board, and all citizens of the community of Akiak have shown and expressed full support of stopping, preventing, and controlling the community of Akiak's riverfront erosion to prevent loss of community homes, businesses, schools, and existing infrastructure and are asking the State of Alaska and the United States of America's Homeland Security Administration, Corp of Engineers to assist the community to stop the current riverfront erosion, and;

NOW, THEREFORE BE IT RESOLVED BY THE CITY OF AKIAK THAT that City of Akiak calls on Governor Sean Parnell of the State of Alaska, President Obama, the United States Corp of Engineers and our Congressional delegation: Senator Mark Begich, Senator Lisa Murkowski, and Congressman Don Young, and the U.S. Department of Homeland Security, to provide protection and assistance to prevent, stop, or control the Community of Akiak's Riverfront Erosion to prevent loss of community homes, businesses, and existing structure, and;

BE IT FURTHUR RESOLVED THAT the agencies of the State of Alaska and the United States provide technical information and assistance for developing an overall strategy to stop, prevention, and controlling the Akiak riverfront erosion that poses immediate danger to community homes, property, and existing infrastructure.

CERTIFICATION

This resolution was passed, approved, and adopted this 23rd of December, 2011 at a duly noticed Akiak City Council meeting with a vote of 7 yes, 0 no, and 0 abstaining.

Debra Jackson

Mrs. Debra Jackson, Mayor

Ida J

Mrs. Ida Jasper, Secretary/Treasurer

Memorandum

700 G Street, Suite 500
Anchorage, AK 99503
Phone: 907.261.9706
Fax: 907.562.1297

SUBJECT: Division of Homeland Security and Emergency Management (DHS&EM) Hazard Mitigation Plan (HMP) /Hazard Mitigation Grant Program (HMGP) Project – Akiak Kick-Off – Team Meeting

Community: City of Akiak, 765.7411

Date/Time: July 26, 2012

From: R. Scott Simmons

Attendees:
Community Members:
- Ivan M. Ivan, Planning Team Lead
- Charity Jasper
- Amelia Nicoli

Due to unavailability, minutes will be reviewed by:
- Mayor David Gilila
- City Council Members
- Sherry McKenzie, Akiak School Principal

- **Subjects covered included:**
  - URS received was hired to develop hazard mitigation plans and to develop one DHS&EM eligible HMGP project application based on the City's mitigatable natural hazard threats, potential impacts, population threatened, and their priorities.
  - It is URS' responsibility to write the plan and take on the bulk of the work to guarantee FEMA compliance, but we need several critical items that only the community can provide:
    - The attendees identified and screened hazards that impact the community and provided brief histories. Attendees also screened which hazards need to be profiled and included in the plan.
    - URS explained the Data Sheets (homework) and how they would be used
    - The Critical Facilities Inventory Spreadsheet needs to list any facilities not on the list. The list needs additional information such as facilities' physical locations (GPS coordinates and street addresses), estimated values, and estimated number of occupants to enable URS to complete a usable risk assessment and vulnerability analysis.
    - The Capability Assessment Data Sheet lists community resources for implementing and administering projects
    - Ivan M. Ivan mentioned a few concerns from severe flood induced riverine scour erosion, severe winter weather and wildland fire threats.
  - A mitigation plan ensures community eligibility for FEMA and potentially other federal agency funding, which they are not currently eligible for... the more the information gathered, the better the plan. The HMP along prepares the community to potentially obtain funding to implement projects.
  - Public meetings and newsletters provide the public opportunities to contribute to the process and lets the public know where a copy of the plan is available for review, etc.

- **City of Akiak Planning Team**
  - Prior telephonic discussion occurred to encourage the team to take-on HMP data gathering – to spread the work among the team members reducing the workload on the Team Leader, and to have periodic meetings to check progress and to obtain guidance from URS which can save time for everyone. Teams are far more successful than any individual as one idea can lead to several – increasing the success of the Team.

700 G Street, Suite 500
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- Public Involvement will help the team:
    - Identify known natural hazards
    - Identify critical facilities
    - Provide historic event and damage information
    - Provide location information
- URS encourages public meeting during development to fulfill FEMA requirements, to ensure public awareness of the hazards that potentially threaten the community, and to gain public support for projects to protect infrastructure and the population.

CITY OF AKIAK HAZARD MITIGATION PLAN

June 2012

This newsletter discusses the preparation of the City of Akiak Hazard Mitigation Plan. It has been prepared to inform interested agencies, stakeholders, and the public about the project and to solicit comments. This newsletter can also be viewed on the State of Alaska Division of Homeland Security and Emergency Management Website at http://www.ready.alaska.gov/plans/localhazmitplans.htm.

The State of Alaska, Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management (DHS&EM) was awarded a Pre-Disaster Mitigation Program grant from the Federal Emergency Management Agency (FEMA) to prepare Hazard Mitigation Plans (HMP) for fifteen Alaskan Communities. The City of Akiak was selected for participation in this effort.

URS was contracted to assist the community with preparing a FEMA approvable hazard mitigation plan and subsequent hazard mitigation grant program application during 2012 and 2013.

The Akiak Hazard Mitigation Plan will identify all natural hazards, such as earthquake, erosion, flood, severe weather, and wildland fire hazards and others. The plan will also identify the people and facilities potentially at risk and ways to mitigate damage from future hazard impacts. The public participation and planning process is documented as part of these projects.

What is Hazard Mitigation?

Across the United States, natural and human-caused disasters have increasingly caused injury, death, property damage, and business and government service interruptions. The toll on individuals, families, and businesses can be very high. The time, money, and emotional effort required to respond to and recover from these disasters takes public resources and attention away from other important programs and problems.

The people and property in the State of Alaska are at risk from a variety of natural hazards that can potentially cause human injury, property damage, or environmental harm.

Hazard mitigation projects eliminate the risk or reduce the hazard impact severity to people and property. Projects may include short- or long-term activities to reduce exposure to or the effects of known hazards. Hazard mitigation activities include relocating or elevating buildings, replacing insufficiently sized culverts, using alternative construction techniques, or developing, implementing, or enforcing building codes, and education.

Why Do We Need A Hazard Mitigation Plan?

Communities must have a State, FEMA approved, and community adopted mitigation plan to receive a project grant from FEMA's pre- and post- disaster grants identified in their Hazard Mitigation Assistance and other agency's mitigation grant programs. The City of Akiak plans to apply for mitigation funds after our plan is complete.

A FEMA approved and community adopted HMP enables the Local government to apply for the Hazard Mitigation Grant Program (HMGP), a disaster related assistance program. Applicants typically compete on a statewide basis.

The Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Loss (RL), Severe Repetitive Flood Loss (SRL) grant programs are nationally competitive funding programs. These grans use the same application process and eligibility requirements.

The Planning Process

There are very specific federal requirements that must be met when preparing a hazard mitigation plan. These requirements are commonly referred to as the Disaster Mitigation Act of 2000, or DMA2000 criteria. Information about the criteria and other applicable laws and regulations may be found at: http://www.fema.gov/plan/mitplanning/guidance.shtm

The DMA2000 requires the plan to include and document the following topics:

- Plan development process
- Identify hazards specific to the community
- Identify the population's and structures' risks
- Define the jurisdiction's mitigation goals
- List the community's mitigation strategy, selected actions, and implemented projects
- Provide a copy of the community's HMP Adoption Resolution

FEMA has prepared Planning Guidance which is available at: http://www.fema.gov/library/viewRecord.do?id=4225; and "How to" Guides that explain in detail how each of the DMA2000 requirements are met. These guides are available at http://www.fema.gov/plan/mitplanning/resources.shtm.

The City's Hazard Mitigation Plan will follow those guidelines.

We are currently in the very beginning stages of preparing the plan. We will be conducting a public meeting to introduce the project and planning team, and to gather comments from our community residents. Specifically we will complete the hazard identification task, and collect data to conduct the risk assessment.

DHS&EM has previously identified natural hazards that occur in the Lower Kuskokwim Regional Educational Attendance Area (REAA) that may also occur specifically in Akiak.

We Need Your Help

Please use the following table to identify any hazards you have observed in your area that DHS&EM is not aware of AND any additional natural hazards that may not be on the list.

Akiak Hazard Worksheet		
Hazard	Lower Kuskokwim REAA*	City of Akiak
Earthquake	Yes (Medium) (0)	Yes
Erosion	Yes (Low) (2)	Yes
Flood	Yes (High) (10)	Yes
Ground Failure (Avalanche, Landslide, Permafrost)	No	No
Tsunami & Seiche	No	No
Volcano	No	No
Weather (Severe)	Yes (High) (4)	Yes
Wildland Fire	Yes (1)	Yes
*Hazard Matrix from the 2010 State of Alaska Hazard Mitigation Plan for the Lower Kuskokwim REAA. (Parentheses indicate threat level and number of historical events)		

DHS&EM identified critical facilities within the City of Akiak as part of the Alaska Critical Facilities Inventory, but the list of critical facilities needs to be updated and the estimated value and location (latitude/longitude) determined.

In addition, the number and value of structures, and the number of people living in each structure will need to be documented. Once this information is collected we will determine which critical facilities, residences, and populations are vulnerable to specific hazards in Akiak. Please add additional facilities if needed.

Akiak Critical Facilities*	
Facility Type	Facility Name
City Office	Cemetery 3
Akiak Tribal Office	Landfill Access Road
Kokarmuit Corporation Office	Airport Access Road
National Guard Armory	Community Well
Post Office	Akiak Community Water System
Akiak gravel airstrip 03/21, 3,196' X 75', 30' Elevation	Community Buried Waterline (9000')
Snow Equipment Removal Building	Washeteria
Fire Station	Akiak Power Utilities
Police Station	Consolidated Fuel Storage Tank Farm
AKIAK Elementary School	Akiak Class III Municipal Landfill
AKIAK High School	Akiak Alternative Dumpsite #1
Headstart Building	Akiak Alternative Dumpsite #2
Akiak Village Clinic	Sewage Lagoon (2 Cell)
Community Hall	Filter Backwash
Church	Lift Station and Force Main
Store 1	Buried Arctic Sewer Line (9000 ft)
Store 2	ACS Telephone Receiver
Teachers Quarters	United Utilities Satellite Dish
Cemetery 1	United Utilities Telephone
Cemetery 2	
* Alaska Critical Facilities Inventory	

Please email or fax updated hazard and critical facility information directly to URS or provide it to your community planning & project team leader.

The Planning Team

The planning team is being led by Ivan M. Ivan, City Administrator with assistance from Amelia Nicoli, Charity Jasper, and the City and Tribal Councils. URS Corporation has been contracted by DHS&EM to provide assistance and guidance to the planning team throughout the planning process.

Public Participation

Public involvement will continue throughout the project. The goal is to receive comments, identify key issues or concerns, and improve ideas for mitigation. When the Draft Akiak Hazard Mitigation Plan is complete, the results will be presented to the community before DHS&EM and FEMA approval, and community adoption.

We encourage you to take an active part in preparing the City of Akiak's Hazard Mitigation Plan development effort. The purpose of this newsletter is to keep you informed and to allow you every opportunity to voice your opinion regarding these important projects. Please contact your community representative or Scott Simmons, URS directly if you have any questions, comments, or requests for more information:

City of Akiak
Planning Team Leader
Ivan M. Ivan, City Administrator
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Akiak, AK 99552
Phone: 765.7411
coa.ivan@yahoo.com

URS Corporation
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Division of Homeland Security & Emergency Management
Ervin Petty, State Support
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URS

FAX TRANSMISSION

700 G Street Avenue, Suite 500
Anchorage, Alaska 99501

Phone: 907.261.9706
Fax: 907.562.1297

TO:

Name: Ivan M. Ivan	Telephone Number: 907. 765.7111	Date: 2/22/2013
Company: City of Akiak	Fax Number: 907.765.7414	Number of Pages: 6 w/cover sheet

FROM:

Name: Scott Simmons	Fax Number: 907.562.1297	Telephone Number: 800.909.9767 Direct: 907.261.9706
Subject: Mitigation project selection sheet – review, consider, and select for implementation		

Comments:

I have attached the information sheet containing hazard mitigation goals and a table listing potential mitigation projects for inclusion within your Hazard Mitigation Plan (HMP).

We will select a few projects that will help you fulfill City needs while potentially avoiding future hazard damages from those hazards you helped me describe in the City's HMP:

- Earthquake
- Erosion
- Flood
- Ground failure
- Severe Weather
- Wildland Fire

We will look over the list together to review, consider, and select projects for potential implementation.

CONFIDENTIALITY NOTICE

The information in this facsimile transmission is intended solely for the stated recipient of this transmission. If you have received this fax in error, please notify the sender immediately by telephone. If you are not the intended recipient, please be advised the dissemination, distribution, or copying of the information contained in this fax is strictly prohibited.

This table shows potential the City of Akiak's Mitigation Goals for your review.

Table 7-4 Mitigation Goals

No.	Goal Description
Multi-Hazards	
1	Promote recognition and mitigation of all natural hazards that affect the City of Akiak (City).
2	Promote cross-referencing mitigation goals and actions with other Tribal planning mechanisms and projects.
3	Reduce possibility of losses from all natural hazards that affect the City.
Natural Hazards	
4	Reduce structural vulnerability to **earthquake** damage.
5	Reduce **erosion** damage and loss possibility.
6	Reduce **flood** damage and loss possibility.
7	Reduce structural vulnerability to **severe weather** damage.
8	Reduce structural vulnerability to **tundra/wildland** fire damage.

Once we finalize the Mitigation Goals, we will then take the potential projects and match them against the goals.

The Hazard ID column lists each goal. The Status info. will be displayed in "bold" text to identify those Selected for implementation by the City and carried forward into Table 7-8, Mitigation Strategy. For example, the first action would potentially be listed in Table 7-8 as 1.1.

Table 7-5 contains Mitigation Projects the City Considered, then Selected those that support City goals for implementation into the HMP:

Sample Table 7-5 Mitigation Action Items -Considered

Hazard ID	Status *Considered* *Selected* *Ongoing*	Description
Natural Hazards		
Multi-Hazard (MH) **Goal 1** **Promote recognition and mitigation of all natural hazards that affect the City of Akiak**	Ongoing spring flood 2 months prior to annual event	Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the City of Akiak. Information should be presented in the form of a brochure or different form of written media so that residents can take information with them after the meeting. Topics should include (but are not limited to) the benefits of participating in the NFIP and safe fire practices while engaged in various activities (e.g., subsistence) in and around the community to help prevent wildland fires.
	C	Establish a formal role for the Hazard Mitigation Planning Team to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions.
	Ongoing	Identify and pursue funding opportunities to implement mitigation actions.
	Ongoing	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all identified natural hazards.
	--	Develop and implement strategies and educational outreach programs for debris management from natural hazard events.
	--	Disseminate FEMA pamphlets to educate and encourage homeowners concerning structural and non-structural retrofit benefits.
	--	Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
	--	Develop outreach program with school district contests having students develop,

Sample Table 7-5 Mitigation Action Items -Considered		
Hazard ID	**Status** ***Considered*** ***Selected*** ***Ongoing***	**Description**
		display, and explain mitigation projects or initiatives.
	--	Investigate benefits of, and potentially joining the National Flood Insurance Program (NFIP) to reduce monetary losses to individuals and the community.
	Ongoing	Identify critical facilities and vulnerable populations based on identified (and mapped where applicable) high hazard areas.
	Ongoing	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
	Ongoing – radios, cell phones, etc.	Acquire emergency warning methods to communicate critical emergency warnings and alerts.
	--	Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events.
	--	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
	--	Develop, implement, and enforce floodplain management ordinances.
	--	Develop outreach program to educate residents concerning flood proofed well and sewer/septic facility installations.
Multi-Hazard (MH) **Goal 2** **Cross reference Mitigation goals and actions with the City's planning mechanisms and projects.**	S	The City will aggressively manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
	--	Review ordinances and develop outreach programs to assure propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as flood or seismic events.
	--	Integrate the Mitigation Plan findings for enhanced emergency planning.
	Ongoing	Develop, incorporate, and enforce building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic, and other hazards to ensure occupant safety.
	S	Develop and incorporate mitigation provisions and recommendations into all community plans and community development processes to maintain protect critical infrastructure, residences, and population from natural hazard impacts.
	--	Update or develop, implement, and maintain jurisdictional debris management plans.
	Ongoing	Prohibit new construction in identified mitigatable hazard impact areas (erosion and flood, etc.) or require building to applicable building codes for other hazard impacts (earthquake, volcanic ash, weather, etc.).
	--	Identify and list repetitively flooded structures and infrastructure, analyze the threat to these facilities, and raise mitigation action priorities to protect the threatened population.
	In – Process NRCS	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
	S	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
	--	Develop process to regulate future development in high landslide potential areas (permitting, geotechnical review, soil stabilization techniques, etc.).
	C	Update Emergency Response Plans to discuss volcanic ashfall and stormwater management, prioritize response actions, and initiate actions to fill capability gaps.
	--	Update the Stormwater Management Plan to include regulations to control runoff, both for flood reduction and to minimize ground failure from saturated soils, steep slope collapse, and erosion or scour.
	--	Develop a vegetation management plan addressing slope-stabilizing root

Sample Table 7-5 Mitigation Action Items -Considered		
Hazard ID	**Status** *Considered* *Selected* *Ongoing*	**Description**
		strength to maintain or encourage precipitation containment.
	--	Develop land use guidelines to minimize vegetation removal to maintain slope stability to reduce rain, snowmelt run-off, and erosion.
	S	Require construction companies to provide as-built plans once facilities are constructed.
	S	Develop a community-wide as-built plan to enable the community to keep track of existing and future requirements. This will eliminate expensive procedures to determine if existing utility infrastructure exists prior to new construction.
Multi-Hazard (MH) Goal 3 **Reduce possibility of losses from all natural hazards that affect the City**	C	Increase power line wire size and incorporate quick disconnects (break-away devices) to reduce ice load and windstorm power-line failure during severe wind or winter ice storm events.
	--	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
	S	Acquire (buy-out), demolish, or relocate structures from hazard prone area (erosion, flood, etc.) Property deeds "must be" restricted for open space uses for perpetuity to keep people from rebuilding in known hazard areas.
	S	Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
	--	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder, medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)
	--	Develop vegetation projects to restore clear-cut and riverine erosion damage and to slope stability in avalanche and landslide areas.
Goal 4 Earthquake (EQ) **Reduce vulnerability of structures to earthquake damage.**	--	Evaluate critical public facilities with significant seismic vulnerabilities and complete retrofit. (e.g. evaluate fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges, etc.)
	--	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current State Adopted Building Codes.
	S	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances to prevent toppling damage and resultant injuries to small children, elderly, and pets.
	S	Encourage building new wider tank frames or tank straps
Goal 5 Erosion ER) **Reduce possibility of damage and losses from erosion.**	S	Develop mitigation initiatives such as: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
	S	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.
	Ongoing	Install wing walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end- or wing-walls).
	S	Dredge river within the main channel to divert water away from the "Short-cut" channel. This will keep the river in its main channel to reduce city erosion.
Goal 6 Flood (FL) **Reduce the possibility of damage and losses from flooding.**	--	Develop and maintain NFIP compliant Repetitive Loss, Severe Repetitive Loss, and Repetitive Flood Claim (RFC) property inventory. Inventory should include property type, structure type, number of buildings, and their geo-referenced locations.
	--	Establish flood mitigation priorities for critical facilities, residential structures, and commercial buildings located within the identified flood hazard area(s) (100- and 500-year floodplains, stormwater, etc.) based on current Base Flood Elevation (BFE) survey elevation data.
	C	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding, significant historical damages, or road closures.
	S	Elevate residential, public, or critical facilities at least two feet above the Base Flood Elevation (BFE)

Sample Table 7-5 Mitigation Action Items -Considered		
Hazard ID	**Status** *Considered* *Selected* *Ongoing*	**Description**
	--	Install NOAA/NWS stream flow and rainfall measuring gauges.
	C	Dry flood-proof historical, residential, and/or non-residential structures.
	C	Increase culvert sizes to increase their drainage capacity or efficiency.
	S	Construct debris basins to retain debris in order to prevent downstream drainage structure clogging.
	S	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
	--	Create detention storage basins, ponds, reservoirs etc. to allow water to temporarily accumulate to reduce pressure on culverts and low water crossings allowing water to ultimately return to its watercourse at a reduced flow rate.
	--	Create relief drainage ditch-openings using culverts or bridges to relieve rapid water accumulation during high water-flow events.
	--	Protect water and/or wastewater treatment systems to prevent damage. sewage lagoons out-wash, and potential contamination.
Goal 7 Ground Failure (GF) **Reduce possibility of damage and losses from ground failure.**	*N/A for Akiak*	Complete a ground failure (avalanche, landslide, permafrost etc.) location inventory; identify (and map) threatened critical facilities, residential buildings, infrastructure, and other essential buildings.
	N/A for Akiak	Develop, implement, and enforce a property development "ground failure" risk assessment for any structure that may be sited in potentially vulnerable locations.
	N/A for Akiak	Identify and seasonally restrict recreational and construction activities in high avalanche and landslide areas.
	N/A for Akiak	Promote permafrost sensitive construction practices in permafrost areas.
Goal 8 Severe Weather (SW) vulnerability of structures to severe weather damage.	--	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms (snow load, ice, and wind).
	--	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
	S	Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods where possible to reduce or eliminate power outages from severe winter storms. Consider developing incentive programs.
	S	Develop personal use and educational outreach training for a "safe tree harvesting" program. Implement along utility and road corridors to prevent or reduce potential winter storm damage.
Goal 9 Wildland Fire (WF) Reduce possibility of damage and losses from tundra/ wildland fires.		Develop Community Wildland Fire Protection Plan to mitigate wildland fire threat.
	--	Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.
	--	Promote FireWise building siting, design, and construction processes and materials.
	--	Provide wildland fire hazard outreach information in an easily distributed format for all residents.
	S	Develop, adopt, and enforce burn ordinances that controls outdoor burning, require burn permits, and restricts open campfires during identified weather periods (windy, dry, etc.).
	C	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high-risk areas.
	S	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.
	S	Acquire fire hoses and construct a small building to protect pre-installed hoses from severe weather damage and freeze-up. Provide fire fighter recurring training to use equipment for fire and hazardous materials.

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CITY OF AKIAK HAZARD MITIGATION PLAN (HMP)

February 2013 **Newsletter 2**

This newsletter discusses the preparation of the City of Akiak Hazard Mitigation Plan. It has been prepared to inform interested agencies, stakeholders, and the public about the project and to solicit comments. This newsletter can also be viewed on the State of Alaska Division of Homeland Security and Emergency Management Website at http://www.ready.alaska.gov/plans/localhazmitplans.htm.

HMP Development

The City of Akiak was one of fifteen communities selected by the State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) for a Hazard Mitigation Planning (HMP) development project. The plan identifies natural hazards that affect the community including earthquake, erosion, flood, ground failure, severe weather, and wildland (tundra) fire. The HMP also identifies the people and facilities potentially at risk and ways to mitigate hazards. The public participation and planning process has been documented as part of the project.

What is Hazard Mitigation?

Across the United States, natural disasters have increasingly caused injury, death, property damage, and business and government service interruptions. The toll on individuals, families, and businesses can be very high. The time, money, and emotional effort required to respond to and recover from these disasters take public resources and attention away from other important programs and problems.

The people and property in the State of Alaska are at risk from a variety of hazards that have the potential for causing human injury, property damage, or environmental harm.

The purpose of hazard mitigation is to implement projects that eliminate the risk or reduce the severity of hazards on people and property. Mitigation programs may include short-term and long-term activities to reduce the hazards, reduce exposure to hazards, or reduce the effects of hazards. Mitigation could include education, and construction projects. Hazard mitigation activity examples include relocating buildings, developing or strengthening building codes, and educating residents and building owners.

Why Do We Need A Hazard Mitigation Plan?

A community is only eligible to receive grant money for mitigation programs by preparing and adopting a hazard mitigation plan. Communities must have an approved mitigation plan to receive grant funding from the Federal Emergency Management Agency (FEMA) for eligible mitigation projects.

The Planning Process

There are very specific federal requirements that must be met when preparing a hazard mitigation plan. These requirements are commonly referred to as the Disaster Mitigation Act of 2000, or DMA2000 criteria. Information about the criteria may be found on the Internet at: http://www.fema.gov/mitigation-planning-laws-regulations-guidance.

The DMA2000 requires the plan to document the following topics:

- Planning process
- Hazard identification
- Risk assessment
- Goals
- Mitigation programs, actions, and projects
- A resolution from the community adopting the plan

FEMA has prepared Planning Guidance which is available at: http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4859, and "How to" Guides that explain in detail how each of the DMA2000 requirements is met. These guides are available at http://www.fema.gov/hazard-mitigation-planning-resources. The Akiak Hazard Mitigation Plan will follow those guidelines.

The planning process kicked-off in April 2012 by establishing a local planning committee and holding a public meeting. The planning committee examined the full spectrum of hazards listed in the State Hazard Mitigation Plan and identified six hazards the HMP would address.

After the first public meeting, Village staff and URS began identifying critical facilities, compiling the hazard profiles, assessing capabilities, and conducting the risk assessment for the identified hazards. Critical facilities are facilities that are critical to the recovery of a community in the event of a disaster. After collection of this information, URS helped to determine which critical facilities and estimated populations are vulnerable to the identified hazards in Akiak.

A mitigation strategy was the next component of the plan to be developed. Understanding the community's local capabilities and using information gathered from the public and the local planning committee and the expertise of the consultants and agency staff, a mitigation strategy was developed. The mitigation strategy is based on an

evaluation of the hazards, and the assets at risk from those hazards. Mitigation goals and a list of potential actions/projects were developed as the foundation of the mitigation strategy.

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goals are positively stated future situations that are typically long-range, policy-oriented statements representing community-wide visions. Mitigation actions and projects are undertaken in order to achieve your stated objectives. On February 22, 2013, the local planning committee identified projects and/or actions for each hazard that focused on six categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. A representative sample of the mitigation actions identified as a priority by the planning team are listed below, and explained in more detail in the plan.

The selected projects and/or actions will potentially be implemented over the next five years as funding becomes available. A maintenance plan has also been developed for the hazard mitigation plan. It outlines how the community will monitor progress on achieving the projects and actions that will help meet the stated goals and objectives, as well as an outline for continued public involvement.

The draft plan is available in the City and Tribal offices for public review and comment. Comments should be made via email, fax, or phone to Scott Simmons (listed below) and be received no later than March 1, 2013. The plan will be provided to DHS&EM and FEMA for their preliminary approval and returned to Akiak's City and Tribal Councils for formal adoption.

The Planning Committee

The plan was developed with the assistance from a planning committee consisting of a cross section of the community. Planning Team members who helped with development of the plan include City Administrator Ivan M. Ivan (Planning Team Leader), Mayor David Gilila, City Clerk Charity Jasper, Bookkeeping Amelia Nicoli, City Council Members, President, Tribal Council Owen Ivan Sr., and Akiak School Principal Sherry McKenzie, and URS Corporation.

Sample of the City of Akiak's Mitigation Actions. Review the draft HMP for a complete list.		
Identify and pursue funding opportunities to implement mitigation actions.	Identify critical facilities and vulnerable populations based on identified (and mapped where applicable) high hazard areas.	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
Establish a formal role for the Hazard Mitigation Planning Team to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions.	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all identified natural hazards.	Require construction companies to provide as-built plans once facilities are constructed.
Acquire (buy-out), demolish, or relocate structures from hazard prone area (erosion, flood, etc.) Property deeds "must be" restricted for open space uses for perpetuity to keep people from rebuilding in known hazard areas.	Develop, incorporate, and enforce building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic, and other hazards to ensure occupant safety.	Develop mitigation initiatives such as: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.	Acquire emergency warning methods to communicate critical emergency warnings and alerts. City uses Radios, cell phones, etc.	Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
The City will strive to manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Develop realistic and fundable river sediment management project within the main channel to divert water away from the "Short-cut" channel. This will keep the river in its main channel to reduce city erosion.	Prohibit new construction in identified mitigatable hazard impact areas (erosion and flood, etc.) or require building to applicable building codes for other hazard impacts (earthquake, volcanic ash, weather, etc.).

We encourage you to learn more about the City of Akiak's Hazard Mitigation Plan. The purpose of this newsletter is to keep you informed and to allow you every opportunity to voice your opinion regarding this important project. If you have any questions, comments, or requests for more information, please contact:

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March 26, 2013

City of Akiak
City Administrator
P.O. Box 52028
Akiak, AK 99552

RE: Akiak Draft Hazard Mitigation Plan Review

Dear Ivan M. Ivan,

Please give me a call when you receive this.

Here is your Draft Hazard Mitigation Plan for your review. This plan is not completed yet. Please make it available for the public to also review. You may desire to place a copy in the City and Tribal Offices or some other location more suitable for your community. You may want to punch holes and place it in a 3-ring binder to make it easier for people to review. Also, please make a log sheet, have people sign it, and keep track of any comments to help us make the changes that may be beneficial to the community. Please send me the log sheet so I may insert it into the plan to demonstrate the public review process.

There are two ways you may make changes in the document.

- You may write directly on a copy and send it back to me with the changes indicated by inserting slips of paper to direct me to specific pages. or
- If there are only a few changes or corrections, you can call me and we can make the changes over the phone.

I have also enclosed the second newsletter for posting in the community informing every one of its availability for review.

We would like to have the draft reviewed and comments returned to me by April 12, 2013.

R. Scott Simmons
Emergency Management, Hazard Mitigation, and
Climate Change Adaptation Planner

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Appendix E

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

All Benefit-Costs must be:

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

General Data Requirements:

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

Damage and Benefit Data

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

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

Building Data

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

Use Correct Occupancy Data

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

Questions to Be Answered

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

Common Shortcomings

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

Appendix F

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: _____ to _____
(date) (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: