Native Village of Circle
Hazard Mitigation Plan

Prepared by
The Native Village of Circle
Hazard Mitigation Planning Team
July 23, 2014

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Bottom of Page

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U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

July 23, 2014

Honorable Jessica Boyle
First Chief, Native Village of Circle
P.O. Box 89
Circle, Alaska 99733

Dear Chief Boyle:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***Native Village of Circle Hazard Mitigation Plan*** as a local plan as outlined in 44 CFR Part 201. With approval of this plan, the Native Village of Circle is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through July 22, 2019.

The plan's approval provides eligibility to apply for hazard mitigation projects through your State. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

Over the next five years, we encourage your community to follow the plan's schedule for its monitoring and updating, and to develop further mitigation actions. The plan must be reviewed, revised as appropriate, and resubmitted for approval within five years in order to continue project grant eligibility.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our State counterpart, Alaska Division of Homeland Security and Emergency Management, which coordinates and administers these efforts for local entities.

Sincerely,

for Mark Carey, Director
Mitigation Division

cc: Ann Gravier, Alaska Division of Homeland Security and Emergency Management

Enclosure

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Table of Contents

Tables

Figures

Appendices

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
AICC	Alaska Interagency Coordination Center
AK	Alaska
ANA	Administration For Native Americans
ARC	American Red Cross
AVEC	Alaska Village Electric Cooperative
BIA	Bureau Of Indian Affairs
CCP	Citizen Corps Program
CDBG	Community Development Block Grant
CFR	Code Of Federal Regulations
CFP	Community Forestry Program
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
Denali	Denali Commission
DHS	Department Of Homeland Security
DHS&EM	Division Of Homeland Security And Emergency Management
DHSS	Department Of Health And Social Services
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
EDP	Economic Development Plan
EOC	Emergency Operations Center
EMPG	Emergency Management Performance Grant
EPA	Environmental Protection Agency
EQ	Earthquake
ER	Erosion
EWP	Emergency Watershed Protection Program

Acronyms/Abbreviations

FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FL	Flood
FMA	Flood Mitigation Assistance
FP&S	Fire Prevention And Safety
ft	Feet
FY	Fiscal Year
g	Gravity
GF	Ground Failure
GIS	Geospatial Information System
Hazus	Hazard United States – Multi-Hazard Software
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
IGAP	Indian Environmental General Assistance Program
IHBG	Indian Housing Block Grant
IHLGP	Indian Home Loan Guarantee Program
INAP	Indian And Native American Programs
IRS	Internal Revenue Service
Kts	Knots
LUP	Land Use Plan
M	Magnitude
MAP	Mitigation Action Plan
MMI	Modified Mercalli Intensity
mph	Miles Per Hour
NAHASDA	Native American Housing Assistance And Self Determination Act
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
PNP	Private Non-Profits
RCASP	Remote Community Alert Systems
RD	Rural Development
RFA	Rural Fire Assistance Grant
RL	Repetitive Loss
RurAL CAP	Rural Alaska Community Action Program Incorporated

Acronyms/Abbreviations

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
SOA	State Of Alaska
Sq.	Square
Stafford Act	Robert T. Stafford Disaster Relief And Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, And Environmental
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
USGS	United States Geological Survey
VFA	Volunteer Fire Assistance Grant
Village	Village of Circle
VSW	Village Safe Water
WARN	Warning, Alert, And Response Network
WHIP	Wildlife Habitat Incentives Program

1

INTRODUCTION

Section One 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 Code of Federal Regulations (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.

In October 2007 and July 2008, FEMA 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) and 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) and 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.

As the State Hazard Mitigation plan states:

"The [FMA] provides pre-disaster grants to State and Local Governments for planning and flood mitigation projects. Created by the National Flood Insurance Reform Act of 1994, its goal is to reduce or eliminate NFIP claims. It is an annual nationally competitive program. Residential and non-residential properties may apply for FMA grants through their NFIP community and are required to have NFIP insurance to be eligible. FMA grant funds may be used to develop the flood portions of hazard mitigation plans or to do flood mitigation projects. FMA grants are funded 75% Federal and 25% applicant.

The Village of Circle does not currently participate in the NFIP and is therefore ineligible for National Flood Insurance Act Grant Programs funding.

The Biggert-Waters Flood Insurance Reform Act of 2012 eliminated the Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) grant programs. Elements of these flood programs have been incorporated into FMA. The FMA program now allows for additional cost share flexibility:

- *Up to 100-percent Federal cost share for severe repetitive loss properties.*
- *Up to 90-percent Federal cost share for repetitive loss properties.*
- *Up to 75-percent Federal cost share for NFIP insured properties.*

The FMA program is available only to communities participating in the NFIP. In the State of Alaska, the Department of Commerce, Community, and Economic Development (DCCED) manages this program" (SHMP 2013).

HMP Layout Description

The HMP consists of the following sections and appendices:

Section 1 Introduction

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.

Section 2 Community Description

Provides a general history and background of the Village of Circle (Village); including historical trends for population and the demographic and economic conditions that have shaped the area.

Section 3 Planning Process

Describes the HMP update's planning process, identifies the Planning Team Members, the meetings held as part of the planning process, and the key stakeholders within the Village of Circle and the surrounding area. This section documents public outreach activities (support documents are located in Appendix D); the review and incorporation of relevant plans, reports, and other appropriate information; actions the Village of Circle plans to implement to assure continued public participation; and their methods and schedule for keeping the plan current.

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.

Section 4 HMP Adoption

Describes the community's HMP adoption process (support documents are located in Appendix C)

Section 5 Hazard Analysis

Describes the process through which the Planning Team identified, screened, and selected the hazards to for profiling in this version of the HMP. The hazard analysis includes the nature, previous occurrences (history), location, extent, impact, and future event recurrence probability for each hazard. In addition, historical impact and hazard location figures are included when available.

Section 6 Vulnerability Analysis

Identifies the Village of Circle's potentially vulnerable assets—people, residential and nonresidential buildings (where available), critical facilities, and critical infrastructure. The resulting information identifies the full range of hazards that the Village could face and potential social impacts, damages, and economic losses. Land use and development trends are also discussed.

Section 7 Mitigation Strategy

Defines the mitigation strategy which provides a blueprint for reducing the potential losses identified in the vulnerability analysis. This section lists the community'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 Village of Circle. 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 NFIP insured properties (if applicable) while encouraging participation with the NFIP and the reduction of flood damage to flood-prone structures.

Section 8 References

Lists reference materials and resources used to prepare this HMP.

Appendices

Appendix A Funding Resources:

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

Appendix B FEMA HMP Review Tool

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

Appendix C Community HMP Adoption Resolution

Provides the State of Alaska's HMP promulgation for the Native Village of Circle.

Appendix D Public Outreach

Provides public outreach information, meeting minutes, correspondence, and newsletters.

Appendix E Benefit-Cost Analysis Fact Sheet

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

Appendix F Plan Maintenance Documents

Provides the plan maintenance documents, such as an annual review sheet and the progress report form.

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2 COMMUNITY DESCRIPTION

Section Two describes the location, geography, history; demographics; and land use development trends of the Native Village of Circle.

2.1 LOCATION, GEOGRAPHY, AND HISTORY

*" Circle, also known as Circle City, is located on the south bank of the Yukon River at the edge of the Yukon Flats, 160 miles northeast of Fairbanks. It is at the eastern end of the Steese Highway at 65.8256 latitude and -144.0606 longitude." (*Department of Community, Commerce, and Economic Development [DCCED], Division of Community and Regional Affairs [DCRA] 2013).

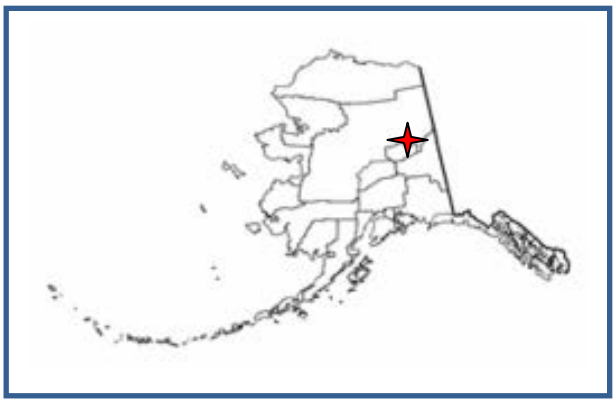

Figure 2-1 Circle Location Map

The Native Village of Circle is described by DCRA as having:

> *"…a continental subarctic climate, characterized by seasonal extremes in temperature. Winters are long and harsh, and summers are warm and short. Summer temperatures range from 65 to 72 °F. Winter temperatures can range from -71 to 0 °F. Annual rainfall averages 6.5 inches, and annual s" (DCRA 2013).*

The Village's historical development is described by DCRA's as:

> *"Circle (also known as Circle City) was established in 1893 as a supply point for goods shipped up the Yukon River and then overland to the gold mining camps. Early miners believed the town was located on the Arctic Circle, and named it Circle. By 1896, before the Klondike gold rush, Circle was the largest mining town on the Yukon, with a population of 700. It boasted an Alaska Commercial Company store, eight or ten dance halls, an opera house, a library, a school, a hospital, and an Episcopal Church. It had its own newspaper, the Yukon Press, and a number of residential U.S. government officials, including a commissioner, marshal, customs inspector, tax collector, and postmaster. The town was virtually emptied after gold discoveries in the Klondike (1897) and Nome (1899). A few hearty miners stayed on in the Birch Creek area, and Circle became a small, stable community that supplied miners in the nearby Mastodon, Mammoth, Deadwood, and Circle Creeks. Mining activity continues to this day" (DCRA 2013)*

The Village of Circle Water & Wastewater Master Plan Feasibility Study, developed by R & F Joint Venture provides a chronologically arranged historical account of Circle's development:

1789	*First contact to European contact was by Sir Alexander Mackenzie.*
1847	*Fort Yukon Trading Post established by Alexander Murray of the Hudson Trading Company.*

1884	*Gold discovered in the Yukon area. Mastodon Creek is located near Circle's present location*
1887	*Trading post built in Circle City by L. N. McQuestem.*
1893	*Circle became an important supply shipment link between the Yukon River and the gold fields.*
1896	*Circle received it name from early miners who believed the town was located on the Arctic Circle*
1896	*Circle was the largest mining town (1,200 residents) on the Yukon River before the Klondike gold rush.*
1898	*Circle dramatically affected by Klondike gold discoveries*
Present	*Circle remains a trading center for communities within the upper Yukon River area because of the [Village's] Steese Highway road access. Mining activities still continue.*

(CSP 2002)

2.2 DEMOGRAPHICS

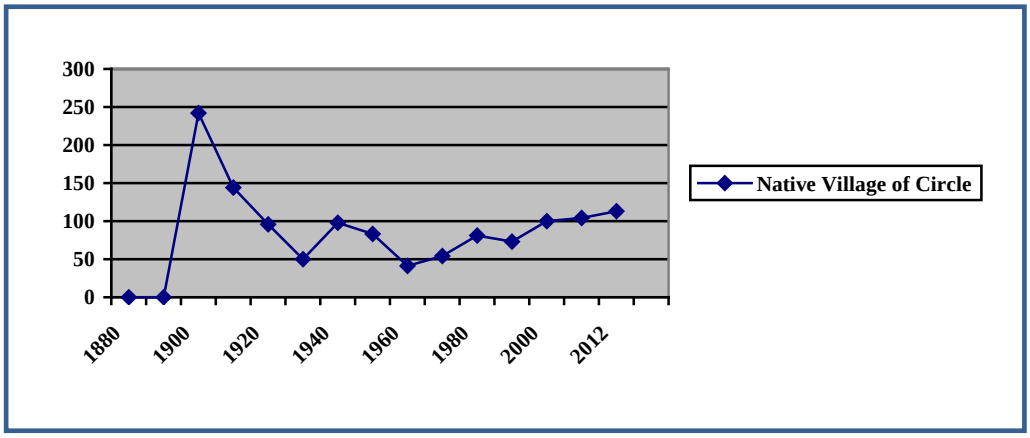

Figure 2-2 Circle Historic Population

The 2010 US Census indicates there are approximately 104 residents of which the median age was 31.7 indicating a relatively young population. The population is expected to remain steady because over half of the population is between 1 and 39 years of age. The Village population is split between two races with 87 percent (%) Alaska Native with 13 % White. The male and female composition is approximately 48% and 52% respectively. The 2010 census revealed that there are 40 households with the average household having approximately three individuals. The most recent 2012 DCRA certified population is 113. Figure 3-2 illustrates the historic population of the Village.

2.3 ECONOMY

The Village of Circle's Sanitation Plan describes the Village's economy in Section,

3.5 Social and Economic

The economy of Circle consists of the tribal government, school, two general stores, a small three-unit motel, an electric and telephone business and a boat ramp access to the Yukon River. Tourism is a growing business as more and more people drive the Steese

Highway to visit Circle each summer. This growth in the tourism business has encouraged the Circle Village Council to undertake the construction of a new lodge/resort with a full service restaurant, lounge and I 6 motel rooms. The existing Yukon Trading Post will be converted to a larger well-stocked general store that will offer more goods to local shoppers as well as fuel sales. Yukon River Enterprises Inc. will operate this new lodge/resort and expanded trading post and several full time jobs will be created on completion as well as many during the lodges' construction.

Other economic generators for Circle are the local tribal government and the local school. The school employs two full time teachers and a janitorial staff. The tribal government has a full time administrator, a water treatment plant operator and a support staff.

(CSP 2002)

According to the 2010 census, the median household income in Circle was $17,500 with a per capita income of $8,502. Approximately 60.7 % were reported to be living below the poverty level. The potential work force (those aged 16 years or older) in the Village was estimated to be 32 (31.3%), of which all (31.3%) were actively employed. In 2010 the unemployment rate was 0.0%. 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 DCCED provided aerial photograph of Circle Village with platting overlays.

Figure 2-3 DCCED Aerial Photograph of the Village of Circle (DCCED 2010)

3

PLANNING PROCESS

Section Three 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 F.

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 PLANNING PROCESS OVERVIEW

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 on August 6, 2013 with a teleconference with Tribal Clerk Jessica Boyle to explain how their community was selected by the Division of Homeland Security and Emergency Management 2012 Pre-Disaster Mitigation Grant award. URS staff described the HMP development requirement to enable the Village to qualify for Hazard Mitigation Grant Program grants and the overall HMP development process.

Ms. Boyle was encouraged to discuss the project with the Tribal President and Administrator. The Village will be asked to assist URS with identifying available resources and capabilities for HMP development. URS explained how the HMP differed from current emergency plans. The Planning Team will assist the Village by acting as an advocate for the planning process, assist with gathering information, and provide support during public participation opportunities. URS briefly discussed existing hazards that affect the community such as erosion, sediment deposition, and permafrost impacts, which are increasing in intensity due to climate changes.

The Planning Team identified applicable Village resources and capabilities during the meeting. URS explained how the HMP differed from current emergency plans. The Planning Team then discussed the Village'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 community 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 Village, 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 August 6, 2013 through July 2014.

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 community 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 Circle, and with the assistance of a hazard mitigation planning consultant (URS), developed the risk assessment for seven identified hazards. The Planning Team reviewed the risk assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.
4. Assess capabilities: The Planning Team reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately 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

First Chief Jessica Boyle is the local Planning Team Leader and is supported by the Tribal Council as the identified Planning Team.

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

Table 3-1 Hazard Mitigation Planning Team

Name	Title	Organization	Key Input
Jessica Boyle	First Chief	Village of Circle	Planning Team Lead, HMP review.
Village Council			Planning Team Member, data input and HMP review.
Scott Simmons	Emergency Management, Hazard Mitigation, and Climate Change Planner	URS Corporation, Alaska	Temporary Team Member, Responsible for HMP development, lead writer, project coordination.

3.3 PUBLIC INVOLVEMENT & OPPORTUNITY FOR INTERESTED PARTIES TO PARTICIPATE

URS extended an invitation to all individuals and entities identified on the project mailing list described the planning process and announced the upcoming communities' planning activities. The announcement was emailed to relevant academia, nonprofits, and local, state, and federal agencies on August 6, 2013. 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)

Table 3-2 lists the community'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 (August 2013)	In August 2013, the jurisdiction distributed a newsletter introducing the upcoming planning activity. The newsletter encouraged the whole community to provide hazard and critical facility information. It was posted at Village Offices, bulletin boards, stores, and other locations throughout the Village to enable the widest dissemination possible.
Agency Involvement eMail (August 6, 2013)	Invited agencies to participate in mitigation planning effort and to review applicable newsletters located on the DHS&EM Local/Tribal All Hazard Mitigation Plan Development website at: http://ready.alaska.gov/plans/localhazmitplans.htm
Newsletter #2 Distribution (January 22, 2013)	In January 22, 2013, the jurisdiction distributed a newsletter describing the HMPs availability and present potential HMP projects for review. The newsletter was posted at the Village Office, and on community bulletin boards to encourage the whole community to review and provide comments or input.

Initial contact was made with Tribal Administrator Jessica Boyle on August 7, 2013; she was very excited that Circle was included within DHS&EM's Pre-Disaster Mitigation grant and the prospects of completing the hazard mitigation plan. She quickly determined the Tribal Council

will act as the Planning Team. She began guiding HMP data acquisition efforts. Ms. Boyle introduced the hazard mitigation planning project and introductory newsletter during the September, 2013 Tribal Council Meeting describing the planning process.

The Planning Team identified six natural hazards: earthquake, erosion, flood, ground failure, severe weather, and wildland fire which periodically threaten the Village. However, they identified Ice Jam flooding as the most devastating of all their identified hazards.

URS described the specific information needed from the Planning Team to assess critical facility vulnerability and population risk by the location, value, and population within residential properties and critical facilities.

The risk assessment was completed after the community asset data was collected by the Planning Team during 2013, which identified the assets that are exposed and vulnerable to specific hazards.

The Planning Team evaluated these facilities and their associated risks to facilitate creating a viable or realistic risk analysis and subsequent vulnerability assessment for Circle.

A Planning Team meeting was held on January 22, 2014 to review and prioritize the mitigation actions identified based on the results of the risk assessment. A second newsletter was prepared and delivered on January 23, 2014 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 met during February, 2014 to review the draft HMP for accuracy – ensuring it meets the Village'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 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Planning Team reviewed and incorporated information from existing plans, studies, reports, and technical reports into the HMP. The following were available from DCCED and were reviewed and used as references for the jurisdiction information and hazard profiles in the risk assessment of the HMP for the Village (Table 3-3).

Table 3-3 Documents Reviewed

Existing plans, studies, reports, ordinances, etc.	Descruotion (How will this information improve mitigation planning?)
Circle Sanitation Master Plan (SMP), 2002	Provide information concerning the Village's soils and existing and future utility needs.
USACE Baseline Erosion Assessment, 2009	Defines statewide erosion concerns, initiatives, and threat categories.
USACE, Erosion Information Paper – Circle, Alaska, February 20, 2008	Defines the Villages "Monitor Conditions" erosion classification, impacts, and potential infrastructure threats.

Table 3-3 Documents Reviewed

Existing plans, studies, reports, ordinances, etc.	Descruotion (How will this information improve mitigation planning?)
State of Alaska, Department of Commerce, Community and Economic Development Community Profile	Provided historical and demographic information.
State of Alaska Hazard Mitigation Plan (SHMP), 2013	Defined statewide hazards and their potential locational impacts.

A complete list of references list 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 Village'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 into existing planning mechanisms
2. Continued public involvement
3. Monitoring, reviewing, evaluating, and updating the HMP

3.5.1 Implementation into 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
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, reports, and technical information?
Source: FEMA, October 2011.

Once the HMP is community adopted and receives FEMA's final approval, Each Planning Team Member ensures that the HMP, in particular each Mitigation Action Project, is incorporated into existing planning mechanisms whenever possible. Each member of the Planning Team has undertaking the following activities.

- Conduct a review of the community-specific regulatory tools to assess the integration of the mitigation strategy. These regulatory tools are identified in the following capability assessment section

- Work with pertinent community departments 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 Village is dedicated to involving the public directly in the continual reshaping and updating the HMP. A paper copy of the HMP and any proposed changes will be available at the Village 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 Village 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 Village-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 provides an explanation of how Circle'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
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 Village will continue to use the Planning Team to monitor, review, evaluate, and update the HMP. Each authority identified in the Mitigation Action Plan (MAP) matrix (Table 7-8) will be responsible for implementing the Mitigation Action Plan and determining whether their respective actions were effectively implemented. The Director of Public Safety, 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 Village will review their success for achieving the HMP's mitigation goals and implementing the Mitigation Action Plan's activities and projects during the annual review process.

During each annual review, each agency or authority administering a mitigation project will submit a Progress Report (Appendix F) to the Planning Team. The report will include the current status of the mitigation project, including any project changes, a list of identified implementation problems (with an appropriate strategies to overcome them), and a statement of whether or not the project has helped achieve the appropriate goals identified in the plan.

3.5.3.3 Evaluating the HMP

The Annual Review Questionnaire (Appendix F) provides the basis for future HMP evaluations by guiding the Planning Team with identifying new or more threatening hazards, adjusting to changes to, or increases in, resource allocations, and garnering additional support for 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:

- Determine Village authorities, outside agency, stakeholders, and resident's participation in HMP implementation success

- Identify notable risk changes for each identified and newly considered natural or human-caused hazards
- Consider land development activities and related programs' impacts on hazard mitigation
- Mitigation Action Plan implementation progress (identify problems and suggest improvements as necessary)
- Evaluate HMP local resource implementation for HMP identified activities

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 Village of Circle will annually review the HMP as described in Section 3.5.3.2 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.

No later than the beginning of the fourth year following HMP adoption, the Planning Team will undertake the following activities:

- Request grant assistance from 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 to the Planning Team
- 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 Village of Circle still desires to implement
    - Prepare a "new" MAP matrix for the Village of Circle
- 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 Village for mitigation grant program eligibility until they have been reviewed and approved by the State and FEMA and received final State of Alaska promulgation.

The Village of Circle 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.

The SHMO will coordinate the local HMP's review process and comment analysis and ensure any required corrections are made prior to resubmittal for FEMA final approval as applicable.

Once the plan has fulfilled all FEMA criteria, the State will promulgate the HMP and return to FEMA for final approval. The State promulgated, FEMA approved HMP will then be returned to the Village.

FEMA's final approval assures the Village is eligible for applying for appropriate mitigation grant program funding. URS will send a final copy of the FEMA approved HMP to the Tribal Office.

4

PLAN ADOPTION

Section Four describes the community's HMP adoption process.

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 Village of Circle is 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 Division of Homeland Security and Emergency Management (DSH&EM) promulgated the HMP on June 30, 2014 and submitted the final draft HMP to FEMA for formal approval. The Native Village of Circle's Tribal Council have committed to honoring the Hazard Mitigation Plan and to implement all of its provisions.

A scanned copy of the promulgation is included in Appendix C.

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5

HAZARD ANALYSIS

Section Five identifies and profiles the hazards that could affect the Village of Circle.

5.1 OVERVIEW OF A HAZARD ANALYSIS

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

Hazard profiling is accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, extent, and probability. Hazards are identified through historical and anecdotal information collection, existing plans, studies, and map reviews, and study area hazard map preparations when appropriate. Hazard maps are used to define a hazard's geographic extent as well as define the approximate risk area boundaries.

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 August 7, 2013 the Planning Team reviewed eight possible hazards that could affect the Yukon Flats REAA. 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 (Table 5-1). The Planning Team determined that seven hazards pose a great threat to the Village: earthquake, erosion, flood, ground failure, and severe weather.

Table 5-1 Identification and Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Natural Hazards		
Earthquake	Yes	Periodic, unpredictable occurrences. The Planning Team has determined that earthquakes pose a minor threat to the Village. They have experienced no damage from the 12 earthquakes which have occurred since 1973; none of which exceeded a magnitude (M) 3.2 intensity.
Erosion	Yes	The Village experiences riverine erosion along the Yukon River, stream, and creek embankments from high water flow, riverine ice flows, wind, surface runoff, and boat traffic wakes.
Flood	Yes	Ice jam, snowmelt run-off, and rainfall flooding occurs during spring thaw and the fall rainy season. Events occur from high water flow and soil saturation. Several minor flood events cause damage. Severe damages occur from major ice jam floods.
Ground Failure (Avalanche, Landslide/Debris Flow, Permafrost, Subsidence)	Yes	Ground Failure occurs throughout Alaska from avalanches, landslides, and melting permafrost. However avalanches and landslides do not exist in Circle. Melting permafrost periodically cause houses to shift due to ground sinking and upheaval. The Village has erosion damage along the Yukon River, stream, and creek system's embankments.
Severe Weather (Drought, Rain, Snow, Wind, etc.)	Yes	Annual weather patterns, severe cold, heavy rain, freezing rain, snow accumulations, and wind are the predominate threats. Severe weather events cause fuel price increases and frozen pipes. Heavy snow loads potentially damage house roofs. Winds potentially remove or damage roofs and moved houses off their foundations. Complex weather systems are the most severe bringing severe cold, wind, freezing rain, and snow. Sometimes these events are compounded resulting in severe blizzard conditions.
Tsunami (Seiche)	No	This hazard does not exist for this location.
Volcano (Ash, Debris)	No	This hazard does not exist for this location.
Wildland Fire	Yes	The Village and the surrounding area becomes very dry in summer months with weather (such as lightening) and human caused incidents igniting dry vegetation in the adjacent area (burning trash outside their landfill's burn box).

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 general impacts associated with each hazard. Section 6 provides detailed impacts to Circle's residents and critical facilities)
- Probability of future events

NFIP insured Repetitive Loss Structures (RL) are addressed in Section 6.0, Vulnerability Analysis.

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

Estimating magnitude and severity are determined based on historic events using the criteria identified in the introductory narrative description of Section 5.3.

Table 5-2 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. • 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 magnitude and severity, Probability is determined based on historic events, using the criteria identified above, to provide the likelihood of a future event (Table 5-3).

Table 5-3 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 20per 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.

The hazards profiled for the Village of Circle are presented throughout the remainder 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) (MMI 2006).

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

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

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

(MMI 2006)

5.3.1.2 History

Accurate seismology for Alaska is relatively young with historic data beginning in 1973 for most locations. Therefore data is limited for acquiring long-term earthquake event data. The HMP's Alaska earthquake data is based on best available data; obtained from the US Geological Survey (USGS) and the State of Alaska, UAF Geophysical Institute's archives. Research included searching the US Geological Survey (USGS) earthquake database for events spanning from 1973 to present; none of which exceeded M3.2; the majority of which occurred over 200 miles distant from the Village.

Therefore the Planning Team determined that based on available recorded data, the Native Village of Circle has only a minor concern for earthquake damages as they have not experienced damaging impacts from their historical earthquake events and only need to be concerned with earthquakes with a magnitude > M5.0. This is substantiated in Table 5-5 which lists 12 historical earthquakes with the largest one (M3.2) occurring on July 30, 2013 and was over 400 km from the Village.

Table 5-5 Historical Earthquakes for Circle

Date	Time	Latitude	Longitude	Depth	Magnitude	
7/31/2013	2:42 PM	66.619	-146.345	3.5	2.2	
7/31/2013	1:13 PM	60.533	-143.399	14.4	1.4	Within 350 Kms
7/31/2013	9:13 AM	63.232	-145.246	13.3	1.4	
7/31/2013	6:21 AM	61.215	-143.41	8.9	0.9	
7/31/2013	6:06 AM	62.272	-145.8	7.1	1.8	
7/30/2013	11:11 AM	62.135	-145.308	20.4	1.6	
7/30/2013	1:52 AM	62.206	-145.69	34.3	3.2	
7/28/2013	4:42 PM	60.501	-143.342	13.6	1.4	
7/27/2013	10:23 PM	64.251	-145.359	0.1	2	
7/26/2013	6:17 PM	61.632	-146.347	15.9	3	
7/24/2013	4:51 AM	62.227	-145.714	19	1.4	
7/24/2013	3:19 AM	63.237	-144.753	4.8	1.2	Within 350 Kms

(USGS 2012)

North America's strongest recorded earthquake occurred on March 27, 1964 in Prince William Sound measuring M9.2 and was felt by many residents throughout Alaska. Circle only experienced minor ground motion from this historic event.

Planning Team members stated that Circle experienced moderate ground shaking from the November 3, 2002 M7.9 Denali EQ.

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

Location

The entire geographic area of Alaska is prone to earthquake effects however the Village of Circle seldom experience earthquake ground movement.

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

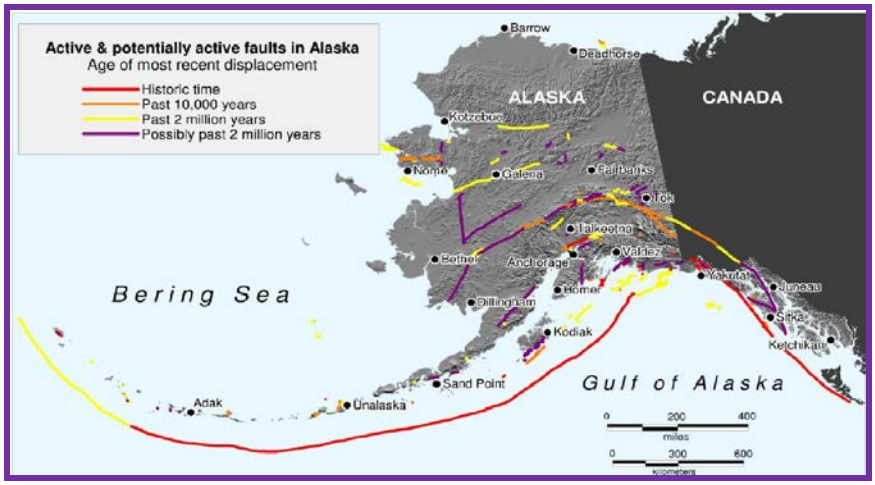

Figure 5-1 Active and Potentially Active Faults in Alaska (DGGS 2009)

The Department of Geological and Geophysical Survey (DGGS) Neotectonic Map of Alaska (Figure 5-2) depicts Alaska's known earthquake fault locations in close proximity to The Village. 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).

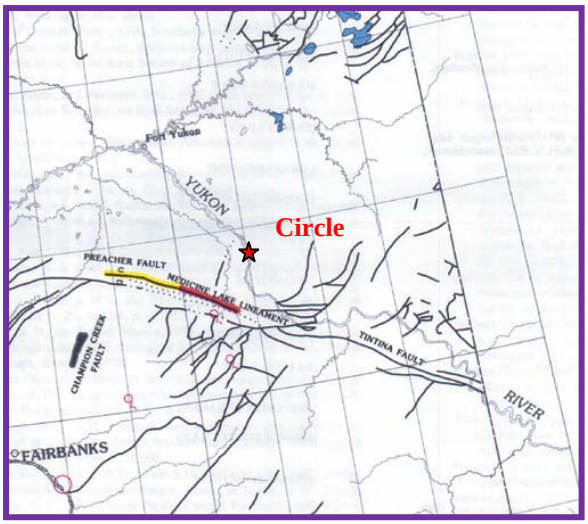

Figure 5-2 Circle Faults (DGGS 2009)

Figure 5-5 portrays the Village of Circle's estimated distance from the following named faults:

Table 5-6 Distance from Known Faults

Fault Name	Distance
Preacher Fault	24.03 miles
Tintina Fault Zone	31.90
Medicine Lake Lineament Fault	23.13
Salcha Seismic Zone	89.46
Fairbanks Seismic Zone	98.96

(USGS 2009)

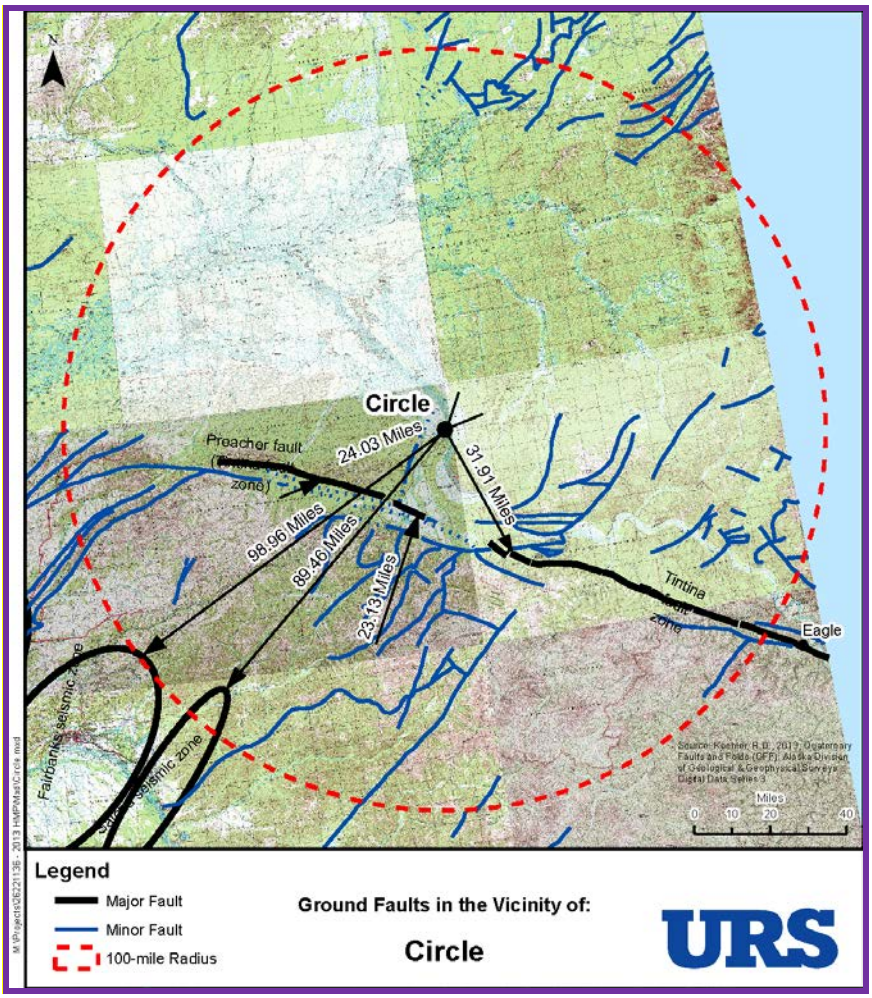

Figure 5-3 Earthquake Faults Adjacent to Circle (URS 2013)

Extent

The average distance of the 12 recorded earthquakes for the Village was approximately 250 miles.

Based on historic earthquake events and the criteria identified in Table 5-2, the magnitude and severity of earthquake impacts in the Village are considered "Negligible" where injuries and/or illnesses are treatable with first-aid; critical facilities could expect to be shut-down for 24 hours or less; and less than 10 percent of property is severely damaged. There is very little potential for long-term damage to transportation, infrastructure, or the economy.

Impact

The Village is located in close proximity to the "Ring of Fire" which is more seismically active than the majority of the State. The community can expect potentially damaging impacts such as significant ground movement, from these identified earthquake faults. However, the Village has only experienced minor shaking from the few historical events. Impacts to future populations, residences, critical facilities, and infrastructure are anticipated to remain the same.

Probability of Future Events

The Village has received only 12 earthquakes since the State began seismologic sensing and archiving events. None of these exceeded M3.2. Therefore the Planning Team has determined that earthquakes pose a minor threat to the community.

While it is not possible to predict when an earthquake will occur; recurrence intervals may be stated using the USGS earthquake intensity Shake Map. This 2009 Shake Map incorporates current seismicity in its development and is the most current map available for this area. Peter Haeussler, USGS, Alaska Region explains its viability for supporting probability inquiries:

> *"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 2002 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).*

Insert EQ probability map here and edit text box to contain community name

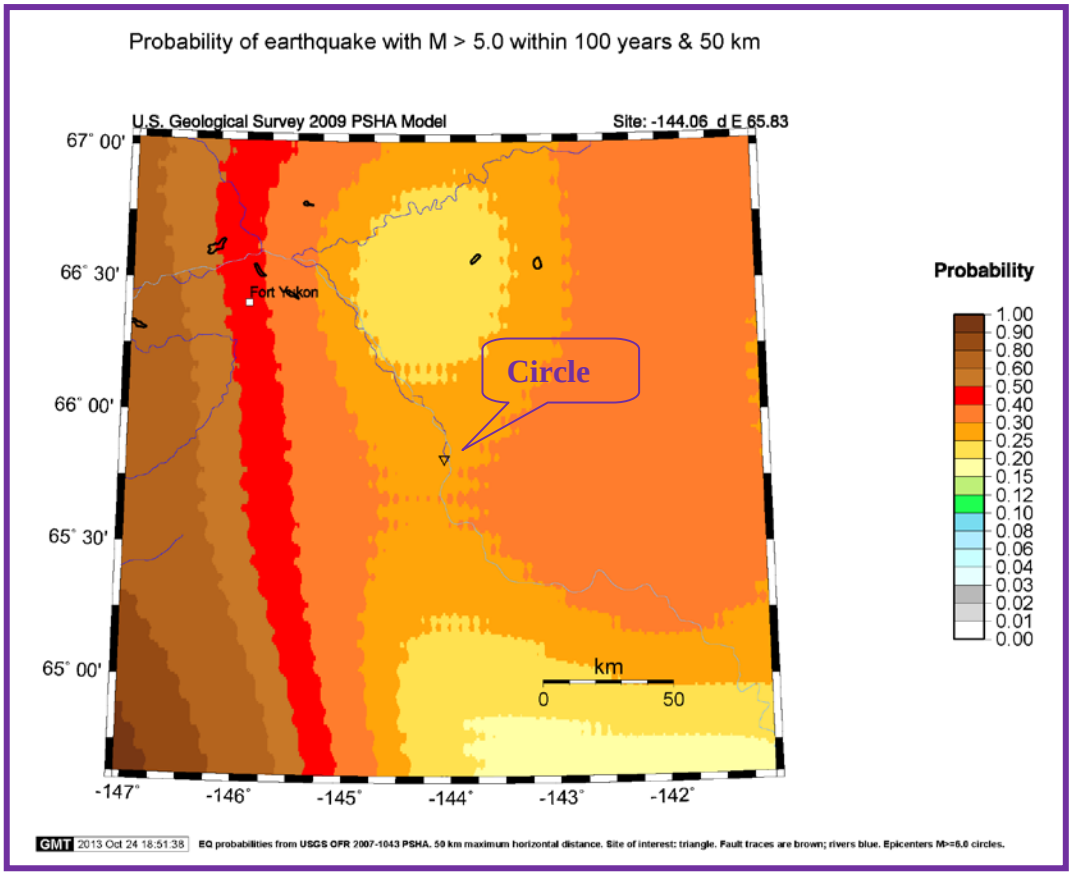

Figure 5-4 USGS Shakemap for the Circle Area (USGS 2009)

As indicated in Figure 5-4, earthquake recurrence probability is rated "Likely." An event which exceeds M 5.0 is probable with a slightly greater than 25% probability. According to Table 5-3

criteria, there is a 1 in 3 year (1/3=33 percent) chance of occurring as the earthquake event history is greater than 20 percent but less than or equal to 33 percent likely per year.

5.3.2 Erosion

5.3.2.1 Nature

Erosion rarely causes death or injury. However, erosion causes property destruction, prohibits development, and impacts community infrastructure. Erosion is typically gradual land loss through wind or water scour. However, erosion 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 easily exacerbated by human activity.

Riverine erosion impacts the Village and threatens the airport embankment along a Yukon River slough.

Riverine erosion results from the force of flowing water and ice formations in and adjacent to river channels. This erosion affects the bed and banks of the channel and can alter or preclude any channel navigation or riverbank development. In less stable braided channel reaches, erosion, and material deposition constant issues. In more stable meandering channels, erosion episodes may only occasionally occur such as from human activities including boat wakes and dredging.

Attempts to control erosion using shoreline protective measures such as groins, jetties, levees, or revetments can lead to increased erosion.

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 storms.

5.3.2.2 History

The Army Corp of Engineers (USACE) completed an erosion survey for the Village of Circle during their 2009 Baseline Erosion Assessment. The 2008 report listed the community as having a "Monitor Conditions" erosion threat classification. The Erosion Information Paper stated,

> *"…erosion events [that occurred] in 1945, 1979, 1985, and 1989 were caused by rapid snowmelt and summer storms. The 1984 Alaska Department of Transportation and Public Facilities (DOT/PF) Task Force on Erosion Control Final Report stated that river ice piling up in the downstream area of the community contributed to erosion" (USACE 2008).*

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

Location

The USACE Erosion Information Paper – Circle, Alaska, February 6, 2008 describes the Native Village of Circle's location:

> *"…on the east bank of a channel and slough associated with the Yukon River… The 1984 Alaska Department of Transportation and Public Facilities (DOT/PF) Task Force on*

Erosion Control Final Report stated that river ice piling up in the downstream area of the community contributed to erosion.

Property below the central part of the community was lost to considerable erosion in 1989. Some residents lost 25 feet of property with erosion periodically accelerated by seasonally high river levels…

Milepost 147 of the Steese Highway is a chronic problem area where for the last 20 years an estimated 6 feet of bank erodes annually"

Photo 3: Steese Highway 13 miles before it ends at Circle is cut down to 1 lane by Birch Creek, photo courtesy of DOT/PF Central Maintenance, 2006.

(USACE 2008).

Figure 5-5 depicts the Village's erosion location with a red dotted line.

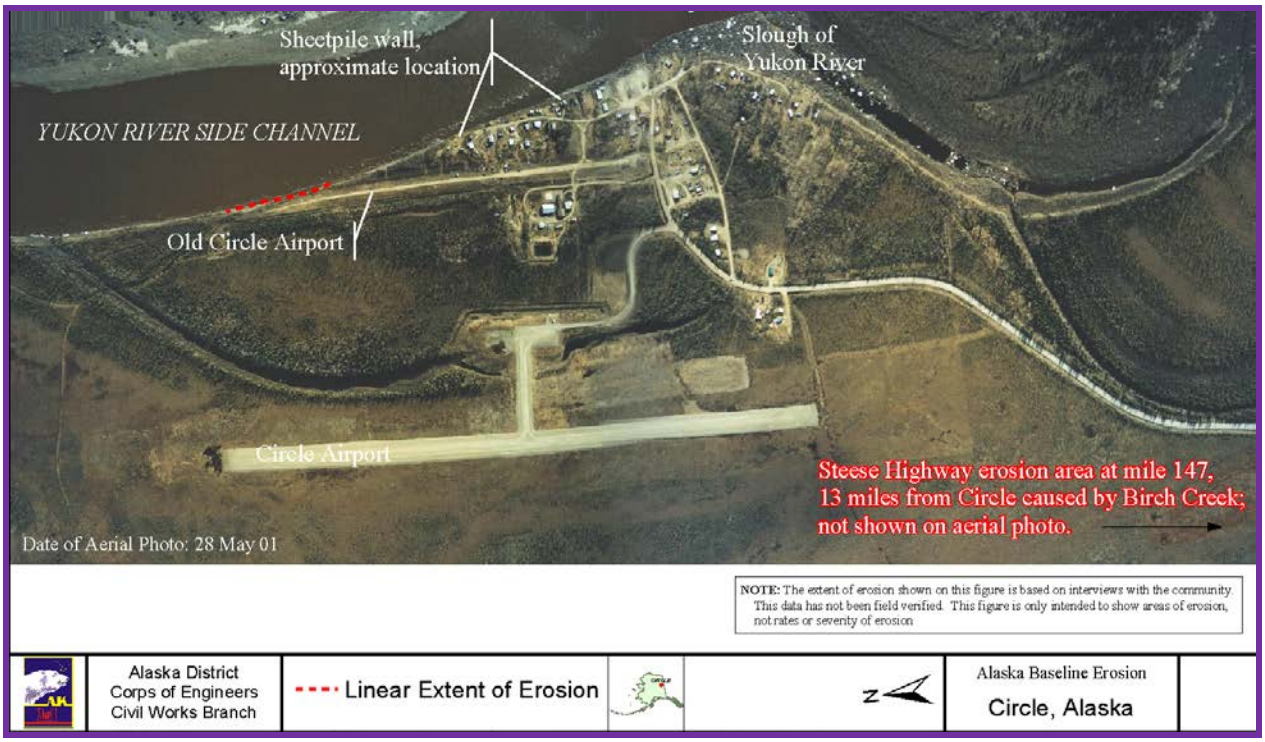

Figure 5-5 USACE Identified Erosion Location for Circle (USACE 2008)

Extent

A variety of natural and human-induced factors influence the erosion process within the community. Coastal orientation and proximity to ocean waves, currents, and storm surges 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 coastal erosion include:

- Embankment type
- Geomorphology
- Structure types along the embankment
- Amount of encroachment within the high hazard zone
- Proximity to erosion inducing riverine structures
- Nature of the topography
- Development density
- Elevation of coastal dunes and bluffs/ shoreline
- Shoreline exposure to wind and waves

Climate change may also play a part in increasing coastal erosion. Rising river water levels and riverine ice may leave stretches of shoreline open to increased exposure during flood and winter storm conditions.

Based on the USACE 2008 Erosion Assessment for Circle, past erosion events, and the criteria identified in Table 5-2, the magnitude and severity of erosion impacts in the Village are considered "limited" with potential for critical facilities to be shut down for more than a week, and more than 10 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 (fuel headers and electric and water/wastewater utilities), and economic impacts associated with the costs of trying to prevent or control erosion sites.

The USACE's Erosion Assessment Paper – Circle, Alaska stated that impacts included:

> *"A steel sheet-pile retaining wall, funded by a state legislative grant, was constructed along the front of the community in 1989. The wall was redesigned after an ice-jam sheered off many of the anchor bolts" (USACE 2008).*

Photo 2: Sheet pile erosion protection in Circle Flooding, photo courtesy of Michael L. Bird, 1997. photo courtesy of Michael L. Bird, 2001.

Probability of Future Events

Based on historical impacts and the criteria identified in Table 5-3, it is likely that erosion 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 l but less than or equal to 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 Village: rainfall-runoff, snowmelt, storm surge, and ice override 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 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 runoff, which can cause flooding. It also breaks the winter ice cover, which causes localized ice-jam floods.

5.3.3.2 History

The Village experiences severe road surface damages and erosion from heavy rainfall, snowmelt, and spring run-off. Ice jams and spring run-off flooding causes the most damages to the community.

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

> *"**92. Circle, May 6, 1989.** Flooding of the Yukon River in **Circle** during Spring Breakup of 1989 caused damage to public and private property. Disaster was eventually included in the Presidential Declaration (#94 below).*
>
> ***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.*
>
> ***156. Flood Response, June 9, 1992.** The Upper Yukon River drainage was experiencing the third worst snow melt flooding in recorded history according to the National Weather Service. The Declaration provided $100,000.00 from the Disaster Relief Fund to cover DHS&EM expenses that began to occur as a result of the need to provide response activities and surveillance. An RSA was established with the Division of Environmental Quality, DEC to respond to and test for environmental contamination for assurance of public health.*
>
> ***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.*

12-242 2013 Spring Floods declared by Governor Parnell on May 30, 2013 then FEMA declared on June 25, 2013 (DR-4122). *Beginning on May 17, through June 10 2013, excessive snow pack and ice thickness, combined with rapid spring warming caused ice jams and severe flooding. The following jurisdictions and communities in Alaska have been impacted: Alaska Gateway Rural Regional Educational Attendance Area (REAA) including the City and Village of Eagle; the Copper River REAA including the Village Communities of Chisotchina and Gulkana; the Yukon Flats REAA including the* ***Community of Circle****, and City of Fort Yukon; the Yukon-Koyukuk REAA including the Cities of Galena; the Lower Yukon REAA including the Cities of Emmonak and Alakanuk. The impact of the flooding resulted in severe damage to approximately 194 homes (requiring evacuations and sheltering) to include loss and damage to personal property, multiple businesses (including loss of revenue), and public infrastructure to include: hazardous and non-hazardous debris removal, emergency protective measures (leading to ongoing mass care operations), damage to city and state roads, bridges, water and sewer systems, electrical generation and distribution systems, recreation areas and fuel storage facilities."*

051913 Yukon River at **Circle** (NWS 2013)

(DHSEM 2013)

The US Army Corp of Engineers, Floodplain October 2011 Report provides the following information concerning structure elevations:

"Recommended Building Elevation:	*602.6 ft NGVD89*
The 100-year flood elevation or Base Flood Elevation (BFE):	*601.6 ft NGVD89*
Known Flood Elevations:	
1945 (Flood of Record)	*600.4 ft NGVD89*
1989	*599.8 ft NGVD89*
1979	*597.1 ft NGVD89*
1983	*595.7 ft NGVD89*
1985	*593.1 ft NGVD89"*

(USACE 2011)

The National Weather Service, (NWS) National Climate Data Center (NCDC) provides the following flood event data for Table 5-7.

Table 5-7 Historic Flood Events (NWS)

Location	Date	Event Type	Magnitude
Circle	5/19/2013	Flood	Damages: 1.500M **An ice jam released upstream of Circle City and sent a surge of water and ice through the Village during the 19th**, causing major flooding by inundating the Village with 5 to 8 feet of water. Most structures were flooded except for the school which was slightly more elevated. All residents were evacuated to higher ground. The area upstream from the boat launch on the slough was most affected as the water levels brought a considerable amount of ice right into the homes in that area. Elsewhere, the main effects were water damage. One vehicle carrying village elders tried to drive through the flooded street to safety and went off of the road into the ditch. They were rescued in the bucket of a front loader and taken to safety. Water levels according to a long-time resident were the 2nd highest in over 50 years, with only the floods in 1989 more severe. Water levels began falling in the late afternoon and receded below flood level by mid-evening on the 19th. Damage amounts are estimated, and include repairs to 8 homes with major damage and 7 homes with minor damage, along with nearly 1 million dollars expended in emergency response and road repair
YUKON FLATS NEARBY UPLANDS CO.	5/28/2012	Flood	The combination of heavy rainfall in excess of an inch, residual winter snowpack in the uplands, and frozen ground in spots caused the Crooked Creek near Central to flood. The water levels peaked during the afternoon hours on the 28th, and at 1345AKST water was entering the museum. Water also flooded residential yards and some roadways adjacent to Crooked Creek on the north side of the Steese Highway
Circle	5/6/2009	Flood	Damages: $1.400M **A large volume of water and a considerable amount of ice moved down river after the historic flooding at Eagle.** A 35 mile long ice run started to move by Circle during the evening of the 6th and jammed about 10 miles downstream of **Circle.** This caused water and ice to back into the channel in front of Circle. The water crested during the early morning hours on the 7th, and then began to drop as the ice jam broke downriver. This led to moderate flooding in Circle. Chunks of ice came into town and damaged a few buildings along the riverbank. The store in town had about 20 inches of water at the highest point, but some homes closer to the Yukon River were flooded with water several feet deep. The damage estimates for this event include the costs to repair and replace homes that were damaged and destroyed as well as costs to repair and replace public infrastructure and equipment
YUKON FLATS NEARBY UPLANDS (ZONE)	5/1/2005	Flood	Damages $3.00K An Ice Jam on the Yukon River produced minor flooding of roads and a few structures in the village of Fort Yukon. Damage amount is a rough estimate
YUKON FLATS NEARBY UPLANDS	9/1/2003	Flood	Rainfall of one to three inches over the Yukon-Tanana Uplands and greater Fairbanks Area caused rivers to flood in a

Table 5-7 Historic Flood Events (NWS)

Location	Date	Event Type	Magnitude
(ZONE)			few areas: ... The Alaska State Troopers reported several incidences where stranded hunters were plucked from the banks of area rivers. Rescues occurred on the Upper Chena River (zone 222), Birch Creek (zone 220), and on the Yukon River (zone 220). Some vehicles were also flooded on the lower Chatanika (zone 222) as unsuspecting hunters parked close to the rivers edge prior to the rise in water level
Circle	5/9/1989	Flood	Flooding of the Yukon River at Circle. Flood, included in the Presidential Declaration of Major Disaster, incorporated sixteen local declarations and applied to all communities on Yukon, Kuskokwim and Kobuk rivers and their tributaries.

(NCDC 2013)

5.3.3.3 Location, Extent, Impact, and Future Events Probability

Location

The 2008 USACE Erosion Information Paper provided a photo of the Village's 2008 ice jam flood event (USACE Photo 1) depicting damaging flood impacts to homes and businesses adjacent to the Yukon River.

Photo 1: Circle and the Circle airfield during spring breakup

(USACE 2008)

The Planning Team supported the Village's Sanitation Plan statement that identified damage locations as routinely recurring to impact infrastructure.

Edited excerpt from the Circle's Sanitation Master Plan:

> *"Many residential homes in the downtown area [are] flooded as well as the Hutchinson Commercial Store. [with] floodwaters reach[ing] a depth of four to four and one half feet at the fire hall… Flood[ing] cause[s] damage to many buildings including the wellhead assembly and clinic. Several fuel storage tanks in the village overturn… spilling [thousands of] gallons of fuel" (Circle 2002).*

Figure 5-6 portrays the high water line from the 2013 presidentially declared spring flood:

Figure 5-6 2013 Spring Flood High-water Mark – Circle (DHSEM 2013)

Extent

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

The following factors contribute to riverine flooding frequency and severity:

- Rainfall intensity and duration
- Antecedent moisture conditions
- Watershed conditions, including terrain steepness, soil types, amount, vegetation type, and development density
- The attenuating feature existence in the watershed, including natural features such as swamps and lakes and human-built features such as dams
- The flood control feature existence, such as levees and flood control channels
- Flow velocity

- Availability of sediment for transport, and the bed and embankment watercourse erodibility
- Village location related to the base flood elevation as indicated with their certified high water mark

The Village experienced severe and unpredictable riverine ice jam flooding. Based on past flood history and the criteria identified in Table 5-2, the extent of flooding in the Village is considered "Critical" with critical facilities and residential properties being shut-down or inhabitable for at least two weeks with less than 25 percent of property being severely damaged.

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, USACE Floodplain Manager's report, and criteria in Table 5-3, It is "Likely" an event will occur within the next three years. There is a 1 in 3 year chance of occurring (1/3=33 percent). History of events is greater than 20 percent but less than or equal to 33 percent likely per year.

5.3.4 Ground Failure

5.3.4.1 Nature

Ground failure describes avalanche, landslide, subsidence, unstable soils, and other gravitational soil movement. Soil movement influences can include rain, snow, and/or water saturation induced avalanches or landslides; as well as be influenced by seismic activity, melting permafrost, river or coastal embankment undercutting, or a combination of steep slope conditions.

Landslides are a dislodgment and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides, and slump-earth flows. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also be triggered or exacerbated by indiscriminate development of sloping ground, or the creation of cut-and-fill slopes in areas of unstable or inadequately stable geologic conditions.

Additionally, landslides often occur with other natural hazards, thereby exacerbating conditions, such as:

- Earthquake ground movement can trigger events ranging from rock falls and topples to massive slides
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides
- Wildfires can remove vegetation from hillsides significantly increasing runoff and landslide potential

Development, construction, and other human activities can also provoke ground failure events. Increased runoff, excavation in hillsides, shocks and vibrations from construction, non-engineered fill places excess load to the top of slopes, and changes in vegetation from fire, timber harvesting and land clearing have all led to landslide events. Broken underground water mains can also saturate soil and destabilize slopes, initiating slides. Something as simple as a blocked culvert can increase and alter water flow, thereby increasing the potential for a landslide event in an area with high natural risk. Weathering and decomposition of geologic material, and alterations in flow of surface or ground water can further increase the potential for landslides.

The USGS identifies six landslide types, distinguished by material type and movement mechanism including:

- **Slides,** the more accurate and restrictive use of the term landslide, refers to a mass movement of material, originating from a discrete weakness area that slides from stable underlying material. A *rotational slide* occurs when there is movement along a concave surface; a *translational slide* originates from movement along a flat surface.
- **Debris Flows** arise from saturated material that generally moves rapidly down a slope. A debris flow usually mobilizes from other types of landslide on a steep slope, then flows through confined channels, liquefying and gaining speed. Debris flows can travel at

speeds of more than 35 mph for several miles. Other types of flows include debris avalanches, mudflows, creeps, earth flows, debris flows, and lahars.

- **Lateral Spreads** are a type of landslide generally occurs on gentle slope or flat terrain. Lateral spreads are characterized by liquefaction of fine-grained soils. The event is typically triggered by an earthquake or human-caused rapid ground motion.
- **Falls** are the free-fall movement of rocks and boulders detached from steep slopes or cliffs.
- **Topples** are rocks and boulders that rotate forward and may become falls.
- **Complex** is any combination of landslide types.

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

Seasonal freezing can cause frost heaves and frost jacking. Frost heaves occur when ice forms in the ground and separates sediment pores, causing ground displacement. Frost jacking causes unheated structures to move upwards. Permafrost is frozen ground in which a naturally occurring temperature below 32ºF has existed for two or more years. (DHS&EM 2010).

Indicators of a possible ground failure include:

- Springs, seeps, or wet ground that is not typically wet
- New cracks or bulges in the ground or pavement
- Soil subsiding from a foundation
- Secondary structures (decks, patios) tilting or moving away from main structures
- Broken water line or other underground utility
- Leaning structures that were previously straight
- Offset fence lines
- Sunken or dropped-down road beds
- Rapid increase in stream levels, sometimes with increased turbidity
- Rapid decrease in stream levels even though it is raining or has recently stopped and
- Sticking doors and windows, visible spaces indicating frames out of plumb

The State of Alaska 2010 State Hazard Mitigation Plan provides additional ground failure information defining mass movement types, topographic and geologic factors which influence ground failure which may pertain to Circle.

5.3.4.2 History

There are few written records defining ground failure impacts. However, the Village has a well written Sanitation Master Plan that describes the area's soil conditions. Excerpts are detailed within this section that describe previous impacts.

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

Location

There are various ground failure locations throughout Napaskiak. Sources include USACE as well as other existing plans, and studies. Land subsidence such as melting permafrost and floodwater soil saturation are the most common ground failure impacts.

The Circle's 2002 Sanitation Master Plan (SMP) describes ground failure soil conditions; vital information for future development:

> *"**3.8 Geotechnical***
> ***General Soil Conditions***
>
> *A generalized area soil profile shows a one-foot organic layer overlying six feet of silts and clay, which is then underlain by gravel beds. The area is underlain with discontinuous permafrost. Depth to the upper surface of the permafrost is up to six feet. Soil logs near the Firehouse developed by VSW engineers and a consultant indicate black organics and muck up to four feet deep, a gray sandy silt at a depth of 9.5 feet. Other more recent soils borings at the new lodge site show a silty gravel layer to about 7 feet deep which overlies a well-graded gravel stratum...*
>
> *…Our investigation of existing soils data for the Circle area are that areas away from the thaw bulb of the Yukon River should be considered as permafrost areas. This thaw bulb is estimated to extend approximately 100 to 200 feet inland from the river…*
>
> *There are some other wells in Circle that provide water to a few properties. Hutchinson Commercial Company has its own well that is reported to be 290' deep. Mr. Hutchinson reported that the well was drilled through 260' feet of permafrost until a water bearing area was located. He reports that this well has its static water level about 2' below the top of his pipe casing…*
>
> *The O&M costs for the "two-mile" area are shown as not feasible due to the location of this piped system and the history of attempting to drill water wells through the permafrost away from the Yukon River. This area is approximately 2 miles from the downtown area of Circle and homes continue from this point to about 2 more miles. To construct a piped system for this area would not be feasible…*
>
> ***4. Community Sewer Haul from Individual Holding Tanks***
>
> *A major consideration for use of holding tanks or septic tanks in Circle is the existence of permafrost and the freezing temperatures through the long winter months…*
>
> ***5. Individual Septic Tanks with Leach Fields***
>
> *This alternative for wastewater disposal uses on-site septic tanks with leach fields or individual holding tanks for each property. Sometimes more than one property can utilize an existing septic tank or holding tank. The key to this method of wastewater disposal for an on-site septic tank with leach field is the existing soils that accommodate the leach field and the separation distance requirements from wells and other systems. The*

presence of groundwater, permafrost, impermeable soils or bedrock also has a major impact on use of this alternative…

6. Piped Vacuum Wastewater System

The "2-mile" area of homes actually begins about 2 miles south of Circle along the Steese Highway. Our recommendation is that this distance is too great to provide a piped system as not only is the area about 2 miles from the downtown area of Circle, but the homes in this area are constructed along the highway for a distance of 2 miles. These distances are more conducive to a haul system for both water and wastewater. ***The soils in this area are a shallow active layer underlain with permafrost.*** *Capital construction and O and M costs would not be feasible for this area….*

APPENDIX F. SOILS TEST DATA

SOILS OF THE CIRCLE AREA, ALASKA

CAPABILITY CLASSIFICATION

Estimated Physical' Properties of the Soils

Table 3 gives estimates of some of the physical properties significant in engineering and the probable classification of each soil in the Area according to the AASHO and Unified systems. Specific characteristics of soils that may affect engineering practices and estimates of the suitability of soils for various uses are given in Table 4.

All the soils of the uplands have developed in thick silty materials overlying stratified sandy and gravelly alluvial deposits. Many areas have substrata suitable for sand or gravel pits. Depth of the silty overburden ranges from 36 inches to many feet.

Table 3. Soils of the Circle Area, Alaska and their estimated physical and chemical properties

Map Symbol	Soil Name	Depth from surface (typical profile) (inches)	Classification: USDA 1/ Texture	Classification: Unified	Classification: AASHO	Permeability (in./hour)	Available water capacity (in./in. of soil)	Reaction pH	Shrink-swell potential
(Ad)	Alluvial land	--	--	--	--	--	--	--	--
(By)	Bradway silt loam	0-11	sil	ML	A-4	0.8 to 2.5	.18 to .23	4.5 to 5.0	Low
		11-20 (20+ permafrost)	sil and vfs	SM	A-2 or A-4	2.5 to 5.0	.12 to .16	5.5 to 6.0	Low
(EaA, EaB,EaC)	Easley silt loam	0-9 (8+ permafrost)	sil	ML	A-4	0.8 to 2.5	.18 to .23	6.5 to 8.2	Low
(KaA, KaB,KaC, KaD,KaE, KaF)	Kandik silt loam	0-11	sil	ML	A-4	0.8 to 2.5	.18 to .23	6.0 to 6.5	Low
		11-42	sil	ML	A-4	0.8 to 2.5	.18 to .23	7.5 to 8.2	Low
(Ke)	Ke silt loam	0-18 (18+ permafrost)	sil	ML	A-4	0.8 to 2.5	.18 to .23	4.5 to 5.0	Low
(Lp)	Lemeta peat	0-12 (12+ permafrost)	pt	--	--	--	.25	4.5 to 5.3	Low
(RaB, RaC,RaD, RaE,RaF)	Rampart silt loam	0-14	sil	ML	A-4	0.8 to 2.5	.18 to .23	6.0 to 6.7	Low
		14-40	sil	ML	A-4	0.8 to 2.5	.18 to .23	7.5 to 8.2	Low
(Sc)	Salchaket silt loam	0-14	sil	ML	A-4	0.8 to 2.5	.18 to .23	5.2 to 5.7	Low
		14-23	vfs	SM or ML	A-2 or A-4	5.0 to 10	.04	5.6 to 6.0	Low
(TkA, TkB)	Takotna silt loam	0-5	sil	ML	A-4	0.8 to 2.5	.18 to .23	5.7 to 6.5	Low
		5-21	vfs	SM or ML	A-2 or A-4	5 to 10	.04	6.6 to 8.2	Low
(YuA, YuB)	Yukon silt loam	0-11	sil	ML	A-4	0.8 to 2.5	.18 to .23	6.0 to 6.5	Low
		11-16 (16+ permafrost)	vfsl	ML	A-4	0.8 to 2.5	.18 to .23	7.5 to 8.2	Low

1/ Explanation: fsl - fine sandy loam; pt peat; sil silt loam; vfs very fine sand; vfsl very fine sandy loam

- 24 -

Table 4. Interpretation of Engineering Properties of Soil in the Circle Area, Alaska (Cont'd)

Soil Series and Symbols	Soil Features Affecting Engineering Practices – Pond Reservoir Areas	Pond Embankment Dikes and Levees	Agricultural Drainage	Irrigation	Waterways	Remarks
Alluvial land (Ad)	--	--	--	--	--	Frequently flooded
Bradway (By)	Permafrost; high water table	Poor stability; wet in natural state	Permafrost	Not needed	Not needed	Occurs on alluvial plains bordering Birch Creek; wet, perennially frozen soils
Kandik (KaA,KaB,KaC, KaD,KaE,KaF)	Moderate permability	Poor stability	Not needed	Moderate water holding capacity;	Silty; highly erodible	Soils formed in deep silty deposits
Easley (EaA,EaB,EaC)	Permafrost; high water table	Poor stability; wet in natural state	Permafrost	Not needed	Not needed	Occurs on alluvial plains and in upland drainageways & depressions; wet; perennially frozen so soils
Ke (Ke)	Permafrost	Poor stability	Permafrost	Moderate water holding capacity;	Silty; highly erodible	Soils formed in silty colluvium with permafrost on north-facing slopes
Leneta (Lp)	Permafrost	--	--	--	--	Soils occur in depressions
Pampart (RaB,RaC,RaD, RaE,RaF)	Moderate permafrost	Poor stability	Not needed	Moderate water-holding capacity	Silty; highly erodible	Soils formed in deep silty deposits
Salchaket (Sc)	Sandy substratum	Fair to poor stability; permeable	Not needed	Moderate to low water holding capacity	Not needed	Occurs on natural levees along Birch Cr
Takotna (TkA,TkB)	Sandy substratum	Fair to poor stability; permeable	Not needed	Moderate to low water holding capacity	Not needed	Occurs on natural levees along Yukon R.
Yukon (YuA,YuB)	Moderate permeability	Poor stability	Permafrost	Moderate water-holding capacity	Not needed	Somewhat poorly drained soils of Yukon River

26

All the soils of the Circle Area are highly susceptible t. o frost heaving. Unless stabilized by vegetation, the erosion hazard is severe in cuts and fills. Large areas of nearly level soils on the alluvial plains are underlain by permafrost, as are most of the soils in upland drainageways and depressions. Removal of the insulating organic mat causes thawing of the upper part of the permafrost. This commonly results in subsidence of the overlying soil. Roads and structures on these soils may settle unevenly unless special construction methods are used. The soils are nearly always saturated above the zone of permafrost" (SMP 2002).

According to permafrost and ice conditions map (Figure 5-7) developed for the National Snow and Ice Data Center/World Data Center for Glaciology located in the State Hazard Mitigation Plan (SHMP) (DHS&EM 2010), shows that Napaskiak has discontinuous permafrost as supported by soil investigations during the Village's 2001 Sanitation Master Plan development process where permafrost was sporadically encountered throughout the Village.

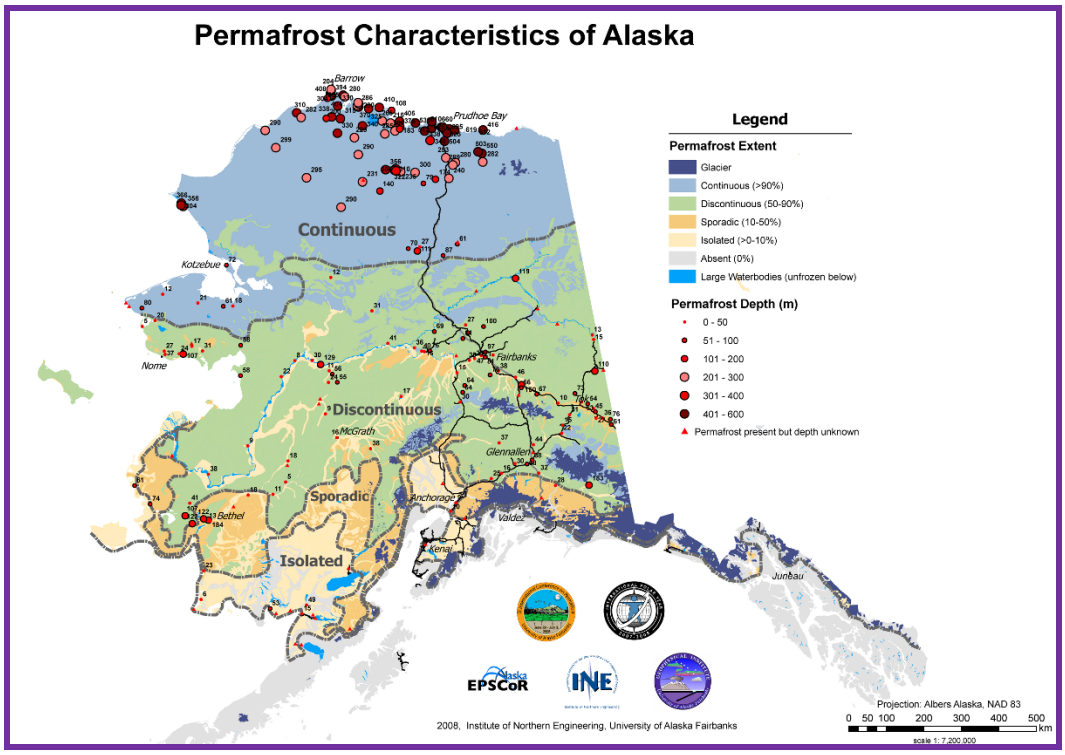

Figure 5-7 Permafrost and Ground Ice Map of Alaska (Jorgenson et al 2008)

Extent

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

Based on research and the Planning Team's knowledge of past ground failure and various degradation events and the criteria identified in Table 5-2, the extent of ground failure impacts in the Village are considered "Limited." Impacts would not occur quickly but over time with warning signs. Therefore this hazard would not likely cause injuries or death, neither would it shutdown critical facilities and services. However, 10 percent of property is could be severely damaged.

Impact

Impacts associated with ground failure include surface subsidence, infrastructure, building, and/or road damage. Ground failure does not typically pose a sudden and catastrophic hazard; however landslides and avalanches may. Ground failure damage occur from improperly designed and constructed buildings that settle as the ground subsides, resulting in structure loss or expensive repairs. It may also impact buildings, communities, pipelines, airfields, as well as road and bridge design costs and location. To avoid costly damage to these facilities, careful planning and location and facility construction design is warranted.

Probability of Future Events

Even though there are few written records defining ground failure impacts for the Village states that annually recurring ground failure damages throughout the community – to structures, roads,

harbor areas, and the airport are expected due to permafrost deposits throughout the community. The Planning Team stated the probability for ground failure follows the criteria in Table 5-3 classification criteria as "Likely." Future damage probability resulting from ground failure is probably in the next three years with an event having up to 1 in 3 years (1/3=33 percent) chance of occurring as the history of events is greater than 20 percent but less than 33 percent likely per year.

5.3.5 Severe Weather

5.3.5.1 Nature

Severe weather occur throughout Alaska with extremes experienced by the Native Village of Circle that includes thunderstorms, lightning, hail, heavy and drifting snow, freezing rain/ice storm, extreme cold, and high winds. The Village 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 Circle**.**

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 -50°F temperatures. 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 throughout Alaska..

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.

Winter Storms include a variety of phenomena described above and as previously stated may include several components; wind, snow, and ice storms. Ice storms, which include freezing rain, sleet, and hail, can be the most devastating of winter weather phenomena and are often the cause of automobile accidents, power outages, and personal injury. Ice storms result in the accumulation of ice from freezing rain, which coats every surface it falls on with a glaze of ice. Freezing rain is most commonly found in a narrow band on the cold side of a warm front, where surface temperatures are at or just below freezing temperatures. Typically, ice crystals high in the

atmosphere grow by collecting water vapor molecules, which are sometimes supplied by evaporating cloud droplets. As the crystals fall, they encounter a layer of warm air where they particles melt and collapse into raindrops. As the raindrops approach the ground, they encounter a layer of cold air and cool to temperatures below freezing. However, since the cold layer is so shallow, the drops themselves do not freeze, but rather, are supercooled, that is, in liquid state at below-freezing temperature. These supercooled raindrops freeze on contact when they strike the ground or other cold surfaces.

Snowstorms happen when a mass of very cold air moves away from the polar region. As the mass collides with a warm air mass, the warm air rises quickly and the cold air cuts underneath it. This causes a huge cloud bank to form and as the ice crystals within the cloud collide, snow is formed. Snow will only fall from the cloud if the temperature of the air between the bottom of the cloud and the ground is below 40 degrees Fahrenheit. A higher temperature will cause the snowflakes to melt as they fall through the air, turning them into rain or sleet. Similar to ice storms, the effects from a snowstorm can disturb a community for weeks or even months. The combination of heavy snowfall, high winds and cold temperatures pose potential danger by causing prolonged power outages, automobile accidents and transportation delays, creating dangerous walkways, and through direct damage to buildings, pipes, livestock, crops and other vegetation. Buildings and trees can also collapse under the weight of heavy snow.

Winter storm floods are discussed in Section 5.3.3.

Figure 5-8 displays Alaska's annual rainfall map based on Parameter-elevation Regressions on Independent Slopes Model (PRISM) that combines climate data from NOAA and Natural Resources Conservation Service (NRCS) climate stations with a digital elevation model to generate annual, monthly, and event-based climatic element estimates such as precipitation and temperature.

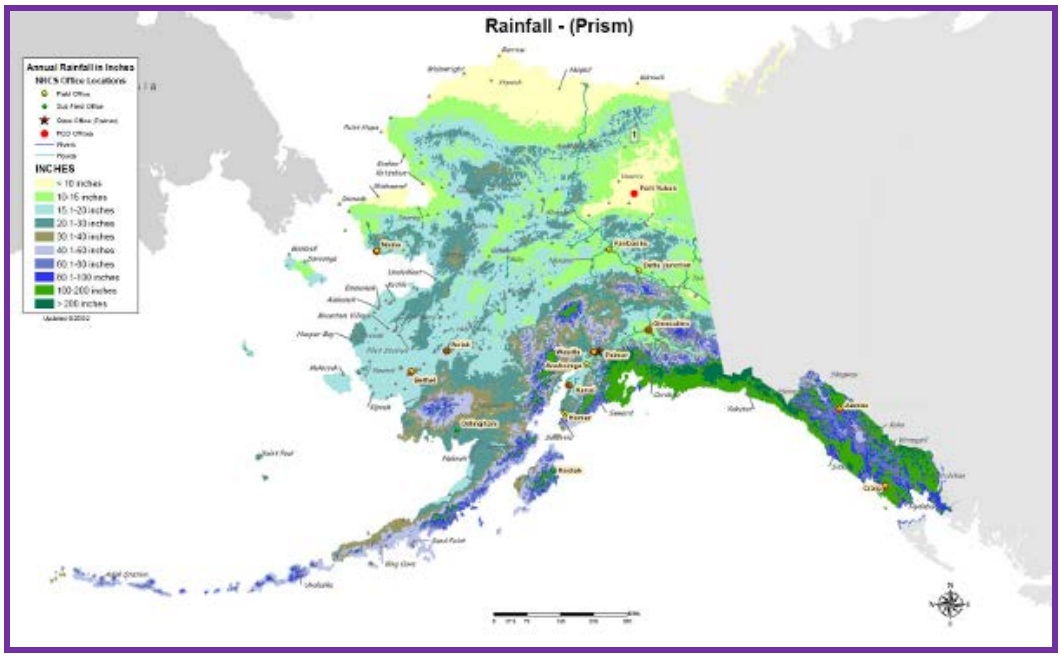

Figure 5-8 **Statewide Rainfall Map** (NRCS 2012)

5.3.5.2 History

The Native Village of Circle is continually impacted by severe weather events. Hurricane force wind, storm surge, and cold typically have disastrous results.

DHS&EM's Disaster Cost Index records the following severe weather disaster events which may have affected the area:

> "**83**. **Omega Block Disaster, January 28, 1989 & FEMA declared (DR-00826) on May 10, 1989** The Governor declared a statewide disaster to provide emergency relief to communities suffering adverse effects of a record breaking cold spell, with temperatures as low as-85. The State conducted a wide variety of emergency actions, which included: emergency repairs to maintain & prevent damage to water, sewer & electrical systems, emergency resupply of essential fuels & food, & DOT/PF support in maintaining access to isolated communities.

The Village is continually impacted by severe weather. Figures 5-9 and 5-10 depict the Village's historic and future predicted precipitation and temperatures.

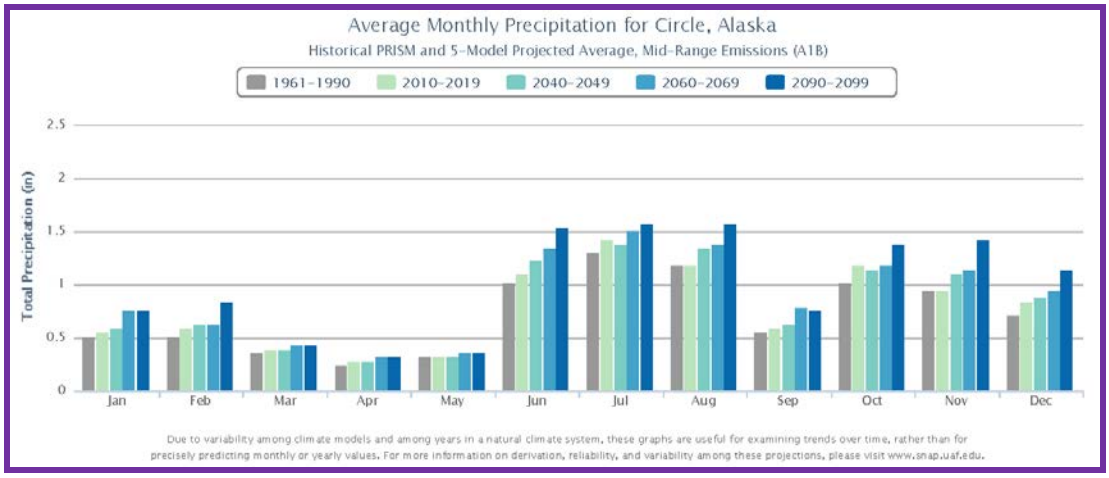

Figure 5-9 Circle's Historic and Predicted Precipitation (SNAP 2012).

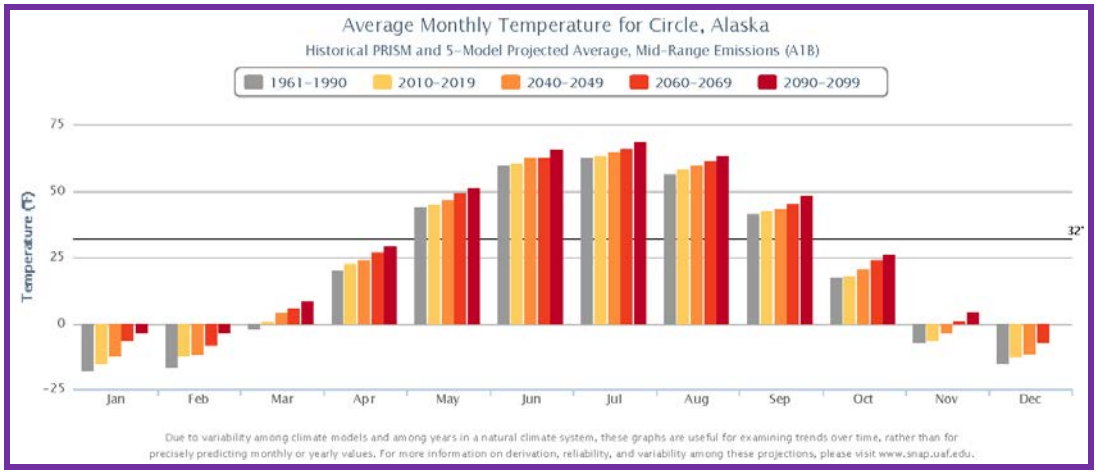

Figure 5-10 Circle's Historic and Predicted Temperatures (SNAP 2012)

The Village is continually impacted by severe weather as depicted in Table 5-8 which lists a representative historical major storm events the National Weather Service identified for the Village's Weather Zone (AKZ220) and geographic location. Each weather event may not have specifically impacted the area around Circle.

These storm events are listed due to their close proximity to listed communities or by location within the identified zone.

Table 5-8 Severe Weather Events

Location	Date	Event Type	Magnitude
Yukon Flats Nearby Uplands	24/6/2011	Heavy Rain	Heavy rainfall in excess of an inch on the 22nd caused a six mile section of the Steese Highway between Birch Creek and **Circle** to washout in spots on the 23rd. Repairs were made to the gravel road on the 23rd, but additional rainfall on the 23rd into the 24th caused another washout on the evening of the 24th with reports of 2 feet of water flowing over the road. The water flowing over the road was likely caused by plugged culverts and was not associated with flash flooding.
AKZ220	26/2/2011	Blizzard	The storm produced widespread blizzard conditions along the west coast as well as the arctic coast and heavy snowfall and high winds in parts of the interior. There were also areas of flooding and high water observed along parts of the west coast.
AKZ220	24/11/2010	Ice Storm	An extremely warm and moist air mass moving around a large ridge of high pressure in the north Pacific produced a prolonged period of freezing rain across much of interior Alaska on November 22-24, 2010. Zone 220: A mix of freezing rain and snow was observed at Central, **Circle** and Fort Yukon. Three day totals of just under one half inch of liquid precipitation were observed at the above locations. The Steese Highway was likely very treacherous in spots from Fox to Circle.
AKZ220	18/12/2009	Extreme Cold/Wind Chill	The low produced a period of stronger wind along the Steese Highway summits. A west wind of 25 to 35 mph combined with temperatures of 25 to 30 below to produce wind chills as low as 65 below. The strongest wind and lowest wind chills were observed at Eagle Summit.
AKZ220	13/11/2009	Blizzard	The low brought a moist westerly flow into the interior, and produced heavy snowfall in the Upper Koyukuk Valley, parts of the Central Interior, and across the higher elevations in the Middle Tanana Valley around Fairbanks. Zone 220: Blizzard conditions likely occurred along parts of the Steese Highway in the vicinity of Eagle Summit from the late afternoon hours on the 12th through the late morning hours on the 13th. According to a statement from the State of Alaska DOT, travel was not advised on the Steese Highway MP 101 to MP 121. Strong winds, heavy snow and drifting snow were reported with low to zero visibility.
Yukon Flats Nearby Uplands	8/5/2009	Flood	A large volume of water and a considerable amount of ice moved down river after the historic flooding at Eagle. A 35 mile long ice run started to move by **Circle** during the

Table 5-8 Severe Weather Events

Location	Date	Event Type	Magnitude
			evening of the 6th and jammed about 10 miles downstream of Circle. This caused water and ice to back into the channel in front of Circle. The water crested during the early morning hours on the 7th, and then began to drop as the ice jam broke downriver. This led to moderate flooding in Circle. Chunks of ice came into town and damaged a few buildings along the riverbank. The store in town had about 20 inches of water at the highest point, but some homes closer to the Yukon River were flooded with water several feet deep. The damage estimates for this event include the costs to repair and replace homes that were damaged and destroyed as well as costs to repair and replace public infrastructure and equipment.
Yukon Flats Nearby Uplands	7/5/2009	Flood	An ice jam below the village of Chalkyitsik caused water to back up in the Black River and caused minor flooding in the village on May 6th. There were a total of 10 homes that had minor flooding, and many yards were submerged by the flood waters.
AKZ220	2/19/2009	Winter Storm	Storm system brought heavy snow and blizzard conditions to much of northern Alaska. High winds were also observed in the passes of the Alaska Range.
AKZ220	1/1-12/2009		Significant cold snap that developed across interior Alaska on December 27th continued through January 12th.
AKZ220 - 223	1/15-17/2009	High Wind With Warm Chinook Winter Temperatures	The cold snap ended with extreme warm temperatures. Fort Yukon reached 46ºF. Previous high was 40ºF in 1927.
Yukon Flats Nearby Uplands	8/7/2008	Flash Flood	Heavy rains clogged the culverts just east of Central, pushing the culverts up through the road between mile 138 and 139.5.
AKZ220 - 224	10/2/2008	Winter Weather	Locally strong east to northeast winds across portions of interior Alaska. Winds of 15 to 30 mph produced areas of blowing snow, and with temperatures between 20 and 30 below the wind chills were as low as 55 below. The 25th running of the Yukon Quest was delayed on its second day because the Steese Highway was closed by high winds and drifting snow at about mile 81.
AKZ220	5/3/2007	Extreme Cold/Wind Chill	Dangerous wind chills over Steese Highway summit due to [a] cold airmass and winds speeds of 25 to 30 mph. Wind chills to -66 F were reported by the Meteorburst Site at Eagle Summit.
AKZ220	16/11/2006	Blizzard	Strong pressure gradient over the Eastern Brooks RangeThe State of Alaska Department of Transportation reported Eagle Summit on the Steese Highway (Zone 220) was closed and that the Dalton Highway through Atigun Pass (Zone 218) was in difficult condition due to zero visibility and winds 70-80 mph (estimated gusts).

(NWS 2012)

Figure 5-11 summarizes precipitation and snowfall trends for the Circle area providing a representation of the typical historical and future weather events.

CIRCLE CITY, ALASKA (501977)

Period of Record Monthly Climate Summary

Period of Record : 6/18/1957 to 10/15/1999

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	-9.2	-5.0	13.4	34.0	57.1	71.5	73.1	68.5	52.7	25.6	1.1	-6.5	31.4
Average Min. Temperature (F)	-25.0	-25.3	-14.0	6.2	30.6	46.8	49.6	44.1	28.9	10.5	-13.5	-22.0	9.8
Average Total Precipitation (in.)	0.47	0.46	0.32	0.26	0.27	0.85	1.24	1.24	0.56	1.00	0.82	0.68	8.16
Average Total SnowFall (in.)	6.5	6.6	4.8	2.8	0.1	0.0	0.0	0.0	1.0	7.7	9.0	8.1	46.6
Average Snow Depth (in.)	17	21	21	15	1	0	0	0	0	3	10	14	8

Percent of possible observations for period of record.
Max. Temp.: 45.7% Min. Temp.: 46.2% Precipitation: 50.4% Snowfall: 49.3% Snow Depth: 46.9%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Figure 5-11 Circle's Historical Average Weather (WRCC 2013)

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

Location

The entire area, which includes the Village of Circle, experiences periodic severe weather impacts. The most common to the area are high winds, severe winter storms, and intense cold. Table 5-11 depicts weather events that have historically impacted the area and are provided as a representative sample.

Extent

The entire Village is equally vulnerable to severe weather effects. The Village experiences severe storm conditions with moderate snow depths; wind speeds exceeding 90 mph; and extreme low temperatures that reach -65ºF.

Based on past severe weather events and the criteria identified in Table 5-2, the extent of severe weather in the Village 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 a severe weather event's impact within a community. Hurricane force winds, rain, snow, and storm surge can be expected to impact the entire Village of Circle.

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 5-3, 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.

5.3.6 Wildland Fire

5.3.6.1 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.

5.3.6.2 History

The Alaska Interagency Coordination Center (AICC) identified 323 wildland fires (Figure 5-12) that occurred within 50 miles of the Village.

Table 5-9 lists 63 of those fires that exceeded 10,000 acres with the largest one burning 640,000 acres in 1940 (Highlighted in dark purple), and seven burning over 200,000 acres (highlighted in light purple).

Table 5-9 Wildfire Locations Since 1939 within 50 Miles of Circle

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
Birch Creek	2013	24,924	65.3777778	-144.2944444	Lightning
Discovery Creek	2013	13,474	65.9671666	-145.6776667	Lightning
Tchulkade Lake	2010	15,561	66.3472214	-143.3691711	Lightning
Little Black One	2009	349,450	66.2236099	-143.2572174	Lightning

Table 5-9 Wildfire Locations Since 1939 within 50 Miles of Circle

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
Jagged Ridge	2009	53,889	65.5480576	-144.117218	Lightning
Bluff Creek	2009	41,756	65.7872238	-144.4997253	Lightning
Paddle	2009	41,743	65.5852814	-143.8263855	Lightning
Three Lakes	2008	35,118	66.1916656	-143.9441681	Lightning
Woodchopper 2	2007	22,011	65.3644409	-143.4477844	Lightning
Little Big Creek	2007	17,717	66.2125015	-143.8227844	Lightning
Grass River	2006	14,880	66.46083	-144.0403	Lightning
Preacher Creek	2005	69,506	65.7325	-145.4364	Lightning
Fanny Mountain	2005	25,803	66.07	-142.203	Lightning
Squirrel Creek	2005	19,345	66.3	-144.62	Lightning
Edwards Creek	2004	243,900	65.51722	-143.17	Lightning
Preacher Creek	2004	243,254	65.98333	-145.05	Lightning
Wolf Creek	2004	214,869	65.27861	-145.0569	Lightning
Bolgen Creek	2004	201,894	65.71194	-144.8081	Lightning
Crazy	2004	52,056	65.77084	-145.2681	Lightning
Grayling Fork	2004	48,307	66.21667	-142.2833	Lightning
Rock Creek	2004	37,363	65.82389	-145.4025	Lightning
Middle Birch Creek	2004	30,294	66	-144.3667	Lightning
Hat Lie Lakes	2004	29,680	66.3525	-145.312	Lightning
Woodchopper Creek	2004	14,904	65.34972	-143.2453	Lightning
Birch	1999	20,187	65.3	-144.7833	Lightning
Big Creek	1997	44,050	66.1500015	-143.3333282	Lightning
Big Creek	1996	48,600	66.3333359	-143.6333313	Lightning
Monkey Girl	1996	39,116	65.5333328	-144.0166626	Lightning
Circ Mountain	1996	34,665	65.75	-143.9833374	Lightning
Graveyard Creek 631360	1996	12,760	65.5666656	-144.8999939	Burning Dump
332557	1993	215,360	65.9000015	-143.6333313	Lightning
332292	1993	47,494	66.1166687	-142.8666687	Lightning
CEMSE34	1993	21,210	65.2666702	-143.6333313	Lightning
132460	1991	80,900	66.4166641	-143.0833282	Lightning
CEM NE 20	1991	53,920	65.8666687	-145.2333374	Lightning
032042	1990	128,780	65.8166656	-144.8333282	Exhaust
032034	1990	50,490	66.4000015	-144.8666687	Lightning
832064	1988	289,360	65.9666672	-145.8166656	Lightning
CHP ENE 34	1986	55,410	65.4499969	-143.3666687	Lightning
531047	1985	88,790	65.8833313	-145.5500031	Lightning
CIRCLE	1979	13,000	66.0500031	-144.5666656	Lightning
Cirle City N 14	1977	59,445	66.0500031	-143.8833313	Lightning
CEM E 20	1977	10,500	65.6333313	-144	Lightning
WOOD CHOPPER	1967	11,500	65.3499985	-143.3833313	Lightning
CIRCLE E-15	1959	10,000	65.8666687	-143.5333405	Lightning
CENTRAL W-10	1957	44,200	65.6333313	-145.2166595	Lightning

Table 5-9 Wildfire Locations Since 1939 within 50 Miles of Circle

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
WOODCHOPPER W-10	1957	16,000	65.3666687	-143.1833344	Lightning
CIRCLE S.10	1954	21,440	65.6333313	-144	Lightning
40 Mile Yukon	1953	65,280	66.3333359	-144.5	Lightning
Crazy Mountain	1953	17,600	65.6166687	-145	Smokers
22 Mile Village	1951	53,376	66.1166687	-144.3000031	Campfire
Circle City Fire	1950	35,200	65.75	-144.5	Campfire
Nation River #1	1950	27,650	65.5	-142.5	Lightning
Charley River S. #2	1950	27,300	65.25	-142.8833313	Campfire
Coal Creek #2	1950	18,900	65.2333298	-143.1833344	Campfire
Woodchopper Creek	1950	10,200	65.2333298	-143.5	Campfire
Circle	1946	35,000	65.7333298	-143.4833374	Lightning
Birch Creek	1944	96,000	66.3666687	-145.6499939	Lightning
Black River	1943	179,200	66.4000015	-143.5	Lightning
Birch Creek	1943	70,000	66.3333359	-145.5833282	Trapper
Birch Creek	1941	24,000	66.3000031	-145.5333405	Unknown
Fort Yukon	1940	640,000	66.4166641	-145.2833405	Trappers
Yukon River	1939	Unknown	66.1500015	-144.6000061	Fisherman

(AICC 2012)

Figure 5-12 depicts Wildland Fire Locations within close proximity to the Native Village of Circle. (AICC 2013a):

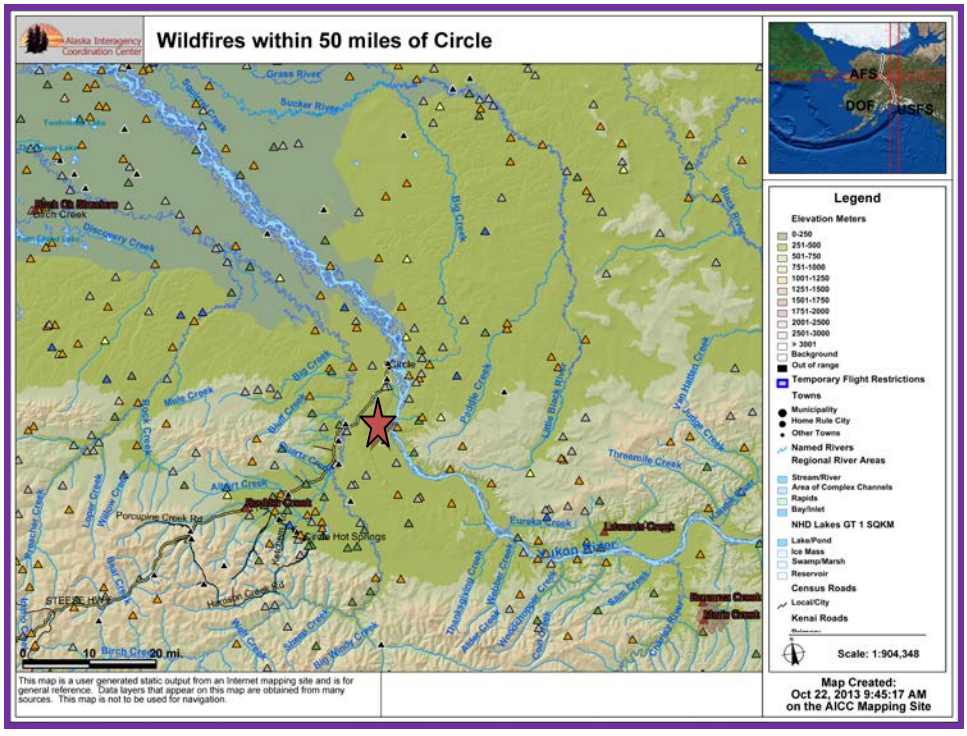

Figure 5-12 Circle's Historical Wildfire Locations (AICC 2012)

Figure 5-3 depicts Circle's relative wildland fire event perimeters (Figure 5-13) that depict the relative size of the fires and their potential threat to the Village (AICC 2013b).

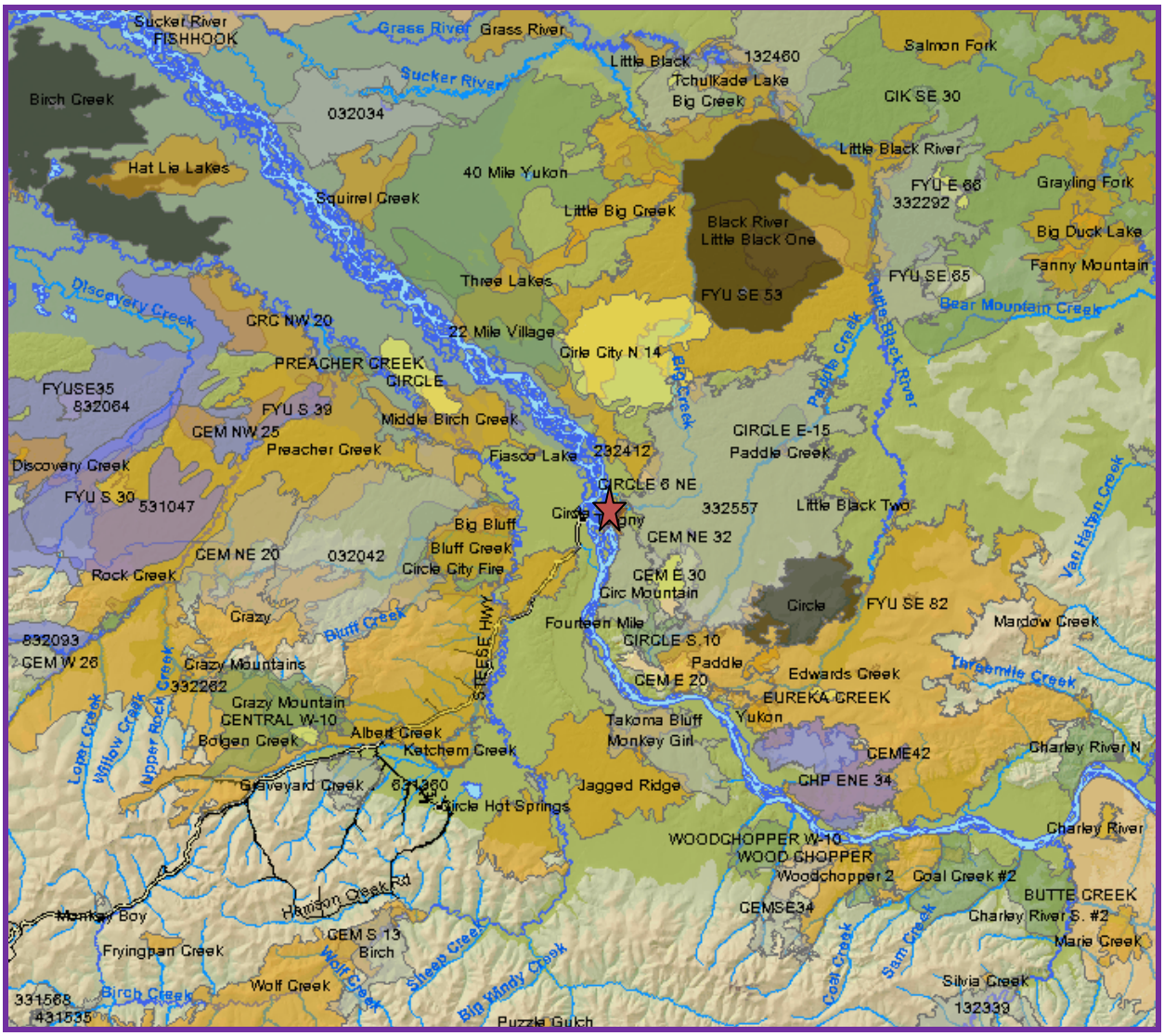

Figure 5-13 Circle's Historical Wildfire Perimeters (AICC 2012)

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

Location

Under certain conditions wildland fires may occur near the Village when weather, fuel availability, topography, and ignition sources combine. Since fuels data is not readily available, for the purposes of this plan, all areas outside Village limits are considered to be vulnerable to tundra/wildland fire impacts. Numerous wildland fire events have occurred within 50 miles of the Village as depicted in Figure 5-12 and 5-13.

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.

Based on the Circle area's past wildland fire event history and the criteria identified in Table 5-3, the magnitude and severity of impacts in the Village of Circle is considered critical with potential for significant injuries, there is potential for critical facilities to be shut down for at least two weeks with more than 25 percent of property or critical infrastructure being severely damaged.

Impact

Impacts of a wildland fire that interfaces with the population center of the Village 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's 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.

Based on the history of wildland fires in the Circle area and applying the criteria identified in Table 5-3, it is "Likely" that a wildland fire event will occur within in the next three years. The event has up to 1 in 3 years (1/3=33 percent) chance of occurring and the history of events is greater than 20 percent but less than or equal to 33 percent likely each year.

6

VULNERABILITY ANALYSIS

Section Six outlines the vulnerability process for determining potential losses for the community from various hazard impacts.

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 eight 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 Village of Circle's infrastructure 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	Percent of Critical Facilities and Utilities
Earthquake	100	100	100	100
Erosion	<2	<1	<1	<1
Flood	75	75	75	75
Ground Failure	100	100	100	100
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 Village 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 Village, 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.

6.3.1.1 Population and Building Stock

Population data for the Village were obtained from the 2010 U.S. Census and the DCCED. The US Census reports the Village's total population for 2010 as 104 and 2012 DCCED data reported a population of 113 (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 Buildings[1]
104	113	52	US Census: $5,293,600 Village: $15,600,000

[1]Sources: U.S. Census 2010, and 2012 101,800 population data. US Census listed housing value at $101,800. The Project Team determined that the average structural replacement value of all single-family residential buildings is $300,000 per structure due to rural construction expense adjustment.

Estimated replacement values for those structures, as shown in Table 6-2, were obtained from the 2010 U.S. Census, and 2012 DCCED/DCRA certified estimate.

The Planning Team stated that residential replacement values are generally understated by the US Census because actual replacement costs exceed Census structure estimates due to material, barge or airplane delivery, and construction costs in rural-remote Alaska; many times away from the road system.

The Planning Team estimates an average 30ft by 40 ft. (1,200 sq. ft.) residential structure costs $300,000. A total of 52 single-family residential buildings were considered in this analysis. The relative comparison demonstrates the US Census estimate is nearly 1/3 the actual cost for constructing in rural Alaska.

6.3.1.2 Existing Infrastructure

The Village of Circle has benefited from numerous funding opportunities to assist them with upgrading their infrastructure. DCRA provides grant and funded project data which demonstrates the Village's capability to manage projects and grant funding.

Table 6-3 lists the DCRA identified "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

(This information is slightly dated because DCCED is rebuilding their database and is currently unable to provide more current project data.)

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	$66,292

Table 6-3 Completed Projects

(This information is slightly dated because DCCED is rebuilding their database and is currently unable to provide more current project data.)

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
HUD	2008	Funded	IHBG/NAHASDA administration, operating & construction funds	Design	$59,634
HUD	2007	Funded	IHBG/NAHASDA administration, operating & construction funds	Construction	$69,779
HUD	2006	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$70,570
Department of Education and Early Development (DEED)	2006	Funded	Circle Soil Remediation	Construction	$463,940
Alaska Native Tribal Health Consortium (ANTHC)	2006	Funded	Design water treatment plant renovations.	Design	$125,000
Denali Commission (Denali)	2006	Funded	Dust Control Design & Construction. The project consists of design and construction of improvements to 2.5 miles of the Steese Highway that passes through Circle/Circle Village to improve safety and reduce dust in the communities. The communities are located at the end of the Steese Highway.	Construction	$900,000
Federal Aviation Administration (FAA)	2006	Funded	Rehabilitate Runway. OTHER FUNDING: DOT/PF	Contract	$177,156
HUD	2005	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$79,647
Division of Community and Regional Affairs (DCRA)	2005	Funded	Community Projects & Improvements. Capital Matching	Completed	$10,000
ANTHC	2005	Funded	Water and sewer service	Preliminary	$2,810,000
HUD	2004	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$81,418
EDA	2004	Funded	Circle Village Hotel Completion. Western Alaska Fisheries Disaster - Part Of Larger Project	Construction	$848,749
HUD	2003	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$50,954
DEED	2003	Funded	Circle School Replacement. Funded by State GO Bond	Completed	$4,151,552
DCRA	2003	Funded	Mechanical Shop Renovation. Capital Matching	Completed	$15,790
DCRA	2003	Funded	Mechanical Shop Renovation/Equipment. Capital Matching	Completed	$10,529
ANTHC	2002	Funded	Planning and design for a new health clinic. Funding to cover all expenses have not been received. Denali Commission has approved the additional funding via email correspondence dated 215-05 and 2-28-05.	Design	$139,260

Table 6-3 Completed Projects

(This information is slightly dated because DCCED is rebuilding their database and is currently unable to provide more current project data.)

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
			FY 2006 2Q Accomplishments: None: Grantee for village clinic site still not determined. FY2007 2		
Denali	2002	Funded	Clinic Design. The scope of work for this project is the design of the Circle Health Clinic. This project was awarded under Amendment No. 1.	Project Close-out Complete	$139,260
HUD	2002	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$44,816
DCRA	2002	Funded	Woodworking and Metalworking Shop Construction. Capital Matching	Completed	$26,316
Bureau of Indian Affairs (BIA)	2002	Funded	Bridge Project	Completed	$32,500
Department of Transportation (DOT)/ Public Facilities (PF)	2002	Funded	Chena Hot Springs Rd: Chena State Rec Area, Ph II. Construct 2 waysides at MP 27 & MP 39.5.	Completed	$60,000
HUD	2001	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$44,025
DOT/PF	2001	Funded	Steese Hwy: MP 147 Birch Creek Wayside	Completed	$420,000
DCRA	2001	Funded	Sawmill Equipment Purchase. Mini-Grant. Denali Commission $30.0	Completed	$30,000
EDA	2001	Funded	Circle Village Hotel. Western Alaska Fisheries Disaster	Completed	$1,325,000
DCRA	2001	Funded	Community Hall Renovation. Capital Matching	Completed	$26,323
HUD	2000	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$41,037
DCRA	2000	Funded	Dumpsite Completion. Capital Matching	Completed	$26,481
DCRA	2000	Funded	Sawmill Operation. Other	Completed	$30,000
DCRA	2000	Funded	Sawmill Operation. Mini-Grant	Completed	$172,000
Denali	2000	Funded	Sawmill Equipment Purchase. Purchase and install lumber drying kiln.	Project Close-out Complete	$30,000
HUD	1999	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$46,496
DCRA	1999	Funded	Landfill Clean-up & Relocation. Capital Matching	Completed	$28,334
HUD	1998	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$50,000
DCRA	1998	Funded	Landfill Clean-up & Relocation. Capital Matching	Completed	$57,138
BIA	1998	Funded	Grade & Drain Airport Road. 5.0 km.	Completed	$400,000
DCRA	1997	Funded	First Phase of Landfill Relocation	Closed	$79,441
DOT/PF	1995	Funded	Airport Improvements, Ph II	Completed	$2,000,000

Table 6-3 Completed Projects

(This information is slightly dated because DCCED is rebuilding their database and is currently unable to provide more current project data.)

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
DOT/PF	1994	Funded	Airport Improvements Ph I	Completed	$2,262,683
DOT/PF	1990	Funded	Flooding/Erosion	Completed	$149,461

(DCRA 2013)

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 Village 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 Village 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
- Community gathering places, such as community and youth centers
- Utilities, such as electric generation, communications, water and waste water treatment, sewage lagoons, landfills.

The Village's critical facilities and infrastructure are listed in Table 6-4.

Table 6-4 Critical Facilities and Infrastructure

Facilities	Number of Occupants	Facilities	Address	Latitude	Longitude	Estimated Value	Building Type	Earthquake	Erosion	Flood	Ground Faailure	Weather (Severe)	Tundra/ Wildland Fire
Government	7	Circle Tribal Council Office	River Street	N/A	N/A	$500,000	Trailer	X	X	X	X	X	X
	3	Post Office	Steese Highway	65.82408	-144.06806	$300,000	Log Cabin	X		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	Ground Faailure	Weather (Severe)	Tundra/Wildland Fire
Emergency Response	1	Circle Fire Hall	Mile 161, Steese Highway	65.82532	-144.06142	$2,000,000	W1	X	X	X	X	X	X
Educational	31	Circle School, P-12	School Road	65.82756	-144.06458	$17,000,000	metal modules and wood-framed	X		X	X	X	X
	1	Circle School Shop	School Road	N/A	N/A	$700,000	W1	X		X	X	X	X
Medical	2	Health Clinic	Spruce Street	65.82478	-144.0658	$3,000,000	W1	X		X	X	X	X
Community	3	Holy Trinity Church	Spruce Street	65.82471	-144.06661	$300,000	W1	X		X	X	X	X
	3	KJNP church	River Street	N/A	N/A	$300,000	W2 Log	X	X	X	X	X	X
	3	Calvary Northern Lights Mission	Old Runway	65.82824	-144.07361	$300,000	W1	X		X	X	X	X
	3	Community Center (Old Tribal Hall)	Spruce Street	65.82475	-144.06601	$300,000	W1 Log	X		X	X	X	X
	1	Circle Fish Company	Willow Street	65.82773	-144.06109	$1,000,000	W1	X	X	X	X	X	X
	7	Hutchinson Commercial Company (Store)	Steese Highway	65.82531	-144.06401	$300,000	W1	X		X	X	X	X
	5	New Tribal Hall	River Street	65.82566	-144.06404	$1,000,000	W1	X	X	X	X	X	X
	0	Circle Lodge	River Street	N/A	N/A	$3,000,000	W3	X	X	X	X	X	X
	3	Teachers Quarters (duplex)	School Road	65.82656	-144.06061	$1,000,000	W1	X		X	X	X	X
	1	School Utility Storage	School Road	65.82743	-144.06426	$1,000,000	W1	X		X	X	X	X
	1	Tribal Tool Shed	Steese Highway	65.82504	-144.06384	$400,000	W1	X		X	X	X	X
	3	Circle City Camping Park	Steese Highway	65.82575	-144.05874	$200,000	N/A	X	X	X	X	X	X
	0	Cemetery	Willow Street	65.80153	-144.08564	$20,000	N/A	X		X	X	X	X
	0	Cemetery	School Road	Unknown	Unknown	$20,000	N/A	X	X	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	Ground Faailure	Weather (Severe)	Tundra/Wildland Fire
Roads	0	Village Roads	Approx. 8 miles of Community Roads built at approx.. $1,000,000 per mile	N/A	N/A	$8,000,000	HRD2	X		X	X	X	X
		Airport Road						X		X	X	X	X
		Alder Street						X		X	X	X	X
		Birch Street						X		X	X	X	X
		Fire Hall Drive						X		X	X	X	X
		Post Office Drive						X		X	X	X	X
		River Street						X	X	X	X	X	X
		School Road						X		X	X	X	X
		School Loop Road						X		X	X	X	X
		Spruce Street						X		X	X	X	X
		Steese Highway						X	X	X	X	X	X
		Tamarack Street						X		X	X	X	X
		Willow Street						X	X	X	X	X	X
		School Loop Road						X		X	X	X	X
Bridges		None											
Transporation	0	Airport (Main)	Gravel, lighted, 2,979' X 60', runway	65.82852	-144.06298	$18,000,000	AFO	X		X	X	X	X
	0	Airport, Tribal (Small)	Dirt Airstrip	65.82824	-144.07361	$1,000,000	AFO	X		X	X	X	X
	0	Floatplane & Boat Dock	Yukon River	N/A	N/A	$1,000,000	N/A	X		X	X	X	X
	1	Service/Maintenance Shop	River Street	65.82605	-144.06072	$10,000,000	Wood/Steel	X	X	X	X	X	X
	0	Boat Launch Pad	River Street	65.82575	-144.05784	$30,000	Concrete	X		X	X	X	X
Utilities	7	Circle Washeteria - Potable Water Treatment Facility & Water Storage	Old Runway	65.82596	-144.06113	$6,000,000	W1	X		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	Ground Faailure	Weather (Severe)	Tundra/Wildland Fire
	1	Landfill/Incinerator	Mile 59, Steeese Highway	65.7767	-144.13592	$4,000,000	N/A	X		X	X	X	X
	0	Sewage Lagoon	School Loop Road	65.8278	-144.06514	$4,000,000	N/A	X		X	X	X	X
	2	Circle Electric Utility	School Loop Road	65.82491	-144.06396	$3,000,000	EPPS	X		X	X	X	X
	0	Power House Generator	School Loop Road	65.82499	-144.06413	$2,000,000	EPPS	X		X	X	X	X
	0	Alascom	Spruce Street	65.82748	-144.06415	$500,000	CBO	X		X	X	X	X
	0	School Satellite Dish	School Loop Road	65.82737	-144.06392	$500,000	CBO	X		X	X	X	X
	0	Tribal Office Satellite Dish	River Street	65.82521	-144.06403	$300	CBO	X		X	X	X	X
	0	Health Clinic Med Tech Satellite Dish	Spruce Street	65.82478	-144.06565	$300	CBO	X		X	X	X	X
Total Occ	89				**Total Damages**	$90,670,600							

(Circle 2013, DHS&EM 2012)

6.4 REPETITIVE LOSS PROPERTIES

This section estimates the number and type of structures at risk to repetitive flooding. (Properties which have experienced RL, 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.

6.4.1.1 NFIP Participation

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

6.5 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 consideration of probability or level of damage.

The methodology used a two pronged effort. First, The Project 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 Geospatial Information System (GIS) based hazard mapping information was available.

Replacement structure and contents values were determined by the community for their physical assets. The community's aggregate exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced) for each physical asset located within a hazard area. 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.

6.6 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.

6.7 VULNERABILITY EXPOSURE ANALYSIS

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

Table 6-5 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	3/11	2,800,000	2/32	17,700,000	1/3	3,000,000	14/33	9,140,000
Erosion	Within 300 ft of erosion areas	1/7	500,000	0/0	0	0/0	0	6/13	5,520,000
Flood	Descriptive	2/10	800,000	2/32	17,700,000	1/3	3,000,000	14/33	9,140,000
Ground Failure	Descriptive	2/10	800,000	2/32	17,700,000	1/3	3,000,000	14/33	9,140,000
Severe Weather	Descriptive	2/10	800,000	2/32	17,700,000	1/3	3,000,000	14/33	9,140,000
Wildland Fire	Descriptive	2/10	800,000	2/32	17,700,000	1/3	3,000,000	14/33	9,140,000

Table 6-6 Potential Hazard Exposure Analysis – Critical Infrastructure

		Highway		Bridges		Transportation Facilities		Utilities	
Hazard Type	Methodology	Miles	Value ($)	No.	Value ($)	# Bldgs / # Occ	Value ($)	# Bldgs / # Occ	Value ($)
Earthquake	Descriptive	8	8,000,000	0	0	5/1	30,030,000	9/10	20,000,600
Erosion	Within 300 ft of erosion areas	3	1,000,000	0	0	1/1	10,000,000	0/0	0
Flood	Descriptive	8	8,000,000	0	0	5/1	30,030,000	9/10	20,000,600
Ground Failure	Descriptive	8	8,000,000	0	0	5/1	30,030,000	9/10	20,000,600
Weather, Severe	Descriptive	8	8,000,000	0	0	5/1	30,030,000	9/10	20,000,600
Wildland Fire	Descriptive	8	8,000,000	0	0	5/1	30,030,000	9/10	20,000,600

6.7.1 Exposure Analysis – Hazard Narrative Summaries

Earthquake

The Village and surrounding area can expect to experience limited, earthquake ground movement that may result in infrastructure damage. Intense shaking may be seen or felt based on past events. Although all structures are exposed to earthquakes, buildings within the Village 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 Village area has a limited risk of experiencing moderate to significant earthquake impacts as a result of its close proximity to known earthquake faults.

Historical data indicates that the entire existing, transient, and future Circle Village population, residential structures, and critical facilities are not exposed to the effects of a "severe" earthquake event. This includes approximately:

- 113 people in 44 residences (approximate structure value $13,200,000)
- 11 people in three government and emergency response facilities (approximate structure value $2,800,000)
- 32 people in two educational facilities (approximate structure value $17,700,000)
- Three people in one medical facility (approximate structure value $3,000,000)
- 33 people in 14 community facilities (approximate structure value $9,140,000)
- Eight road system miles (approximate value $8,000,000)
- One person in five transportation facilities (approximate structure value $30,030,000)
- 10 people in nine utility facilities (approximate structure value $30,000,600)

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

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 (beaches, docks, harbors, and electric and water/wastewater utilities), and economic impacts associated with costs trying to prevent or control erosion sites. Only a building's or facility's location can lessen its vulnerability to erosion in Circle.

Based on local knowledge, areas within the Village affected by erosion are located adjacent to the Yukon River or along road surfaces damaged by snow melt and rain run-off (Section 5.3.2.3). This includes approximately:

- 42 people in 14 residences (approximate structure value $4,200,000)
- Seven people in one government and emergency response facilities (approximate value $500,000)
- 13 people in six community facilities (approximate structure value $5,520,000)
- Three road system miles (approximate value $1,000,000)
- One person in one transportation facilities (approximate structure value $10,000,000)

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

Flood

Typical flood impacts associated with flooding is water damage to structures and contents, roadbed erosion and damage, boat strandings, areas of standing water in roadways, and damage or displacement of fuel tanks, power lines, or other infrastructure. Buildings on slab foundations, not located on raised foundations, and/or not constructed with materials designed to withstand flooding events (e.g., cross vents to allow water to pass through an open area under the main floor of a building) are more vulnerable to the impacts of flooding (see Section 5.3.3.3).

This includes approximately:

- 63 people in 21 residences (approximate structure value $6,300,000)
- 11 people in three government and emergency response facilities (approximate structure value $2,800,000)
- 32 people in two educational facilities (approximate structure value $17,700,000)
- Three people in one medical facility (approximate structure value $3,000,000)
- 33 people in 14 community facilities (approximate structure value $9,140,000)
- Eight road system miles (approximate value $8,000,000)
- One person in five transportation facilities (approximate structure value $30,030,000)
- 10 people in nine utility facilities (approximate structure value $30,000,600)

The Village anticipates that impacts to future populations, residential structures, critical facilities, and infrastructure will be at the same historical impact level.

Ground Failure

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

The potential ground failure impacts from avalanches, landslides, and subsidence can be widespread. Potential debris flows and landslides can impact transportation, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, or within alluvial fans or natural

drainages. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Damages may require reestablishing electrical, communication, and gas pipeline connections occurring from specific breakage points. Initial debris clearing from emergency routes and high traffic areas may be required. Water and wastewater utilities may need treatment to quickly improve water quality by reducing excessive water turbidity and reestablishing waste disposal capability.

Ground Failure hazards periodically cause structure and infrastructure displacement due to ground shifting, sinking, and upheaval. According to mapping completed by the DGGS, Circle has discontinuous permafrost (see Section 5.3.4.3).

Potentially threatened facilities include:

- 113 people in 44 residences (approximate structure value $13,200,000)
- 11 people in three government and emergency response facilities (approximate structure value $2,800,000)
- 32 people in two educational facilities (approximate structure value $17,700,000)
- Three people in one medical facility (approximate structure value $3,000,000)
- 33 people in 14 community facilities (approximate structure value $9,140,000)
- Eight road system miles (approximate structure value $8,000,000)
- One person in five transportation facilities (approximate structure value $30,030,000)
- 10 people in nine utility facilities (approximate structure value $30,000,600)

Impacts to future populations, residential structures, critical facilities, and infrastructure are anticipated at the same 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. Additional impacts may occur from secondary weather hazards or complex storms such as extreme high winds combined with freezing rain, high seas, and storm surge. Section 5.3.5.3 provides additional detail regarding severe weather impacts. 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 severe weather damage.

Based on information provided by the Village of Circle and the National Weather Service, the entire existing, transient, and future population, residential structures, and critical facilities are exposed to future severe weather impacts. This includes approximately:

- 113 people in 44 residences (approximate structure value $13,200,000)
- 11 people in three government and emergency response facilities (approximate structure value $2,800,000)
- 32 people in two educational facilities (approximate structure value $17,700,000)
- Three people in one medical facility (approximate structure value $3,000,000)
- 33 people in 14 community facilities (approximate structure value $9,140,000)
- Eight road system miles (approximate structure value $8,000,000)
- One person in five transportation facilities (approximate structure value $30,030,000)
- 10 people in nine utility facilities (approximate structure value $30,000,600)

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

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 Circle's boundaries. However, 323 wildland fires have occurred within a 50-mile radius of the Village (see Section 5.3.6.3). There is a high potential for wildland fire to interface with the population center of the Village. This area includes approximately:

- 113 people in 44 residences (approximate structure value $13,200,000)
- 11 people in three government and emergency response facilities (approximate structure value $2,800,000)
- 32 people in two educational facilities (approximate structure value $17,700,000)
- Three people in one medical facility (approximate structure value $3,000,000)
- 33 people in 14 community facilities (approximate structure value $9,140,000)
- Eight road system miles (approximate value $8,000,000)
- One person in five transportation facilities (approximate structure value $30,030,000)
- 10 people in nine utility facilities (approximate structure value $30,000,600)

6.8 FUTURE DEVELOPMENT

Table 6-7 delineates DCCED identified future, planned, and funded projects with their respective - tentative completion status.

Table 6-7 Planned and Funded Projects

(This information is slightly dated because DCCED is rebuilding their database and is currently unable to provide more current project data.)

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	$66,292
HUD	2008	Funded	IHBG/NAHASDA administration, operating & construction funds	Design	$59,634
HUD	2007	Funded	IHBG/NAHASDA administration, operating & construction funds	Construction	$69,779
Department of Education and Early Development (DEED)	2006	Funded	Circle Soil Remediation	Construction	$463,940
Alaska Native Tribal Health Consortium (ANTHC)	2006	Funded	Design water treatment plant renovations.	Design	$125,000
Denali Commission (Denali)	2006	Funded	Dust Control Design & Construction. The project consists of design and construction of improvements to 2.5 miles of the Steese Highway that passes through Circle/Circle City to improve safety and reduce dust in the communities. The communities are located at the end of the Steese Highway.	Construction	$900,000
Federal Aviation Administration (FAA)	2006	Funded	Rehabilitate Runway. OTHER FUNDING: DOT/PF	Contract	$177,156
ANTHC	2005	Funded	Water and sewer service	Preliminary	$2,810,000
EDA	2004	Funded	Circle Village Hotel Completion. Western Alaska Fisheries Disaster - Part Of Larger Project	Construction	$848,749
ANTHC	2002	Funded	Planning and design for a new health clinic. Funding to cover all expenses have not been received. Denali Commission has approved the additional funding via email correspondence dated 215-05 and 2-28-05. FY 2006 2Q Accomplishments: None: Grantee for village clinic site still not determined. FY2007 2	Design	$139,260

(DCRA 2013)

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7

MITIGATION STRATEGY

Section Seven outlines the six-step process for preparing a mitigation strategy including:

1. Identifying each jurisdiction's existing authorities for implementing mitigation action initiatives
2. NFIP Participation
3. Developing Mitigation Goals
4. Identifying Mitigation Actions
5. Evaluating Mitigation Actions
6. Implementing the Mitigation Action Plan (MAP)

DMA requirements for developing a comprehensive mitigation strategy include:

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 VILLAGE OF CIRCLE'S CAPABILITY ASSESSMENT

The Village's capability assessment reviews the technical and fiscal resources available to the community.

DMA 2000 Requirements
Incorporation into Existing Planning Mechanisms §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.
ELEMENT C. Incorporate into Other Planning Mechanisms
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?
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.

This section outlines the resources available to the Village of Circle for mitigation and mitigation related funding and training. Tables 7-1, 7-2, and 7-3 delineate the Village's regulatory tools, technical specialists, and financial resource available for project management. Additional funding resources are identified in Appendix A.

Table 7-1 Circle's Regulatory Tools

Regulatory Tools (ordinances, codes, plans)	Existing Yes/No?	Comments (Year of most recent update; problems administering it, etc.)
Comprehensive Plan	No	
Tribal Corporation Land Use Plan	No	
Emergency Response Plan	No	
Wildland Fire Protection Plan	No	
Building code	No	
Zoning ordinances	No	
Subdivision ordinances or regulations	No	
Special purpose ordinances	No	

Local Resources

The Village 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 Circle's Technical Specialists for Hazard Mitigation

Staff/Personnel Resources	Yes / No	Department/Agency and Position
Planner or engineer with knowledge of land development and land management practices	Yes	The Village has contractors on retainer to fulfill this need
Engineer or professional trained in construction practices related to buildings and/or infrastructure	Yes	The Village has contractors on retainer to fulfill this need

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

Staff/Personnel Resources	Yes / No	Department/Agency and Position
Planner or engineer with an understanding of natural and/or human-caused hazards	Yes	The Village has contractors on retainer to fulfill this need
Floodplain Manager	No	The Village coordinates floodplain activities with the State Floodplain Coordinator.
Surveyors	Yes	The Village has contractors on retainer to fulfill this need
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	Yes	The Village has staff with this knowledge
Personnel skilled in Geospatial Information System (GIS) and/or Hazards Us-Multi Hazard (Hazus-MH) software	Yes	The Village has contractors on retainer to fulfill this need
Scientists familiar with the hazards of the jurisdiction	No	Village can work with U.S. Fish & Wildlife Service (USFWS) and Fish & Game (ADF&G), and other agencies as needed.
Emergency Manager	Yes	Village President
Finance (Grant writers)	Yes	Village Finance Officer
Public Information Officer	Yes	Village Tribal Administrator

Table 7-3 Financial Resources Available for Hazard Mitigation

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
General funds	Can manage Tribal funds with Tribal Council approval
Indian Community Development Block Grants	Can accept and manage grants with Tribal Council approval
Capital Improvement Project Funding	Can accept and manage grants with Tribal Council approval
Authority to levy taxes for specific purposes	*Does not have the authority to exercise this resource*
Incur debt through general obligation bonds	*Does not have the authority to exercise this resource*
Incur debt through special tax and revenue bonds	*Does not have the authority to exercise this resource*
Incur debt through private activity bonds	*Does not have the authority to exercise this resource*
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 which 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. ***Note:** Circle does not qualify for this funding source because they do 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 to address identified potential hazard impacts for the Village of Circle within Section 5.3.

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, eleven 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-Hazards (MH)	
MH 1	Promote recognition and mitigation of all natural and manmade hazards that affect the Village of Circle (Village).
MH 2	Promote cross-referencing mitigation goals and actions with other Tribal planning mechanisms and projects.
MH 3	Reduce possibility of losses from all natural and manmade hazards that affect the Village.
Natural Hazards	
EQ 4	Reduce structural vulnerability to earthquake (ER) damage.
ER 5	Reduce erosion (ER) damage and loss possibility.
FL 6	Reduce flood (FL) damage and loss possibility.
GF 7	Reduce ground failure (GF) damage and loss possibility.
SW 8	Reduce structural vulnerability to severe weather (SW) damage.
WF 9	Reduce structural vulnerability to Tundra/Wildland Fire (WF) damage.

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 developing mitigation goals, the Planning Team reviewed a comprehensive list of potential mitigation actions that were identified during this HMP development process.

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 January 22, 2013, the Planning Team selected 14 new, and identified seven ongoing, natural hazard mitigation actions for potential Mitigation Action Plan (MAP) implementation during the

five-year life cycle of this HMP. The Planning Team placed particular emphasis on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure as well as facilities located in potential flood zones to comply with NFIP requirements should the Village join the NFIP.

The table breaks out the project criteria as considered, selected, ongoing, and completed. The Planning Team considered projects from a comprehensive list for each hazard type. They identified numerous "ongoing" mitigation actions currently in-process or those that were listed in other Village planning documents. The Planning Team then selected additional "newly identified" actions that would most benefit the community.

These 'Considered" projects are listed in Table 7-5 below.

Table 7-5 Potential Mitigation Actions

(Bold "Criteria" reflects ongoing and newly selected items identified for MAP implementation)

Supports Goal No.	Hazard	Criteria *Considered Selected Ongoing Completed*	Action Description
Multi- Hazards (MH)			
MH 1	Promote recognition and mitigation of all natural hazards that affect the Native Village of Circle.	**S**	Identify and pursue funding opportunities to implement mitigation actions.
		O	Disseminate FEMA pamphlets to educate and encourage homeowners concerning structural and non-structural retrofit benefits.
		O	*Identified as an Indian Environmental General Assistance Program (IGAP) goal* Improve the Villages evacuation route identification and public education to enable residents to move away from high hazard areas. This includes educating the public concerning warnings and evacuation procedures.
		S	Acquire emergency warning sirens to communicate critical emergency warnings and alerts.
MH 2	Cross reference Mitigation goals and actions with Tribal planning mechanisms and projects.	**S**	The Village 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.
		C	Integrate the Mitigation Plan hazard analysis findings for enhanced emergency planning.
		S	Update or develop, implement, and maintain jurisdictional debris management plans.
		O	Prohibit new construction in identified mitigatable hazard impact areas (flood, ground failure, erosion, etc.) or require building to applicable building codes for other hazard impacts (earthquake, weather, etc.).
		O	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.
MH 3	Reduce possibility of losses from all natural hazards that affect the Village	**S**	Acquire (buy-out), demolish, relocate, or elevate structures from hazard prone area (erosion, flood, ground failure, etc.) Property deeds "must be" restricted for open space uses for perpetuity to keep people from rebuilding in known hazard areas.
		C	Encourage community and agency to evaluate, harden, or relocate vulnerable infrastructure elements such as the

Table 7-5 Potential Mitigation Actions

(Bold "Criteria" reflects ongoing and newly selected items identified for MAP implementation)

Supports Goal No.	Hazard	Criteria *Considered Selected Ongoing Completed*	Action Description
Multi- Hazards (MH)			
			washeteria, for sustainability.
Natural Hazards			
EQ 4	Reduce vulnerability of structures to earthquake damage.	None	Planning Team has determined this hazard presents a minimal threat to the Village
ER 5	Reduce possibility of damage and losses from erosion.	**S**	Pursue opportunities to protect the Village's eroding embankment by identifying and implementing more viable mitigation initiatives such as better designed: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide Yukon River bank protection.
		S	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.
		S	Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end- or wing-walls).
FL 6	Reduce the possibility of damage and losses from flooding.	**S**	Establish flood mitigation priorities for critical facilities, residential structures, and commercial buildings located within the identified flood hazard area(s) (such as 100- and 500-year floodplains, stormwater, etc.) based on currently identified base flood elevation (BFE) survey elevation data.
		O	Increase culvert sizes to reduce flood and erosion damages by increasing drainage capacity.
		C	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.
		C	Research and select best mitigation option to provide wastewater treatment systems flood protection to prevent erosion or flooding damage and sewage lagoon out-wash.
GF 7	Reduce possibility of damage and losses from ground failure.	**S**	Promote ground failure (such as permafrost) sensitive construction practices in permafrost areas.
SW 8	Reduce vulnerability of structures to severe weather damage.	**S**	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
		C	Develop, implement, and maintain partnership program with electrical utilities to use underground utility placement methods, or to install "quick disconnect" utility protection where possible to reduce or eliminate power outages from severe winter storms.
		S	Provide personal use and training for a "safe tree harvesting" program. Implement along utility and road corridors to prevent or reduce potential winter storm damage.
WF 9	Reduce structural vulnerability to Wildland Fire damage for new and existing structures.	**S**	Promote FireWise building siting, design, construction, and landscaping processes and materials.
		O	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.).
		O	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.

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 January 22, 2014 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 Village. To complete this task, the Planning Team first prioritized the hazards that were regarded as the most significant within the community (earthquake, erosion, flood, ground failure, severe weather, and wildland fire).

The Planning Team reviewed the simplified social, technical, administrative, political, legal, economic, and environmental (STAPLEE) evaluation criteria (Table 7-6) and the Benefit-Cost Analysis Fact Sheet (Appendix G) 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 Village 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

Table 7-6 Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
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 January 22, 2014, the hazard mitigation Planning Team prioritized 21 natural hazard mitigation actions that were selected 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 within the MAP matrix (Table 7-8) was completed to provide the Village with an implementation approach.

7.5 MITIGATION ACTION PLAN

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

The Village's Mitigation Action Plan, Table 7-8, depicts how each mitigation action will be implemented and administered by the Planning Team. The MAP delineates 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 7-7 Potential Funding Source Acronym List

Native Village of Circle Tribal Council (Tribe)

Assistance to Native Americans (ANA)
(NAFSMA),

Bureau of Indian Affairs (BIA)
Housing Improvement Program (HIP)

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

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)

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)

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

US Department of Environmental Protection (EPA)

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

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 & recovery)

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 (DOT)
State Road Repair Funding

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

Alaska Department of Environmental Conservation (DEC) /
Village Safe Water (VSW),
Alaska Drinking Water Fund (ADWF),
Alaska Clean Water Fund [ACWF],
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 and Rural Fire Assistance Grant (VFAG/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)

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

Bering Straits Regional Housing Authority (BSRHA)

University of Alaska Fairbanks
Cold Climate Housing and Research Center (CCHRC)
Sustainable Northern Communities (SNC)

Lindbergh Foundation Grant Programs (LFGP)

Rasmuson Foundation Grants (LFG)

Table 7-8 Native Village of Circle's Mitigation Action Plan (MAP)

(Italicized projects were brought forward from cross referenced – Identified Plans)

Goal / Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
MH 1.1	Identify and pursue funding opportunities to implement mitigation actions.	High	Circle Tribal Council (Tribe)	Tribe	Ongoing	B/C: This ongoing activity is essential for the Village as there are limited funds available to accomplish effective mitigation actions. T/F: This activity is ongoing demonstrating its feasibility.
MH 1.2	Disseminate FEMA pamphlets to educate and encourage homeowners concerning structural and non-structural retrofit benefits.	Medium	Tribe	Tribe, FEMA HMA programs, AFG, FP&S, and SAFER	Ongoing	B/C: Sustained mitigation outreach programs have 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. T/F: 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 1.3	*Identified as an Indian Environmental General Assistance Program (IGAP) goal* Improve the Villages evacuation route identification and public education to enable residents to move away from high hazard areas. This includes educating the public concerning warnings and evacuation procedures.	Low	Tribe	Tribe, Denali Commission, Division of Community and Regional Affairs (DCRA), IGAP	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. T/F: This is technically feasible using existing tribal resources.
MH 1.4	Acquire emergency warning sirens and educate residents concerning emergency notification procedures to communicate critical emergency warnings and alerts.	Medium	Tribe	Tribe, DHS/HSGP DOT/AFG, FP&S, SAFER	3-5 years	B/C: Sustained emergency response planning and outreach programs have minimal cost and will help build and support community capacity enabling the public to prepare for, respond to, and recover from disasters. T/F: This project is technically feasible using existing Village staff

Table 7-8 Native Village of Circle's Mitigation Action Plan (MAP)

(Italicized projects were brought forward from cross referenced – Identified Plans)

Goal / Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
MH 2.1	The Village 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.	Medium	Tribe	Tribe, Denali Commission, DCRA, IGAP	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. T/F: 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	Update or develop, implement, and maintain jurisdictional debris management plans.	Low	Tribe	Tribe, HMA, AFG, FP&S, SAFER, ANA, EFSP, IGAP	1-4 years	B/C: Debris management plans are an essential disaster management tool. Focused and coordinated planning enables effective damage abatement and ensures proper attention is assigned to reduce losses, damage, and materials management. T/F: This action is feasible with limited fund expenditures.
MH 2.3	Prohibit new construction in identified mitigatable hazard impact areas (flood, ground failure, erosion, etc.) or require building to applicable building codes for other hazard impacts (earthquake, weather, etc.).	High	Tribe	Tribe, DCRA, Denali Commission, IGAP	Ongoing	B/C: Building code development, implementation and enforcement can 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. T/F: This project is technically feasible as the community need only demonstrate cost savings by demonstrating losses from history utility impacts and down time.
MH 2.4	Identify and list repetitively damaged structures and infrastructures, analyze the natural hazard threat to these facilities, and prioritize mitigation	Medium	Tribe	Tribe, Denali Commission, DCRA	Ongoing	B/C: Repetitive damage reduction is a high priority for FEMA and will therefore benefit the community greatly. Identifying RL and SRL properties is the first step to reducing losses.

Table 7-8 Native Village of Circle's Mitigation Action Plan (MAP)

(Italicized projects were brought forward from cross referenced – Identified Plans)

Goal / Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
	actions to protect the threatened population.					Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and Village residents. T/F: 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, relocate (or elevate for flood hazard area) structures to protect from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	High	Tribe	Tribe, HMA, NRCS, ANA, USACE, USDA, Lindbergh	1-5 years	B/C: This project would remove threatened structures from hazard areas, eliminating future damage while keeping land clear for perpetuity. TF: This project is feasible using existing staff skills, equipment, and materials. Acquiring contractor expertise may be required for large facilities.
EQ 4.1	None – Minimal threat to the Village					
ER 5.1	Pursue opportunities to protect the Village's eroding embankment by identifying and implementing more viable mitigation initiatives such as better designed: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide Yukon River bank protection.	High	Tribe	Tribe, HMA, ANA, NRCS, USACE	3-5 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. T/F: 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.
ER 5.2	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.	High	Tribe	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. TF: This project is technically feasible as the

Table 7-8 Native Village of Circle's Mitigation Action Plan (MAP)

(Italicized projects were brought forward from cross referenced – Identified Plans)

Goal / Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
						community need only demonstrate cost savings by demonstrating losses from history utility impacts and down time.
ER 5.3	Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end- or wing-walls).	High	Tribe	Tribe, HMA, ANA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	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. T/F: This project is technically feasible as the community need only demonstrate cost savings by demonstrating losses from history utility impacts and down time.
FL 6.1	Establish flood mitigation priorities for critical facilities, residential structures, and commercial buildings located within the identified flood hazard area(s) (such as 100- and 500-year floodplains, stormwater, etc.) based on currently identified base flood elevation (BFE) survey elevation data.	High	Tribe	Tribe, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. FEMA desires communities focus on repetitive flood loss properties. This activity will ensure the Tribal Council focuses on priority flood locations and projects. T/F: Low to no cost makes this outreach activity very feasible.
FL 6.2	Increase culvert sizes to reduce flood and erosion damages by increasing drainage capacity.	High	Tribe	Tribe, HMA, ANA, Denali Commission, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	Ongoing	B/C: Improving water flow capability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh replacement costs of lost facilities. T/F: 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.
GF 7.1	Promote ground failure (such as permafrost) sensitive construction practices in permafrost areas.	Medium	Tribe	Tribe, HMA, ANA	2-4 years	B/C: This outreach project would decrease damage to facilities if they were sited and used the most appropriate construction practices. T/F: Technically feasible as the community is currently working with UAF and other entities to

Table 7-8 Native Village of Circle's Mitigation Action Plan (MAP)

(Italicized projects were brought forward from cross referenced – Identified Plans)

Goal / Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
						determine most viable permafrost construction practices.
SW 8.1	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.	Low	Tribe	Tribe, DOF: VFAGP, RAGP	Ongoing	B/C: Implementing this mitigation activity will potentially reduce ancillary damage from severe winter storms caused by heavy snow loads, icy rain, and wind. T/F: This type activity is technically feasible within the community typically using existing labor, equipment, and materials.
SW 8.2	Provide personal use and training for a "safe tree harvesting" program. Implement along utility and road corridors to prevent or reduce potential winter storm damage.	Low	Tribe	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. T/F: This type activity is technically feasible within the community by implementing existing programs such as Fire Wise and other State and Federal agency programs.
WF 9.1	Promote FireWise building siting, design, construction, and landscaping processes and materials.	Medium	Tribe	Tribe, AFG, FP&S	1-3 Years	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support community capacity enabling the public to appropriately prepare for, respond to, and recover from disasters. T/F: This project is technically feasible using existing Tribal staff.
WF 9.2	Provide wildland fire hazard outreach information in an easily distributed format for all residents.	Medium	Tribe	Tribe, AFG, FP&S	Ongoing	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support community capacity enabling the public to appropriately prepare for, respond to, and recover from disasters. T/F: This project is technically feasible using existing Tribal staff.

Table 7-8 Native Village of Circle's Mitigation Action Plan (MAP)

(Italicized projects were brought forward from cross referenced – Identified Plans)

Goal / Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
WF 9.3	Develop, adopt, and enforce burn ordinances that controls outdoor burning, require burn permits, and restricts open campfires during identified weather periods (windy, dry, etc.).	Medium	Tribe	Tribe	1-5 years	B/C: Ordinance development, implementation, and enforcement can effectively reduce future losses to hazardous events. T/F: This project is technically feasible and enforceable.
WF 9.4	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.	Medium	Tribe	Tribe, AFG, FP&S, SAFER	Ongoing	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. T/F: This project is technically feasible using existing Tribal Council staff.

7.6 IMPLEMENTING MITIGATION STRATEGY INTO EXISTING PLANNING MECHANISMS

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

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.
- The Circle Native Village has no governing authority per the Alaska Constitution and the Alaska Native Claims Settlement Act (ANCSA). However, the Village successfully works with applicable State agencies to manage ongoing development and resource management for their community. The Mitigation Strategy, Section 7, identifies several ongoing and successful mitigation activities. These activities include tribal Work with pertinent state agencies, tribal staff, and residents to increase awareness for implementing HMP philosophies and identified initiatives. The Tribal Council will strive to implement the mitigation strategy as they prepare for, respond to, and recover from natural hazard impacts.
- Implementing this philosophy and activities may require updating or amending specific planning mechanisms.

8

REFERENCES

Section Eight lists reference materials and resources used to prepare this HMP.

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Appendix A
Funding Resources

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Funding Resources

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 National Incident Management System (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 (DHS) 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 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)

- The Indian Environmental General Assistance Program (GAP or IGAP) is exempt from competition. EPA has determined that competition for GAP is not practical because of the need to provide a clear and stable source of base funding for tribal program development and capacity building consistent with the primary statutory purpose of the program. Therefore, all applications that meet the stated requirements in program regulations and this guidance will be funded if funds are available. This grant notification includes two GAP funding opportunities:
  - GAP Grants to tribes and tribal Consortia
  - Coordination of the Regional Tribal Operations Committee

(http://yosemite.epa.gov/R10/TRIBAL.NSF/Grants/igap_2013#bpd)

- 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 (IHLGP). 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. DOT increases State, Territorial, Tribal and local effectiveness in safely and efficiently handling hazardous materials accidents and incidents, enhances implementation of the Emergency Planning and Community Right-to-Know Act of 1986, and encourages 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 provides information concerning disaster assistance, preparedness, planning, cleanup, and recovery planning. (http://www.sba.gov/category/navigation-structure/starting-managing-business/managing-business/running-business/emergency-preparedness-and-disaster-)
  - 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.
- Grants.gov. was established as a governmental resource named the E-Grants Initiative, part of the President's 2002 Fiscal Year Management Agenda to improve government services to the public. The concept has its origins in the Federal Financial Assistance Management Improvement Act of 1999, also known as Public Law 106-107. The Grants Policy Committee (GPC), a committee of the U.S. Chief Financial Officers (CFO) Council consisting of grants policy experts from across the federal government assumed responsibility for implementing P.L. 106-107, working to enhance federal financial assistance even after P.L. 106-107 expired in November 2007. The Council on Financial Assistance Reform (COFAR), created in October 2011, continues to assist the Federal financial assistance community with delivery, management, coordination, and accountability of Federal grants and cooperative agreements.

  Today, www.Grants.gov is a central storehouse for information on over 1,000 grant programs and provides access to approximately $500 billion in annual awards.

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://ready.alaska.gov/plans/mitigation.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 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's" 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). DEC's primary roles and responsibilities concerning hazards mitigation are ensuring safe food and safe water, and pollution prevention and pollution response. DEC ensures water treatment plants, landfills, and bulk fuel storage tank farms are safely constructed and operated in communities. Agency and facility response plans include hazards identification and pollution prevention and response strategies. (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.
- Rural Alaska Community Action Program Inc. (RurAL CAP) In the nearly 50 years since it began, it is difficult to imagine any aspect of rural Alaskan lives which has not been touched in some way by the people and programs of RurAL CAP. From Head Start, parent education, adult basic education, and elder-youth programs, to Native land claims and subsistence rights, energy and weatherization programs, and alcohol and substance abuse prevention, RurAL CAP has left a lasting mark on the history and development of Alaska and its rural Peoples. (http://ruralcap.com/?page_id=334)

  From its earliest days to the present, RurAL CAP's success can be attributed to the direct involvement of rural Alaskans in its programs and in the decision making processes

which affect their lives, and to the belief in and respect for those Peoples by the board and staff of RurAL CAP.

- Weatherization Assistance Program assists low to moderate income households in weatherization needs. The program is available to homeowners as well as renters and includes; single family homes, cabins, mobile homes, condominiums and multifamily dwellings.

  Services *may* include improvements such as; air sealing, caulking and insulation, doors and windows, exterior paint, heating system test and tune, ventilation and moisture control. Major home repairs are not classified under weatherization and thus are not eligible under the program. (http://www.weatherizeme.org/Applications/RUR/Wx%20app%20Rural%2004-13.pdf)

- Energy Programs. VISTA Energy Program (VEP) Members work on projects like energy efficiency education, planning and capacity building for renewable energy options, and home energy efficiency education. VEP helps rural Alaskan communities reduce their energy bills.

  VEP Members build partnerships, developed funding proposals, and worked with their sponsoring council to raise money and in-kind resources for energy projects in their communities.

- Environment. RurAL CAP has several interwoven projects under the Environmental Program. All of these projects were created to respond to the needs rural Alaskans reported in community assessments conducted by AmeriCorps members. All of these interconnected projects address local environmental issues with local solutions, connect rural Alaskans to each other to share resources, and are connected to the RAVEN AmeriCorps program.

  RurAL CAP's environmental programs surround issues of solid waste, backhaul efforts, the RAVEN AmeriCorps program, subsistence and indoor air quality. The programs include the Denali Solid Waste Grants, EPA Community Environmental Demonstration Projects, Solid Waste Management Technical Assistance, RAVEN AmeriCorps Members, Subsistence in Alaska, and Alaska Village Indoor Air Quality.

- Solid Waste Management. RurAL CAP continues to host an expert solid waste liaison, Ted Jacobson, through funding provided by the Environmental Protection Agency (EPA) and Senior Services America, Inc. The liaison provides solid waste management technical assistance to rural communities through training, site visits, hands-on demonstrations, and remote contact. Resources are provided for dump management activities, collaborating with funders for funding and technical assistance on solid waste management, recycling, and backhaul.

- 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.
- University of Alaska Fairbanks, Cold Climate Housing and Research Center (CCHRC); Sustainable Northern Communities (SNC). The Sustainable Northern Shelter program was initiated in 2008 to address the need for sustainable rural housing in northern climates. CCHRC designers work with local residents and housing authorities to develop homes that reflect the culture, environment, and local resources of individual communities. The designs emphasize energy efficiency, affordability, and durability.
    - CCHRC has developed several prototype homes that can be easily and affordably reproduced throughout communities to provide much-needed housing. The program, which started with an experimental house made out of spray foam in Anaktuvuk Pass, has grown to encompass more than a dozen villages throughout Alaska. (http://www.cchrc.org/sustainable-northern-communities).
- 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.

  Rasmuson Foundation awards grants both to organizations serving Alaskans through a base of operations in Alaska, and to individuals for projects, fellowships and sabbaticals. To be considered for a grant award, grant seekers must meet specific criteria and complete and submit the required application according to the specific guidelines of each program. (http://www.rasmuson.org/index.php?switch=viewpage&pageid=5)

  - Tier 1 Awards: Grants of up to $25,000 for capital projects, technology updates, capacity building, program expansion, and creative works.
  - Tier 2 Awards: Grants over $25,000 for projects of demonstrable strategic importance or innovative nature.
  - Pre-Development Program: Guidance and technical resources for planning new, sustainable capital projects.

  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

FEMA Hazard Mitigation Plan (HMP) 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: Native Village of Circle	**Title of Plan:** Native Village of Circle Hazard Mitigation Plan	**Date of Plan:** February 2014
Local Point of Contact: Jessica Boyle	**Address:** PO Box 89 Circle, AK 99733	
Title: First Chief		
Agency: Native Village of Circle		
Phone Number: 907.773.2822	**E-Mail:** Jessica.boyle@tananachiefs.org	

State Reviewer: **Scott Nelsen**	**Title: Mitigation Planner**	**Date: 3/7/2014**

FEMA Reviewer: Brett Holt	**Title:** Mitigation Planner	**Date:** April 24, 2014; June 5, 2014
Date Received in FEMA Region X	March 10, 2014; May 16, 2014	
Plan Not Approved		
Plan Approvable Pending Adoption	June 5, 2014	
Plan Approved	July 23, 2014	

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))	Section 3.1, Page 3-1 Section 3.2, Page 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))	Section 3.3, Page 3-3	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 3.3, Page 3-3	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Throughout the plan, Section 8	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))	Section 3.5.2, Page 3-7	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))	Section 3.5.3,Page 3-7	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))	Section 5	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))	Section 5	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))	Chapter 6	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))	Section 6.4	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))	Section 7.1, Page 7-1 Tables 7-1, 7-2, 7-3, Page 7-2	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))	Section 1.1, Page 1-3 Section 6.4.1.1 Page 6-10	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 7.2 Table 7-4, Page 7-5	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))	Section 7-3 Table 7-5, Page 7-6	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))	Section 7-4, Process, Page 7-8 Section 7.5 Implementation Plan Tables 7-7, 7-8, Page 7-10	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))	Section 7.6 Page 7-18	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))	Section 4.1, Page 4-1		√
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			

Appendix C
HMP Promulgation

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THE STATE of ALASKA
GOVERNOR SEAN PARNELL

Department of Military and Veterans Affairs
Division of Homeland Security and Emergency Management
P.O. Box 5750
JBER, AK 99505-0800
Main: 907.428.7000
Fax: 907.428.7009
www.ready.alaska.gov

COPY

June 30, 2014

Jessica Boyle
First Chief
Native Village of Circle
P.O. Box 89
Circle, AK 99733

RE: Native Village of Circle Hazard Mitigation Plan

Dear Ms. Boyle:

Culminating a successful collaborative effort, the Native Village of Circle Hazard Mitigation Plan is hereby adopted. Upon Federal Emergency Management Agency (FEMA) approval, the community will be eligible for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation assistance grants.

The Native Village of Circle is an unincorporated community located within Alaska's Unorganized Borough. Therefore, we are serving as the community's adopting authority in accordance with FEMA policy.

If you have any questions regarding your hazard mitigation plan or FEMA's mitigation grant programs, please contact Scott Nelsen, State Hazard Mitigation Planner, at (907) 428-7010.

Sincerely,

John W. Madden
Director

Y:\Templates\Scott's letter to Circle.docx

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Appendix D
Public Outreach Activities

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Simmons, Scott

From: Simmons, Scott
Sent: Tuesday, August 06, 2013 2:24 PM
To: 'mewest@alaska.edu'; 'hdenny@anthc.org'; 'tneal@usgs.gov'; 'swhite@avcp.org'; 'steve.heppner.bia.ak@gmail.com'; 'kato_howard@ak.blm.gov'; 'jneimeyer@denali.gov'; 'leslie.pearson@alaska.gov'; 'ryan.anderson@alaska.gov'; 'Alice.Edwards@alaska.gov'; 'taunnie.boothby@alaska.gov'; 'scott.nelsen@alaska.gov'; 'alan.wien@alaska.gov'; 'terri.lomax@alaska.gov'; 'Soderlund.Dianne@epamail.epa.gov'; 'john.lingaas@noaa.gov'; 'joel.curtis@noaa.gov'; 'sam.albanese@noaa.gov'; 'meg.mueller@ak.usda.gov'; 'merlaine.kruse@ak.usda.gov'; 'greg.magee@alaska.gov'; 'Anna_Plager@dnr.state.ak.us'; 'kerry_walsh@dnr.state.ak.us'; 'John_Dunker@dnr.state.ak.us'; 'Steve_Clautice@dnr.state.ak.us'; 'patricia_burns@dnr.state.ak.us'; 'Steve_McGroarty@dnr.state.ak.us'; 'Mac_McLean@dnr.state.ak.us'; 'Margie_Goatley@dnr.state.ak.us'; 'Bruce.R.Sexauer@poa02.usace.army.mil'; 'colleen.bickford@hud.gov'; 'ak_le@fws.gov'
Cc: Dunable, Erin; DHSEM Scott Nelsen
Subject: Hazard Mitigation Plan Development Project Initial Notice

Dear Potential HMP Development Participants,

URS Corporation has received a 2013 contract from the State Division of Homeland Security and Emergency Management (DHS&EM) to develop 11 Local All-Hazard Mitigation Plans for the following communities:

- City of Brevig Mission
- City of Chefornak
- Village of Circle
- City of Eagle
- City of Eek
- City of Elim
- City of Koyuk
- City of Marshall
- City of Mountain Village
- City of Napaskiak
- City of Toksook Bay

We invite you to participate in this important community planning effort during the development process. Community newsletters will be located on the DHS&EM Local/Tribal All Hazard Mitigation Plan Development website at: http://ready.alaska.gov/plans/localhazmitplans.htm as the communities finalize them.

Please feel free to contact me and to forward this email to the most appropriate person within your agency (please cc me so I may update the contact list) involved with hazard assessments, hazard mitigation plan development or community specific hazard information or planning suggestions.

I encourage you to provide this information at your earliest convenience to allow me include it (with appropriate acknowledgments) within the Draft HMPs prior to State and FEMA review.

Kind Regards

-Scott-

R. Scott Simmons
Emergency Management | *Hazard Mitigation* | *Climate Change Adaptation Planner*

NOTE: *We have moved we now have new office address and phone numbers effective Immediately:*

3201 C Street, Suite 200 | Anchorage, AK 99503
Ph: 907.433.6711 | 800.909.6787 | Fax: 907.644.6930
eMail Address: scott.simmons@urs.com

Simmons, Scott

From: Simmons, Scott
Sent: Tuesday, August 06, 2013 1:46 PM
To: 'angela@arcticrg.com'; 'jessica.boyle@tananachiefs.org'
Cc: Dunable, Erin
Subject: Village of Circle Hazard Mitigation Plan Development Project funded by DHS&EM
Attachments: Circle Newsletter 1_8-6-2013.pdf

Good Afternoon,
My name is Scott Simmons. I work for URS Corporation located in Anchorage and I specialize in Hazard Mitigation Plan development and other emergency management projects. Mr. Scott Nelsen, DHS&EM, has contracted with URS to develop a FEMA compliant Hazard Mitigation Plan for the Native Village of Circle and 10 other rural communities.

We are excited about helping the Village with developing your hazard Mitigation Plan.

I am writing to introduce you to the project as one of eleven communities for URS Corporation (URS) to assist with developing a Hazard Mitigation Plan (HMP). It is important to note that the Village does not have to pay anything for this project. This is an important project for your community funded by FEMA through the Alaska Division of Homeland Security and Emergency Management (DHS&EM). DHS&EM hired URS Corporation to work with each community.

URS has been developing HMPs nationwide since 2000. Our Alaska office has completed approximately 60 State, Borough (County) and local community, State reviewed, and FEMA approved Hazard Mitigation Plans to-date.

Mitigation is defined as “any sustained action taken to reduce or eliminate long-term risk to life and property from natural, manmade or technological hazards and their impacts.”

Hazard Mitigation plans identify hazards which routinely impact a community, defines those hazards so community members understand their nature and their impact locations within the community, and their potential impact extent. The HMP also includes a strategy to reduce or avoid future damages from the identified hazards.

URS's role in this project is to ensure that the HMP meets state and federal requirements -- part of this requirement is to describe the process in which the community was involved. We are at the beginning stages of this project, and it is our experience that successful plans are a result of an involved community.

Our first goal for the community is to select a Planning Team Leader and team members. Who do you recommend? Ms. Jessica Boyle, Tribal Administrator?

Team members should have knowledge of the natural hazards that continually cause Village damages; what facilities are critical for protection from these hazards; as well as, what Village resources and capabilities are available within the community to mitigate those hazards.

URS will write the plan. The community Planning Team will assist the process by participating on project funded teleconferences to:

- Identify which hazards routinely impact your community,
- Gather and provide historical disaster damage information,
- Identify the community’s critical facilities and their location within each identified hazard’s impact area,
- Determine their estimated replacement costs,
- Define the community’s population risk and critical facility vulnerabilities,

- Develop hazard mitigation goals,
- Identify potential projects which could reduce or eliminate each hazard's impact and subsequent damages,
- Identify potential funding sources,
- Describe the plan's development process, involved community member participants, involved agency participants, public participation processes, and continued plan maintenance and the update process.

We suggest you ask for team member volunteers from the Village Council, the health clinic, school, volunteer fire fighters, law enforcement, elders, and others. We suggest no more than four or five members on this team. However, some communities have chosen to involve their entire Tribal Council. There will be opportunities for the entire community to review the team's work at strategic points because FEMA requires at least two public involvement activities. These activities can include tribal council meetings, distributing community wide brochures or newsletters, holding public meetings, and participating in planning workgroup teleconferences.

URS will provide two (2) newsletters. The first newsletter (1st draft attached) will introduce the project and explain the planning process, encourage public involvement; ask the community to identify known hazards, and to confirm their critical infrastructure as identified by DHS&EM's statewide small community Critical Facility Database. Please provide me your Planning Team member's names to include on the draft newsletter so I can email you a completed newsletter for distributing or posting throughout the community.

The second newsletter, will introduce the draft HMP and encourage the community to review and provide comments to make the plan better or more usable to mitigate your hazards.

We would like to schedule a teleconference to introduce the project and explain the process. The newsletter further describes the process and the information we will need to allow us to proceed. We may invite members of DHS&EM's Mitigation Section staff to answer pertinent HMP development questions.

When would you like to schedule the Kick-off teleconference. I will return a finalized copy of Newsletter #1 for distribution before the project kick-off teleconference.

Please call or email either me or Erin Dunable (261.9737, erin.dunable@urs.com) with any questions.

Thank you for your excitement for participating in this planning opportunity.

Kind Regards
-Scott-

R. Scott Simmons
Emergency Management **|** *Hazard Mitigation* **|** *Climate Change Adaptation Planner*

NOTE: *We have moved we now have new office address and phone numbers effective Immediately:*
3201 C Street, Suite 200 | Anchorage, AK 99503
Ph: 907.433.6711 | 800.909.6787 | Fax: 907.644.6930
eMail Address: scott.simmons@urs.com

Hi Scott,

Yes, I've contacted them and they requested a mitigation plan for their community. I'm forwarding the original e-mail transcripts with contact information now.

Scott

From: Nelsen, Scott G (MVA)
Sent: Monday, July 08, 2013 3:46 PM
To: 'jessica.boyle@tananachiefs.org'
Cc: Gravier, Ann Y (MVA)
Subject: Circle Hazard Mitigation Plan

Hi Jessica,

It was good talking to you on the phone. We will begin writing your hazard mitigation plan. As promised, your community will receive a copy of the draft plan for review, as well as many opportunities for your community to offer input and make changes throughout the writing. This will be your community's plan and you may make any changes or additions as you wish.

My contact information is below. I'm looking forward to working with you.

Scott Nelsen
Emergency Management Specialist
Department of Military and Veterans Affairs
Division of Homeland Security and Emergency Management
Direct: 907-428-7010
Mobile: 907-343-9915
Fax: 907-428-7009

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VILLAGE OF CIRCLE HAZARD MITIGATION PLAN

Newsletter #1 **October 2013**

This newsletter discusses the preparation of the Village of Circle 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 Village of Circle 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, etc. 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 Village of Circle 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) and the National Insurance Program's Flood Mitigation Assistance (FMA), grant programs are nationally competitive funding programs. These grants 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/mitigation-planning-laws-regulations-guidance.

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?fromSearch=fromsearch&id=4859; 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/hazard-mitigation-planning-resources. The Village'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 Yukon Flats Regional Educational Attendance Area (REAA) that may also occur specifically in Circle.

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.

Circle Hazard Worksheet		
Hazard	Yukon Flats REAA*	Village of Circle
Earthquake	Yes	Yes
Erosion	Yes	Yes
Flood	Yes	Yes
Ground Failure (Avalanche, Landslide, Permafrost)	Yes	Yes
Severe Weather	Yes	Yes
Tsunami & Seiche	No	No
Volcano	No	No
Wildland Fire	Yes	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 Village of Circle 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 Circle. Please add additional facilities if needed.

Circle's Critical Facilities	
Facility Name	Facility Name
Circle Council Office	Cemetery #1
Post Office	Cemetery #2
Circle Fire Hall	Airport (Main)
Circle School, P-12	Airport, Tribal (Small)
Circle School Shop	Floatplane & Boat Dock
Health Clinic	Service/Maintenance Shop
Holy Trinity Church	Boat Launch Pad
KJNP church	Circle Washeteria - Potable Water Treatment Facility
Calvary Northern Lights Mission	Circle Washeteria - Water Storage
Community Center (Old Tribal Hall)	Fuel Storage Tanks (>500gal)
Tribal Hall	Landfill/Incinerator
Circle Fish Company	Circle Washeteria
Hutchinson Commercial Company	Sewage Lagoon
New Circle Tribal Hall	Circle Electric Utility
Circle Lodge	Power House Generator
Teachers Quarters	Alascom
School Utility Storage	School Satellite Dish
Tool Shed	Circle Trading Post Satellite Dish
Circle Village Camping Park	Health Clinic Satellite Dish
* 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 First Chief Jessica Boyle with assistance from the Tribal Council. 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 Native Village of Circle 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 Village of Circle'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:

Village of Circle
Planning Team Leader
Jessica Boyle, (First Chief)
P.O. Box 89
Circle, AK 99733
Phone: 907.773.2822
Jessica.boyle@tananachiefs.org

URS Corporation
Scott Simmons, Hazard Mitigation, Emergency Management, and Climate Change Planner
3201 C Street, Suite 200
Anchorage, Alaska 99503
433.6711 or 800.909.6787
scott_Simmons@urs.com

Division of Homeland Security & Emergency Management
Scott Nelsen, State Support
PO Box 5750
Anchorage, AK 99505-5750
428.7010 or 800.478.2337
scott.nelsen@alaska.gov

Simmons, Scott

From: Simmons, Scott
Sent: Thursday, October 17, 2013 12:26 PM
To: 'jessica.boyle@tananachiefs.org'
Subject: Critical Facilities List - Please review
Attachments: Circle-CriticalFacility-HazardsSpreadsheet-Done-ss 10-16-13.pdf; Circle Newsletter 1_ 10-16-2013.pdf

Hello Jessica,
This is a duplicate message that I faxed on 10/16.

I have attached the Critical Facilities spreadsheet we worked on earlier today. This will be used in the HMP as the basis for the Village's hazard vulnerability assessment.

Please review it, make corrections as needed and either email it or fax it back to me as soon as you are able. I would like to get it back by next Monday, October 21, 2013 to enable me to move to the next section.

I will send this to you via email along with the updated newsletter. Please post the newsletter to fulfill one of two FEMA community involvement requirements for developing this plan.

Thank you for making time for this portion of the project.

Kind Regards
-Scott-

R. Scott Simmons, CFM
Emergency Management | *Hazard Mitigation* | *Climate Change Adaptation Planner*

NOTE: We have moved back to our old office. The address and phone numbers are effective Immediately:

700 G Street, Suite 500 | Anchorage, AK 99501
Ph: 907.261.9706 | 800.909.6787 | Fax: 907.562.1297
eMail Address: scott.simmons@urs.com

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

FEMA

June 5, 2014

Ms. Ann Gravier
State Hazard Mitigation Planner
Alaska Division of Homeland Security
and Emergency Management
P.O. Box 5750
Fort Richardson, Alaska 99505-5750

Dear Ms. Gravier:

As requested, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has completed a pre-adoption review of the ***Native Village of Circle Hazard Mitigation Plan***. The plan successfully contains the required criteria, excluding the adoption, for hazard mitigation plans, as outlined in 44 CFR Part 201. This letter serves as Region 10's commitment to approve the plan upon receiving documentation of its adoption by the Community.

The plan will not be formally approved by FEMA until it is adopted. The Community is not eligible for mitigation project grants until the plan is formally approved by FEMA.

Please contact our Regional Mitigation Planning Manager (Acting), Brett Holt, at (425) 487-4553 with any questions.

Sincerely,

Tamra Biasco
Chief, Risk Analysis Branch
Mitigation Division

BH:bb

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URS

January 23, 2014

Tribal Administrator
Native Village of Circle
P.O. Box 89
Circle, AK 99733

RE: City of Brevig Mission Draft Hazard Mitigation Plan Review

Dear Ms. Jessica Boyle,

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 by January 31, 2014.

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

Direct: 907.261.9706
scott.simmons@urs.com

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NATIVE VILLAGE OF CIRCLE HAZARD MITIGATION PLAN (HMP)

February 2014 **Newsletter 2**

This newsletter discusses the preparation of the Native Village of Circle 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 Village of Circle was one of 11 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 tundra/wildland fire. The HMP also identifies the people and facilities potentially at risk and potential actions to mitigate community hazards. The public participation and planning process is 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.

People and property throughout 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 reduce the risk severity of hazards on people and property. Mitigation programs may include short-term and long-term activities to reduce hazard impacts or exposure to hazards. Mitigation could include education, construction or planning 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 HMP. 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
- Community Involvement and HMP review
- Hazard identification
- Risk assessment
- Mitigation Goals
- Mitigation programs, actions, and projects
- A resolution from the community adopting the plan

FEMA has prepared a Local Planning Review Guide) and (available at: http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=4859). It explains how the HMP meets each of the DMA2000 requirements. FEMA has prepared and "Mitigation Planning Guidance" and "How to Guides" (available at: http://www.fema.gov/hazard-mitigation-planning-resources). The City's Hazard Mitigation Plan will follow those guidelines.

The planning process kicked-off on August 6, 2013 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, the Planning Team 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 Circle.

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 January 22, 2014, the local planning committee identified projects and/or actions for each hazard that focus 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 was 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 Tribal office 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 January 31, 2014. The plan will be provided to DHS&EM and FEMA for their preliminary approval and returned to Circle's Tribal Council for implementation.

The Planning Committee

The plan was developed with the assistance from the community's planning committee consisting of a cross section from the community. Planning Team members who helped with developing the plan include Tribal Administrator and Planning Team Leader, Jessica Boyle, with assistance from the Tribal Council and URS Corporation.

Sample of the City/Village of 's Mitigation Actions. Review the draft HMP for a complete list.		
Identify and pursue funding opportunities to implement mitigation actions.	Acquire emergency warning sirens to communicate critical emergency warnings and alerts.	Update or develop, implement, and maintain jurisdictional debris management plans.
The Village 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.	Acquire (buy-out), demolish, relocate, or elevate structures from hazard prone area (erosion, flood, ground failure, etc.) Property deeds "must be" restricted for open space uses for perpetuity to keep people from rebuilding in known hazard areas.	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.
		Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end- or wing-walls).
		Update or develop, implement, and maintain jurisdictional debris management plans.
Establish flood mitigation priorities for critical facilities, residential structures, and commercial buildings located within the identified flood hazard area(s) (such as 100- and 500-year floodplains, stormwater, etc.) based on currently identified base flood elevation (BFE) survey elevation data.	Pursue opportunities to protect the Village's eroding embankment by identifying and implementing more viable mitigation initiatives such as better designed: Rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide Yukon River bank protection.	Promote ground failure (such as permafrost) sensitive construction practices in permafrost areas.
		Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
		Provide personal use and training for a "safe tree harvesting" program. Implement along utility and road corridors to prevent or reduce potential winter storm damage.

We encourage you to learn more about the Native Village of Circle'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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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: _____ (date) to _____ (date)

Project Title: _____ Project ID# _____

Responsible Agency: _____

Address: _____

City: _____

Contact Person: _____ Title: _____

Phone #(s): _____ email address: _____

List Supporting Agencies and Contacts:

_____

_____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

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

Anticipated completion date: _____

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

_____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal (s) Addressed:

Goal: _____

Indicator of Success: _____

_____

_____

_____

Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed*

*explain: _____

_____

☐ Project canceled

Project Cost Status

☐ Cost unchanged

☐ Cost overrun*

*explain: _____

_____

☐ Cost underrun*

*explain: _____

_____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

_____

_____

_____

_____

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

_____

_____

_____

_____

C. How was each problem resolved?

_____

_____

_____

_____

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

Other Comments: