The City of Nulato
Hazard Mitigation Plan

Prepared by
The City of Nenana
Mitigation Planning Team

January 2010

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

FEMA

January 13, 2010

Honorable Sharon Agnes
Mayor, City of Nulato
P.O. Box 65009
Nulato, Alaska 99765

Dear Mayor Agnes:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***City of Nulato Hazard Mitigation Plan*** as a local plan as outlined in 44 CFR Part 201. With approval of this plan, the City of Nulato is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through January 13, 2015.

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 monitoring and updating the plan, 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: Mark Roberts, Alaska Division of Homeland Security and Emergency Management

Enclosure

KM:bb

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Acronyms and Abbreviations

°F	Degrees Fahrenheit
ACF	Administration of Children & Families
AFG	Assistance to Firefighters Grant
AHFC	Alaska Housing Finance Corporation
AICC	Alaska Interagency Coordination Center
ANA	Administration for Native Americans
ANCSA	Alaska Native Claims Settlement Act
ANTHC	Alaska Native Tribal Health Consortium
APA	American Planning Association
ARC	American Red Cross
ATV	all-terrain vehicle
AVEC	Alaska Village Electric Cooperative
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CD	Compact Disc
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
CHEMS	Community Health and Emergency Medical Services
DCCED	Department of Commerce, Community, and Economic Development
DCRA	Division of Community and Regional Affairs
DEC	Department of Environmental Conservation
DGGS	Division of Geological and Geophysical Survey
DHS	United States Department of Homeland Security
DHS&EM	Division of Homeland Security and Emergency Management
DHSS	Department of Health and Social Services
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
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map

FMA	Flood Mitigation Assistance
FP&S	Fire Prevention and Safety
FY	Fiscal Year
g	gravity as a measure of peak ground acceleration
HAZUS-MH	Hazards US-Multi-Hazard
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HUD	Housing and Urban Development
HWE	High Water Elevation
HWM	High Water Marks
IBHS	Institute for Business and Home Safety
IHS	Indian Health Service
IRS	Internal Revenue Service
M	Magnitude
MM	Modified Mercalli
mm	millimeter
mph	miles per hour
MSL	mean sea level
NAHASDA	Indian Housing Block Grant – Native American Housing Assistance and Self Determination Act
NFIP	National Flood Insurance Program
PDM	Pre-Disaster Mitigation
PGA	peak ground acceleration
RFC	repetitive flood claims
RL	repetitive loss
SAFER	Staffing for Adequate Fire and Emergency Response
SBA	Small Business Administration
SRL	severe repetitive loss
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
UHMA	Unified Hazard Mitigation Assistance
URS	URS Corporation
USACE	United States Army Corps of Engineers
USC	United States Code
USDA/RD	United States Department of Agriculture/Rural Development
USGS	United States Geological Survey
VPSO	Village Public Safety Officer

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

1.1 HAZARD MITIGATION PLANNING

Hazard mitigation, as defined in Title 44 of the Code of Federal Regulations (CFR), Part 201, §201.2, is "any sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." Many areas have expanded this definition to also include human-caused hazards. As such, hazard mitigation is any work done to minimize the impacts of any type of hazard event before it occurs. It aims to reduce losses from future disasters. Hazard mitigation is a process in which hazards are identified and profiled, people and facilities at risk are analyzed, and mitigation actions are developed. The implementation of the mitigation actions, which include long-term strategies that may include planning, policy changes, programs, projects, and other activities, is the end result of this process.

1.2 PLANNING REQUIREMENTS

1.2.1 Local Mitigation Plans

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

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

FEMA's October 31, 2007 and July 2008 changes to 44 CFR Part 201 combined and expanded flood mitigation planning requirements with local hazard mitigation plans (44 CFR §201.6). All hazard mitigation assistance program planning requirements for the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Severe Repetitive Loss (SRL), and potentially Repetitive Flood Claim (RFC) programs were combined eliminating duplicated mitigation plan requirements. It also required participating NFIP communities' risk assessments and mitigation strategies to identify and address repetitively flood damaged properties. Local hazard mitigation plans now qualify communities for the following Federal Hazard Mitigation Assistance grant programs:

- *Hazard Mitigation Grant Program*
- *Pre-Disaster Mitigation*
- *Flood Mitigation Assistance*
- *Severe Repetitive Loss*
- *Repetitive Flood Claim*

FEMA policy may require a local mitigation plan under the RFC Program, at which time this policy will apply to those governments that apply for and/or receive assistance under the RFC program as well.

1.3 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

All five FEMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State 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. As of June 19, 2008, the grant programs were segregated. The HMGP is a directly funded competitive disaster grant program. Whereas the other programs: PDM, FMA, RFC, and SRL programs although competitive, rely on specific pre-disaster grant funding sources, sharing several common elements.

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

1.3.1 Unified Hazard Mitigation Assistance (UHMA) Programs

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

total aggregate disaster damage costs to fund HMGP project or planning grants. The cost-share for this grant is 75 percent Federal/25 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 Fiscal Year (FY) 2008, PDM program funding totaled approximately $54 million. The cost-share for this grant is 75 percent Federal/25 percent non-Federal.

The goal of the FMA grant program is to reduce or eliminate flood insurance claims under the NFIP. Particular emphasis for this program is placed on mitigating repetitive loss (RL) properties. The primary source of funding for this program is the National Flood Insurance Fund. Grant funding is available for three types of grants, including Planning, Project, and Technical Assistance. Project grants, which use the majority of the program's total funding, are awarded to States, Tribes, and local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2008, FMA funding totaled $32 million. The cost-share for this grant is 75 percent Federal/25 percent non-Federal. However, 90 percent Federal/10 percent non-Federal to mitigate SRL properties is available in certain situations.

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

This has been identified as a high priority action as a result of this hazard mitigation planning process, and the City of Nulato is investigating application to the NFIP program.

The SRL program provides funding to reduce or eliminate the long-term risk of flood damage to residential structures insured under the NFIP. Structures considered for mitigation must have at least four NFIP claim payments over $5,000 each, when at least two such claims have occurred within any 10-year period, and the cumulative amount of such claim payments exceeds $20,000; or for which at least two separate claim payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any 10-year period. Congress authorized $40 million for FY 2006 and FY 2007, $80 million for FY 2008, and $80 million for FY 2009. The cost-share for this grant is 75 percent Federal/25 percent non-Federal. However, 90 percent Federal/10 percent non-Federal to mitigate SRL properties is available when the State or Tribal plan addresses ways to mitigate SRL properties.

The RFC program provides funding to reduce or eliminate the long-term flood damage risk to residential and non-residential structures insured under the NFIP. Up to $10 million is available annually to assist States and communities with reducing flood damages to structures which have had one or more claim payments for flood damages. All RFC grants are eligible for up to 100 percent Federal assistance.

1.4 HMP DESCRIPTION

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

Prerequisites

Section 2 addresses the prerequisites of plan adoption, which include adoption by the City of Nulato (City). The adoption resolution is included in Appendix B.

Community Description

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

Planning Process

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

Hazard Analysis

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

Vulnerability Analysis

Section 6 identifies potentially vulnerable assets—people, residential and non-residential buildings and/or dwelling units (where available), critical facilities, and critical infrastructure – in the City. The resulting information identifies the full range of hazards that the City could face and potential social impacts, damages, and economic losses.

Mitigation Strategy

Section 7 defines the mitigation strategy which provides a blueprint for reducing potential losses identified in the vulnerability analysis. The Planning Team developed a list of mitigation goals and potential actions to address the risks facing the City. Mitigation actions include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities. In the spirit of the new requirements, mitigation strategies were developed encouraging participation with the NFIP and the reduction of flood damage to flood-prone structures.

Plan Maintenance

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

References

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

Appendix A

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

Appendix B

Appendix B provides the adoption resolution for the City of Nulato.

Appendix C

Appendix C provides public outreach information, including newsletters.

Appendix D

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

Appendix E

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

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2.1 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: PREREQUISITES

Local Plan Adoption

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

Element

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

Source: FEMA, July 2008.

The City of Nulato is the local jurisdiction represented in this HMP and meets the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000.

The local governing body of the City of Nulato adopted the HMP by resolution on January 5, 2010. A scanned copy of the resolution is included in Appendix B.

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This section describes the location, geography, history, demographics, and economic trends of the City of Nulato.

3.1 LOCATION, GEOGRAPHY, AND HISTORY

"Nulato is a second class city located in the Unorganized Borough. The community is situated on the west bank of the Yukon River, 35 miles west of Galena and 310 air miles west of Fairbanks. It lies in the Nulato Hills, across the river from the Innoko National Wildlife Refuge. It lies at approximately 64.719440 North Latitude and -158.103060 West Longitude. (Sec. 08, T009S, R004E, Kateel River Meridian.) Nulato is located in the Nulato Recording District." (Division of Community and Regional Affairs [DCRA] 2009)

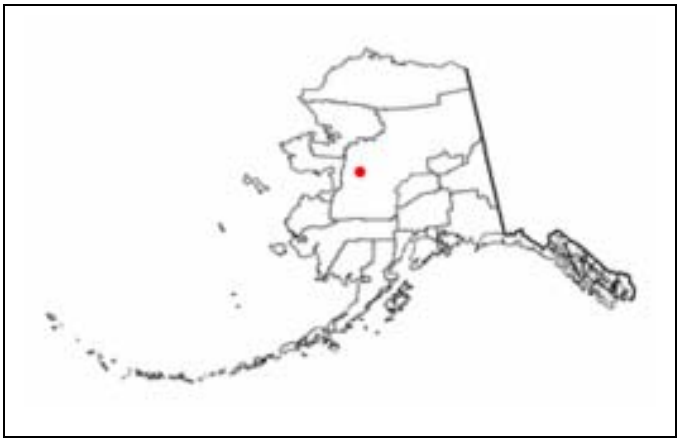

Figure 3-1. Nulato Location Map

The City covers approximately 42.7 square land miles and approximately 2.0 square miles of water. Extreme temperature changes occur throughout Alaska's interior. The City's temperatures range from a winter low of -65 degrees Fahrenheit (ºF) to above 90ºF during summer. The highest temperature ever recorded is 90ºF; the lowest is -55ºF. The area receives approximately 15.6 inches of rain and 74 inches of snow.

The Koyukon Athabascans inhabited the area along the Yukon River as nomadic tribes following game and fish food sources to support their subsistence lifestyle. The following is a chronology of the City's developmental history:

- Nulato was the trading site between Athabascans and Inupiat Eskimos from the Kobuk area.
- 1830s: western contact increased rapidly.
- 1839: Trading Post opened by Russian explorer Malakov.
- 1839: Small Pox, the first of several major epidemics.
- 1851: Nulato Massacre – disputes over local trade between Koyukuk River Natives and Nulato Native population.
- 1867: The Western Union Telegraph Company explored the area.
- 1887: Roman Catholic mission and school built – area Alaska Natives moved to the village.
- 1884: Yukon and Koyukuk gold rush – Epidemics took many Alaska Native lives.
- 1900: Measles epidemic and food shortages killed up to one-third of the Nulato population.
- 1900: Steamboat traffic peaked – 46 boats in operation, two steamers a day would stop for firewood.

- 1897: Post office opened.
- 1906: Gold seekers left the Yukon.
- 1919: Lead mining began in the Galena area.
- 1963: Nulato incorporated as a City.
- 1970s: Clinic, water supply, new school, telephone, and television services developed.
- 1981: Housing development began at a new townsite on the hills north of the City, about 2 miles from the old townsite.

(DCRA 2009)

3.2 DEMOGRAPHICS

The 2000 census recorded 338 residents, of which the median age was 23 indicating a young population. The population of Nulato has been dropping since 1990 and is expected to remain relatively flat. Nearly half of the population is between 18 and 44 years of age. Nulato is blended Koyukon Athabascan community, and about 92.9 percent of residents recognize themselves as such. The male and female composition is approximately 49.4 and 50.6 percent respectively. The 2000 census revealed that there are 119 households with the average household having approximately 3.69 individuals. The most recent 2008 DCRA certified population is 274. Figure 3-2 illustrates the historic population of the City of Nulato.

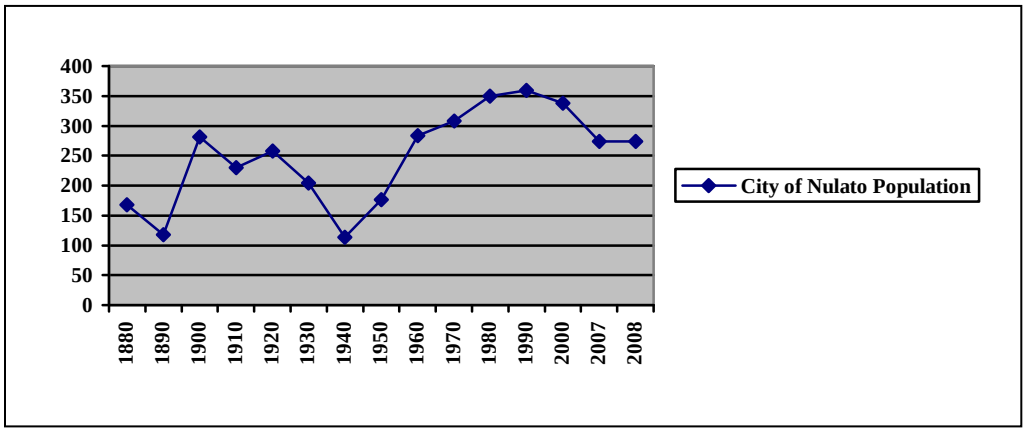

Figure 3-2 Historic Population of the City of Nulato

3.3 ECONOMY

There are limited employment opportunities in the City of Nulato. Established government provides the bulk of the employment opportunities such as the City and Tribal Offices, the school district, the health clinic, and store. The summer months bring fire fighting, outside construction job opportunities, and fish processing. However salmon, moose, bear, small game, and berries subsistence harvesting are the primary mechanisms by which the residents survive. (DCRA 2009)

According to the 2000 census, the median household income in Nulato was $25,114. Approximately 60 individuals (18.1 percent) were reported to be living below the poverty level. The potential work force (those aged 16 years or older) in Nulato was estimated to be 213, of which 126 were actively employed. In 2000 the unemployment rate was 52 percent; however, this rate included part-time and seasonal jobs, and practical unemployment or underemployment is likely to be significantly higher.

Figure 3-3 shows an aerial view of the City's Old Town location below the hillside and adjacent to the Yukon River. Old Town is constantly impacted from high water flood events. The airport is located on the hill above the City.

Figure 3-3 Old Town Nulato (DCRA 1998)

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

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

DMA 2000 Requirements: Planning Process

Local Planning Process

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

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

Element

- An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and nonprofit interests to be involved in the planning process; and
- Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Element

- Does the plan provide a narrative description of the process followed to prepare the new or updated plan?
- Does the new or updated plan indicate who was involved in the planning process?
- Does the new or updated plan indicate how the public was involved?
- Does the new or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?
- *Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process? (Not applicable until 2013 update)*

Source: FEMA, July 2008.

4.1 OVERVIEW OF PLANNING PROCESS

The first step in the planning process began with the Mayor Sharon Agnes organizing the Planning Team prior to the HMP Project Kick-Off Meeting held on February 10, 2009. The Mayor subsequently selected City Council Member Lawrence Esmailka as the Planning Team Leader. During the Kick-Off Meeting, the team identified resources, capabilities, and set the date for the public meeting. The role of the Planning Team was discussed to include: acting as an advocate for the planning process, assisting with gathering information, and support for the public meeting and other public participation opportunities. There was also a brief discussion about hazards that affect the community such as floods and wildland fire.

The Planning Team presented the HMP planning process at the March 2009 Public Meeting. Participants were asked to help identify hazards that affect the City and to also identify critical facilities.

In summary, the following five-step process took place from January 2009 through October 2009.

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 HMP.
2. Assess risks: The Planning Team identified the hazards specific to the City, and with the assistance of a hazard mitigation planning consultant (URS), developed the risk assessment for the seven identified hazards. The Planning Team reviewed the risk assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.
3. 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.
4. 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 to be implemented.
5. 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.

4.2 HAZARD MITIGATION PLANNING TEAM

The Planning Team consists of Lawrence Esmailka, Kimberly Joyce, Jessica Ekada, Brother Bob, Ruth Ann Madors, and Nathan Ekada. The State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) provided funding and project oversight in coordination with the DCRA who is managing a joint mapping project for the community. URS, DHS&EM's contractor, provided assistance to the Planning Team identified in Table 4-1.

Table 4-1 Hazard Mitigation Planning Team

Name	Title	Organization	Phone
Lawrence Esmailka, Team Leader	City Council Member	City of Nulato	898.2251
Kimberly Joyce	City Book Keeper	City of Nulato	898.2205
Sharon Agnes	Mayor	City of Nulato	898.2209
Jessica Ekada	City Bookkeeper	City of Nulato	898.2205
Brother Bob	Priest	Catholic Church	898.2242
Ruth Ann Madors	Tribal Operations	Nulato Tribal Council	898.2329.
Nathan Ekada	Fire Chief	City of Nulato	898.2205
Scott Simmons	Planner Consultant	URS Corporation	562.3366
Laura Young	Planner Consultant	URS Corporation	562.3366
Ervin Petty	Mitigation Specialist	DHS&EM	428.2337

Table 4-1 Hazard Mitigation Planning Team

Name	Title	Organization	Phone
Mark Roberts	State Hazard Mitigation Officer	DHS&EM	428.2337
Ruth St.Amour	Government Planner	DCRA	269.4527
Keith Jost	Natural Resources Specialist	DCRA	269.4548

4.3 PUBLIC INVOLVEMENT AND OPPORTUNITIES FOR INTERESTED PARTIES TO PARTICIPATE

Table 4-2 lists the community's public involvement initiatives focused to encourage participation and insight for the HMP effort.

Table 4-2 Public Involvement Mechanisms

Mechanism	Description
Newsletter Distribution (January 2009)	In January 2009, the jurisdiction distributed a newsletter describing the upcoming planning activity. The newsletter encouraged the whole community to provide hazard and critical facility information. It was delivered door-to-door to ensure everyone received a copy.
KLYU (Galena)	Radio Station advertised the Community Meeting and its purpose.
Newsletter from Tribal Council	Tribe placed the meeting notice in their newsletter.
Local Website (myfamily.comnulato)	Newsletter posted on the community's "myfamily" website page.
Newsletter from the City of Nulato	The Planning Team provided updates to this planning activity in the quarterly newsletter.
Nulato Tribal Council Meeting	The Planning Team provided updates to this planning activity during monthly meetings.
City of Nulato Meetings	The Planning Team provided updates to this planning activity during monthly meetings.

On March 10, 2009, a public meeting was held to introduce the hazard mitigation planning project to the community and other interested parties. An invitation was extended to all individuals and entities identified on the project mailing list via a project newsletter describing the planning process and announcing the upcoming public meeting. The newsletter was developed and was either faxed or emailed to relevant academia, nonprofits, and local, State, and Federal agencies on February 17, 2009. The newsletter was placed on the DSH&EM website and signs posted throughout the community announcing the public meeting.

During the meeting, the Planning Team led the attending public through a hazard identification and screening exercise. The attendees identified seven potential hazards for profiling (earthquake, erosion, flood, landslide, permafrost, severe weather, and wildland fire).

Following the hazard screening process, the Planning Team led the attendees through the process of identifying critical facilities in the community. URS also described the specific information needed from the Planning Team and public to complete the risk assessment including the location, value, and population of residents and critical facilities in the community.

After the community asset data was collected by the Planning Team over the spring of 2009, a risk assessment was completed that illustrated the assets that are exposed and vulnerable to specific hazards.

The Planning Team provided updates to this planning activity during monthly meetings. The Planning Team reviewed and prioritized the mitigation actions identified based on the results of the risk assessment. A second newsletter was provided on September 3, 2009 describing the process to date, presenting the prioritized mitigation actions, and announcing the availability of the draft HMP for public review and comment.

4.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Planning Team reviewed and incorporated information from existing plans, studies, and technical reports into the HMP. These resource references and reviews provided jurisdiction specific information for hazard profiles, risk assessment, and vulnerability analysis development for the City of Nulato's HMP:

- *U.S. Army Corps of Engineers, Alaska Baseline Erosion Assessment, Erosion Information Paper – Nulato, Alaska. August 8, 2007, provides an explanation of the City's erosion threat.*
- *2007 Nulato Community Comprehensive Plan, provided hazard, land-use, and development information.*
- *The Tanana Chiefs Conference, Region Comprehensive Economic Development Strategy, lists the community's business goals and future infrastructure needs.*
- *The City of Nulato Wildfire Protection Plan, explained wildfire threat.*
- *The City of Nulato Water & Sewer Feasibility Study, defines the current and future sanitation growth needs and provides erosion rate information.*
- *The City of Nulato Search & Rescue Guidelines, defined City hazard information.*
- *State of Alaska, Department of Commerce, Community and Economic Development Community Profile, provided community demographic data.*

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

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

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, technological, and terrorism related hazards are beyond the scope of this plan. Even though a particular hazard may not have occurred in recent history in the study area, all natural hazards that may potentially affect the study area are considered; the hazards that are unlikely to occur or for which the risk of damage is accepted as being very low, are eliminated from consideration.

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

5.2 HAZARD IDENTIFICATION AND SCREENING

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

DMA 2000 Requirements: Risk Assessment: Identifying Hazards

Identifying Hazards

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

Element

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

Source: FEMA, July 2008.

For the first step of the hazard analysis, the Planning Team identified 10 possible hazards that could affect the City of Nulato. They then evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard (see Table 5-1). The Planning Team determined that seven hazards pose the greatest threat to the City: earthquake, erosion, flood, landslide, permafrost, severe weather, and wildland fire. The remaining hazards excluded through the screening process were considered to be nonexistent or not pose a threat to life and property in the City due to the low likelihood of occurrence.

Table 5-1 Identification and Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Avalanche	No	This hazard does not exist for the City.
Earthquake	Yes	The City is located adjacent to the Kaltag Fault and experiences periodic, unpredictable occurrences.
Erosion	Yes	Riverine erosion by water flow, ice jam scour, wind, and surface runoff occur continually. Two foot annually (est.) along the Yukon River & Mukluk Slough area.
Flood	Yes	Flooding events occur regularly from snowmelt, ice jam, and fall flooding events. Aufeis (ice overflow) occasionally occurs.
Landslide	Yes	A localized area along the airport hillside may be subject to slope failure, as well as two residential homes on the opposite side of the hill.
Permafrost	Yes	The City is located in an area of discontinuous permafrost, and experiences melting, frost heaves, and sinkholes. There are residential homes in Nulato that require their foundations to be leveled in the spring and fall to avoid damages, specifically in the lower new townsite area (1 Block radius, 10 homes). There have been damages in the past (broken windows, etc.).
Tsunami & Seiche	No	This hazard does not exist for the City.
Volcano	No	This hazard does not exist for the City.
Weather, Severe	Yes	Annual weather patterns, severe cold, freezing rain, and snow accumulations are predominate threats. The snowfall amount directly determines winter weather damages. Less snow causes frost lime deepen resulting in frozen water and sewer pipes. More snow provides better ground insulation. Severe cold usually occurs during December-January. High winds typically occur from February-March and August-September. August experiences the most rain. Too much rain causes wild game to move to more distant dry ground away from the City, increasing resident travel to harvest subsistence foods. Heavy rain and spring thaw causes high river water which reduces the City's residents' capability to harvest King salmon for subsistence needs.
Wildland Fires	Yes	Historic wildfire occurrences during summer dry season (April-October).

5.3 HAZARD PROFILE

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

DMA 2000 Requirements: Risk Assessment – Profiling Hazards

Profiling Hazards

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

Element

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

Source: FEMA, July 2008.

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

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

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

Table 5-2 Hazard Probability Criteria

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

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

Table 5-3 Hazard Magnitude/Severity Criteria

MAGNITUDE / SEVERITY	CRITERIA
4 - Catastrophic	Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50 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 probability, magnitude, and severity are determined based on historic events using the criteria identified above.

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

5.3.1 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), 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 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.
- **Landslides/Debris Flows** occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include 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 (MM) Intensity Scale. As shown in Table 5-4, the MM Intensity Scale consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location. PGA can be measured as acceleration due to gravity (*g*) (see Table 5-4). (MMI 2006)

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

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

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

(MMI 2006)

5.3.1.2 History

The Planning Team determined that the City of Huslia has had no historical damaging earthquake impacts. They subsequently decided to only be concerned with earthquake events which exceeded M5.0. Table 5-5 depicts a list of historical earthquakes from 1971 to present which exceeded M5.0 located within 100 miles of the City of Nulato. This earthquake did not induce any major damage due primarily to their community structure types and foundation support system designs.

Table 5-5 Historical Earthquakes for the City of Nulato

CAT	YEAR	MO	DAY	ORIG TIME	LAT	LONG	DEPTH (miles)	MAGNITUDE	DISTANCE (miles)
PDE	1978	12	24	131308.10	63.56	-157.59	20.5	5.3 MLPMR`	81

(USGS 2007)

The City of Nulato has no history of damaging earthquakes. Since 1977, 90 earthquakes have been recorded within a 100 mile radius of the City of Nulato. The average magnitude of these earthquakes is 2.6. The largest recorded earthquake within 100 miles of the City of Nulato measured M5.3 on December 24, 1978, and caused no damage to critical facilities, residences, non-residential buildings, or infrastructure.

North America's strongest recorded earthquake occurred on March 27, 1964, measuring M9.2 and was felt by many residents throughout Alaska. The City of Nulato felt ground motion resulting from this historic event; however, no local damage occurred.

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

Location

The entire geographic area of Alaska and subsequently the City of Nulato, is prone to the effects of an earthquake. Peter Haeussler, Alaska Region United States Geological Survey (USGS) explained during a telephone conversation, the Kaltag Fault follows the Yukon River and is relatively centered on the Koyukuk/Yukon River confluence. The City of Nulato is located in close proximity to the Kaltag Fault.

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

Of the 90 recorded earthquakes since 1977, one exceeded M5.0 (USGS). It occurred on December 24, 1978, measuring M5.1 at a depth of 6.2 miles. The epicenter was located approximately 81 miles from the City of Nulato.

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

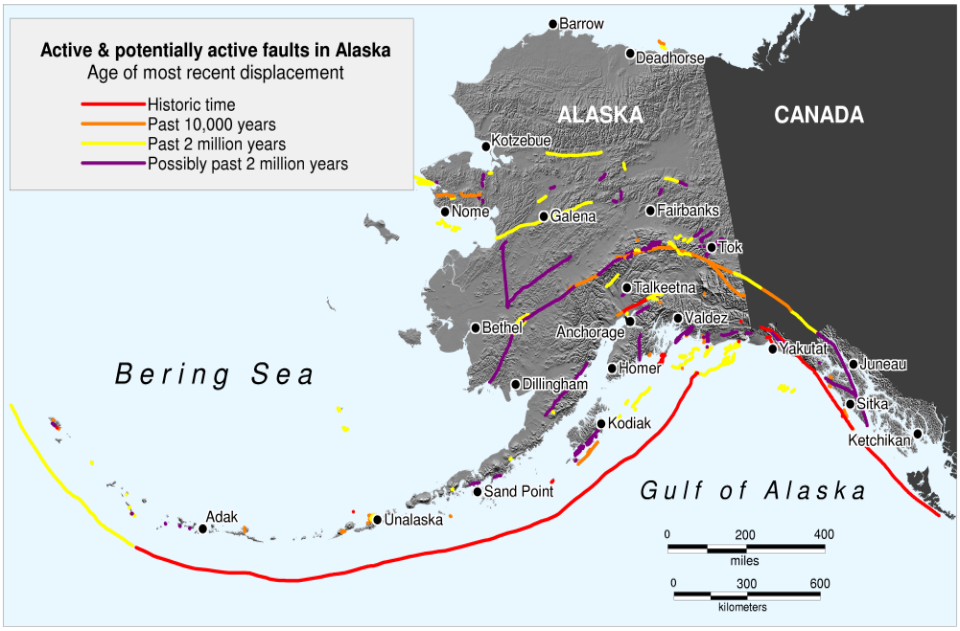

Figure 5-1 Active and Potentially Active Faults in Alaska

Extent

The entire City of Nulato could potentially receive earthquake damage from a catastrophic event generated from a Kaltag Fault event. The Kaltag fault is a strike-slip fault that produces intraplate earthquakes, which occur within a tectonic plate sometimes at great distance from the plate boundaries. These types of earthquakes can have magnitudes of 7.0 and greater. Shallow earthquakes in the Fairbanks area are an example of intraplate earthquakes.

Earthquakes felt in the City of Nulato area have not exceeded M5.3 in the past 31 years, and damage has never been reported due to an earthquake event.

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

Impact

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

Probability of Future Events

The City of Nulato has no official record of significant earthquake activity resulting in damage or injuries. While it is not possible to predict when an earthquake will occur; Figure 5-2 was generated using the USGS Earthquake Mapping model and indicates approximately a 3 percent probability of a M5.0 or greater earthquake occurring within 10 years and 31 miles of the City of Nulato.

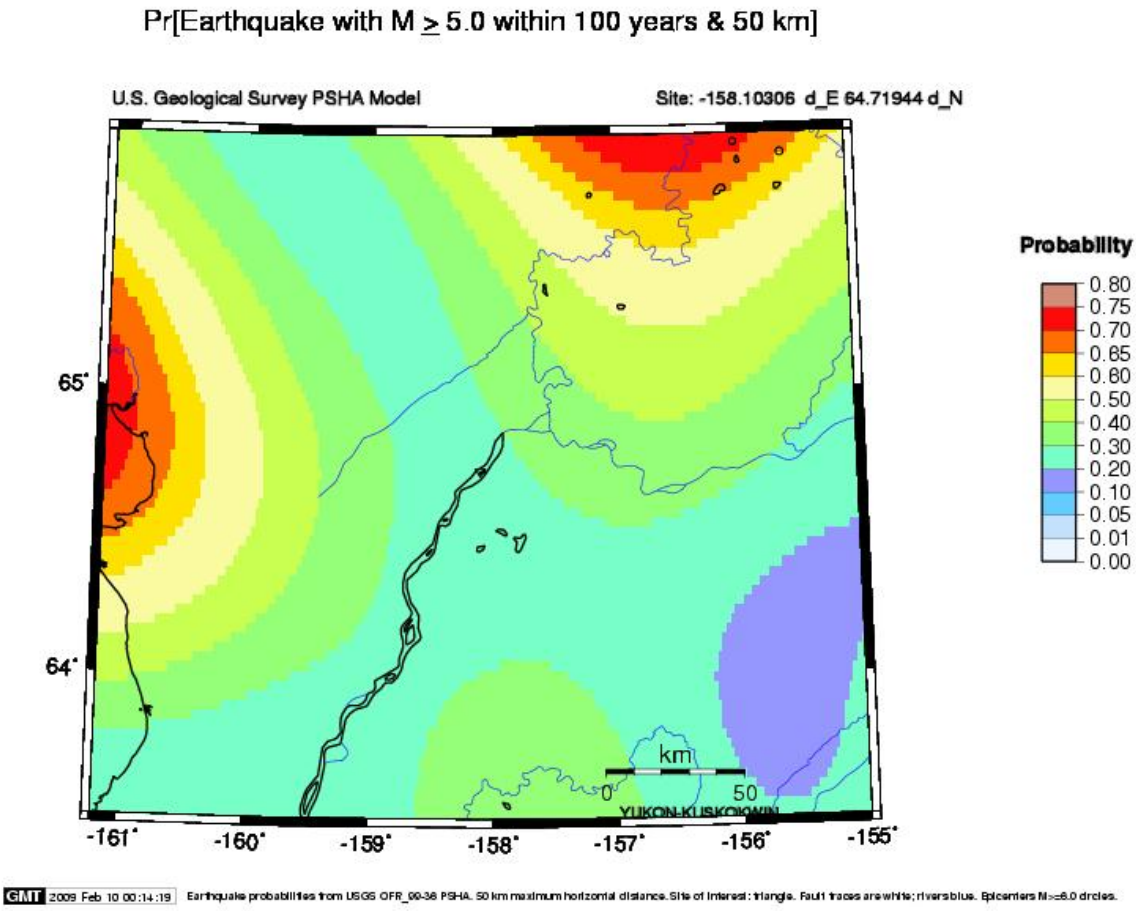

Figure 5-2 Nulato Earthquake Probability
(USGS 2009)

The Figure 5-2, 2002 shake map, is the most current map available for this area. However, it is a viable representation to support probability analysis as supported by Peter Haeussler, USGS, Alaska Region:

> *"The occurrence of various small earthquakes does not change earthquake probabilities. In fact, in the most dramatic case, the probability of an earthquake on the Denali fault was/is the same the day before the 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. For… [the City of Nulato], I don't think anything has changed." (Haeussler 2009)*

5.3.2 Erosion

5.3.2.1 Nature

Erosion rarely causes death or injury. However, erosion causes the destruction of property, development, and infrastructure. Erosion is the wearing away, transportation, and movement of land. It is usually gradual but can occur rapidly as the result of floods, storms, and other events,

or slowly as the result of long-term environmental changes. Erosion is a natural process, but its effects can be exacerbated by human activity.

Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure. Only riverine erosion affects human activity in the City of Nulato.

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

5.3.2.2 History

The City of Nulato's Comprehensive Plan states, "In the late 1970's the community decided to develop a new townsite in the hills just west of the City's Old Townsite. Moving from a flood plain area was the primary motive for the new development. Ice jams and stream overflows cause flooding in the old townsite about every two to three years."

Large sections of Yukon River embankment loss are prevalent. Utilities and infrastructure such as barge landing areas, docks, and fuel headers used for fuel offloading are often damaged as house sized ice blocks scour the embankment as they flow downriver. Spring thaw melts the snow and softens the river ice. The excess water raises the river, many times over its bank, and breaks up the thick ice sheet. This break-up is a seasonal recurrence and damages are often minimal for the City of Nulato. The Planning Team stated the area along Mukluk Slough and the dock experiences an average erosion rate of 2 feet per year. (Nulato 2009)

The US Army Corp of Engineers (USACE) 2009 Alaska Baseline Erosion Assessment has classified the City of Nulato has having a minimal erosion threat, where "impacts are not serious and are not affecting the community's viability." The assessment states,

> "Erosion along the riverbank was reported. The record flood was caused by an ice jam in 1961. …No potential erosion damages have been identified. About 15 homes, the loading dock, fuel depot, roads, and the bridge to the airport reportedly flood every few years. According to a Corps C*ommunity Information Form* collected from Nulato in 1992, water levels and extent of damage are unknown. The most recent flood was on May 19, 2006 when an ice jam caused extensive flooding and residents were evacuated." (USACE 2009b)

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

Location

Riverine erosion hazards are known to affect the City of Nulato. Factors that influence erosion include flooding, spring break-up, and melting permafrost. The riverbanks around Nulato are essential to the lives of the residents and are susceptible to the effects of erosion and floods.

Figure 5-3 is an aerial photograph supplied by the USACE depicting the City of Nulato's Old Town street layout in relation to the Yukon River (the City's flood source).

Figure 5-3 Aerial View of the City of Nulato
(USACE 2009)

Extent

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

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

Erosion in the City of Nulato's "Old Town" area is a minor threat as this area is situated along a fairly straight stretch of the Yukon River where soil deposition is evident from a USACE erosion assessment aerial photograph. Erosion in this area usually removes small areas at a time. No historical significant events have occurred. However, significant events could potentially cause infrastructure to fall into the river. Erosion sites have been noted to be less than 100 feet from important structures and critical facilities, including roads, as well as the school and other public buildings. (USACE 2009b)

Based on past events, the USACE 2009 *Alaska Baseline Erosion Assessment*, and the criteria identified in Table 5-3, the magnitude and severity of erosion impacts in the City of Nulato are considered limited with injuries that do not result in permanent disability, the potential for critical facilities to be shutdown for more than one week, and more than 10 percent of property or critical infrastructure being severely damaged.

Impact

Impacts from riverine 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 costs trying to prevent or control erosion sites.

Probability of Future Events

Based on previous occurrences and applying the criteria identified in Table 5-2, it is possible that erosion will occur in the next five years (event has up to 1 in 5 years chance of occurring) as the history of events is greater than 10 percent but less than or equal to 20 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.

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

Rainfall-Runoff Flood

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

Snowmelt Flood

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

Ice Jam Flood

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

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

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

Ice Overflow (Aufeis) Flood

Aufeis is glaciation or icing of streams and rivers, affecting road surfaces and infrastructure. Aufeis forms during the winter when emerging ground water freezes. Stream glacial flooding occurs when ice forms from the bottom up not from the top down forcing water out of the stream channel. If aufeis occurs on a roadway, it makes travel difficult. For example, the Steese Highway frequently has an aufeis problem in the winter months. In the mid 1980s, several homes in Fox suffered from an aufeis event occurring at the wellhead. The homes flooded 6 feet deep, and then froze.

Timing of Events

Many floods are predictable based on rainfall patterns. Most of the annual precipitation is received from May through September 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 flood of record occurred in 1961 at an estimated elevation of 152.0 feet. The last flood event occurred in 2006 from a downstream ice jam resulting in $32,000 in damages.

Table 5-6 lists historical flood events impacting the City of Nulato's old town structures and facilities.

Table 5-6 Severe Flood Events

Zone(s)	Location(s)	Date(s)	Event	Description
	Nulato	1945	Flood	Unknown
	Nulato	1961	Ice Jam Flood	Flood of record 152 feet
AK04	Nulato	1989	Flood	Unknown
	Nulato	1992	Ice Jam Flood	Unknown
AK216	Nulato	24-30-May-01	Flood	On May 24, an Ice Jam formed on the Yukon River downriver from Nulato, causing the water to back up into the villages of Nulato and Koyukuk. A State Disaster Declaration was issued on May 30th for both Koyukuk and Nulato. The ice jam below Nulato released around noon Tuesday the 29th. The water levels at Nulato had fallen over 10 feet by 9am Wednesday the 30th. Nulato: 10% of community inundated by floodwaters. Bridge from Airport to Nulato under water. Roadway to Nulato under water 25 feet x ½ mile. Fuel tank farm containment area flooded (no tank damage noted), petroleum sheen visible on water (probably residual fuel from containment area). Community landfill inundated. Community well: water sample tested was returned negative for contamination. Well head and controller under water. Well shutdown Wednesday, May 23, 2001 with storage tank at 97% capacity. Current capacity is 64% - community on water conservation - voluntary. Private residences: 8 to 10 had some water intrusion. Personal property damages: snow machines, 4-wheelers, building materials and misc. unknown quantities. Loss of well due to controller failure or contamination. Damage by ice to fueling header (community asset). Damage by ice to fueling header (school). Roadway from airport to Nulato underwater for 300 yards. $482,000 (combined Nulato/ Koyukuk damages)
AK216	Nulato	17-19-May-06	Flood	An ice jam formed on the Yukon River 20 miles downstream of Nulato causing flooding of the City of Nulato and Koyukuk. At Nulato the water reached maximum height at 0500 ADT on the morning of the 9th....reaching a marking of 2.2 on the USACE gage. In Nulato, a number of roads were impassable during the flooding, including the road to the airport. Monetary amount of damage was $32,000 in Nulato.

(Lingaas 2009)

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

Location

In the 1970s, "A new townsite was developed on the hills north of the community, approximately 2 miles from the old townsite. Elevation surveys were not run to the new

townsite, but the area appears to be above the Base Flood Elevation (BFE). High Water Marks (HWM) were placed at the level of the 1961 flood, which is estimated to be the 100-year flood level at the old townsite where the school is located. (The 152.0 elevation datum is arbitrary.) HWM #1 is located on the downstream, streamward side of the school, approximately 4.2 feet above ground level. HWM #2 is located on the upstream, streamward side of the school, approximately 4.2 feet above the ground level. BLM prepared a map in 1967 with a flood hazard marked at elevation 125.5 feet. However, it is not clear if this is the 1961 flood. The datum for this map is presumed to mean sea level (MSL), and is different from that used above." (USACE 2009)

Figure 5-4 Nulato High Water Elevation (HWE) Point

Table 5-7 depicts historical flood elevation data collected in September 1995 by USACE Floodplain Management.

Table 5-7 USACE Flood Elevation Data

Description	Elevation
100-year flood, or Base Flood Elevation (BFE)	152.0
Recommended building elevation	153.0
1989 flood	145.8
Typical top of bank	141.6

(USACE 2009)

Extent

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

The following factors contribute to riverine flooding frequency and severity:

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

- The attenuating feature existence in the watershed, including natural features such as swamps and lakes and human-built features such as dams.
- The flood control feature existence, such as levees and flood control channels.
- Flow velocity.
- Availability of sediment for transport, and the bed and embankment watercourse erodibility.
- Village or city location related to the base flood elevation as indicated with their certified HWM.

Most of the new community's structures are above the level of this periodic flooding. However, the high water line is located in the lower village, when flood events still impact streets and structures such as the school, City well, church, City dock, cemetery, landfill, and sewage lagoon. The Planning Team stated that approximately 50 structures are located in the old townsite within the 100-year floodplain. There is no FEMA Flood Insurance Rate Map (FIRM) available to depict the flood threat extent for the City.

Based on past flood events and the criteria identified in Table 5-3, the extent of flood impacts in the City of Nulato's Old Town area are considered critical even though injuries do not result in permanent disability, complete shutdown of critical facilities occurs for at least two weeks, and more than 25 percent of property is 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 and presents a challenge for navigational purposes. Deposition also reduces channel capacity, resulting in increased flooding or bank

erosion. Stream bank erosion involves the removal of material from the stream bank. When bank erosion is excessive, it becomes a concern because it results in loss of streamside vegetation, loss of fish habitat, and loss of land and property. (BKP 1998)

Probability of Future Events

Based on previous occurrences and applying the criteria identified in Table 5-2, it is probable within the calendar year (event has up to 1 in 1 years chance of occurring) as the history of events is greater than 33 percent likely per year.

5.3.4 Landslide

5.3.4.1 Nature

Landslide is a general term for the 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, rockfalls, 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, as described below:

- Shaking due to earthquakes can trigger events ranging from rockfalls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Landslides into a reservoir can indirectly compromise dam safety, and a landslide can even affect the dam itself.
- Wildfires can remove vegetation from hillsides significantly increasing runoff and landslide potential.

Development and other human activities can also provoke landslides. Increased runoff, excavation in hillsides, shocks and vibrations from construction, non-engineered fill, 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:** 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 miles per hour (mph) for several miles. Other types of flows include debris avalanches, mudflows, creeps, earth flows, debris flows, and lahars.
- **Lateral Spreads:** This 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:** Falls are the free-fall movement of rocks and boulders detached from steep slopes or cliffs.
- **Topples:** Topples are rocks and boulders that rotate forward and may become falls.
- **Complex:** Any combination of landslide types.

Indicators of a possible landslide 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.

In Alaska, seasonally frozen ground and permafrost are often agents of ground failure. 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. Permafrost can form a stable foundation if kept frozen but when thawed, the soil weakens and can fail. Approximately 85 percent of Alaska is underlain by continuous or discontinuous permafrost. (DHS&EM 2007)

5.3.4.2 History

The City of Nulato has a very limited history of landslides with no available documented data. However the City Planning Team noted that landslides occur annually following major flooding of the Yukon River from spring break-up's. The Yukon River embankment along the hillside adjacent to the airfield experiences annual erosion on the river side of the hill. There are also two homes located on the other side of this hill with a potential of being damaged from a landslide.

The graveyard is on top of the hill, from the point and moving back toward the airfield. Some of the graves had houses on them and have fallen off the cliff; same with old fencing; some graves have been exposed from the hillside sloughing off. [Damages] could be from landslide and wind/weather wear. (Nulato 2009)

The history of permafrost and possible future ramifications are discussed further in Chapter 5.3.5.

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

Location

In general, the probability of slope failure increases with an increase in slope inclination. However, depending on various factors such as soil type, and water content, a slope having a relatively low inclination could be at greater risk of failure than another slope having a relatively high inclination. Other factors that influence susceptibility include: rock type; water content; vegetative cover and type; slope aspect; permeability and rate of infiltration; proximity to seismic sources; and magnitude of seismic events. In addition, unconsolidated deposits of alluvial and glacial outwash materials are subject to accelerated stream bank erosion and landslides. The possibility of failure also increases in sloped areas in which humans have disturbed the soil and vegetation such as from cutback projects and timber reduction areas.

The City of Nulato's landslide hazard area is limited to the steep embankments on each side of the airport and the hillside adjacent to the graveyard. (Nulato 2009)

Extent

The geographic extent of landslide events is essentially the same as the slide location. The effects depend on what infrastructure will be impacted by a slide, as well as the magnitude and force of the slide itself. The extent of effects can be limited to one building or property, or an event could have community-wide effects.

The City of Nulato's impact would be limited to two houses located on the edge of the cliff on the north side of the airport. A landslide event in this location would only impact these two structures as there is no infrastructure or facilities below the embankment. The hillside between the airport and the Yukon River experiences sloughing during high water flood and from heavy rain saturation events. There is no immediate threat to the airport from a landslide event. (Nulato 2009)

Based on the Planning Team's knowledge of past landslide events and the criteria identified in Table 5-3, the extent of landslide impacts in the City of Nulato are considered limited where 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.

Impact

Landslide events can cause fatalities, injuries, and public and private financial losses to communities in direct and indirect ways. For example, real estate values can decrease and direct costs can be incurred in an effort to prevent or mitigate landslide events. Landslides can destroy all types of buildings and infrastructure. Buildings can be swept off foundations; and occupants can be trapped inside buildings as the debris overcomes the structure. Landslides can block roads, knock out or damage power and other types of transmission lines. Landslide events can also strip forest cover, causing habitat damage and destruction; deposit additional sediment in stream channels, potentially changing channels and stream passages can be blocked, damaging or destroying spawning beds.

The general impact of a landslide on the north side of the airport would potentially damage or destroy two residential structures. The graveyard would be severely impacted however, no residential or infrastructure damage would occur along the Yukon River side of the airport.

Probability of Future Events

Using the criteria listed in Table 5-2, the probability of a landslide event occurring is likely. An event is probable within the next three years (event has up to 1 in 3 years chance of occurring), and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.

5.3.5 Permafrost

5.3.5.1 Nature

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

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

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

5.3.5.2 History

Melting permafrost has caused uneven settling throughout the years within the City damaging buildings and roads in the lower portion of the new townsite. Permafrost impacts regularly occur in a one block radius affecting 10 homes in the lower Nikaghun, Sis, and Dineega Streets area of the new townsite. These structures require re-leveling in the spring and fall in order to avoid damage from permafrost shifting. These homes have received past damages such as broken windows, sticking doors, and interior cracks. (Nulato 2009)

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

Location

The City of Nulato's Planning Team explained that 10 residences located at the bottom of the hill, in a one block radius of each other in the new townsite area (Figure 5-5), have experienced uneven structure settling and heaving from permafrost freeze thaw events.

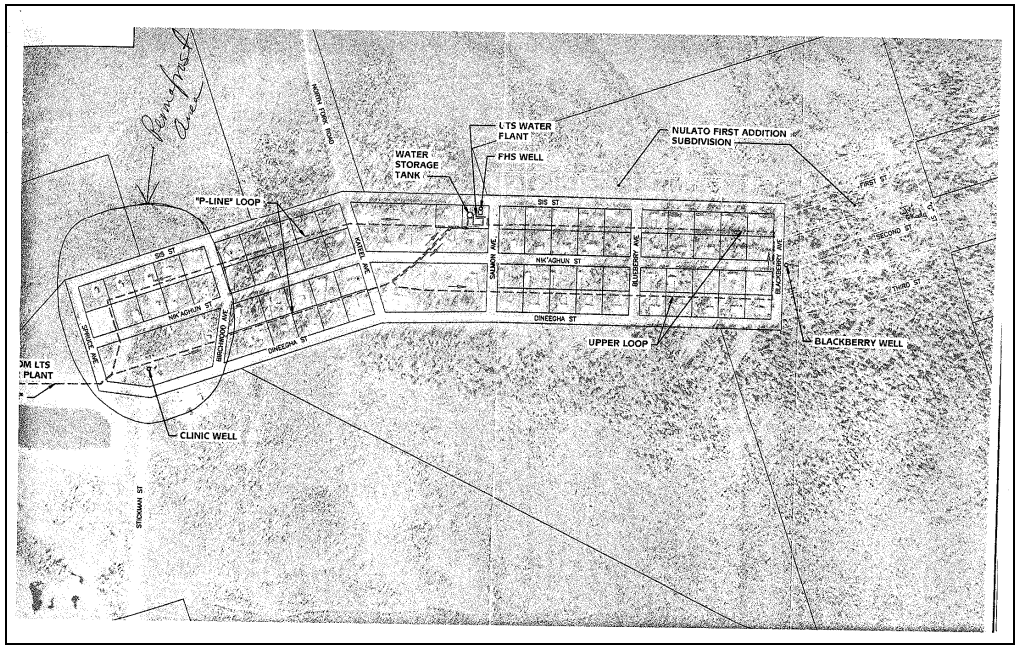

Figure 5-5 Nulato's Permafrost Susceptible Properties (located within the circle)

According to mapping completed by the USGS, the entire City of Nulato is underlain by discontinuous permafrost (Figure 5-6).

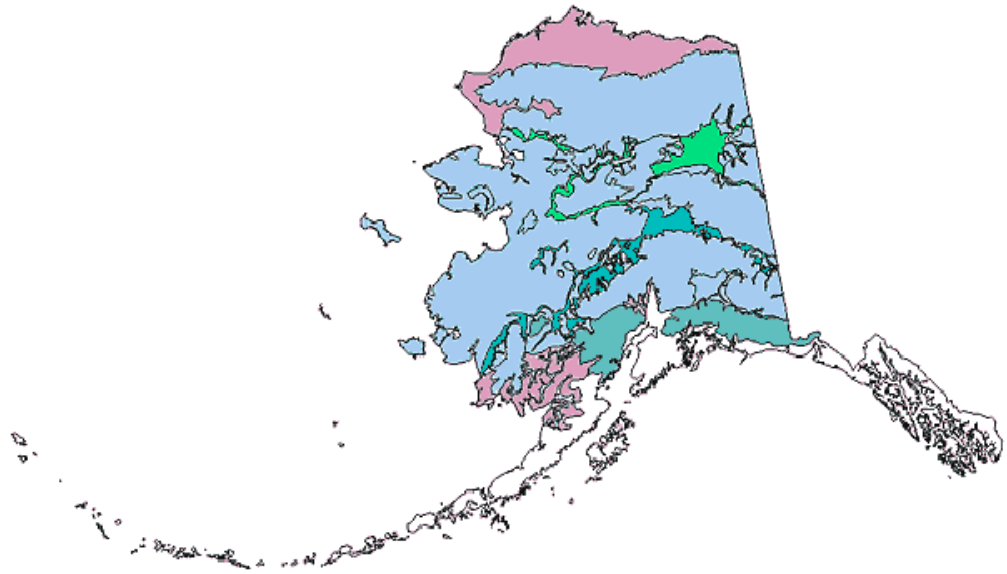

Figure 5-6 Permafrost Map of Alaska (Ferrian 1998)

Extent

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

Based on past permafrost degradation events, the Planning Team's knowledge of past events, and the criteria identified in Table 5-3, the extent of permafrost degradation impacts in the City of Nulato are considered negligible where injuries are treatable with first aid, minor quality of life is lost, shutdown of critical facilities and services occurs for 24 hours or less, and less than 10 percent of property is severely damaged.

Impact

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

Probability of Future Events

Only unwritten anecdotal historical permafrost damage data exists for the City of Nulato. The Planning Team provided sufficient information to qualify their stated opinion concerning permafrost recurrence probability that "permafrost damage occurs annually to structures and roads located in the new development area" indicated in Figure 5-5. The planning team stated that the probability for permafrost occurring follows the criteria in Table 5-2, the probability of

future damage resulting from permafrost is possible in the next five years as the history of events is greater than 10 percent but less than or equal to 20 percent likely per year.

5.3.6 Weather (Severe)

5.3.6.1 Nature

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

Heavy and Drifting Snow

Heavy snow generally means snowfall accumulating to 4 inches or more in depth in 12 hours or less or 6 inches or more in depth in 24 hours or less. Drifting is the uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall.

Freezing Rain/Ice Storm

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

Extreme Cold

The definition of extreme cold varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme". In Alaska, extreme cold usually involves temperatures between -20 to -50°F. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. The City of Nulato's coldest recorded temperature is -85ºF.

High Winds

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

5.3.6.2 History

The City of Nulato is located in Alaska's interior and is subject to severe weather pattern shifts. Several historic events have affected the community such as the Omega Block cold spell which occurred in 1989 bringing -85ºF temperatures where the community suffered permanent damage to water and sewer systems. The City also experienced one fatality during this event. Another severe low temperature event occurred in 2005 where the City Office had 6 inches of water from broken water pipes.

Table 5-8 lists the National Weather Service's major storm events for the City of Nulato's Weather Zone. Each weather event may not have specifically impacted the City but they were

listed due to the City's close proximity to listed communities or by location within the identified zone.

Table 5-8 Severe Weather Events

Zone(s)	Location(s)	Date(s)	Event	Description
AK004, AK008,	Various	24-25-Feb-89	Winter Storm	Wind and heavy snow in many areas, probably affected all villages.
AK008	Galena	27-28-Dec-90	Heavy Snow	11-13 inches (1-day)
AK008	Galena	22-Mar-91	Heavy Snow	6 inches (1-day)
AK004	Alatna, Allakaket, Hughes	8-9-May-91	Flood	Minor Flooding
AK004		24-26-Feb-96	High Wind	Strong winds in the passes of the Alaska and Brooks Ranges.
AK004 & AK008	Bettles, Evansville, Galena, Huslia, Nulato Kaltag, Ruby	26-29-Feb-96	Heavy Snow	Widespread snow. Snowfall totals for the one-to-two day event. Kaltag 12-16 inches, Galena 4 inches, Huslia 6-8 inches, Allakaket 9+ inches, Bettles 11 inches.
AK004 & AK008	Galena, Hughes, Huslia, Nulato Kaltag, Ruby	22-24-Jan-99	Heavy Snow	Blizzard conditions, precipitation, and strong winds. Nulato 7 inches, 23rd; Ruby 10.2 inches, 23rd; Kaltag 12 inches, 23rd.
AK004 & AK008	Galena, Hughes, Huslia, Kaltag, Nulato, Ruby, Grayling	29-31-Jan-99	Extreme Cold	Cold air mass Zones 4 and 8 and Zones 5 and 7 remained in the -50s to -60s. The lowest recorded temperatures and dates are: Zone 4: Huslia: -67, 31st, Galena -64, 31st, and Grayling -58, 31st.
AK004 & AK008	Galena, Hughes, Huslia, Kaltag, Nulato, Ruby, Grayling	01-12-Feb-99	Extreme Cold	Continuation of January event. Zones 4 and 8 and Zones 5 and 7 remained in the -50s to -60s. Galena -64, 2nd; Kaltag -65, 7th; Ruby, -58 6th; Grayling -58, 1st, 2nd, and 4th.
AK004 & AK008	Koyukuk Valley, Galena	20-23-Dec-99	Heavy Snow	Winter weather, high winds snow and ice. Galena 7 inches, 22nd.
AK004 & AK008	Nulato, Kaltag	22-24-Jan-00	Winter Storm	Winter weather, heavy snow; Nulato 9.6 inches, 23rd; Kaltag 7 inches, 23rd and 24th.
AK004 & AK008	Galena, Hughes, Huslia, Nulato	1-3-Feb-00	Blizzard	Winter weather, strong winds, blizzard conditions. Heavy snow occurred at: Galena 8.3 inches, 2nd; Kaltag 8 inches, 2nd.

	Kaltag,			Blizzard conditions occurred at Huslia.
AK004 & AK008	Bettles, Nulato, Galena, Kaltag	9-11-Nov-00	Winter Storm	Winter weather, blizzard conditions. Nulato and Galena reported freezing rain, Kaltag reported freezing rain. Nulato reported 9 inches of snow, ending at 9am on the 10th.
AK008	Nulato, Kaltag	12-13-Nov-00	Heavy Snow	Blizzard conditions, heavy snow at Kaltag and Nulato by the morning of the 13th. Strong winds. Nulato 9 inches; Kaltag 8 inches.
AK215 & AK216	Anvik, Kaltag	10-12-Feb-01	Winter Storm	Heavy snow. Blizzard conditions, pockets of light freezing rain. Strong south winds. Kaltag 6 inches of snow the morning of the 12th.
AK216	Galena, Nulato, Kaltag	2-3-Apr-01	Heavy Snow	Blizzard conditions, heavy snow and high winds reported at: Galena 7-10 inches; Nulato 10-12 inches; Kaltag 6 inches.
AK216	Nulato	24-30-May-01	Flood	On May 24, an ice jam formed on the Yukon River downriver from Nulato, causing the water to back up into the villages of Nulato and Koyukuk. State Disaster Declaration issued for both Koyukuk and Nulato. 10% of Nulato inundated by floodwaters. Bridge from Airport to Nulato under water. Roadway to New Nulato under water 25 feet x half mile. Fuel tank farm containment area flooded (no tank damage noted). Petroleum sheen visible on water (probably residual filet from containment area). Community landfill inundated. Community well: water sample tested was returned negative for contamination. Well head and controller under water. Well shutdown Wednesday, May 23, 2001 with storage tank at 97% capacity. Current capacity is 64% - community on water conservation - voluntary. Private residences: 8 to 10 had some water intrusion. Personal property damages: snow machines, 4-wheelers, building materials and misc.; unknown quantities. Loss of well due to controller failure or contamination. Damage by ice to fueling header (community asset). Damage by ice to fueling header (school). Roadway from airport to Nulato underwater for 300 yards. $482,000 combined damages for Nulato and Koyukuk.
AK216	Kaltag, Nulato	6-7-Jan-02	Heavy Snow	Heavy snow. Kaltag reported 6 inches over a 12 hour period.
AK216	Kaltag	14-15-Jan-02	Heavy Snow	Heavy snow. Kaltag reported 6 inches of new snow over a 12 hour period.
AK216-AK218	Kaltag	16-17-Apr-02	Heavy Snow	Strong winds, blizzard conditions, heavy snow. Kaltag reported 6 inches of new snow in the 24 hours ending a 7:30am on the 17th.

AK216	Kaltag	3-4-Feb-03	Heavy Snow	Heavy snow. Kaltag 6 inches of new snow fell over a 24 hour period.
AK216 & AK219	Bettles, Galena	1-3-Mar-03	Heavy Snow	Heavy snow Galena (Zone 216) 8 inches and reported via phone that near white-out conditions.
AK216 & AK219	Huslia, Kaltag	30-31-Oct-03	Winter Storm	Widespread rain...freezing rain...sleet...and a little snow. Rain and freezing rain was reported at Huslia and Kaltag (Zone 216) and at Ambler (Zone 217).
AK216	Kaltag	23-24-Nov-03	Heavy Snow	Snow Zone 216 – Kaltag 9 inches.
AK216	Kaltag	29-Dec-03	Heavy Snow	Zone 216: Kaltag 15 inches, snow began around 0800 AST on the 28th and reached 6 inches at 0030 AST on the 29th.
AK216	Galena	3-5-Feb-04	Heavy Snow	Zone 216: Galena 9 inches. Snowfall began 8am on the 3rd.
AK216	Galena	15-Feb-04	Heavy Snow	Zone 216: Galena 6 inches.
AK216	Galena	10-Nov-04	Heavy Snow	Galena 9 inches.
AK216	Galena	1-Dec-04	Heavy Snow	Snow. Galena
AK216	Galena	22-Dec-04	Heavy Snow	Winter storm conditions: Zone 219. Heavy snow, Zone 216. Galena, total 8 inches.
AK216-AK219	Galena, Bettles	2-5-Jan-05	Heavy Snow	Heavy Snow: Zone 216. Galena 8 inches. Zone 219. Bettles Airport 10.4 inches.
AK216	Kaltag	5-7-Feb-05	Heavy Snow	Heavy snow: Kaltag reported 16 inches of snow.
AK216	Galena	13-Feb-05	Heavy Snow	Heavy snow reported at Galena 6 inches.
AK216	Galena, Huslia, Kaltag, Nulato	20-22-Mar-05	High Wind	Zone 216: Huslia peak gust 62 mph, Kaltag Peak Wind 55 mph, and Galena highest gust 39 mph. Nulato, tree fell onto a powerline which pushed the line onto the City building which started a fire, destroying the City building. The building contained most of the administrative and financial records of the village, along with archives of irreplaceable documents and photos. Estimated loss is $150.00
AK216		18-19-Feb-06	Winter Weather	Moderate winds, with snow and blowing snow. A 42 year old woman, on a solo hunting trip, died from hypothermia when she was stranded after her snowmobile broke down.

Table 5-8 Severe Weather Events

Zone(s)	Location(s)	Date(s)	Event	Description	Losses
AK215 & AK216	Galena, Huslia, Kaltag, Nulato, Ruby,	3-5-Apr-08	Winter Storm	Zone 215: Snowfall Kaltag, freezing rain, snowfall amounts of 7 to 9 inches are likely in the highest hills based on the estimate of 6.8 inches for Kaltag. Kaltag, snow...turning to rain...then back to snow with occasional rain. Snowfall total is estimated to be 6.8 inches. The nearby Nulato Hills likely received a total of 8 to 12 inches. Galena reported 1-2 inches.	
AK216	Nulato	17-19-May-06	Flood	An ice jam formed on the Yukon River 20 miles downstream of Nulato causing flooding of the village of Nulato and Koyukuk. At Nulato the water reached maximum height at 0500 ADT on the morning of the 9th....reaching a marking of 2.2 on the USACE gage. In Nulato, a number of roads were impassable during the flooding, including the road to the airport. Monetary amount of damage was $32,000 in Nulato.	
AK216	Kaltag	26-Nov-06	Heavy Snow	Zone 216: Kaltag reported 12 inches of snow.	
AK216	Galena	9-10-Oct-07	Heavy Snow	Galena reported 8 inches of snow.	
AK216	Kaltag	4-5-Nov-07	Heavy Snow	Kaltag reported 8 inches of snow.	
AK216	Galena	3-4-Dec-08	Heavy Snow	Galena reported 7 inches of snow.	
AK216	Nulato	5-6-Dec-07	Heavy Snow	Heavy snowfall at Nulato, 16 inches of snowfall.	
AK216 & AK219	Lower Koyukuk Middle Yukon Vlys	9-Dec-08	High Wind	Strong winds of 50 mph with local gusts to 70 mph observed at the Koyukuk National Wildlife Refuge.	
AK216 & AK219	Galena, Bettles	1-12-Jan-09	Extreme Cold/Wind Chill	Zone 216: Galena: -51. Zone 219: Bettles: -51.	
AK216 & AK219	Galena & Bettles	2-Jan-09	Temperat ures	Zone 216: Galena: -51. Zone 219: Bettles: -51. The most prolonged cold snap across interior Alaska since 1999.	
AK215, AK216 & AK219	Galena, Hughes, Huslia, Kaltag, Nulato, Ruby	13-16-Jan-09	Winter Storm	Zone 215: Snow 8 to 12 inches along the Nulato Hills. Snow changed to freezing rain. Zone 216: 8 to 12 inches of snow along the slopes of the Nulato Hills. Huslia, Kaltag, Galena, and Ruby, snow changed to freezing rain.	

Table 5-8 Severe Weather Events

Zone(s)	Location(s)	Date(s)	Event	Description	Losses
AK216	Galena	16-17-Jan-09	Winter Storm	High winds, heavy snow, blizzard conditions, and freezing rain Galena reported trees and power lines down during the early morning hours of the 17th. Sustained winds of 50 mph were observed, with a peak wind gust of 64 mph. Wind gusts to 64 mph were 63 mph.	
AK216 & AK215	Galena, Anvik	17-Jan-09	High Wind	High winds 63 mph were observed. Snow Anvik had reduced visibilities of snow and blowing snow. Zone 216: Galena reported trees and power lines down during the early morning hours of the 17th. Sustained winds of 50 mph were observed, with a peak wind gust 63 mph at Koyukuk.	

(Lingaas 2009)

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

Location

The entire City of Nulato is equally vulnerable to severe weather. The National Weather Service has continued to modify their system for assigning weather zones to facilitate and more accurately confine weather patterns to relevant geographic areas. Consequently the data in Table 5-8 reflects different zone numbering patterns and should be used to depict weather events that have historically impacted the area; some of which may not have impacted the Village of Nulato as severely as other areas within the same zone.

Extent

The entire City of Nulato area is equally vulnerable to the effects of severe weather. Blizzard conditions and heavy snow depths for the area can reach 12 inches per storm event; wind speed can exceed 64 mph; and extreme low temperatures have reached to approximately -64ºF.

Based on past severe weather events and the criteria identified in Table 5-3, the extent of severe weather in the City of Nulato are considered negligible where injuries and or illnesses are treatable by first aid, minor quality of life loss, shutdown of critical facilities and services occurs for 24 hours or less, and less than 10 percent of property is severely damaged.

Impact

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

Heavy snow can immobilize a community by bringing transportation to a halt. Until the snow can be removed, airports and roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding.

The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns.

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

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

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

Probability of Future Events

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

5.3.7 Wildland Fire

5.3.7.1 Nature

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

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

- **Topography:** As slope increases, the rate of wildland fire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildland fire behavior. However, ridge tops may mark the end of wildland fire spread, since fire spreads more slowly or may even be unable to spread downhill.
- **Fuel:** The type and condition of vegetation plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the

amount of combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel load continuity, both horizontally and vertically, is also an important factor.

- **Weather:** The most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. By contrast, cooling and higher humidity often signal reduced wildland fire occurrence and easier containment.

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

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

5.3.7.2 History

Wildland fires have not been documented within the boundaries of City of Nulato. However, wildland fires have occurred in the vicinity such as the July 30, 2005 lightening induced fire located 4 miles northwest of the City which damaged 14,404.6 acres. The Bureau of Land Management (BLM) indicated that fire fighters worked approximately 20,862.5 hours with gross wages of $380,680.

The Alaska Interagency Coordination Center (AICC) lists over 108 wildland fire events occurred within 50 miles of the City of Nulato during the historical period of 69 years (1939-2008). Seventy of these fire events exceeded 1,000 acres (Table 5-9).

Table 5-9 Wildfire Locations from 1939 to 2008

(Within 50 Miles of the City of Nulato)

Fire Name	Fire Year	Estimated Acres	Specific Cause
Coffee Can West	2008	2309	Lightning
Coffee Can Lake	2007	39795	Lightning
Gisasa River	2005	52606.4	Lightning
Nulato #3	2005	14404.6	Lightning
East Fork Yuki River	2005	32774.5	Lightning
Box River	2005	5991.3	Unknown
Kalyuh Hill	2005	8958.8	Lightning

Table 5-9 Wildfire Locations from 1939 to 2008

(Within 50 Miles of the City of Nulato)

Fire Name	Fire Year	Estimated Acres	Specific Cause
Little Mud River #2	2005	30170.7	Lightning
Camp Creek	2005	13755	Lightning
Holtnakatna Creek	2005	194015.2	Lightning
Rodo River	2004	8715.7	Lightning
Bonanza Creek	2004	265916	Unknown
Louis Lake	2004	22193	Lightning
Yukon Creek	2000	61291	Lightning
Natlaratlen River	2000	8541	Lightning
Box River	2000	5532	Lightning
Soonkakat River	1997	3070	Lightning
331662	1993	3300	Lightning
331688	1993	1280	Lightning
331653	1993	4800	Lightning
331639	1993	3410	Lightning
131356	1991	5170	Lightning
Gal Ne 30	1991	11040	Lightning
Gal N 38	1990	60000	Lightning
831024	1988	52600	Lightning
Gal W 76	1986	1100	Lightning
531028	1985	2200	Lightning
Gmt Ese 42	1977	69000	Lightning
Old Woman	1976	1000	Lightning
Koyukuk	1973	10240	Lightning
Rede	1972	1000	Lightning
Little Mud River	1972	10000	Lightning
Yukon	1972	3200	Lightning
Inglutalik	1971	6500	Lightning
England	1971	28000	Lightning
Mueller	1969	90000	Lightning
Thirsty	1969	2000	Lightning
Bear	1969	422000	Lightning
7 Mile Isle	1968	2000	Lightning
Khotol Mt	1968	15300	Lightning
X-Mas Creek	1968	6000	Lightning
Talik River	1968	3500	Lightning
9 Mile Slough	1968	3500	Lightning
Holt Creek	1968	8000	Lightning
Unalakleet River	1968	1300	Lightning
Yuki River	1968	3000	Lightning
Nulato River	1968	1900	Lightning
Ketlkede Creek	1968	1300	Lightning
Nulato	1960	16500	Lightning
Kayiuh Mtn	1959	5100	Lightning

Table 5-9 Wildfire Locations from 1939 to 2008

(Within 50 Miles of the City of Nulato)

Fire Name	Fire Year	Estimated Acres	Specific Cause
Khoto Mtn	1959	2000	Lightning
Ungalik (Gisasa)	1957	65920	Lightning
South Fork Nulato River	1957	40000	Lightning
Hill 1224	1957	151800	Lightning
Nikolai Slough-Bear Creek	1957	1200	Lightning
Galena N-35	1956	23000	Lightning
Nulato S-10	1956	129840	Lightning
20 Mile	1954	17920	Lightning
South Kotol Mt.	1953	9700	Lightning
Kotol River	1953	11000	Lightning
Yuko River	1953	2380	Unknown
Nulato #4	1950	2000	Lightning
Galena	1946	15360	Lightning
Yuko	1946	128000	Lightning
Yuko River	1943	1000	Lightning
Galena	1941	10000	Unknown
Kaltag	1941	10000	Trapper
Ruby	1941	100000	Unknown
Nulato	1941	10000	Trapper
Galena	1940	2500	Trappers

(DOF 2009)

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

Location

Under certain conditions wildland fires may occur in any area with fuel surrounding the City of Nulato. Since fuels data is not readily available, for the purposes of this plan, all areas outside City limits are considered to be vulnerable to wildland fire impacts. Since 1939, 180 wildland fire events have occurred within 50 miles of the City of Nulato (Figure 5-7).

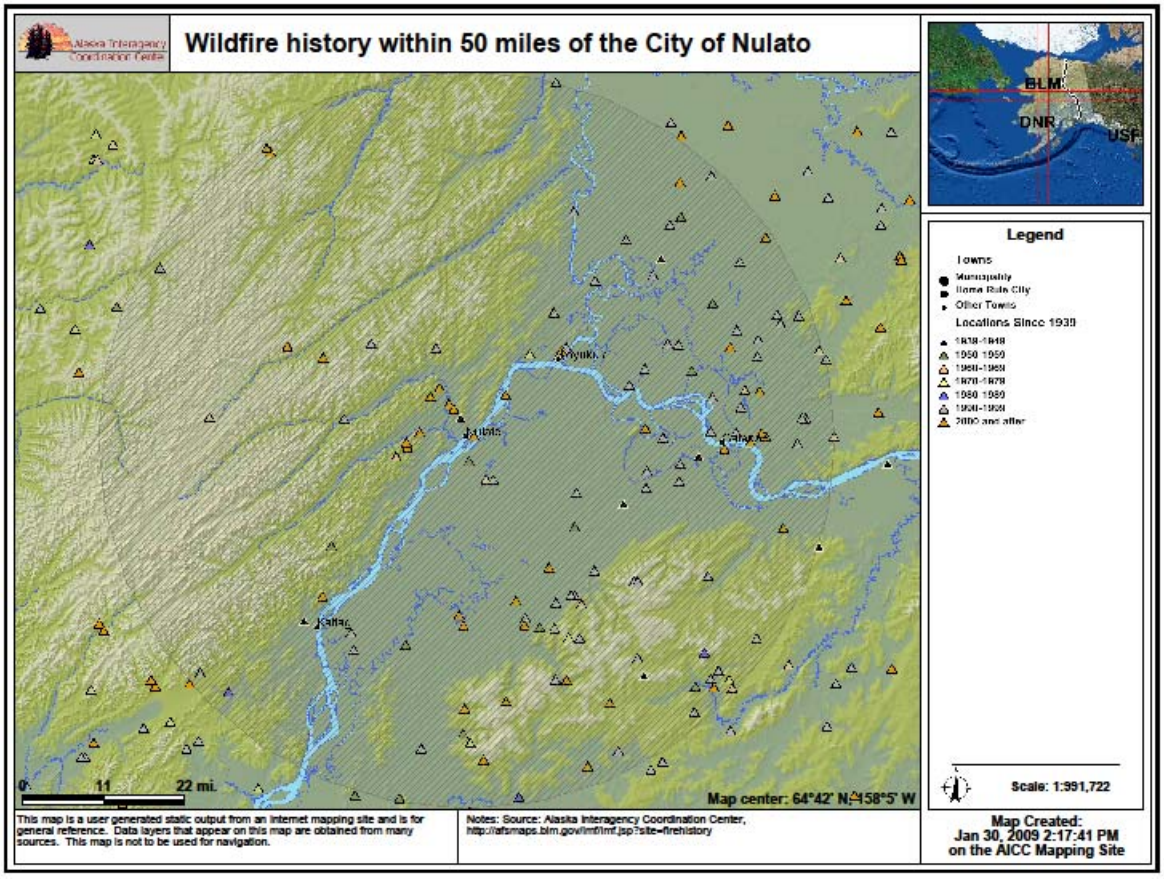

Figure 5-7 Nulato 69 Year Wildland Fire History (AICC 2008)

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 lightening 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.

Over the past 69 years an average of 33,699 acres burned during each of the 70 wildland fire events from Table 5-9. Recent wildland fires appear to burn much smaller acreage per event. This may be due to the fact that the State's Division of Forestry (DOF) much more efficiently manage wildland fires using a four tiered suppression methodology based on infrastructure

criticality while using more modern available resources as the respond to wildland fires which potentially threaten populated areas (DOF 2009).

Based on past wildland fire events and the criteria identified in Table 5-3, the magnitude and severity of impacts within the City of Nulato are considered negligible where minor injuries and/or illnesses are treatable with first aid, minor quality of life loss, critical facilities and services shutdown for less than 24 hours, and less than 10 percent of property or critical infrastructure being severely damaged.

Impact

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

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

Probability of Future Events

Fire is recognized as a critical feature of the natural history of many ecosystems. It is essential to maintain the biodiversity and long-term ecological health of the land. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process and the full range of fire management activities is exercised in Alaska to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighter and public safety and welfare, natural and cultural resources threatened, and the other values to be protected dictate the appropriate management response to the fire. In Alaska, the natural fire regime is characterized by a return interval of 50 to 200 years, depending on the vegetation type, topography, and location. Recorded wildland fires occurring within 50 miles of the City of Nulato have an average recurrence rate of approximately 2.5 to 3 years.

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

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

6.1 OVERVIEW OF A VULNERABILITY ANALYSIS

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

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

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

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

Assessing Vulnerability: Overview

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

Element

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

Source: FEMA, July 2008.

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

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

Assessing Vulnerability: Addressing Repetitive Loss Properties

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

Element

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

Source: FEMA, July 2008.

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

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

Assessing Vulnerability: Identifying Structures

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

Element

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

Source: FEMA, July 2008.

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

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

Assessing Vulnerability: Estimating Potential Losses

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

Element

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

Source: FEMA, July 2008.

6.2 VULNERABILITY ANALYSIS: SPECIFIC STEPS

6.2.1 Asset Inventory

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

6.2.1.1 Population and Building Stock

Population data for the City of Nulato were obtained from the 2000 U.S. Census. The City of Nulato's total population for 2000 was 338 with a 2008 Department of Commerce, Community, and Economic Development (DCCED)/DCRA certified population of 274 (Table 6-1).

Table 6-1 Estimated Population and Building Inventory

Population		Residential Buildings	
2000 Census	DCCED 2007 Data	Total Building Count	Total Value of Buildings[1]
338	274	119	$5,355,000

Sources: City of Nulato, U.S. Census 2000, and the DCRA 2008 Community Profile certified population data.

[1] Average structural value of all single-family residential buildings is $45,000 per structure.

Estimated numbers of residential buildings and replacement values for those structures, as shown in Table 6-1, were obtained from the City of Nulato, the 2000 U.S. Census, and DCRA. A total of 119 single-family residential buildings were considered in this analysis.

6.2.1.2 Repetitive Loss Properties

The City of Nulato does not currently participate in the NFIP therefore the City is not eligible to participate in the insurance program. However, the City has identified one RL property that would potentially meet RL criteria (Table 6-2)

Table 6-2 Repetitive Loss Properties

Type (RL/SRL)	Town	Occupancy (#)	No. of Losses	Flood Insurance (Yes/No)	Value ($)[1]	Total Claims ($)[2]
RL	City of Nulato Community Hall	0	4	No	$250,000	0

Type includes: RL or SRL

[1]Insured structural value n/a.
[2]Content and building claims.

Participation in the NFIP has been identified as an action item to consider as a result of this hazard mitigation planning process, and the City of Nulato is investigating application to the NFIP program.

6.2.1.3 Existing Critical Facilities and Infrastructure

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

- Government facilities, such as city and tribal administrative offices, departments, or agencies.
- Emergency response facilities, including police, Village Public Safety Officer (VPSO), fire, and Code Red equipment.
- Educational facilities, including K-12.
- Care facilities, such as medical clinics, congregate living health, residential and continuing care, and retirement facilities.
- Community facilities include community gathering places, such as community and youth centers.
- Utilities, such as electric generation, communications, water and wastewater treatment, sewage lagoons, landfills.

The total number of critical facilities is listed in Table 6-3.

Table 6-3 City of Nulato Critical Facilities

Occupancy Type	Facility Name	Location / Address	Structure or Per Mile Replacement Value	Total Miles / Ft / Gals / Occupants
Government Facilities	City Office & Fuel Tank	Nikaghun Street	$250,000	1 Occ
	Yellow Rental Building	Nikaghun Street	$250,000	0 Occ
	Maintenance Shop	Nikaghun Street	$25,000	2 Occ
	City Shed (across from old clinic)	Dineega Street	$25,000	0 Occ
	New House (Corrines's)	Nikaghun Street	$260,000	3 Occ
	Small Rental (John-B's)	Nikaghun Street	$200,000	3 Occ
	Tribal Office	Kateel Avenue	$200,000	8 Occ
	US Post Office	Nikaghun Street	$661,040	1 Occ
Transportation Facilities	Nulato Airfield	Airport Road	$8,000,000	0 Occ
	State DOT Building	Stickman Street	$800,000	1 Occ
	Dock	Yukon River	$100,000	0 Occ
Emergency Response Facility	Fire Response Equipment (Code Red?)	Nikaghun Street	$66,025	0 Occ
Educational Facilities	Andrew K. Demoski School	Yukon Way	$7,717,723	55 Occ
	Head Start – Adult Recreation Center	Nikaghun Street	$240,000	12 Occ
Care Facilities	Nulato Health Clinic (New)	Nikaghun Street	$1,861,625	4 Occ
	Old Clinic	Dineega Street	$250,000	0 Occ
Community Facilities	Liquor Store	Nikaghun Street	$300,000	1 Occ
	Liquor Store Shed	Nikaghun Street	$150,000	0 Occ
	Teen Recreation Center	Nikaghun Street	$300,000	20 Occ
	Church /Living Quarters	Yukon Way	$570,000	2 Occ
	H & H Enterprises - Store	Blueberry Avenue	$Unknown	2+ Occ
	Victor's Store	Nikaghun Street	$250,000	2 Occ
	School Bus Barn	Yukon Way	$22,397	0 Occ
	Teacher Housing (Duplex)	Yukon Way	$463,356	2 Occ
	Teacher Housing (Trailer 1)	Yukon Way	$265,561	2 Occ
	Teacher Housing (Trailer 2)	Yukon Way	$265,561	0 Occ
	Teacher Housing (Cabin)	Yukon Way	$106,651	1 Occ
	Teacher Housing (House 1)	Yukon Way	$86,814	1 Occ
	Teacher Housing (House 2)	Yukon Way	$86,814	1 Occ
	Community Hall	Stickman Street	$250,000	50 Occ
Roads	North Fork Road (BIA)			0 Occ. 2 Miles
	Roads (Community)			0 Occ. 12 Miles
Bridges (local, State, & Federal)	Nulato River Bridge	North Fork Road	$5,000	0 Occ.
	Slough Bridge	Airport Road	$Unknown	0 Occ.
Utilities	Alaska Village Electric Cooperative (AVEC) Plant Fuel Storage Tanks,	Airport Road	$1,500,000	0 Occ. 109,000 gals
	City Fuel Depot Fuel Storage Tanks,	Airport Road	$900,000	0 Occ. 116,900 gals

Table 6-3 City of Nulato Critical Facilities

Occupancy Type	Facility Name	Location / Address	Structure or Per Mile Replacement Value	Total Miles / Ft / Gals / Occupants
Utilities (Continued)	Andrew K. Demoski School Fuel Storage Tanks	Yukon Way	$180,000	0 Occ. 88,700 gal
	H&H Enterprises. Fuel Storage Tanks	Yukon Way	$67,570	0 Occ. 12,600 gals
	Army National Guard Fuel Storage Tanks	Dineega Street	$27,128	0 Occ. 6,000 gals
	City Office Fuel Storage Tanks	Nikaghun Street	$4,438	0 Occ. 200 gals
	Uptown Washeteria Fuel Storage Tanks	Blueberry Avenue	$15,791	0 Occ. 3,000 gals
	Village Safe Water (Old town) Washeteria Fuel Storage Tanks	Yukon Way	$34,896	0 Occ. 10,000 gals
	City Old Town Water	Yukon Way	$58,635	0 Occ. 25,000 gals
	School Backup Generator	Yukon Way	$Unknown	0 Occ.
	Nulato Landfill	P-Line	$1,500,000	0 Occ.
	Water Plant-New Townsite	Blueberry Avenue	$1,202,447	1 Occ.
	Water Plant-Old Townsite	Yukon Way	$2,215,000	Occ.0
	AVEC Plant	Airport Road	$1,467,500	0 Occ.
	Nulato River Well	Nulato River Road	$300,000	0 Occ.
	Uptown (Blackberry) Well	Blackberry Avenue	$200,000	0 Occ.
	Telephone - ACS	Birchwood Avenue/Dineega St.	$Unknown	0 Occ.
	Uptown Sewage Lagoon, structure connections & pipe	P-Line	$4,095,000	0 Occ.
	Downtown Sewage Lagoon	Yukon Way	$845,050	0 Occ.
	Washeteria-Uptown	Blueberry Avenue	$1,500,000	1 Occ.
	Washeteria-Downtown	Yukon Way	$2,000,000	1 Occ.

(Nulato 2009, DHS&EM 2004, DCRA 2009)

6.2.1.4 Future Critical Facilities and Infrastructure

The 2007 Nulato Community Comprehensive Plan, December 2007 developed with assistance by Agnew::Beck Consulting LLC states:

> *"In the 1970's, because of persistent spring flooding, the village decided to develop a new townsite in the hills just west of Old Town. By 1978, a health clinic was established at the new townsite, and in the early 1980's, new homes were built there as well. In decades since, most new construction in the village has been at the new townsite. For the most part, lots in the new townsite are owned by the city, except for those that were established for homes built by the Interior Regional Housing Authority in 1981.*
>
> *Despite perennial flooding, most Old Town residents wish to remain in their homes there. As the community develops further and new facilities are built or renovated, decisions about where to locate new housing, new facilities and expand services will*

have direct impacts on the viability of Old Town and the integration of the entire community."

The City of Nulato now restricts new development to the new townsite located approximately 2 miles inland from "Old Town" the City's flood hazard area. The City has received funding, construction, and technical assistance from various agencies such as the Alaska Native Tribal Health Consortium for building a new water treatment plant and sewer system upgrade in 2007; and the Department of Environmental Conservation's Village Safe Water program to expand the New Town community water and sewer system for infrastructure and residential subdivision expansion.

6.2.2 Methodology

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

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

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

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

6.2.3 Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this 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.

6.2.4 Exposure Analysis

The results of the exposure analysis for loss estimations in the City of Nulato are summarized in Table 6-4 below and in the following discussion.

Table 6-4 City of Nulato Potential Hazard Exposure Analysis

			Residential Structures		Critical Facilities		Total	
Hazard	Methodology	Population[(A)]	Number	Structure Value	Number	Structure Value	Structures	Value
Earthquake*	Simplified exposure-level analysis	274	119	$5,355,000	59	$41,941,932	178	$47,296,932
Erosion	descriptive	0	0	$0	4	$3,161,625	38	4,691,625
Flood	Simplified exposure-level analysis	45	35	$1,575,000	19	$17,430,410	53	$18,960,410
Landslide	descriptive	3	2	$90,000	4	$4,045,050	6	$4,135,050
Permafrost*	descriptive	39	12	$540,000	5	$729,438	15	$1,179,438
Weather (Severe)*	descriptive	274	120	$5,355,000	59	$41,941,932	178	$47,296,932
Wildland Fire*	Simplified exposure-level analysis	274	120	$5,355,000	59	$41,941,932	178	$47,296,932

* All people, critical facilities, and residential structures are equally vulnerable to this hazard.
(a) Total population was based on DCRA 2008 population data - population estimates were provided by the Planning Team for Erosion, Flood, and Landslide hazard areas.
(b) Cost estimates based on DCRA Capitol Improvement Project information or Planning Team.

Earthquake

Based on earthquake probability model maps produced by the USGS, the entire City of Nulato area is at risk of experiencing the impacts from an earthquake. However, the probability is low (see Section 5.3.1.3). Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. The entire existing and future City of Nulato population, residences, and critical facilities are exposed to the effects of an earthquake. This includes 274 people in 119 residences (worth approximately $5,355,000), and 176 people in 54 critical facilities (worth $41,941,932).

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

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level as the City of Nulato is not located in an area with a high probability of strong shaking (i.e., >M4.8).

Erosion

Based on local knowledge, areas within the City of Nulato affected by erosion are the same areas affected by flood. There are four people in four critical facilities (worth $3,161,625) located in areas exposed and historically prone to erosion. These include: the Nulato Health Clinic, the City Fuel Depot, the Nulato River Well, and the boat dock. There are no residential structures or population located in areas exposed and historically prone to erosion.

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

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level as the City of Nulato does not allow new development in erosion prone areas. Impacts could also be lessened if current threatened uninsured properties could be relocated.

Flood

Based on local knowledge, areas within the City of Nulato affected by flood are the same areas affected by erosion. There are 65 people in 19 critical facilities (worth $17,430,410) located in areas exposed and historically prone to flooding. These include the Andrew K. Demoski School, teacher housing, City Fuel Depot and School Fuel tanks, the Nulato River Well, Sewage Lagoon, and the Old Town Washeteria. There are approximately 45 people in 35 residences (worth approximately $1,575,000) located in areas exposed and historically prone to flooding.

Impacts associated with flooding in the City of Nulato include water damage to structures and contents, roadbed erosion, 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 constructed on raised foundations, and/or not constructed with materials designed to withstand flooding events are more vulnerable to the impacts of flooding (e.g., cross vents to allow water to pass through an open area under the main floor of a building).

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level as the City of Nulato does not allow new development in flood prone areas. Impacts could also be lessened if threatened uninsured properties could be relocated.

Landslide

Impacts associated with landslide events include fatalities, injuries, and public and private financial losses in indirect and direct ways.

There is one person in four critical facilities (worth $4,045,050) located in potential landslide areas. These include the City Fuel Depot, the Nulato River Well, the Sewage Lagoon, and the Old Town Washeteria. There are approximately three people in two residential buildings (worth approximately $90,000) located in potential landslide areas.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level if land use ordinances and zoning controls dictate development is not allowed in areas with high landslide risk. However, if special land use ordinances are not established, impacts to existing and future populations, residences, critical facilities, and infrastructure could be greater than impacts that have been experienced with historic events.

Permafrost

According to mapping completed by the USGS, the entire City of Nulato is underlain by discontinuous permafrost, thus exposed to the impacts from this hazard. This includes 39 people in 12 residences (worth approximately $540,000) and 176 people in five critical facilities (worth approximately $729,438) which include the City Office Fuel Tanks, the Old Town Clinic, the City's Small Rental Unit, the City Shed, and the City Office.

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

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

Weather, Severe

Using information provided by the City of Nulato and the National Weather Service, the entire existing and future City of Nulato population, residences, and critical facilities are equally

exposed to the effects of a severe weather event. This includes 274 people in 119 residences (worth approximately $5,355,000), and 176 people in 54 critical facilities (worth $41,941,932).

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

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

Wildland Fire

According to the Alaska Fire Service, there are no wildland fire areas within the City of Nulato boundaries. However, 108 wildland fires have occurred within a 50-mile radius of the City. There is potential for wildland fire to interface with the population center of the City. Thus, for the purposes of this exposure and vulnerability assessment, it is assumed that all structures within the City are equally exposed to the impacts of a wildland fire event. This includes 274 people in 119 residences (worth approximately $5,355,000), and 176 people in 54 critical facilities (worth $41,941,932).

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.

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

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

Assessing Vulnerability: Analyzing Development Trends

Requirement §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.

Element

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

Source: FEMA, July 2008.

6.3 LAND USE AND DEVELOPMENT TRENDS

The 2007 Nulato Comprehensive Plan states that Nulato land is mostly Alaska Native Claims Settlement Act (ANCSA) and BLM, while surrounding land consists of a mix of local, State, and Federal ownership. Federal lands comprise the largest percentage within a 40 mile radius of the City. The plan further states that land ownership within the village boundaries is a mix of Village

Corporation, native allotments, and municipal land. The Old townsite is mostly residential ownership. Most new construction is completed on the new townsite west of the Yukon River away from persistent flood events. (Nulato 2007)

Most new home construction occurs at the new townsite as it is located away from exposure to disastrous springtime flood events. These new homes have running water and indoor plumbing, while the 34 homes located in the old townsite do not have running water or indoor facilities. There is a profound shortage of homes in Nulato. The new townsite only has a few lots remaining for expansion but 2009 should bring an expansion project for 14 new sites. (DCRA 2009)

Land use in the City of Nulato is predominately residential with few areas for commercial services and community (or institutional) facilities. Suitable developable vacant land is in short supply within the boundaries of the City of Nulato. One area of town is classified as airport land use.

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

Development Trends

Development trends in the City of Nulato will likely remain relatively flat as its population growth has been slowly declining since 1990. Youth are not returning to the community due to insufficient job availability or training opportunities. Additionally, the lack of access to running water, expensive electricity, and high heating and vehicle fuel costs will likely stymie development. (Nulato 2007)

A new sewage lagoon is under construction in the lower townsite area. A landfill feasibility study is also underway. The following projects are in various stages from planning to construction: The Planning Team state's they desperately need a new landfill engineered and constructed to ensure contaminate containment and to expand its townsite and subdivision to allow for residential expansion.

Table 6-5 Projects Under Development

Lead Agency	Fiscal Year	Project Status	Project Description
FAA/ DOT/PF	2012	Planned	Federal Aviation Administration (FAA) and Dept of Transportation & Public Facilities (DOT/PF) Rehabilitate Runway 02/20
FAA/ DOT/PF	2012	Planned	Construct Snow Removal Equipment Building
FAA/ DOT/PF	2012	Planned	Expand Apron
FAA/ DOT/PF	2012	Planned	Rehabilitate Access Road
DOT/PF	2002	Planned	Airport Snow Removal Equipment - Dozer
DCCED	2009	Funded	Grader Acquisition
DEC-VSW	2009	Funded	Dept of Environmental Conservation (DEC)/Village Safe Water (VSW) Upper Townsite Expansion - Phase I - Renewal and Replacement
ANTHC	2007	Funded	Alaska Native Tribal Health Consortium (ANTHC) Water Treatment Plant and LTS Sewer Upgrade
HUD	2007	Funded	Housing & Urban Development (HUD) Indian Housing Block Grant – Native American Housing Assistance and Self Determination Act (NAHASDA) administration, operation, and construction funds
DCCED	2007	Funded	Nulato School Paint and Carpet

Table 6-5 Projects Under Development

Lead Agency	Fiscal Year	Project Status	Project Description
HUD	2006	Funded	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
FAA/ DOT/PF	2005	Funded	Rehabilitate Runway
DEC/VSW	2004	Funded	Department of Environmental Conservation/Village Safe Water (DEC/VSW) Water Source Study - RD – 2004
DEC/VSW, USDA/RD	2003	Funded	DEC/VSW /US Dept of Agriculture/Rural Development (USDA/RD) Lower Townsite Water & Sewer Alternatives Study, Analyze requirements for water and sewer upgrades in Lower Townsite
Denali Commission	2001	Funded	Bulk Fuel Storage Project - Bulk Fuel Business Plan
DCCED	2006	Funded	Equipment Purchases and Community Improvements
Denali Commission	2006	Funded	Teacher Housing Construction; New construction of duplex at 1,904 square ft. Yukon Koyukuk School District
DEED	2005	Funded	Nulato Structural Roof Repair
HUD	2005	Funded	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
HUD	2004	Funded	Senior Assisted Living Facility - ICDBG Program
DEED	2002	Funded	Department of Education and Early Development (DEED) School Structural Repairs

(DCRA 2009)

Water is derived from wells and is treated. A piped water and sewer system was completed in 1996 for 53 homes in the new (upper) townsite, with bathroom and kitchen plumbing. The washeteria recently benefited from a major renovation. Thirty-four unserved residences in the lower townsite haul water from the Blackberry Well or the Church, and use honeybuckets or outhouses.

Table 6-6 lists completed projects for the City of Nulato.

Table 6-6 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description
DCCED	2005	Complete	Community Projects & Improvements - Capital Matching
HUD	2004	Complete	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
USDA/RD	2003	Complete	Fire Response Equipment & Training
HUD	2003	Complete	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
DCCED	2003	Complete	Health Clinic - Capital Matching
DCCED	2002	Complete	Health Clinic Construction - CDBG
HUD	2002	Complete	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
ANTHC	2002	Complete	Health Clinic Design & Construction - Denali Commission Funding. Full design and construction, community decision on multi-use before release of construction funds.
DCCED	2002	Complete	Purchase of VPSO Vehicle and Equipment - Capital Matching
DCCED	2001	Complete	City Building Renovation - Capital Matching
DCCED	2001	Complete	Townsite Survey and Subdivision - Mini-Grant. USFS $21.2
DEC/VSW	2001	Complete	Middle Yukon Flood - DES - 2001 - $25,600.
DEC/VSW	2001	Complete	Middle Yukon Flood - DES - 2001 - $15,876.

Table 6-6 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description
HUD	2001	Complete	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
DCCED	2000	Complete	City Building Upgrade - Capital Matching
DCCED	2000	Complete	Bulk Fuel Storage Tank Purchase - CDBG
DEC/VSW	2000	Complete	Landfill Feasibility Study - EPA/IG - 2000 - $56,250.Alaska Housing Finance Corporation AHFC $18.7. Feasibility study and design for an upgraded solid waste landfill to replace existing dump
DEC/VSW	2000	Complete	Water and Sewer Improvements - USDA/RD - 2000 - $633,800. Finish construction on the Lower Townsite Lagoon. Construct new sewage outfall line from the LTS Washeteria to the LTS Lagoon. Complete improvements to the UTS Lagoon. Design & Construct water distribution services to the LTS teacher housing units.
HUD	2000	Complete	Indian Housing Block Grant - NAHASDA administration, operating & construction funds
DEC/VSW	2000	Complete	Sanitation Facilities Improvement Project – Indian Health Service (his) Housing - 2000 - $140,000.

(DCRA 2009)

This section outlines the four-step process for preparing a mitigation strategy including: developing mitigation goals, identifying mitigation actions, evaluating mitigation actions, and implementing mitigation action plans. Within this section the Planning Team developed the mitigation goals and potential mitigation actions for the City of Nulato.

7.1 DEVELOPING MITIGATION GOALS

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

DMA 2000 Requirements: Mitigation Strategy – Local Hazard Mitigation Goals

Local Hazard Mitigation Goals

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

Element

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

Source: FEMA, July 2008.

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

Table 7-1 Mitigation Goals

No.	Goal Description
1	Promote recognition and mitigation of all natural hazards that affect the City of Nulato.
2	Cross reference mitigation goals and actions with other City planning mechanisms and projects.
3	Reduce possibility of losses from all natural hazards that affect the City.
4	Reduce vulnerability of structures to earthquake damage.
5	Reduce possibility of damage and losses from erosion.
6	Reduce the possibility of damage and losses from flooding.
7	Reduce possibility of damage and losses from landslide.
8	Reduce possibility of damage and losses from permafrost.
9	Reduce vulnerability of structures to severe winter storm damage.
10	Reduce possibility of damage and losses from wildland fires.

7.2 IDENTIFYING MITIGATION ACTIONS

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

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

Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Element

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

Source: FEMA, July 2008.

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

On July 22, 2009, the Planning Team discussed potential mitigation goals and action items. Table 7-2 contains a comprehensive list of potential mitigation actions. The team narrowed the list to 62 potential mitigation actions that they considered for implementation. The team then proceeded to select from that list those they desired to implement within the Mitigation Strategy during this plan's five year life cycle.

The Planning Team placed particular emphasis on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure.

DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Identification and Analysis of Mitigation Actions: NFIP Compliance

Requirement §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Element

- Does the new or updated plan describe the jurisdiction(s) participation in the NFIP?
- Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?

Source: FEMA, July 2008.

Table 7-2 Mitigation Goals and Potential Actions
(Bold ID items were selected for implantation by the Planning Team)

GOALS		ACTIONS	
No.	**Description**	**ID**	**Description**
1	Promote recognition and mitigation of all natural hazards that affect the City of Nulato.	**A**	Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the City of Nulato. Presented in the form of a brochure or written media so that residents can take information with them after the meeting. Example Topics: NFIP program participation benefits, safe fire practices, to help prevent wildland fires, etc.
		B	Identify and pursue funding opportunities from outside agencies to fund and implement identified mitigation projects (ANTHC, DCCED, AKDOT, and HUD etc.).
		C	Establish a formal role for the jurisdictional Hazard Mitigation Planning Team to develop a continuous process to implement, monitor, and evaluate community wide mitigation actions.
		D	Cross reference and 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 strengthen eligibility from multiple funding sources.
		E	City of Nulato and Nulato Tribal Council to use up-to-date technology in new housing construction to assure that housing complies with federal guidelines.
		F	Join the NFIP to reduce monetary losses to individuals and the community.
		G	Review ordinances and develop outreach programs to assure propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as flood or seismic events.
		H	Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to protect the threatened population.
		I	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
		J	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.
		K	Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
		L	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
2	Cross reference Mitigation goals and actions with other City of Nulato planning mechanisms and projects	A	Integrate the Mitigation Plan findings for enhanced emergency planning.
		B	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic, and other hazards to ensure occupant safety.

Table 7-2 Mitigation Goals and Potential Actions
(Bold ID items were selected for implantation by the Planning Team)

GOALS		ACTIONS	
No.	**Description**	**ID**	**Description**
		C	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
		D	Review existing community plans and incorporate mitigation philosophy from this plan into appropriate sections of other community plans.
3	Reduce possibility of losses from all natural hazards that affect the City of Nulato	**A**	Modify structure of existing drinking water wellhead so that rising flood water does not threaten the village's ability to access potable water. *(Nulato Comprehensive Plan 2004)*
		B	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.
		C	Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
		D	Harden utility headers located along river embankments to mitigate potential flood, debris, and erosion damages.
		E	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)
		F	Raise frontage road bed to mitigation recurring road surface damages. *(Nulato Comprehensive Plan 2004)*
		G	Relocate fuel tanks away from erosion and flood threatened embankment. *(Nulato Comprehensive Plan 2004)*
		H Ongoing	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
		I	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
		J	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current State Adopted Building Codes.
		K	Nulato Tribal Council to use up-to-date technology in new housing construction and will assure that housing complies with federal guidelines. (Earthquake, Permafrost, weather-snow load) *(From Nulato Comprehensive Plan)*
4	Reduce vulnerability of structures to earthquake damage.	**A**	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.

Table 7-2 Mitigation Goals and Potential Actions
(Bold ID items were selected for implantation by the Planning Team)

GOALS		ACTIONS	
No.	Description	ID	Description
		B	Develop outreach program to educate residents concerning benefits of increased seismic resistance and modern building code compliance during rehabilitation or major repairs for residences or businesses.
		C	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current State Adopted Building Codes.
		D	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
5	Reduce possibility of damage and losses from erosion.	A	Relocate buildings that are at risk of being affected by erosion.
		B	Apply for grants/funds to implement riverbank protection methods.
		C	Raise frontage road bed to mitigation recurring road surface erosion damages
6	Reduce the possibility of damage and losses from flooding.	**A**	Join the NFIP to reduce monetary losses to individuals and the community.
		B	Develop and maintain GIS mapped critical facility inventory for all structures located within 100-year and 500-year floodplains.
		C	Develop and maintain GIS mapped inventory, and develop prioritized list of residential and commercial buildings within 100-year and 500-year floodplains.
		D	Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.
		E	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.
		F	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
		G	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.
		H	Develop, implement, and enforce floodplain management ordinances.
		I	Develop outreach program to educate residents concerning flood proofed well and sewer/septic installation.
		J	Acquire (buy-out), relocate, elevate, or otherwise flood-proof identified critical facilities and private properties.
		K	Raise frontage road bed to mitigation recurring road surface flood damages. *(Nulato Comprehensive Plan 2004)*
7	Reduce possibility of damage and losses from landslide.	A	Complete a landslide location inventory; identify threatened critical facilities and other buildings and infrastructure.
		B	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.

Table 7-2 Mitigation Goals and Potential Actions
(Bold ID items were selected for implantation by the Planning Team)

GOALS		ACTIONS	
No.	Description	ID	Description
		C	Develop process to limit future development in high landslide potential areas (permitting, geo-technical review, soil stabilization techniques, etc).
		D	Develop a vegetation management plan addressing slope-stabilizing root strength while facilitating precipitation containment.
		E	Relocate AVEC generator building.
8	Reduce possibility of damage and losses from permafrost.	**A**	Identify existing permafrost areas to assist in residential and critical facility siting.
		B	Promote permafrost sensitive construction practices in permafrost areas.
9	Reduce vulnerability of structures to severe weather damage.	**A**	Construct heated fire truck storage facility to enable vehicle to be used in winter. *(Nulato Comprehensive Plan 2004).*
		B Ongoing	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
		C	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.
		D Ongoing	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
		E Ongoing	Develop personal use and educational outreach training for a "safe tree harvesting" program. Implement along utility and road corridors, preventing potential winter storm damage.
		F	Implement and enforce the most current State adopted building codes to ensure structures can withstand winter storm hazards such as high winds, rain, water, and snow.
10	Reduce possibility of damage and losses from wildland fires.	**A**	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
		B Ongoing	Develop Community Wildland Fire Protection Plans for all at-risk communities.
		C Ongoing	Provide wildland fire information in an easily distributed format for all residents.
		D	Purchase and garage a second Code Red Project box at another location in village. *(Nulato Comprehensive Plan 2004)*
		E	Tank Farm storage capacity needs to be increased to prevent fuel shortages during long winters. *(Nulato Comprehensive Plan 2004)*
		F	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.
		G	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.

7.3 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

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

DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions

Implementation of Mitigation Actions

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

Element

- Does the new or updated mitigation strategy include how the actions are prioritized?
- Does the new or updated mitigation strategy address how the actions will be implemented and administered?
- Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?
- *Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred? (Not applicable until 2014 update)*

Source: FEMA, July 2008.

The Planning Team evaluated and prioritized each of the 65 considered mitigation actions to determine which actions would be included in the Mitigation Action Plan. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities in the City of Nulato. To complete this task, the Planning Team first prioritized the hazards that were regarded as the most significant within the community (erosion, flood, and severe weather).

The Planning Team reviewed the simplified Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) evaluation criteria (shown in Table 7-3) and the Benefit-Cost Analysis Fact Sheet (Appendix D) to consider the opportunities and constraints of implementing each particular mitigation action. For each action considered for implementation, a qualitative statement is provided regarding the benefits and costs and where available the technical feasibility. A detailed cost-benefit analysis is anticipated as part of the application process for those projects the City chooses to implement.

On September 2, 2009, the hazard mitigation Planning Team prioritized each of the 28 selected mitigation actions chosen to be carried forward in the mitigation action plan. To determine the priority of the mitigation action, the hazard mitigation Planning Team considered each hazard's history, extent, and probability. 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.

Table 7-3 STAPLEE Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance/operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management.	Political support Local champion Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations.	Local, State, and Federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit-Cost Analysis.	Benefit/cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community.	Effect on local flora and fauna Consistent with community environmental goals Consistent with local, State, and Federal laws

Prioritizing the mitigation actions in the Mitigation Action Plan was completed to provide the City with an approach to implement the plan. Table 7-4 provides a summary of the mitigation action priorities.

7.4 IMPLEMENTING A MITIGATION ACTION PLAN

Table 7-4 shows the City of Nulato Mitigation Action Plan Matrix that shows how the mitigation actions were prioritized, how the overall benefit/costs were taken into consideration, and how each mitigation action will be implemented and administered by the Planning Team.

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
1A	Hold an annual or biennial "hazard meeting" to educate residents about recognizing and mitigating natural hazards that affect the City. Presentations can be either brochure or other written media so residents can take information with them after the meeting. Example Topics: NFIP program participation benefits, safe fire practices, and erosion reduction, etc.	High	City of Nulato, Nulato Tribal Council (In order to obtain ANA funding, the Tribe would need to be the applicant)	FEMA HMA, HMGP, FEMA Assistance to Firefighters Grant (AFG) Program's Fire Prevention and Safety Grant (FP&S) Program, and Staffing for Adequate Fire and Emergency Response (SAFER) Program, Administration for Native Americans (ANA) Grant Programs, Emergency Food and Shelter Program (EFSP)	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. TF: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
1B	Identify and pursue funding opportunities from outside agencies to fund and implement identified mitigation projects (ANTHC, DCCED, AKDOT, and HUD etc.).	High	City of Nulato Staff, Nulato Tribal Council Staff	City of Nulato, Nulato Tribal Council, Denali Commission, DCCED/CDBG	Ongoing	B/C: This ongoing activity is essential for the City of Nulato as there are limited funds available to accomplish effective mitigation actions. TF: This activity is ongoing demonstrating its feasibility.
1C	Establish a formal role for the jurisdictional Hazard Mitigation Planning Team to develop a continuous process to implement, monitor, and evaluate community wide mitigation actions.	Medium	City of Nulato, Nulato Tribal Council	City of Nulato, Nulato Tribal Council	1-3 years	B/C: The existing team has gained experienced throughout this process which can provide invaluable for ensuring a sustained effort toward mitigating natural hazard damages. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
1D	Cross reference and 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 strengthen eligibility from multiple funding sources.	Medium	City of Nulato, Nulato Tribal Council	City of Nulato, Nulato Tribal Council, Denali Commission, DCCED/CDBG	1-3 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.
1E	City of Nulato and Nulato Tribal Council to use up-to-date technology in new housing construction to assure that housing complies with Federal guidelines.	Medium	City of Nulato Staff, Nulato Tribal Council	DOE, ANTHC, DCCED/CDBG	2-4 years	B/C: This project would assure structure longevity and survivability, reducing damages and potential loss from hazardous events. TF: The project is feasible, however, the City and Tribal Council need to implement building codes and code enforcement to assure residents comply with this effort.
2D	Review existing community plans and incorporate mitigation philosophy from this plan into appropriate sections of other community plans.	Medium	City of Nulato Staff	City of Nulato, Nulato Tribal Council	1-3 years	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This action is feasible with limited fund expenditures.
3A	Modify structure of existing drinking	High	City of Nulato	FEMA HMA, HMGP,	1-3 years	B/C: This is a relatively low

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
	water wellhead so that rising flood water does not threaten the village's ability to access potable water. *(Nulato Comprehensive Plan 2004)*		Staff, Nulato Tribal Council	ANTHC, DEC/VSW, ANA		cost project which would eliminate future flood water contamination. TF: This project is technically feasible for the community to accomplish with DEC guidance.
3C	Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	High	City of Nulato Staff, Nulato Tribal Council	FEMA HMA, HMGP, Natural Resources Conservation Service (NRCS), ANA	1-5 years	B/C: This project would remove threatened structures from the floodplain, eliminating future damage while keeping land clear for perpetuity. F: This project is feasible using existing staff skills, equipment, and materials.
3F, 5C, 6K	Raise frontage road bed and apply hardened surface to mitigate recurring road surface damages. *(Nulato Comprehensive Plan 2004)*	High	City of Nulato Staff, Nulato Tribal Council	Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), DOT/PF, DEC, ANTHC	2-4 years	B/C: This project would reduce recurring flood and erosion damage. TF: This project while technically feasible will require the City to hire DEC qualified contractors. The project is beyond the City's financial capability to complete.
3G	City tank farm needs to be relocated away from flood and erosion hazard areas. *(Nulato Comprehensive Plan 2004)*	High	City of Nulato Staff, Nulato Tribal Council	DEC, ANTHC, Denali Commission, DCCED/CDBG	2-4 years	B/C: This project would remove the tank farm from the floodplain (and erosion area) eliminating potential damage and contamination from fuel spills dispersal during high water flood events. TF: This project while technically feasible will

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
						require the City to hire DEC qualified contractors. The project is beyond the City's financial capability to complete.
3H	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.	Medium	City of Nulato Staff, Nulato Tribal Council	FEMA HMA, HMGP, DOF	Ongoing	B/C: FEMA provides free publications for community education purposes. TF: Low to no cost makes this a very feasible project to successfully educate large populations.
4A	Disseminate FEMA pamphlets to educate and encourage homeowners concerning seismic structural and non-structural retrofit benefits.	Medium	City of Nulato Staff, Nulato Tribal Council	FEMA HMA, HMGP	1-3 years	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. TF: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
6A	Join the National Flood Insurance Program (NFIP) to reduce monetary losses to individuals and the community.	High	City of Nulato Staff, Nulato Tribal Council	City of Nulato, Nulato Tribal Council	1-3 years	B/C: NFIP participation while one of FEMA's highest priorities also enables communities with an effective program focus on repetitive flood loss properties and other priority flood locations and projects.

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
						TF: Low to no cost makes this outreach activity very feasible.
6E	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.	High	City of Nulato Staff, Nulato Tribal Council	City of Nulato, Nulato Tribal Council	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 City and Tribal Councils focus on priority flood locations and projects. TF: Low to no cost makes this outreach activity very feasible.
6G	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.	Low	City of Nulato	FEMA HMA, HMGP, Denali Commission,	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. FEMA provides free publications for community education purposes. TF: Low to no cost makes this outreach activity very feasible.
6J	Acquire (buy-out), relocate, elevate, or otherwise flood-proof identified critical facilities and private properties.	High	City of Nulato Staff, Nulato Tribal Council	FEMA HMA, HMGP, NRCS, Denali Commission, ANA	1-5 years	B/C: This project would remove threatened structures from the floodplain, eliminating future damage while keeping land clear for perpetuity. TF: This project is feasible using existing staff skills, equipment and materials.
7B	Develop prioritized list of landslide threatened properties or infrastructure then match with	Low	City of Nulato Staff, Nulato Tribal Council	City of Nulato, Nulato Tribal Council	4 years	B/C: Relocation is usually the most cost beneficial action as it removes the structures

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
	appropriate mitigation actions for threatened residential, critical, and other facilities and infrastructure.					from the hazard area. TF: This action is feasible as it can be easily accomplished using existing community resources (labor, equipment, and materials).
7E	Relocate AVEC generator building away from landslide area.	Medium	City of Nulato Staff, AVEC	AVEC	3-8 years	B/C: This project would remove threatened structures from the landslide prone areas, eliminating future damage while keeping land clear for perpetuity. TF: This project is feasible using existing staff skills, equipment, and materials.
8A	Identify existing permafrost areas to assist in residential and critical facility siting.	Low	City of Nulato, Nulato Tribal Council	City of Nulato, Nulato Tribal Council, DCCED/CDBG, Denali Commission	1-5 years	B/C: Pre-identification ensures that structures are not placed inappropriately and are built with the hazard as a focus. TF: This is feasible using existing resources as the community has awareness of permafrost areas due to prior project reports and studies.
9A	Construct heated fire truck storage facility to enable vehicle to be used in winter. *(Nulato Comprehensive Plan 2004)*	High	City of Nulato, Nulato Tribal Council	FEMA AFG, FP&S, SAFER	2-3 years	B/C: This project would assure equipment startup during sub-zero weather. TF: This project is technically feasible using existing skilled labor, however, funding is non-existent.
9B	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public	Low	City of Nulato, Nulato Tribal Council	DCCED/CDBG, Denali Commission	Ongoing	B/C: Scheduling maintenance and implementing mitigation activities will potentially reduce severe winter storm

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
	infrastructure from severe winter storms.					damages caused by heavy snow loads and icy rain. TF: This type activity is technically feasible within the community typically using existing labor, equipment, and materials. Specialized methods are not new to rural communities as they are used to importing required contractors.
9D	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.	Low	City of Nulato, Nulato Tribal Council	DOF: Volunteer Fire Assistance Grant Program (VFAGP), Rural Assistance Grant Program (RAGP)	Ongoing	B/C: Implementing this mitigation activities will potentially reduce ancillary damage from severe winter storms caused by heavy snow loads, icy rain, and wind. TF: This type activity is technically feasible within the community typically using existing labor, equipment, and materials.
9E	Develop personal use and educational outreach training for a “safe tree harvesting” program. Implement along utility and road corridors, preventing potential winter storm damage.	Low	City of Nulato, Nulato Tribal Council	FEMA AFG, FP&S, SAFER DOF: VFAG, RAGP, FireWise	Ongoing	B/C: This mitigation activity will reduce severe winter storm damages caused by heavy snow loads and icy rain by avoiding damage to structures and infrastructure. TF: This type activity is technically feasible within the community by implementing existing programs such as Fire Wise and other State and Federal agency programs.

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
10A	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.	Medium	City of Nulato, Nulato Tribal Council	DOF: VFAG, RAGP	1-2 years	B/C: This project will ensure the community looks closely at their wildland fire hazard to ensure they can safely evacuate their residents and visitors to safety during a fire event. TF: This is technically feasible using existing city and tribal resources.
10B	Develop Community Wildland Fire Protection Plans.	High	City of Nulato, Nulato Tribal Council, Alaska Fire Service, Division of Forestry, US Forest Service	DOF: VFAG, RAGP	Ongoing	B/C: This project will ensure the community looks closely at their wildland fire hazard to ensure they can safely address actions and needs during a wildland fire event. TF: This is technically feasible using existing city and tribal resources with existing State and Federal agency support and guidance.
10C	Provide wildland fire information in an easily distributed format for all residents.	Medium	City of Nulato, Nulato Tribal Council, AK Fire Service	DOF FireWise Program	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. TF: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is

Table 7-4 City of Nulato Mitigation Action Plan Matrix

Action ID	Description	Prioritization	Responsible Department	Potential Funding	Timeframe	(B) Benefit-Costs (F) Technical Feasibility
						ongoing demonstrating its feasibility.
10D	Purchase and garage a second Code Red Project box at another location in village. *(Nulato Comprehensive Plan 2004)*	Medium	City of Nulato Staff, Nulato Tribal Council	FEMA AFG, FP&S, SAFER	2-3 years	B/C: This project will enable rapid fire response to village locations more distant from current fire fighting equipment, reducing potential damages and life loss. TF: This project is feasible with as it requires building a simple structure, but is currently not financially viable.
10E	Tank Farm storage capacity needs to be increased to prevent fuel shortages during long winters. *(Nulato Comprehensive Plan 2004)*	Medium	City of Nulato Staff, Nulato Tribal Council	DCCED/CDBG, DEC, ANTHC	1-3 years	B/C: This project will assure essential and available heating fuel to reduce cold weather impacts to residents and infrastructure. TF: This project is feasible with financial assistance and outside agency support.
10F	Relocate power poles further from road to reduce likelihood of people hitting them during severe weather events. *(Nulato Comprehensive Plan 2004)*	Medium	City of Nulato Staff, Nulato Tribal Council	Alaska Energy Authority	Ongoing	B/C: Relocating telephone poles to a more safe distance from the roadway will reduce traffic injuries, vehicle damages, and infrastructure failure. TF: This project is feasible, however this is not a City owned infrastructure. It requires the utility company to fund and complete the project.

This section describes a formal plan maintenance process to ensure that the HMP remains an active and applicable document. It includes an explanation of how the City of Nulato 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:

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

8.1 MONITORING, EVALUATING, AND UPDATING THE HMP

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

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

Monitoring, Evaluating and Updating the Plan

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

Element

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

Source: FEMA, July 2008.

The HMP was prepared as a collaborative effort among the Planning Team Members. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the City of Nulato will use the Planning Team to monitor, evaluate, and update the HMP. Each authority identified in Table 7-4 will be responsible for implementing the Mitigation Action Plan. The Vice Mayor of Nulato, the hazard mitigation Planning Team Leader (or designee), will serve as the primary point of contact and will coordinate local efforts to monitor, evaluate, and revise the HMP.

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

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

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

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

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

8.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

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

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

Incorporation into Existing Planning Mechanisms

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

Element

- Does the new or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?
- Does the new or updated plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?
- *Does the updated plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate? (Not applicable until 2014 update)*

Source: FEMA, July 2008.

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

- Ensure the identified mitigation goal is fulfilled by conducting 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 appropriate community members 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.

8.3 CITY OF NULATO CAPABILITY ASSESSMENT

The City of Nulato capability assessment reviews the technical and fiscal resources available to the community. This section outlines the resources available to the City of Nulato for mitigation and mitigation related funding and training.

Table 8-1 City of Nulato Regulatory Tools

REGULATORY TOOLS (ORDINANCES, CODES, PLANS)	EXISTING?	COMMENTS (YEAR OF MOST RECENT UPDATE; PROBLEMS ADMINISTERING IT, ETC)
Building code	No	The City can exercise this authority.
Zoning ordinances	No	The City can exercise this authority.
Subdivision ordinances or regulations	No	The City can exercise this authority.
Special purpose ordinances	No	The City can exercise this authority.
Comprehensive Plan	Yes	Completed in 2007
Economic Development Plan	No	Tanana Chiefs Conference, Regional Comprehensive Economic Development Strategy
Emergency Response Plan	No	
Land Use Ordinance	No	
Land Use Plan	No	
Wildland Fire Protection Plan	Yes	
Other Plans	Yes	The City of Nulato Search & Rescue Plan

Federal 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/fima/planhowto.shtm).
  - Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments. FEMA DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation and shows state and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.
  - Mitigation Resources for Success compact disc (CD). FEMA 372, September 2001. This CD contains a wealth of information about mitigation and is useful for State and local government planners and other stakeholders in the mitigation process. It provides mitigation case studies, success stories, information about Federal mitigation programs, suggestions for mitigation measures to homes and businesses, appropriate relevant mitigation publications, and contact information.
  - A Guide to Federal Aid in Disasters. FEMA 262, April 1995. When disasters exceed the capabilities of State and local governments, the President's disaster assistance programs (administered by FEMA) is the primary source of Federal assistance. This handbook discusses the procedures and process for obtaining this assistance, and provides a brief overview of each program.
  - The Emergency Management Guide for Business and Industry. FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and

emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to a community's industries and businesses located in hazard prone areas.

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

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

State Resources

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

  (1) Coordinate public and private agencies engaged in the planning and delivery of emergency medical services, including trauma care, to plan an emergency medical services system.

  (2) Assist public and private agencies to deliver emergency medical services, including trauma care, through the award of grants in aid.

(3) Conduct, encourage, and approve programs of education and training designed to upgrade the knowledge and skills of health personnel involved in emergency medical services, including trauma care.

(4) Establish and maintain a process under which hospitals and clinics can represent themselves to be trauma centers because they voluntarily meet criteria adopted by the department which are based on an applicable national evaluation system.

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

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

  Additionally, DOT/PF provides safe, efficient, economical, and effective operation of the State's highways, harbors, and airports. DOT/PF uses it's Planning, Design & Engineering, Maintenance & Operations, and Intelligent Transportation Systems resources to identify the hazard, plan and initiate mitigation activities to meet the transportation needs of Alaskans, and make Alaska a better place to live and work. DOT/PF budgets for the temporary replacement bridges and materials necessary to make the multi-model transportation system operational following a natural disaster.
- Alaska Department of Natural Resources (DNR): DNR administers various projects designed to reduce stream bank erosion, reduce localized flooding, improve drainage, and improve discharge water quality through the storm water grant program funds. Within DNR, the Division of Geological and Geophysical Survey (DGGS) is responsible for the use and development of Alaska's mineral, land, and water resources, and collaboration on earthquake mitigation.
  - DNR/DOF. DOF participates in a statewide wildfire control program in cooperation with the forest industry, rural fire departments, and other agencies. Prescribed burning may increase the risks of fire hazards; however, prescribed

burning reduces the availability of fire fuels and therefore the potential for future, more serious fires.

- DOF also manages various wildland fire programs, activities, and grant programs such as the FireWise Program, the Community Forestry Program, the Volunteer Fire Assistance, and Rural Fire Assistance Grant programs. Information can be found at http://forestry.alaska.gov/fire/current.htm.

Other Funding Sources and Resources

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

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

Local Resources

The City of Nulato has a limited number of planning, land, and financial management tools to implement hazard mitigation activities. The resources available in these areas have been assessed by the hazard mitigation Planning Team, and are summarized in Table 8-2 and 8-3 below.

Table 8-2 City of Nulato Staff Resources

Staff / Personnel Resources	Y / N	Department / Agency and Position
Planner or engineer with knowledge of land development and land management practices	No	City hires consultants with land development and land management knowledge
Engineer or professional trained in construction practices related to buildings and/or infrastructure	No	City may hire engineering consulting services
Planner or engineer with an understanding of natural and/or human-caused hazards	No	City hires consultants with hazard mitigation knowledge
Floodplain Manager	No	Taunnie Boothby, State Floodplain Manager
Surveyor	No	City hires surveying consulting services
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	No	
Personnel skilled in GIS and/or Hazards US-Multi-Hazard (HAZUS-MH) software	No	
Scientists familiar with the hazards of the jurisdiction	No	US Fish and Wildlife Service (USFWS) local office; AK Dept. of Fish and Game (ADF&G) local office
Emergency manager	No	
Grant writer	No	

Table 8-3 City of Nulato Financial Resources

Financial Resources	Accessible or Eligible to Use (Yes / No / DK-Don't Know)
Community Development Block Grants	Yes
Capital Improvement Projects Funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric service	No
Impact fees for homebuyers or developers for new developments/homes	No
Withhold spending in hazard-prone areas	No

Based on the above information, the City of Nulato has the capability to develop, manage, and complete mitigation projects using appropriate and available resources and expertise to fulfill Federal grant requirements.

The City has the capability to hire or utilize existing resources to manage their hazard mitigation planning goals, initiatives, and plan implementation and management requirements.

8.4 CONTINUED PUBLIC INVOLVEMENT

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

DMA 2000 Requirements: Plan Maintenance Process - Continued Public Involvement

Continued Public Involvement

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

Element

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

Source: FEMA, July 2008.

The City of Nulato is dedicated to involving the public directly in the continual reshaping and updating of the HMP as depicted in their Mitigation Actions Plan Matrix, Table 7-4, six of their implemented Mitigation Actions (1A, 3H, 4A, 6G, 9E, and 10C) are outreach activities focused to keeping their population involved and aware of the hazards threatening their community.

A paper copy of the HMP and any proposed changes will be available at the City 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 City Office.

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

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Appendix A
Crosswalk

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LOCAL MITIGATION PLAN REVIEW CROSSWALK

Jurisdiction: Nulato, Alaska

LOCAL MITIGATION PLAN REVIEW SUMMARY

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

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
1. Adoption by the Local Governing Body: §201.6(c)(5) OR		**X**
2. Multi-Jurisdictional Plan Adoption: §201.6(c)(5) **AND**		**N/A**
3. Multi-Jurisdictional Planning Participation: §201.6(a)(3)		**N/A**

Planning Process	**N**	**S**
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		**X**

Risk Assessment	**N**	**S**
5. Identifying Hazards: §201.6(c)(2)(i)		**X**
6. Profiling Hazards: §201.6(c)(2)(i)		**X**
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		**X**
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		**X**
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		**X**
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		**X**
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		**X**
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		**N/A**

*States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Mitigation Strategy	**N**	**S**
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		**X**
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		**X**
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		**X**
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		**X**
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		**N/A**

Plan Maintenance Process	**N**	**S**
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		**X**
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		**X**
20. Continued Public Involvement: §201.6(c)(4)(iii)		**X**

Additional State Requirements*	**N**	**S**
Insert State Requirement		
Insert State Requirement		
Insert State Requirement		

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	
See Reviewer's Comments	
PLAN APPROVED	**X**

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Jurisdiction: Nulato, Alaska

Local Mitigation Plan Review and Approval Status

Jurisdiction: City of Nulato	**Title of Plan:** City of Nulato Hazard Mitigation Plan	**Date of Plan:** December 2009
Local Point of Contact: Lawrence Esmailka	**Address:** City of Nulato P.O. Box 65009, Nulato, AK 99765	
Title: Vice Mayor		
Agency: City of Nulato		
Phone Number: 907. 898.2251	**E-Mail:** nulatoclerk@ak.net	

State Reviewer: Andy Jones	**Title:** EMS III	**Date:** November 2, 2009

FEMA Reviewer: Brett Holt	**Title:** Mitigation Planner	**Date:** December 8, 2009
Date Received in FEMA Region	November 14, 2009	
Plan Not Approved		
Plan Approved	X	
Date Approved	January 13, 2010	

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
1. City of Nulato		X		

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

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Jurisdiction: Nulato, Alaska

PREREQUISITE(S)

1. Adoption by the Local Governing Body

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

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the local governing body adopted **new** or updated plan?	p. 2-1	Plan adopted via resolution		X
B. Is supporting documentation, such as a resolution, included?	Appendix B	Resolution provided		X
		SUMMARY SCORE		X

2. Multi-Jurisdictional Plan Adoption

***Requirement §201.6(c)(5)*:** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new** or updated plan indicate the specific jurisdictions represented in the plan?	N/A			N/A
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?	N/A			N/A
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	N/A			N/A
		SUMMARY SCORE		N/A

3. Multi-Jurisdictional Planning Participation

***Requirement §201.6(a)(3)*:** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan describe **how** each jurisdiction participated in the plan's development?	N/A			N/A
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	N/A			N/A
		SUMMARY SCORE		N/A

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(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 non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative description of the process followed to prepare the **new** or updated plan?	pp. 4-1 to 4-2	The planning process is described.		X
B. Does the **new** or updated plan indicate who was involved in the **current** planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, *etc*.?)	pp. 4-2 to 4-3 Table 4-1	City officials, community members, and state officials participated.		X
C. Does the **new** or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	p. 4-3 Table 4-2, Appendix C	Multiple opportunities were provided for the public to be involved.		X
D. Does the **new** or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	p. 4-3	Opportunities existed for community members and organizations to participate.		X
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	p. 4-4, Section 9	A number of existing plans and other information were incorporated. References are provided in Section 9.		X
F. 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?	N/A			N/A
		SUMMARY SCORE		X

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

5. Identifying Hazards

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan include a description of the types of all natural hazards that affect the jurisdiction?	p. 5-1 to 5-2	The Planning Team determined that seven hazards pose the greatest threat to the City: earthquake, erosion, flood, landslide, permafrost, severe weather, and wildland fire.		X
		SUMMARY SCORE		X

6. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (*i.e.*, geographic area affected) of each natural hazard addressed in the **new** or updated plan?	Section 5	The location of each natural hazard is identified.		X
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new** or updated plan?	Section 5	The extent of each hazard is described.		X
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the **new** or updated plan?	Section 5	Previous occurrences of each hazard are provided.		X
D. Does the plan include the **probability of future events** (*i.e.*, chance of occurrence) for each hazard addressed in the **new** plan?	Section 5	The plan includes the probability of future events for each hazard.		X
		SUMMARY SCORE		X

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Jurisdiction: Nulato, Alaska

7. Assessing Vulnerability: Overview

Requirement §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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section 6	An overall summary description of the jurisdiction's vulnerability is included.		X
B. Does the **new** or updated plan address the **impact** of each hazard on the jurisdiction?	Section 5	The impacts are addressed in each hazard profile.		X
		SUMMARY SCORE		X

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

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

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?	p. 6-3 Section 6.2.1.2	The City does not participate in the NFIP. The City has one repetitive loss property that meets the repetitive loss criteria.		X
		SUMMARY SCORE		X

9. Assessing Vulnerability: Identifying Structures

Requirement §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 area … .*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 6	The plan describes vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas		X
B. Does the **new** or updated plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	p. 6-12	Future building stock is identified.		X
		SUMMARY SCORE		X

10. Assessing Vulnerability: Estimating Potential Losses

Requirement §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 … .*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan estimate **potential dollar losses** to vulnerable structures?	p. 6-7, Table 6-3	A potential hazard exposure analysis is provided.		X
B. Does the **new** or updated plan describe the **methodology** used to prepare the estimate?	p. 6-6	The methodology is described.		X
		SUMMARY SCORE		X

11. Assessing Vulnerability: Analyzing Development Trends

Requirement §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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe land uses and development trends?	p. 6-5 to 6-6, 6-10 to 6-11, Table 6-4 & 6-5	Land uses and development trends are described.		X
		SUMMARY SCORE		X

12. Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	N/A			N/A
		SUMMARY SCORE		N/A

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include 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.*

13. Local Hazard Mitigation Goals

Requirement §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	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new** or updated plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	p. 7-1 Table 7-1	10 goals are developed.		X
		SUMMARY SCORE		X

14. Identification and Analysis of Mitigation Actions

Requirement §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	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	pp. 7-3 to 7-6	A comprehensive range of mitigation actions are identified.		X
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	pp. 7-3 to 7-6	Actions address reducing the effects of hazards on existing and new buildings.		X
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	pp. 7-3 to 7-6	See above comment.		X
		SUMMARY SCORE		X

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe the jurisdiction (s) participation in the NFIP?	p. 6-3	The City does not participate in the NFIP.		X
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	N/A			N/A
		SUMMARY SCORE		X

16. Implementation of Mitigation Actions

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

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	pp. 7-7 to 7-8	A prioritization process is provided.		X
B. Does the **new** or updated mitigation strategy address how the actions will be implemented and administered, including the responsible department, existing and potential resources and the timeframe to complete each action?	pp. 7-9 to 7-17	Each action has the prioritization, responsible department, potential funding, timeframe, and benefit-costs/technical feasibility provided.		X
C. Does the **new** or updated prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?	p. 7-9 to 7-17 Appendix D	An emphasis on the use of a cost-benefit review is included.		X
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	N/A			N/A
		SUMMARY SCORE		X

17. Multi-Jurisdictional Mitigation Actions

Requirement §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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new** or updated plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	N/A			N/A
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	N/A			N/A
		SUMMARY SCORE		N/A

PLAN MAINTENANCE PROCESS

18. Monitoring, Evaluating, and Updating the Plan

Requirement §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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe the method and schedule for **monitoring** the plan, including the responsible department?	pp. 8-1 to 8-2	An annual review will take place.		X
B. Does the **new** or updated plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?	pp. 8-1 to 8-2	The method and schedule for evaluating the plan is described.		X
C. Does the **new** or updated plan describe the method and schedule for **updating** the plan within the five-year cycle?	p. 8-2	The method and schedule for updating the plan is described.		X
		SUMMARY SCORE		X

19. Incorporation into Existing Planning Mechanisms

Requirement §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	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	p. 8-3	Local planning mechanisms are identified.		X
B. Does the **new** or updated plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	p. 8-3	Local planning processes are included.		X
C. Does the **updated** plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	N/A			N/A
		SUMMARY SCORE		X

20. Continued Public Involvement

Requirement §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	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	p. 8-10	Continued public participation is explained.		X
		SUMMARY SCORE		X

END OF REVIEW

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Appendix B

Adoption Resolution

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CITY OF NULATO
PO Box 65009
Nulato, AK 99765

Resolution 10-01

A RESOLUTION OF THE NULATO CITY COUNCIL ADOPTING THE CITY OF NULATO HAZARD MITIGATION PLAN

WHEREAS, the Nulato City Council is recognized by the State of Alaska as the governing body for the community of Nulato, Alaska; and

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

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

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

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

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

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

1. The Plan is hereby adopted as an official plan of the City of Nulato.

2. The City of Nulato officials identified in the Mitigation Plan (Section 8) are hereby directed to implement the recommended actions assigned to them. These officials will report quarterly on their activities, accomplishments, and progress to the city council.

3. The City of Nulato's Hazard Mitigation Planning Team will provide annual progress reports on the status of the implemented Mitigation Action Plan's projects to the Planning Team Leader. This report shall be submitted to the City Council annually by the Plan's adoption anniversary date.

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

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

PASSED AND APPROVED by a duly constituted quorum of the City Council this 5th. Day of January, 2010.

Sharon Agnes, Mayor

ATTEST: Kimberly A. Joyce
City Clerk

Appendix C
Public Outreach

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CITY OF NULATO HAZARD MITIGATION PLAN

January 2009

This newsletter discusses the preparation of the Nulato 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.ak-prepared.com.

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 eleven Alaskan Communities. Nulato was selected for participation in this effort.

Alaska Division of Community & Regional Affairs (DCRA) is collaborating with DHS&EM and the Interior Regional Housing Authority for preparing community profile maps as part of the hazard mitigation planning process. Examples of the maps can be viewed online at http://www.commerce.state.ak.us/dca/profiles/profile-maps.htm.

DCRA is working with DHS&EM, and their contractor URS Corporation, to share information and coordinate map preparation and hazard mitigation plan development efforts. Work on the maps is expected to begin in Spring 2009.

The Nulato Hazard Mitigation Plan will identify all natural hazards, such as flood, earthquake, erosion, wildland fire, weather related hazards and others. The plan will also identify the people and facilities potentially at risk and ways to mitigate damage from hazards. The public participation and planning process will be documented as part of the project.

What is Hazard Mitigation?

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

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

Hazard mitigation projects eliminate the risk or reduce the severity of hazards on 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, 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 either the Hazard Mitigation Assistance or disaster mitigation assistance programs. The City of Nulato plans to apply for mitigation funds after our plan is complete.

The rules have changed. The Local government and Flood Hazard Mitigation Plans' requirements were consolidated into one planning mechanism. Additionally the Flood Mitigation Assistance (FMA), Repetitive Flood Loss (RL) and Severe Repetitive Flood Loss (SRL) programs were also consolidated with the Pre-Disaster Mitigation Grant Program under the newly developed Hazard Mitigation Assistance (HMA) program. Each of these programs must use the same application process and eligibility requirements for nationally competitive funding.

The Hazard Mitigation Grant Program (HMGP) is a disaster related assistance program. Applicants typically compete on a statewide basis.

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. Information about the requirements may be found on the Internet at: http://www.fema.gov/plan/mitplanning/index.shtm#2 under Laws, Regulations, and Guidance.

The DMA2000 requires the plan to document the following topics:

- Planning process
- Hazard identification
- Risk assessment
- Mitigation Strategy: Goals, actions, and projects
- A plan adoption resolution from the community
- State and FEMA approval

FEMA has prepared Planning Guidance and "How to" Guides that explain in detail how each of the DMA2000 requirements are met. These guides are available at http://www.fema.gov/plan/mitplanning/planning_resources.shtm#0. The Nulato Hazard Mitigation Plan will be prepared following 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.

Our community is located in the Yukon-Koyukuk Census Area, and DHS&EM has previously identified natural hazards that occur in this area that may also occur specifically in Nulato.

The Planning Team

The planning team is being lead by Mayor Sharon Agnes with assistance from Kimberly Joyce and Lawrence Esmailka. DHS&EM has contracted with URS Corporation to provide assistance and guidance to the planning team throughout the planning process.

Public Participation

PUBLIC MEETINGS – Project Presentation & Data Gathering	
Location	Community Center
Date	February 10, 2009
Time	3:30 p.m.
Toll Free call-In number: 1.877.290.1337, Conference Code: 3422356	

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 Nulato Hazard Mitigation Plan is complete, the results will be presented to the community before DHS&EM and FEMA approval, and community adoption.

We Need Your Help

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

Nulato Hazard Worksheet		
Hazard	**Yukon-Koyukuk Census Area***	**Nulato**
Earthquake	Y	
Erosion	Y	
Flood	Y	
Landslide	U	
Permafrost	Y	
Snow Avalanche	Y	
Tsunami & Seiche	N	
Volcano	N	
Weather (Severe)	Y	
Wildland Fire	Y	
**Hazard Matrix from the State of Alaska Hazard Mitigation Plan for the Yukon-Koyukuk Census Area*		

DHS&EM identified critical facilities within Nulato as part of the Alaska Critical Facilities Inventory, but the list of critical facilities needs to be updated and determine the estimated value and location (latitude/longitude), the number and value of structures, and the number of people living in each structure. Once this information is collected we will determine which critical facilities, residences, and populations are vulnerable to specific hazards in Nulato. Please add additional facilities if needed.

Nulato Critical Facilities*	
Facility Type	**Facility Name**
Airport	Nulato Airfield
Bridge	Nulato River Bridge
Bridge	Slough Bridge
Cemetery	
Church	Church Living Quarters
Church	Church
Community Hall	Adult Recreation Center
Community Hall	Teen Recreation Center
Community Storage Shed	Storage 1
Community Storage Shed	Storage 2
Fuel Storage Tanks (>500gal)	AVEC Plant
Fuel Storage Tanks (>500gal)	City Fuel Depot
Fuel Storage Tanks (>500gal)	School Tanks
Fuel Header	Nulato Fuel Header
Generator	School Backup Generator
Clinic	Nulato Health Clinic
Landfill/Incinerator	Nulato Landfill
Offices	City Office-1
Offices	City Office-2
Offices	Tribal Office
Police Station	VPSO Building
Post Office	
Potable Water Production & Treatment Facility	Water Plant-New Townsite
Potable Water Production & Treatment Facility	Water Plant-Old Townsite
Power Generation Facility	AVEC
Reservoir/Water Supply	Nulato River Well
Reservoir/Water Supply	Uptown well
Satellite Dish	Telephone
School	Andrew K. Demoski School
School	Head Start
Service/Maintenance Shop	City Garage
Service/Maintenance Shop	State DOT Building
Sewage Lagoon	Sewage Lagoon
Store	H&H Store
Store	Victors
Teachers Quarters	1, 2, 3, 4, & 5
Washeteria	Washeteria-New Town Site
Washeteria	Washeteria-Old Town Site
**AK Critical Facilities Inventory*	

Please email or fax updated hazard and critical facility information directly to URS or provide it to your community planning team lead

We encourage you to take an active part in preparing the Nulato Hazard Mitigation Plan and the DCCED Community Mapping 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, URS planning coordinators, or the DCCED community mapping manager if you have any questions, comments, or requests for more information:

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CITY OF NULATO HAZARD MITIGATION PLAN

September 2009 **Newsletter 2**

This newsletter discusses the preparation of the City of Nulato 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.ak-prepared.com.

The City of Nulato was one of eleven communities selected by the State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) for a Hazard Mitigation Planning development project. The plan identifies natural hazards that affect the community including earthquake, erosion, drought, flood, permafrost, severe weather, and wildland fire. The plan also identifies the people and facilities potentially at risk and ways to mitigate hazards. The public participation and planning process has been documented as part of the project. URS Corporation (URS) was hired as consultants to assist in preparing the plan.

What is Hazard Mitigation?

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

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

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

Why Do We Need A Hazard Mitigation Plan?

A community is only eligible to receive grant money for mitigation programs by preparing and adopting a hazard mitigation plan. Communities must have an approved mitigation plan to receive grant funding from the Federal Emergency Management Agency (FEMA) for eligible mitigation projects. The City of Huslia plans to apply for grant funding after the plan is approved by DHS&EM and FEMA and adopted by the City.

The Planning Process

There are very specific federal requirements that must be met when preparing a hazard mitigation plan. These requirements are commonly referred to as the Disaster Mitigation Act of 2000, or DMA2000 criteria. Information about the criteria may be found on the Internet at: http://www.fema.gov/pdf/help/fr02-4321.pdf.

The DMA2000 requires the plan to document the following topics:

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

FEMA has prepared a user's guide that explains in detail how each of the DMA2000 requirements are met. This guide is available on the Internet at:

http://www.fema.gov/library/viewRecord.do?id=1867

The City of Nulato Hazard Mitigation Plan has been prepared following those guidelines.

In January 2009 the planning process kicked-off by establishing a local planning committee and holding a public meeting. During the meeting the planning committee examined the full spectrum of hazards listed in the State Hazard Mitigation Plan and identified seven hazards that the Huslia plan would address including earthquake, erosion, drought flood, permafrost, wildland fire, and severe weather.

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

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. Goals and 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/projects are undertaken in order to achieve your stated objectives. In June 2009, the local planning committee identified projects/actions for each hazard that focus on six categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. The mitigation actions identified as a high priority by the planning team are listed below, and explained in more detail in the plan.

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

The draft plan is available in the City office and on the State website (http://www.ak-prepared.com) for public review and comment. Comments should be made via email, fax, or phone to the contact person below and be received no later than July 24, 2009. The plan will be provided to DHS&EM and FEMA for their approval prior to formal adoption by the Nulato City Council.

The Planning Committee

The plan was developed with the assistance from a planning team consisting of a cross section of the community. Planning Team members who helped develop the plan include Team Leader Vice Mayor Lawrence Esmailka with assistance from Jessica Ekada and Kimberly Joyce. URS Corporation and DHS&EM are also providing assistance to the Planning Team.

Sample of the City of Nulato's Mitigation Actions. Review the draft HMP for a complete list.

Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the City of Nulato.	Review existing community plans and incorporate mitigation philosophy from this plan into appropriate sections of other community plans.	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.
Identify and pursue funding opportunities from outside agencies to fund and implement identified mitigation projects (ANTHC, DCCED, AKDOT, and HUD etc.).	Modify structure of existing drinking water wellhead so that rising flood water does not threaten the village's ability to access potable water. *(Nulato Comprehensive Plan 2004)*	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Establish a formal role for the jurisdictional Hazard Mitigation Planning Team to develop a continuous process to implement, monitor, and evaluate community wide mitigation actions.	Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	Construct heated fire truck storage facility to enable vehicle to be used in winter. *(Nulato Comprehensive Plan 2004)*
Cross reference and 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 strengthen eligibility from multiple funding sources.	Raise frontage road bed to mitigation recurring road surface damages. *(Nulato Comprehensive Plan 2004)*	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures
City of Nulato and Nulato Tribal Council to use up-to-date technology in new housing construction to assure that housing complies with federal guidelines.	Relocate fuel tanks away from erosion and flood threatened embankment. *(Nulato Comprehensive Plan 2004)*	Relocate AVEC generator building

We encourage you to learn more about the City of Huslia'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 D
Benefit–Cost Analysis Fact Sheet

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Benefit-Cost Analysis Fact Sheet

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

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

All Benefit-Costs must be:

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

General Data Requirements:

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

Damage and Benefit Data

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

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

Building Data

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

Use Correct Occupancy Data

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

Questions to Be Answered

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

Common Shortcomings

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

Appendix E

Plan Maintenance Documents

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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: