

Glennallen and Native Village of Tazlina DRAFT Hazard Mitigation Plan

*Prepared by
The Glennallen LEPC and the Native Village of Tazlina
Hazard Mitigation Planning Team*
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Draft Glennallen/Tazlina
Multi-Jurisdictional Hazard Mitigation Plan

Hazard Mitigation Plan Update Requirements

The Copper River Local Emergency Planning Committee (LEPC) coordinator will annually review the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) to determine needed changes, including planning process, hazard information, disaster losses, community asset values, and the mitigation strategy implementation status.

The Glennallen MJHMP, including appendices and annexes, will be updated every five years, after a disaster response, or as appropriate in response to community mitigation activities. The plan will undergo a complete contents review led by the LEPC who will submit it to DHS&EM for review and approval. The State will in-turn submit the reviewed plan to FEMA for review and conditional approval.

Following FEMA's conditional MJHMP approval, the Native Village of Tazlina will formally adopt the plan and DHS&EM will formally promulgate the plan for Glennallen. DHS&EM will re-submit for FEMA final approval and provide the Copper River LEPC and the Native Village of Tazlina a formal approval letter for inclusion within the Final MJHMP.

Record of Plan Changes

The Copper River LEPC will track and record updates revisions to the MJHMP in the following table. This process will ensure that the most recent version of the MJHMP is disseminated and implemented as appropriate.

MJHMP Update Tracking Sheet

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Plan Distribution List

The Copper River LEPC Committee Coordinator is ultimately responsible for disseminating all plan updates. The LEPC will provide the following communities, agencies, and persons with copies of each MJHMP revision. Recipients are responsible for updating their respective MJHMP documents when they receive changes.

MJHMP Distribution List

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Draft Glennallen/Tazlina Multi-Jurisdictional Hazard Mitigation Plan

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Acronyms/Abbreviations

| | |
|--------|---|
| °F | Degrees Fahrenheit |
| ACCIMP | Alaska Climate Change Impact Mitigation Program |
| ACIA | Arctic Climate Impact Assessment |
| ACWF | Alaska Clean Water Fund |
| ADWF | Alaska Drinking Water Fund |
| AEA | Alaska Energy Authority |
| AECOM | AECOM, Consultant, or Contractor |
| AEEE | Alternative Energy and Energy Efficiency |
| AFG | Assistance to Firefighters Grant |
| AHFC | Alaska Housing Finance Corporation |
| AICC | Alaska Interagency Coordination Center |
| AIDEA | Alaska Industrial Development and Export Authority |
| AK | Alaska |
| AMF | Airport Maintenance Facility |
| ANA | Administration for Native Americans |
| ARC | American Red Cross |
| ARW | Airport Runway |
| AVEC | Alaska Village Electric Cooperative |
| B/C | Benefit vs. Cost or Benefit/Cost |
| BCA | Benefit Cost Analysis |
| BIA | US Bureau of Indian Affairs |
| CBO | Communications Building-Other |
| CCP | Citizen Corps Program |
| CDBG | Community Development Block Grant |
| CEHHWG | Climate, Ecosystems & Human Health Work Group |
| CFR | US Code of Federal Regulations |
| CFP | Community Forestry Program |
| CGP | Comprehensive Grant Program |
| CIG | Conservation Innovation Grant |
| CO-OP | Cooperative |
| Corp | Corporation |
| CRS | Community Rating System |
| CTA | Conservation Technical Assistance |
| CVRF | Coastal Villages Region Fund |
| CWSRF | Clean Water State Revolving Fund |
| DCCED | Department of Commerce, Community, and Economic Development |

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Acronyms/Abbreviations

| | |
|----------|--|
| DCRA | Division of Community and Regional Affairs |
| DEC | Department of Environmental Conservation |
| Denali | Denali Commission |
| DHS | US Department of Homeland Security |
| DHS&EM | Division of Homeland Security and Emergency Management |
| DHSS | Department of Health and Social Services |
| DGGS | Division of Geological and Geophysical Survey |
| DMA 2000 | Disaster Mitigation Act Of 2000 |
| DMVA | Department of Military and Veterans Affairs |
| DNR | Department of Natural Resources |
| DOE | US 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 |
| EMPG | Emergency Management Performance Grant |
| EOC | Emergency Operations Center |
| EPA | US Environmental Protection Agency |
| EPPS | Energy Production Plant-Small |
| EQ | Earthquake |
| EQIP | Environmental Quality Incentives Program |
| EWPP | Emergency Watershed Protection Program |
| FAA | Federal Aviation Administration |
| FEMA | Federal Emergency Management Agency |
| FL | Flood |
| FMA | Flood Mitigation Assistance |
| FP&S | Fire Prevention and Safety |
| ft | Feet |
| FY | Fiscal Year |
| g | Gravity |
| GF | Ground Failure |
| GIS | Geospatial Information System |
| Hazus | Hazards US – Multi-Hazard Software |
| HMA | Hazard Mitigation Assistance |
| HMGP | Hazard Mitigation Grant Program |
| HMP | Hazard Mitigation Plan |

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Acronyms/Abbreviations

| | |
|---------|---|
| HRD1 | Highway/Road - One Lane |
| HRD2 | Highway/Road - Two Lane |
| HS GP | Homeland Security Grant Program |
| HUD | Housing and Urban Development |
| HWBO | Highway Bridge-Other (includes wood) |
| IBHS | Institute for Business And Home Safety |
| ICDBG | Indian Community Development Block Grant |
| IGAP | Indian General Assistance Program |
| IHBG | Indian Housing Block Grant |
| IHLGP | Indian Home Loan Guarantee Program |
| INAP | Indian and Native American Programs |
| IRS | Internal Revenue Service |
| Kt(s) | Knot(s) |
| LEG | Legislative Energy Grant |
| LEPC | Local Emergency Planning Committee |
| M | Magnitude |
| MAP | Mitigation Action Plan |
| MGL | Municipal Grants And Loans |
| MMI | Modified Mercalli Intensity |
| mph | Miles Per Hour |
| msl | Mean Sea Level |
| MJHMP | Multi-Jurisdictional Hazard Mitigation Plan |
| NAHASDA | Native American Housing Assistance and Self Determination Act |
| NFIP | National Flood Insurance Program |
| NIMS | National Incident Management System |
| NOAA | National Oceanic and Atmospheric Administration |
| NRF | National Response Framework |
| NRCS | Natural Resources Conservation Service |
| NWS | National Weather Service |
| OTF | Oil Tank Farm |
| PDM | Pre-Disaster Mitigation |
| PGA | Peak Ground Acceleration |
| PNP | Private Non-Profits |
| PPSB | Potable Water Pumping Station |
| PSTS | Water Storage Tank-Steel |
| PWE | Potable Water Well |
| PWPB | Potable Water Pipelines-Buried |

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Acronyms/Abbreviations

| | |
|--------------|--|
| PWS | Port Waterfront Structures (Harbor) |
| PWTS | Potable Water Treatment (Plant)-Small |
| RCASP | Remote Community Alert Systems |
| RD | Rural Development |
| RL | Repetitive Loss |
| RurALCAP | Rural Alaska Community Action Program Incorporated |
| SAFER | Staffing For Adequate Fire and Emergency Response |
| SBA | US Small Business Administration |
| SHMP | Alaska State Hazard Mitigation Plan |
| SHSP | State Homeland Security Program |
| SOA | State of Alaska |
| Sq. | Square |
| Stafford Act | Robert T. Stafford Disaster Relief and Emergency Assistance Act |
| STAPLEE | Social, Technical, Administrative, Political, Legal, Economic, and Environmental |
| T/F | Technical / Feasibility |
| US or U.S. | United States |
| USACE | US Army Corps of Engineers |
| USC | US Code |
| USDA | US Department of Agriculture |
| USFWS | US Fish and Wildlife Service |
| USGS | US Geological Survey |
| VFA-RFA | Volunteer Fire Assistance and Rural Fire Assistance Grant |
| Village | Village of Tazlina or Native Village of Tazlina |
| VSW | Village Safe Water |
| WARN | Warning, Alert, and Response Network |
| WTF | Water Treatment Facility |
| WWTS | Wastewater Treatment (Plant)-Small |

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

1.1 OVERVIEW

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

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

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

This MJHMP complies with Title 44 CFR current as of March 11, 2015 and applicable guidance documents. (FEMA 2015a)

1.2 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

FEMA HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local Mitigation Plan. Two of the grants are authorized under the Stafford Act and DMA 2000, while the remaining three are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act. Excerpts from FEMA's 2015 HMA Guidance, Part I, is as follows:

"The U.S. Department of Homeland Security (DHS) FEMA HMA programs present a critical opportunity to reduce the risk to individuals and property from natural hazards, while simultaneously reducing reliance on Federal disaster funds. On March 30, 2011, the President signed Presidential Policy Directive 8 (PPD-8): National Preparedness, and the National Mitigation Framework was finalized in May 2013. The National Mitigation Framework comprises seven core capabilities, including:

- ♦ *Threats and Hazard Identification*
- ♦ *Risk and Disaster Resilience Assessment*

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- ◆ Planning
- ◆ Community Resilience
- ◆ Public Information and Warning
- ◆ Long-Term Vulnerability Reduction
- ◆ Operational Coordination

HMA programs provide funding for eligible activities that are consistent with the National Mitigation Framework's Long-Term Vulnerability Reduction capability. HMA programs reduce community vulnerability to disasters and their effects, promote individual and community safety and resilience, and promote community vitality after an incident. Furthermore, HMA programs reduce response and recovery resource requirements in the wake of a disaster or incident, which results in a safer community that is less reliant on external financial assistance.

Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. Accordingly, States, territories, federally-recognized tribes, and local communities are encouraged to take advantage of funding that HMA programs provide in both the pre- and post-disaster timelines.

In addition to hazard mitigation, FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) Program provides communities with education, risk communication, and outreach to better protect its citizens. The Risk MAP project lifecycle places a strong emphasis on community engagement and partnerships to ensure a whole community approach that reduces flood risk and builds more resilient communities. Risk MAP risk assessment information strengthens a local community's ability to make better and more informed decisions. Risk MAP allows communities to better invest and determine priorities for projects funded under HMA. These investments support mitigation efforts under HMA that protect life and property and build more resilient communities.

The whole community includes children, individuals with disabilities, and others with access and functional needs; those from religious, racial, and ethnically diverse backgrounds; and people with limited English proficiency. Their contributions must be integrated into mitigation/resilience efforts, and their needs must be incorporated as the whole community plans and executes its core capabilities.

WHOLE COMMUNITY

A. HMA Commitment to Resilience and Climate Change Adaptation

FEMA is committed to promoting resilience as expressed in PPD-8: National Preparedness; the President's State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience; the Administrator's 2011 FEMA Climate Change Adaptation Policy Statement (Administrator Policy 2011-OPPA-01); and the 2014–2018 FEMA Strategic Plan. Resilience refers to the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies. The concept of resilience is closely related to the concept of hazard mitigation, which reduces or eliminates potential losses by breaking the cycle of damage, reconstruction, and repeated

damage. Mitigation capabilities include, but are not limited to, community-wide risk reduction projects, efforts to improve the resilience of critical infrastructure and key resource lifelines, risk reduction for specific vulnerabilities from natural hazards and climate change, and initiatives to reduce future risks after a disaster has occurred.

FEMA is supporting efforts to streamline the HMA programs so that these programs can better respond to the needs of communities nationwide that are addressing the impacts of climate change. FEMA, through its HMA programs:

- ◆ *Develops and encourages adoption of resilience standards in the siting and design of buildings and infrastructure*
- ◆ *Modernizes and elevates the importance of hazard mitigation*

FEMA has issued several policies that facilitate the mitigation of adverse effects from climate change on the built environment, structures and infrastructure. Consistent with the 2014–2018

FEMA Strategic Plan, steps are being taken by communities through engagement of individuals, households, local leaders, representatives of local organizations, and private sector employers and through existing community networks to protect themselves and the environment by updating building codes, encouraging the conservation of natural and beneficial functions of the floodplain, investing in more resilient infrastructure, and engaging in mitigation planning. FEMA plays an important role in supporting community-based resilience efforts, establishing policies, and providing guidance to promote mitigation options that protect critical infrastructure and public resources.

FEMA encourages better integration of Sections 404 and 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (Stafford Act), Title 42 of the United States Code (U.S.C.) 5121 et seq., to promote more resilience during the recovery and mitigation process. FEMA regulations that implement Sections 404 and 406 of the Stafford Act allow funding to incorporate mitigation measures during recovery activities. Program guidance and practice limits Section 406 mitigation to the damaged elements of a structure. This limitation to Section 406 mitigation may not allow for a comprehensive mitigation solution for the damaged facility; however, Section 404 funds may be used to mitigate the undamaged portions of a facility.

Recognizing that the risk of disaster is increasing as a result of multiple factors, including the growth of population in and near high-risk areas, aging infrastructure, and climate change, FEMA promotes climate change adaptation by:

- ◆ *Incorporating sea level rise in the calculation of Benefit-Cost Analysis (BCA)*
- ◆ *Publishing a new HMA Job Aid on pre-calculated benefits for hurricane wind retrofit measures, see HMA Job Aid (Cost Effectiveness Determination for Residential Hurricane Wind Retrofit Measures Funded by FEMA)*
- ◆ *Encouraging floodplain and wetland conservation associated with the acquisition of properties in green open space and riparian areas*
- ◆ *Reducing wildfire risks*
- ◆ *Preparing for evolving flood risk*
- ◆ *Encouraging mitigation planning and developing mitigation strategies that encourage community resilience and smart growth*

- ◆ *Encouraging the use of building codes and standards (the American Society of Civil Engineers/Structural Engineering Institute [ASCE/SEI] 24-14, Flood Resistant Design and Construction) wherever possible.*

For additional information, see <http://www.fema.gov/climate-change>” (FEMA 2015b).

1.2.1 Hazard Mitigation Assistance (HMA) Grant Programs

HMA grant program activities include:

Table 1-1 HMA Eligible Activities

| Activities | HMGP | PDM | FMA |
|--|------|-----|-----|
| 1. Mitigation Projects | ✓ | ✓ | ✓ |
| Property Acquisition and Structure Demolition | ✓ | ✓ | ✓ |
| Property Acquisition and Structure Relocation | ✓ | ✓ | ✓ |
| Structure Elevation | ✓ | ✓ | ✓ |
| Mitigation Reconstruction | ✓ | ✓ | ✓ |
| Dry Floodproofing of Historic Residential Structures | ✓ | ✓ | ✓ |
| Dry Floodproofing of Non-residential Structures | ✓ | ✓ | ✓ |
| Generators | ✓ | ✓ | |
| Localized Flood Risk Reduction Projects | ✓ | ✓ | ✓ |
| Non-localized Flood Risk Reduction Projects | ✓ | ✓ | |
| Structural Retrofitting of Existing Buildings | ✓ | ✓ | ✓ |
| Non-structural Retrofitting of Existing Buildings and Facilities | ✓ | ✓ | ✓ |
| Safe Room Construction | ✓ | ✓ | |
| Wind Retrofit for One- and Two-Family Residences | ✓ | ✓ | |
| Infrastructure Retrofit | ✓ | ✓ | ✓ |
| Soil Stabilization | ✓ | ✓ | ✓ |
| Wildfire Mitigation | ✓ | ✓ | |
| Post-Disaster Code Enforcement | ✓ | | |
| Advance Assistance | ✓ | | |
| 5 Percent Initiative Projects | ✓ | | |
| Miscellaneous/Other ⁽¹⁾ | ✓ | ✓ | ✓ |
| 2. Hazard Mitigation Planning | ✓ | ✓ | ✓ |
| Planning Related Activities | ✓ | | |
| 3. Technical Assistance | | | ✓ |
| 4. Management Cost | ✓ | ✓ | ✓ |
| ⁽¹⁾ Miscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available. | | | |

(FEMA 2015b)

The Hazard Mitigation Grant Program (HMGP) is a competitive, disaster funded, grant program. Whereas the other Unified Mitigation Assistance Programs: Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA) programs although competitive, rely on specific pre-disaster grant funding sources, sharing several common elements. The 2015 HMA Guidance provides the following programmatic information:

“HMGP is authorized by Section 404 of the Stafford Act, 42 U.S.C. 5170c. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster.

HMGP funding is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. Federally-recognized tribes may also submit a request for a Presidential major disaster declaration within their impacted areas (see <http://www.fema.gov/media-library/assets/documents/85146>). The amount of HMGP funding available to the Applicant is based on the estimated total Federal assistance, subject to the sliding scale formula outlined in Title 44 of the Code of Federal Regulations (CFR) Section 206.432(b) that FEMA provides for disaster recovery under Presidential major disaster declarations. The formula provides for up to 15 percent of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10 percent for amounts between \$2 billion and \$10 billion, and up to 7.5 percent for amounts between \$10 billion and \$35.333 billion. For States with enhanced plans, the eligible assistance is up to 20 percent for estimated aggregate amounts of disaster assistance not to exceed \$35.333 billion.

The Period of Performance (POP) for HMGP begins with the opening of the application period and ends no later than 36 months from the close of the application period.

PDM is designed to assist States, territories, federally-recognized tribes, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. Congressional appropriations provide the funding for PDM.

The total amount of funds distributed for PDM is determined once the appropriation is provided for a given fiscal year. It can be used for mitigation projects and planning activities.

The POP for PDM begins with the opening of the application period and ends no later than 36 months from the date of subapplication selection.

FMA is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994. The Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112-141) consolidated the Repetitive Flood Claims and Severe Repetitive Loss grant programs into FMA. FMA funding is available through the National Flood Insurance Fund (NFIF) for flood hazard mitigation projects as well as plan development and is appropriated by Congress.

Neither the Glennallen Community nor the Native Village of Tazlina participates in FEMA’s National Flood Insurance Program (NFIP); they are therefore ineligible for Flood Mitigation Assistance (FMA) associated grant funding

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States, territories, and federally-recognized tribes are eligible to apply for FMA funds. Local governments are considered subapplicants and must apply to their Applicant State, territory, or federally-recognized tribe.

The POP for FMA begins with the opening of the application period and ends no later than 36 months from the date of subapplication selection” (FEMA 2015b).

As the State Hazard Mitigation Plan states:

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

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

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

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

MJHMP Layout Description

The MJHMP consists of the following sections and appendices:

Section 1 Introduction

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

Section 2 Community Description

Provides a general history and background of the Glennallen area, including historical trends for population and the demographic and economic conditions that have shaped the area.

Section 3 Planning Process

Describes the MJHMP update’s planning process, identifies the Planning Team Members, the meetings held as part of the planning process, and the key stakeholders within the Glennallen area. This section documents public outreach activities (support documents are located in Appendix D); including document reviews and relevant plans, reports, and other appropriate information data utilized for MJHMP development; actions the plans to implement to assure continued public participation; and their methods and schedule for keeping the plan current.

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

Section 4 Jurisdictional Adoption

Describes the community’s MJHMP adoption process (support documents are located in Appendix C)

Section 5 Hazard Analysis

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

Section 6 Vulnerability Assessment

Identifies Glennallen’s potentially vulnerable assets—people, residential and nonresidential buildings (where available), critical facilities, and critical infrastructure. The resulting information identifies the full range of hazards the Glennallen area could face along with potential social impacts, damages, and economic losses. Land use and development trends were also discussed.

Section 7 Mitigation Strategy

Defines the mitigation strategy, which provides a blueprint for reducing the potential losses identified in the vulnerability analysis. This section lists the community’s governmental authorities, policies, programs, and resources.

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

Section 8 References

Lists reference materials and resources used to prepare this MJHMP.

Appendices

- Appendix A: Delineates Federal, State, and other potential mitigation funding sources. This section will aid the community with researching and applying for funds to implement their mitigation strategy.
- Appendix B: Provides the FEMA Local Mitigation Plan Review Tool, which documents compliance with FEMA criteria.
- Appendix C: Provides Glennallen’s Promulgation and the Native Village of Tazlina’s adoption resolution.
- Appendix D: Provides public outreach information, including newsletters.

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

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

Section Two provides the Glennallen Area and the Native Village of Tazlina's location, geography, history, and demographic information.

2.1 LOCATION, GEOGRAPHY, AND HISTORY

The Department of Community, Commerce, and Economic Development's [DCCED], Division of Community and Regional Affairs (DCRA) provides community profiles for Glennallen and Tazlina:

"The community of Glennallen lies along the Glenn Highway at its junction with the Richardson Highway, 189 road miles east of Anchorage. It is located just outside the western boundary of Wrangell-St. Elias National Park."



Figure 2-1 Glennallen's Location Map

[Glennallen's] name was derived from Maj. Edwin Glenn and Lt. Henry Allen, both leaders in the early American explorations of the Copper River region. It is one of the few communities in the region that was not built on the site of a Native village.

The area has historically been occupied by the Ahtna, although Glennallen is currently a non-Native community."

[The Native Village of] Tazlina is located 5 miles south of Glennallen on the Richardson Highway, at mile 110.5. It is comprised of several small residential subdivisions and a business district. Copperville, Aspen Valley, Tazlina Terrace, and Copper Valley School Road are all part of this area.

The village reportedly was a fishing camp of the Ahtna Indian tribes who historically moved up and down the Copper River and its tributaries. Tazlina is Athabascan for "swift water." By 1900, a permanent village had been established on the north and south banks off the Tazlina River near its confluence with the Copper River. During the pipeline era, Tazlina developed around the old Copper Valley School, built to board students from all over the state. It closed in 1971, when local high schools were constructed in the remote areas of the state and boarding schools were discontinued" (DCRA 2016).

The Tazlina Tribal website provides a brief history of their native lands and its uses:

"The area around the Tazlina reportedly was a fishing camp of Ahtna Indian Tribes who historically moved up and down the Copper River and its tributaries. Tezlende [Tazlina] is Athabascan for swift water. By 1900, two permanent villages had been established on the North and South banks of the Tazlina River near its confluence with the Copper River, where the villages sang back and forth to each other during potlatches over the long winter months and short summer months.

The community of Tazlina developed around the Old Copper Valley School, built by the Catholic Church in 1954, to board students from all over the State. The School closed in 1971, when local high schools were constructed in the remote areas of the State and boarding schools were discontinued...

Copper Valley School

In 1954, the Catholic Archdiocese of Anchorage built a boarding school at the end of a dirt road in Tazlina, Alaska. The Copper Valley School was built to board students from around the state who did not have a high school in the villages. It was the only school in the valley until the 1960's when Glennallen School was built. In 1971, the school closed due to students attending school elsewhere closer to home.

In 1975, the Catholics leased a wing of the school building to an electronics store operator and in 1976, something went terribly wrong at the store and the whole school burned to the ground leaving rubble and several contaminants in its wake. In the years following the fire, rain and snow produced a friable contamination to the site, asbestos...

It took Alaska Demolition and Alaska Abatement seven weeks to clean up not only the asbestos and rubble but also 150 acres of the land where dumps had begun to form, where the officials of the school left old furnaces, industrial washers, and other debris” (Tazlina 2016).



2.2 DEMOGRAPHICS

The 2015 US Census (Census) estimated Glennallen area’s population as 366 residents, of which the median age was 26.9 indicating a moderately young population. Their average population age is expected to remain steady because over half of the population is between 5 and 44 years of age. Glennallen’s population has a diverse population with 95.6 percent (%) white with 4.4% from two or more cultures (Alaska native, Asian, Black or African American) cultures. The male and female composition is approximately 57.9% and 42.1% respectively. The 2015 Census estimates that there are 117 households with the average household having approximately three individuals. The 2015 DCCED certified population is 459. Figure 2-2 illustrates Glennallen’s historic population.

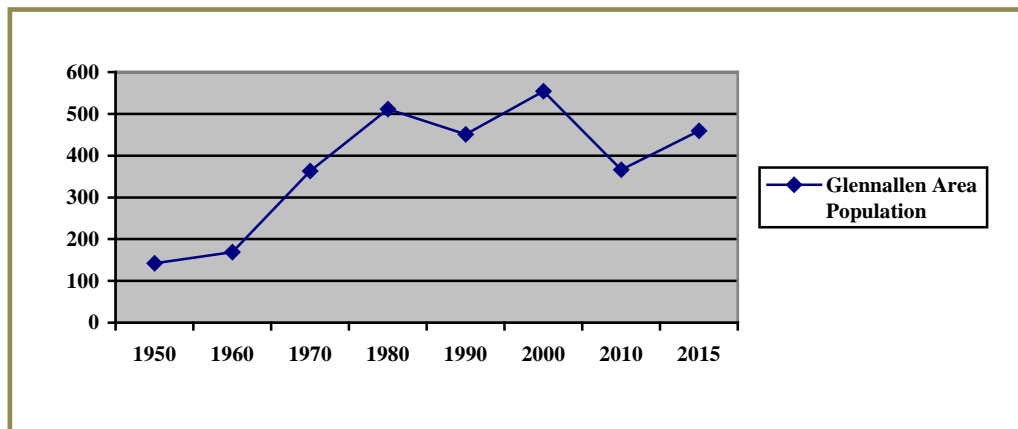


Figure 2-2 Glennallen’s Historic Population

The 2015 Census recorded Tazlina’s population as 358 residents, of which the median age was 36.5 indicating a moderately young population. The average population is expected to remain steady because over half of the population is between 5 and 44 years of age. Tazlina’s population consists of white (59.88%) and Alaska Native (40.12%) residents. The male and female composition is approximately 51% and 49% respectively. The 2015 Census estimated there are 111 households with the average household having approximately three individuals. The 2015 DCCED certified population is 260. Figure 2-3 illustrates Tazlina’s historic population.

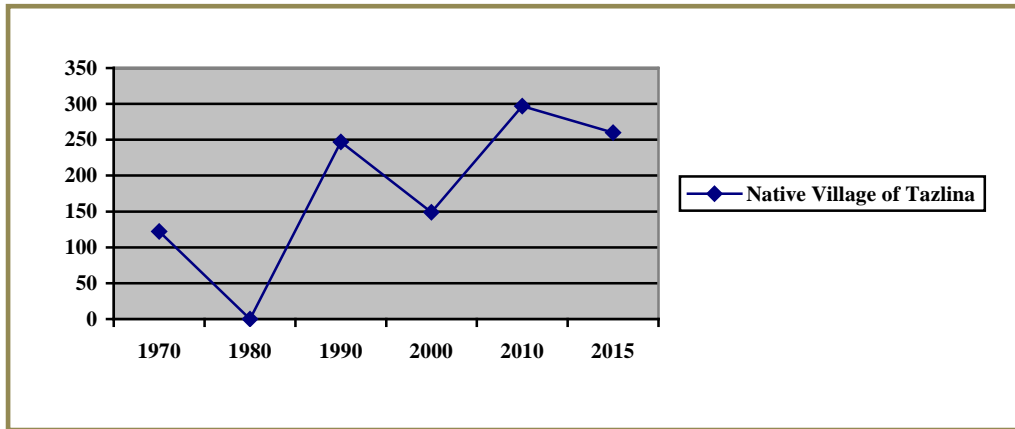


Figure 2-3 Tazlina’s Historic Population

2.3 ECONOMY

“Glennallen is the supply hub of the Copper River region. Local businesses serve area residents and tourism from the Glenn Highway traffic, supplies and services, schools and medical care. State highway maintenance and federal offices are in Glennallen. RV parks, lodging, fuel and other services cater to independent travelers. The National Park Service’s Wrangell-St. Elias Visitor Center and the Copper River Princess Wilderness Lodge were completed in 2002 at Copper Center. Offices for the Bureau of Land Management, Alaska State Troopers, and the Dept. of Fish and Game are located here. There are several small farms in the area. Four residents hold commercial fishing permits” (DCRA 2016).

The 2015 Census estimated Glennallen’s median household income in 2015 was \$50,097 with a per capita income of \$16,991. No one in the community was reported to be living below the poverty level. The potential work force (those aged 16 years or older) in the Glennallen area was estimated at 288, of which 207 were actively employed. In 2015, the unemployment rate was 4.9%; however, this rate included part-time and seasonal jobs, and practical unemployment or underemployment is likely to be significantly higher.

The 2015 Census estimated Tazlina’s median household income in 2015 was \$64,688 with a per capita income of \$27,398. The Census indicates that 14.5% of Tazlina’s population lives below the poverty level. The potential work force (those aged 16 years or older) in Tazlina was estimated at 310, of which 152 were actively employed. In 2015, the unemployment rate was 17.7%; however, this rate included part-time and seasonal jobs, and practical unemployment or underemployment is likely to be significantly higher.

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

DMA 2000 requirements and implementing local and multi-jurisdictional governance regulations for describing the planning process include:

| DMA 2000 Requirements |
|--|
| <p>Local Planning Process</p> <p>§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:</p> <p>Element</p> <p>§201.6(b)(1): An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;</p> <p>§201.6(b)(2): An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and nonprofit interests to be involved in the planning process; and</p> <p>§201.6(b)(3): Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.</p> <p>§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.</p> <p>§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.</p> <p>§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.</p> |
| 1. REGULATION CHECKLIST |
| ELEMENT A. Planning Process |
| <p>A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))</p> <p>A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))</p> <p>A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))</p> <p>A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))</p> <p>A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))</p> <p>A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle?) (Requirement §201.6(c)(4)(i))</p> <p>A7. Does the <u>updated plan</u> 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).</p> |
| Source: FEMA, March 2015. |

DMA 2000 requirements and implementing Tribal governance regulations for describing the planning process include:

3

| DMA 2000 Requirements | |
|--|--|
| Local Planning Process | |
| §201.7(b): An effective planning process is essential in developing and maintaining a good plan. The mitigation planning process should include coordination with other tribal agencies, appropriate Federal agencies, adjacent jurisdictions, interested groups, and be integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA mitigation programs and initiatives. | |
| Element | |
| §201.7(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was defined and involved. | |
| §201.7(c)(1)(i): An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval, including a description of how the Indian Tribal government defined "public;" and | |
| §201.7(c)(1)(ii): As appropriate, an opportunity for neighboring communities, tribal and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process. | |
| 1. REGULATION CHECKLIST | |
| ELEMENTS. Planning Process | |
| A. Does the plan provide a narrative description of the process followed to prepare the new or updated plan? | |
| B. Does the new or updated plan indicate who was involved in the current planning process? | |
| C. Does the new or updated plan indicate how the "public" was defined and involved? How was the "public" defined? How was the "public" involved? Were they provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval? | |
| D. Does the new or updated plan discuss the opportunity for other Indian Tribal governments, tribal and regional agencies, businesses, academia, nonprofits, neighboring communities, and other affected stakeholders and interested parties to be involved in the planning process? | |
| E. Does the updated plan document how the planning team reviewed and analyzed each section of the plan? [Updates only.] | |
| F. Does the updated plan indicate for each section of the plan whether or not it was revised as part of the update process? [Updates only.] | |
| Source: FEMA, March 2015. | |

3.1 OVERVIEW

The DMA 2000 highlights the importance of mitigation planning and emphasizes planning for disasters before they occur. This act provides funding for mitigation planning and projects. Mitigation plans must demonstrate that their proposed measures are based on sound planning that accounts for the risk to and the capabilities of individual communities. Figure 3-1 delineates the planning process.

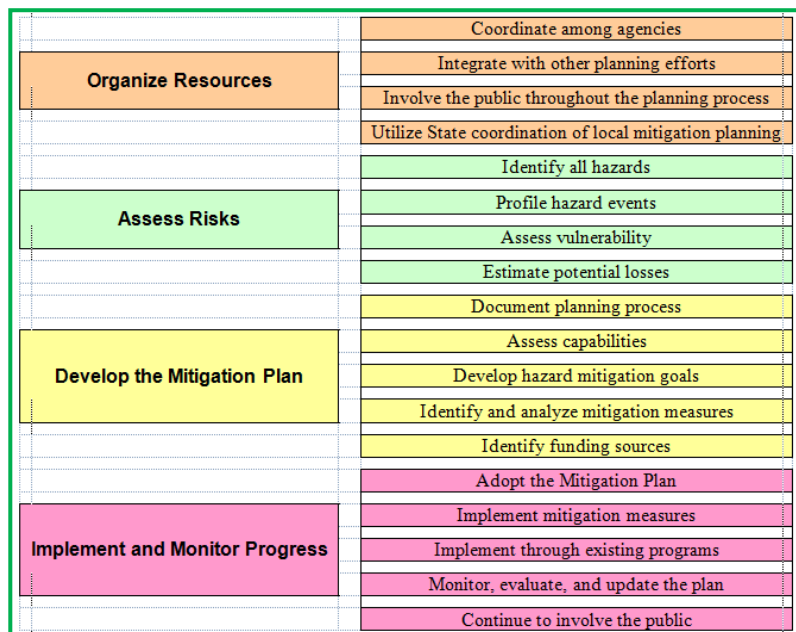


Figure 3-1 HMP Planning Process

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

The planning process began on October 28, 2016 with an introductory email and follow-up teleconference with Ms. Libby Bengtson, Copper River Local Emergency Planning Committee Coordinator to explain how their community was selected by the Division of Homeland Security and Emergency Management 2014 Pre-Disaster Mitigation Grant award. AECOM staff described the MJHMP development requirement to enable the community to qualify for Hazard Mitigation Grant Program grants and the overall MJHMP development process. Ms. Bengtson was encouraged to develop a community Planning Team to assist the community's efforts to identify available resources and capabilities for MJHMP development.

During the November 10, 2016 Copper River LEPC meeting AECOM explained how the MJHMP update process was only slightly different from the legacy HMP development process. The update requires the Planning Team to determine the legacy HMP's effectiveness, identify substantive changes and to report on the current status of any identified actions.

The Planning Team was enthusiastic and ready to begin. They agreed that it was essential for them to advocate for the planning process, assist with gathering information, and provide support during public participation opportunities. AECOM briefly discussed existing hazards that affect the community such as their minimal flood and erosion threat, severe weather as a matter of rural Alaska life, and their discontinuous permafrost impacts, all of which could be subtly impacted by the every changing climate.

The Planning Team further discussed the hazard mitigation planning update process, asking participants to help identify new hazards they may have determined that should've been profiled in the legacy HMP; information concerning legacy HMP hazards impacts since approval, and any significant changes that may affect residential and critical facilities. The Planning Team was also briefed on the importance of determining their legacy Mitigation Strategy's listed mitigation actions status.

In summary, the following five-step process took place from November 2016 through September 2017.

1. Organize resources: Members of the Planning Team identified resources, including staff, agencies, and local community members, who could provide technical expertise and historical information needed in the development of the hazard mitigation plan.
2. Monitor, evaluate, and update the plan: The Planning Team developed a process to ensure the plan was monitored to ensure it was used as intended while fulfilling community needs. The team then developed a process to evaluate the plan to compare how their decisions affected hazard impacts. They then outlined a method to share their successes with community members to encourage support for mitigation activities and to provide data for incorporating mitigation actions into existing planning mechanisms and to provide data for the plans five year update.
3. Assess risks: The Planning Team identified the hazards specific to the Glennallen area and with the assistance of a hazard mitigation planning consultant (AECOM), developed the risk assessment for seven identified hazards. The Planning Team reviewed the risk

assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.

4. Assess capabilities: The Planning Team reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards.
5. Develop a mitigation strategy: After reviewing the risks posed by each hazard, the Planning Team developed a comprehensive range of potential mitigation goals and actions. Subsequently, the Planning Team identified and prioritized the actions for implementation.

3

3.2 PLANNING TEAM

The Copper River Basin LEPC determined they would be the best venue to fulfill the local Planning Team responsibilities because the LEPC is responsible for guiding and managing disaster related interaction with State agencies. Libby Bengtson, LEPC Coordinator will lead the Glennallen area LEPC/HMP Planning Team. Table 3-1 identifies the complete hazard mitigation Planning Team.

Table 3-1 Hazard Mitigation Planning Team

| Name | Title | Organization | Key Input |
|---------------------|--|--|---|
| Libby Bengtson | Copper River Local Emergency Planning Committee (CRLEPC) Coordinator | Copper River Local Emergency Planning Committee (LEPC) | Planning Team Lead, MJHMP review, Data input, and MJHMP Coordinator |
| Laura Thiesen | Chairman | LEPC, Cross Road Medical | Planning Team Member, data input, and MJHMP review |
| Willard Hand | Information | LEPC, Village of Tazlina | Planning Team Member, data input, and MJHMP review |
| Jason Hoke | Treasurer | LEPC, Copper Valley, Developmental Association | Planning Team Member, data input, and MJHMP review |
| Jack Von Thær | LEPC Member | Copper River School District (CRSD) | Planning Team Member, data input, and MJHMP review |
| David Abbott, CREMS | LEPC Vice-Chairman | Copper River Emergency Medical Service (CREMS) | Planning Team Member, data input, and MJHMP review |
| Bob Sloma | LEPC Member | Cross Road Medical Center (CRMC) | Planning Team Member, Tribal data input, and MJHMP review |
| Robert Cyr | LEPC Member | Copper Valley T C (CVTC) | Planning Team Member, Tribal data input, and MJHMP review |
| Jason Sever | LEPC Member | Gakona Volunteer Fire Department (GVFD) | Planning Team Member, Tribal data input and MJHMP review. |
| Matthew Catledge, | LEPC Member | Copper River Emergency Medical Service (CREMS) | Planning Team Member, Tribal data input, and MJHMP review |
| Russell Scribner | Tribal Administrator | Village of Tazlina | Planning Team Member, Tribal data input, and MJHMP review |
| Vanessa Goodlataw | Environmental Coordinator | Native Village of Tazlina | Planning Team Member, Tribal data input, and MJHMP review |
| Tana Mae Pete | LEPC Secretary | Gulkana Native Village Council | Planning Team Member, Tribal data input, and MJHMP review |

Table 3-1 Hazard Mitigation Planning Team

| Name | Title | Organization | Key Input |
|-----------------|---|-----------------------|---|
| Benjamin Endres | LEPC Member | Alaska State Troupers | Planning Team Member, Tribal data input, and MJHMP review |
| Scott Simmons | Emergency Management, Hazard Mitigation, and Resiliency Planner | AECOM, Alaska | Planning Team Member, Responsible for MJHMP development, lead writer, project coordination. |

3.3 PUBLIC INVOLVEMENT AND OPPORTUNITY FOR INTERESTED PARTIES TO PARTICIPATE

3

AECOM extended an invitation to all individuals and entities identified on the project mailing list described the planning process and announced the upcoming communities' planning activities. The announcement was emailed to relevant academia, nonprofits, and local, state, and federal agencies on October 13, 2016. The following agencies were invited to participate and review the MJHMP:

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

- US Department of Housing and Urban Development (HUD)
- US Fish & Wildlife Service (USFWS)

Legacy 2011 HMP Lifecycle Planning Team Meeting Recommendations

44 CFR requires communities to schedule MJHMP Planning Team meetings and teleconferences to review, discuss, and determine mitigation implementation accomplishments, track data relevance for future HMP update inclusion and document recommendations for future HMP updates.

3

3.4 Legacy 2011 HMP Review and Analysis.

The Legacy 2011 HMP document was revised as described below.

- Section 1. ***Introduction:*** added new HMP Update section explaining the Glennallen area MJHMP review and update process.
- Section 2. ***Community Description:*** updated and expanded community information, including new US Census and State data.
- Section 3. ***Planning Process:*** updated this section to reflect 2017 public process including newsletters, public meetings and 2017 Planning Team.
- Section 4. ***Plan Adoption:*** 2017 MJHMP adoption promulgation and resolutions and dates.
- Section 5. ***Hazard Profile Analysis:*** reviewed hazard identification and risk assessment for earthquake, flooding, severe weather and wildland/tundra fire adding events spanning from 2011 to 2017 descriptions and data. A new ground failure hazard profile is now included within the MJHMP.
- Section 6. ***Vulnerability Analysis:*** added a new section to analyze vulnerability with 2017 critical facilities and infrastructure tables.
- Section 7. ***Mitigation Strategy:*** reviewed 2011 mitigation goals and actions and added new goals and actions for the 2017 Mitigation Action Plan.
- Section 8. ***References:*** revised to reflect 2017 updates and additions.

The Planning Team did not complete their designated annual HMP reviews or plan maintenance activities during the initial 2011 Legacy HMP's 5-year life cycle. Therefore it became a primary consideration to update the legacy 2011 HMP to include all hazards that have, or could potentially have, impacted the community during the 2011 HMP's 5-year lifecycle.

Table 5 delineates Planning Team identified HMP components that necessitated information update. The Team determined how community changes, construction and infrastructure conditions, climate change impacts, and population increases or decreases have influenced hazard risks and/or facility vulnerabilities.

The 2017 MJHMP Update process included inviting new and existing stakeholders to review the legacy HMP to determine what was accomplished versus what was intended to accomplish.

Pertinent section data are identified within Table 3-2, which provided the foundation for completing the 2017 MJHMP Update.

GLENNALLEN/TAZLINA
MULTI-JURISDICTIONAL Hazard Mitigation Plan
3 Planning Process

Table 3-2 Legacy HMP Review and Update Needs Determination

| 2011 FHMP Section | 2011 HMP Items to be Updated | Status: F: Fulfilled NF: Not Fulfilled | 2011 HMP Identified items for Deletion | Newly Identified Items to be Added for HMP Compliance | New Action Commitment |
|--|---|---|---|--|--|
| Planning Process | <ul style="list-style-type: none"> • Planning process • Planning team membership • Mitigation resource list • Public outreach initiatives • Plan Maintenance Activities • Plan Review Obligations | <ul style="list-style-type: none"> • NF: Did not meet or complete annual HMP review • NF: Adding Manmade/ Technological Hazards • NF: Continued Plan Development | <ul style="list-style-type: none"> • None | <ul style="list-style-type: none"> • Refine plan maintenance processes and responsibilities | <ul style="list-style-type: none"> • Planning Team will begin to hold annual review meetings and • Strive to integrate HMP initiatives into other plans, ordinances, and resolutions. • Planning Team will continue meetings and strive to integrate HMP initiatives into other plans, ordinances, and resolutions. |
| Hazard Profile Update | <ul style="list-style-type: none"> • Update hazard profile and new event history • Profile newly identified hazard risks | <ul style="list-style-type: none"> • NF: Update hazard profile and new event history | <ul style="list-style-type: none"> • Mitigation projects that were deleted or combined due to similarity | <ul style="list-style-type: none"> • Identify new hazards e.g. Ground Failure • Determine mitigation project status and annotate deleted, deferred, or combined due to similarity • Develop new Mitigation Action Plan (MAP) • Update existing hazards' historical impacts | <ul style="list-style-type: none"> • Delineate new actions within the MAP |
| Risk Analysis and Vulnerability Assessment | <ul style="list-style-type: none"> • Asset inventory • Vulnerability analysis & summaries | <ul style="list-style-type: none"> • NF: Identify development and land use changes | <ul style="list-style-type: none"> • None | <ul style="list-style-type: none"> • Develop or refine legacy asset inventory • Determine infrastructure vulnerabilities • Determine residential structure vulnerabilities • Identify repetitive loss properties as appropriate for NFIP compliance | <ul style="list-style-type: none"> • Fill data gaps • Locate scientific information to augment these data. • Delineate climate change scenario future development analysis |

Table 3-2 Legacy HMP Review and Update Needs Determination

| 2011 FHMP Section | 2011 HMP Items to be Updated | Status: F: Fulfilled NF: Not Fulfilled | 2011 HMP Identified items for Deletion | Newly Identified Items to be Added for HMP Compliance | New Action Commitment |
|---------------------|---|--|---|---|---|
| Mitigation Strategy | <ul style="list-style-type: none"> Determine existing mitigation actions status Define mitigation action implementation successes or barriers | <ul style="list-style-type: none"> NF: Did not track project implementation processes | <ul style="list-style-type: none"> Delete completed, combined, or deleted actions Implemented & non-relevant mitigation actions | <ul style="list-style-type: none"> Identify existing (20xx) mitigation plan actions' status Identify new mitigation actions for newly identified hazard implementation Develop community specific capability assessment(s) | <ul style="list-style-type: none"> Annually review action's status and feasibility |

3.5 2017 UPDATE HMP PLANNING ACTIVITIES

Table 3-3 lists the community's public involvement initiatives focused to encourage participation and insight for the MJHMP effort.

Table 3-3 Public Involvement Mechanisms

| Mechanism | Description |
|---|--|
| Newsletter #1 Distribution (November 10 2016) | The jurisdiction distributed their 1 st newsletter introducing the upcoming planning activity. The newsletter encouraged the whole community to provide hazard and critical facility information. It was posted at LEPC and Tribal Offices, stores, and bulletin boards to enable the widest dissemination. |
| Agency Involvement eMail (October 13, 2016) | Invited agencies to participate in mitigation planning effort and to review applicable newsletters located on the DHS&EM Local/Tribal All Hazard Mitigation Plan Development website at: http://ready.alaska.gov/plans/localhazmitplans |
| Newsletter #2 Distribution (August 28, 2017) | The jurisdiction distributed their 2 nd newsletter describing the draft MJHMP's availability and presented potential projects for review. The newsletter encouraged the whole community to provide comments or input. It was posted at LEPC and Tribal Offices, stores, and bulletin boards to enable the widest dissemination. |
| Public Meeting Notice | Notice of the meeting was posted at community and Tribal Office location such as bulletin boards, stores, and the post office to encourage communitywide participation. |

Initial person to person contact was made with Ms. Libby Bengtson, LEPC Coordinator on November 8, 2016; Ms. Bengtson was very encouraged the legacy 2011 HMP was included within DHS&EM's Pre-Disaster Mitigation grant and the prospects of completing the hazard mitigation plan update. She quickly suggested the LEPC act as the local Planning Team due to their natural hazards experience and began directing MJHMP data acquisition efforts. She

introduced the hazard mitigation planning project and introductory newsletter during the November 10, 2016 LEPC Meeting where AECOM described the HMP update processes and requirements.

The newsletter was placed on the DSH&EM website and posted throughout the community (post offices, public bulletin boards, etc.) encouraging community participation during the HMP update process.

The Planning Team identified six natural hazards: earthquake, flood, ground failure, severe weather, volcano, and wildland/tundra fire which periodically impact the Copper River Basin.

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

The risk assessment was completed after the community asset data was collected by the Planning Team during 2016/2017, which identified the assets that are exposed and vulnerable to specific hazards.

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

A Planning Team meeting was held in August, 2017 to review and prioritize the mitigation actions identified based on the results of the risk assessment. A second newsletter was prepared and delivered in August, 2017 describing the process to date, presenting the prioritized mitigation actions, and announcing the availability of the draft MJHMP for public review and comment.

The Planning Team held a special meeting September, 2017 to review the draft MJHMP for accuracy – ensuring it meets Glennallen’s and the Native Village of Tazlina’s needs. Their review specifically targeted plan development information, hazard impacts, community vulnerability analysis, and the mitigation strategy.

3.6 PLAN MAINTENANCE

This section describes the updated HMP’s formal plan maintenance process to ensure that the new multi-jurisdictional plan (MJHMP) remains an active and applicable document. It includes an explanation of how the Community of Glennallen and the Native Village of Tazlina’s Planning Team intends to organize their efforts to ensure that improvements and revisions to the MJHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail here:

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

3.7 INCORPORATING EXISTING PLANS AND OTHER RELEVANT INFORMATION

DMA 2000 requirements and implementing jurisdictional governance regulations for reviewing and incorporating exiting information include:

| DMA 2000 Requirements | |
|---|--|
| Incorporation into Existing Planning Mechanisms | |
| §201.6(b)(3): Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. | |
| 1. REGULATION CHECKLIST | |
| ELEMENT A Planning Process (Continued) | |
| A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? | |
| Source: FEMA, March 2015. | |

DMA 2000 requirements and implementing Tribal governance regulations for reviewing and incorporating exiting information include:

| DMA 2000 Requirements | |
|--|---|
| Program Integration | |
| §201.7(c): An effective planning process is essential in developing and maintaining a good plan. The mitigation planning process should include coordination with other tribal agencies, appropriate Federal agencies, adjacent jurisdictions, interested groups, and be integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA mitigation programs and initiatives. | |
| §201.7(c)(1)(iii); Review and incorporation, if appropriate, of existing plans, studies, and reports; and | |
| §201.7(c)(1)(iv); Be integrated to the extent possible with other ongoing tribal planning efforts as well as other FEMA programs and initiatives. | |
| 1. REGULATION CHECKLIST | |
| ELEMENTS. Data Incorporation | |
| A. | Does the new or updated plan describe the review and incorporation, if appropriate, of existing plans, studies, and reports in the new or updated plan? |
| B. | Does the new or updated plan describe how the Indian tribal mitigation plan is integrated with other ongoing Indian tribal planning efforts? |
| C. | Does the new or updated plan describe how the Indian tribal mitigation planning process is integrated with FEMA mitigation programs and initiatives? |
| Source: FEMA, March 2015. | |

During the 2017 HMP Update planning process, the Planning Team reviewed and incorporated pertinent information from resources that became available since the legacy 2011 HMP received FEMA Final approval. Data collected included newly available plans, studies, reports, and technical research listed in Table 3-4. The data were reviewed and referenced where applicable for the MJHMP's jurisdictional information, hazard profiles, risk analysis, and vulnerability assessment.

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3 Planning Process

Table 3-4 Documents Reviewed

| Existing plans, studies, reports, ordinances, etc. | Contents Summary (How will this information improve mitigation planning?) |
|--|--|
| Glennallen HMP, 2011 | Forms the foundation for this 5-year lifecycle update |
| 2014, 2015, and 2016 Preparedness Conferences | Workshops presented by DHS&EM, Mat-Su Borough, FEMA, Red Cross, and ANTHC to define agency and community roles and responsibilities during a disaster. |
| Glennallen Community Energy Plan, 2012 | Defined the community's energy resources and potential projects |
| Copper Valley Alaska 5-Year Area Plan 2010-2015, Appendix I | Defined community goals, geological conditions, and provided other pertinent data for HMP update |
| Guidebook To Permafrost and Quaternary Geology Along the Richardson and Glenn Highways Between Fairbanks, and Anchorage, Alaska, Reprinted 1993 | Defined the Glennallen Area's ground failure susceptibility |
| Copper River Basin Plan, 1986 (<i>New plan not yet available</i>) | Provided soils and other geologic data for vulnerability analysis |
| Comprehensive Economic Development Strategy, Copper River Region, Alaska, 2009 Update. 2009. Copper River Native Association (CRNA 2009) | Provided future development information for plan development |
| Statewide Assessment of Forest Resources. 2010. State of Alaska, Division of Forestry. (ADOE 2010) | Defined wildland fire threat data for plan development |
| Effects of the Earthquake March 27, 1964 in the Copper River Basin Area, Alaska. 1966. Oscar J. Ferrians, Jr. U.S. Department of the Interior, Geological Survey. (Ferrians 1966) | Defined community earthquake threat analysis |
| Rupture in South-Central Alaska – The Denali Fault Earthquake of 2002. 2003. Gary S. Fuis and Lisa A. Wald. U.S. Department of the Interior, U.S. Geological Survey. http://pubs.usgs.gov/fs/2003/fs014-03/fs014-03.pdf | Defined Denali Fault earthquake impact data |
| US Army Corps of Engineers, Erosion Information Paper, - Tazlina, Alaska, February, 29 2008 | Defined Tazlina's erosion impacts |
| US Army Corps of Engineers, Alaska Baseline Erosion Assessment, 2009 | Defined the area's erosion impacts |
| US Army Corps of Engineers, Floodplain Manager's Reports, Community Specific 2011 | Defined the Tazlina's historical flood impacts; explained that Glennallen had no historic flood threat |
| State of Alaska, Department of Commerce, Community and Economic Development Community Profile | Provided historical and demographic information |
| State of Alaska Hazard Mitigation Plan (SHMP), 2013 | Defined statewide hazards and their potential locational impacts |

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

3.7.1 Implementing MJHMP Precepts into Existing Planning Mechanisms

The requirements for implementing or coordinating existing planning mechanisms into the MJHMP, as stipulated in the DMA 2000 and its support regulations, are described within this section.

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

3

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

3.7.2 Continued Public Involvement

DMA 2000 requirements and implementing jurisdictional governance regulations for continued public involvement include:

| DMA 2000 Requirements |
|--|
| Continued Public Involvement §201.6(c)(4)(iii): The plan maintenance process shall include a) discussion on how the community will continue public participation in the plan maintenance process. |
| 1. REGULATION CHECKLIST |
| ELEMENT A Planning Process (Continued) |
| A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii)) |
| Source: FEMA, March 2015. |

DMA 2000 requirements and implementing Tribal governance regulations for continued public involvement include:

| DMA 2000 Requirements |
|---|
| Continued Public Involvement §201.7(c)(4)(iv): <i>[The plan maintenance process shall include a) discussion on how the Indian Tribal government will continue public participation in the plan maintenance process.]</i> |
| 1. REGULATION CHECKLIST |
| ELEMENTS. Continued Public Involvement |
| 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?) |
| Source: FEMA, March 2015. |

The Glennallen community and Native Village of Tazlina are dedicated to involving the public directly in the continual reshaping and updating the MJHMP. A paper copy of the MJHMP and any proposed changes will be available at the Glennallen Community Library and the Tazlina

Tribal Office. An address and phone number of the Planning Team Leader to whom people can direct their comments or concerns will also be available at these locations.

The Planning Team will continue to identify opportunities to raise community awareness about the MJHMP and the hazards that affect the area using Facebook or the newspaper “Local Copper River Record”. This effort could include attendance and providing notices and other materials at Community and Tribal-sponsored events, outreach programs, and public mailings. Any public comments received regarding the MJHMP will be collected by the Planning Team Leader, included in the annual report, and considered during future MJHMP updates.

3.7.3 Monitoring, Reviewing, Evaluating, and Updating the MJHMP

DMA 2000 requirements and implementing jurisdictional governance regulations for monitoring, reviewing, evaluating, and updating the MJHMP include:

| DMA 2000 Requirements |
|---|
| Monitoring, Evaluating and Updating the Plan §201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding. |
| 1. REGULATION CHECKLIST |
| ELEMENT A. Planning Process (Continued) |
| A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle?) |
| A7. Does the <u>updated plan</u> 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). |
| <i>Source: FEMA, March 2015.</i> |

DMA 2000 requirements and implementing Tribal governance regulations for monitoring, reviewing, evaluating, and updating the MJHMP include:

| DMA 2000 Requirements |
|--|
| Monitoring, Evaluating and Updating the Plan §201.7(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan. |
| 1. REGULATION CHECKLIST |
| ELEMENTS |
| A. Does the new or updated plan describe the method and schedule for monitoring the plan, including how, when, and by whom (e.g., the responsible agency)? |
| B. Does the new or updated plan describe the method and schedule for evaluating the plan, including how, when, and by whom (e.g., the responsible agency)? |
| C. Does the new or updated plan describe the method and schedule for updating the plan, including how, when, and by whom (e.g., the responsible agency), within the 5-year cycle? |
| D. Does the updated plan include an analysis of whether the previously approved plan's method and schedule worked, and what elements or processes, if any, were changed for the next 5 years? |
| <i>Source: FEMA, March 2015.</i> |

3.7.3.1 Planning Team (Re)Commitment for MJHMP Maintenance

The MJHMP was prepared as a collaborative effort. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the Copper River LEPC and the Native Village of Tazlina will continue to use the Planning Team to monitor, review, evaluate,

and update the MJHMP. Each authority identified in the Mitigation Action Plan (MAP) matrix (Table 7-8) will be responsible for implementing the Mitigation Action Plan and determining whether their respective actions were effectively implemented. The Copper River LEPC and Tribal Councils will direct the hazard mitigation Planning Team Leader, (or designee), as the primary point-of-contact, to coordinate community and Tribal efforts to monitor, evaluate, revise, and tabulate MJHMP actions' progress and status.

The Glennallen area LEPC Planning Team intends to organize their efforts to ensure that improvements and revisions to the legacy HMP occur in a well-managed, efficient, and coordinated manner.

3

The following three process steps are addressed in detail here:

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

3.7.3.2 Monitoring the MJHMP

The MJHMP was prepared as a collaborative effort. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the will continue to use the Planning Team to monitor, review, evaluate, and update the MJHMP. Each authority identified in the Mitigation Action Plan (MAP) matrix (Table 7-8) will be responsible for implementing the Mitigation Action Plan and determining whether their respective actions were effectively implemented. The Director of Public Safety, the hazard mitigation Planning Team Leader, (or designee), will serve as the primary point of contact and will coordinate local efforts to monitor, evaluate, revise, and tabulate MJHMP actions' status.

3.7.3.3 Reviewing the MJHMP

The Planning Team will review their success for achieving the MJHMP's mitigation goals and implementing the Mitigation Action Plan's activities and projects during the annual review process.

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

3.7.3.4 Evaluating the MJHMP

The Annual Review Questionnaire (Appendix F) provides the basis for future MJHMP evaluations by guiding the Planning Team with identifying new or more threatening hazards,

adjusting to changes to, or increases in, resource allocations, and garnering additional support for MJHMP implementation.

The Planning Team Leader will initiate the annual review two months prior to the scheduled planning meeting date to ensure that all data is assembled for discussion with the Planning Team. The findings from these reviews will be presented at the annual Planning Team Meeting. Each review, as shown on the Annual Review Worksheet, will include an evaluation of the following:

- Determine authorities, outside agency, stakeholders, and resident's participation in MJHMP implementation success
- Identify notable risk changes for each identified and newly considered natural or human-caused hazards
- Consider land development activities and related programs' impacts on hazard mitigation
- Mitigation Action Plan implementation progress (identify problems and suggest improvements as necessary)
- Evaluate MJHMP local resource implementation for MJHMP identified activities

3

3.7.3.5 Updating the MJHMP

In addition to the annual review, the Planning Team will update the MJHMP every five years. However, neither the Copper River LEPC nor Native Village of Tazlina's Planning Team reviewed the legacy 2011 HMP during its five-year life cycle. The Planning Team recommitted to annually reviewing the MJHMP and completing an Annual Review Questionnaire (Appendix F) as described in Section 3.5.3.2. This will facilitate updating the MJHMP every five years or when significant changes occur.

A complete Annual Review Questionnaire will enable the Team to identify possible changes (successes, failures, and roadblock experiences) in the MJHMP Mitigation Action Plan by refocusing on new or more threatening hazards, resource availability, and acquiring stakeholder support for the MJHMP project implementation.

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

- Request grant assistance from DHS&EM to update the MJHMP (this can take up to one year to obtain and one year to update the plan)
- Ensure that each authority administering a mitigation project will submit a Progress Report to the Planning Team
- Develop a chart to identify those MJHMP sections that need improvement, the section and page number of their location within the MJHMP, and describing the proposed changes

- Thoroughly analyze and update the natural hazard risks
 - Determine the current status of the mitigation projects
 - Identify the proposed Mitigation Plan Actions (projects) that were completed, deleted, or delayed. Each action should include a description of whether the project should remain on the list, be deleted because the action is no longer feasible, or reasons for the delay
 - Describe how each action's priority status has changed since the MJHMP was originally developed and subsequently approved by FEMA
 - Determine whether or not the project has helped achieve the appropriate goals identified in the plan
 - Describe whether the community has experienced any barriers preventing them from implementing their mitigation actions (projects) such as financial, legal, and/or political restrictions and stating appropriate strategies to overcome them
 - Update ongoing processes, and to change the proposed implementation date/duration timeline for delayed actions the Glennallen/Tazlina MJHMP still desires to implement
 - Prepare a "new" MJHMP MAP matrix
- Prepare a new Draft Updated MJHMP
- Submit the updated draft MJHMP to the Division of Emergency Management (DHS&EM) and FEMA for review and approval

3.7.3.6 Formal State and FEMA MJHMP Review

Completed Hazard Mitigation Plans do not qualify the Community of Glennallen or the Native Village of Tazlina for mitigation grant program eligibility until they have been reviewed and approved by the LEPC or Tribal Council as applicable; and received State promulgation and FEMA final approval.

Tribal Assurance: Evidenced by Section Four of this MJHMP update; by formal Tribal HMP adoption, the Tribal government assures they will monitor the portions of the MJHMP that applies to them and work with the LEPC to update the MJHMP every five years to comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR parts 200 and 3002. Each participating government will amend its plan whenever necessary to reflect changes in State, Community, Tribal, or Federal laws and statutes including 2 CFR parts 200 and 3002.

Once the plan has fulfilled all FEMA criteria, the Copper River LEPC Coordinator will submit the Glennallen/Tazlina MJHMP to the Division of Homeland Security and Emergency Management (DHS&EM) for initial review and preliminary approval. When all corrections are made, DHS&EM will forward the MJHMP to FEMA for their review and conditional approval.

Once the plan has fulfilled all FEMA criteria, DHS&EM will promulgate the Community of Glennallen's MJHMP and the Native Village of Tazlina will formally adopt the MJHMP. Tazlina will submit a copy of their formal adoption to the MJHMP Planning Team Leader

(Copper River LEPC Coordinator) who in-turn will send it to the State Hazard Mitigation Officer (SHMO). These documents will be sent to FEMA for final formal MJHMP approval.

FEMA's final approval assures that Glennallen and the Native Village of Tazlina are eligible for applying for appropriate mitigation grant program funding. Glennallen will be able to submit future applicable grant funding applications to the State for consideration and potential funding.

3.7.3.7 Tribal or Native Village Mitigation Grant Application Process Considerations

The Tazlina's tribal Council can potentially qualify to either apply for applicable grant funding as a State sub-applicant; through DHS&EM or apply directly to FEMA as an eligible federally recognized tribal government with sovereign authority working directly with government agencies.

Therefore, the Village CAN determine which of the two following options will best fit the Village's needs. These options are:

Option 1:

The Village can submit grant applications through the State with no loss in Tribal governance authorities.

The Village submits their mitigation grant applications to the State Hazard Mitigation Officer (SHMO) for initial State review. This option could potentially enable the Tribe to avoid paying future mitigation project grant funding match.

The SHMO will then coordinate tribal applications within their grant review and prioritization process for potential approval and award. DHS&EM will review, prioritize, and award grants assigning their most current grant recipient cost share requirements to successful grant awardees.

Option2:

The Tribe can submit mitigation grant applications directly to FEMA or other granting agencies as a sovereign, federally recognized tribal government, maintaining sovereign authority working directly with government agencies.

As a federally recognized tribe, the Tribal Council submits their mitigation grant applications directly to FEMA with full knowledge the Tribe will be responsible for providing any applicable programmatic project matching funds.

FEMA will review, prioritize, and award grants assigning their most current grant recipient cost share requirements to successful grant awardees.

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Section Four is included to fulfill the Community of Glennallen and the Native Village of Tazlina’s MJHMP promulgation and adoption requirements.

4.1 COMMUNITY ADOPTION OR PROMULGATION

The Communities of Glennallen and the Native Village of Tazlina are represented in the Glennallen/Tazlina MJHMP and meet the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000, and 44 CFR §201.6(c)(5), and §201.7(c)(5) & (6).

DMA 2000 requirements and implementing jurisdictional governance regulations for the MJHMP adoption include:

4

| DMA 2000 Requirements | |
|--|--|
| Local Plan Adoption | §201.6(c)(5): [The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted. |
| 1. REGULATION CHECKLIST | |
| ELEMENT E. Plan Adoption | |
| E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval?? (Requirement §201.6(c)(5)) | |
| Source: FEMA, March 2015. | |

DHS&EM formally Promulgated the Glennallen/Tazlina MJHMP on [REDACTED], 2017 and submitted the final draft MJHMP to FEMA for formal approval.

A scanned copy of the DHS&EM’s formal Promulgation is included in Appendix C.

4.2 TRIBAL GOVERNMENT MJHMP ADOPTION

DMA 2000 requirements and implementing Tribal governance regulations for THMP adoption include:

| DMA 2000 Requirements | |
|--|---|
| Local Plan Adoption | §201.7(c)(5): The plan must be formally adopted by the governing body of the Indian Tribal government prior to submitting to FEMA for final review and approval §201.7(c)(6): [The plan must include] assurances that the Indian Tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 13.11(c) of this chapter. The Indian Tribal government will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 13.11(d) of this chapter. |
| 1. REGULATION CHECKLIST | |
| ELEMENT. Tribal HMP Adoption and Assurances | |
| A. | Has the Indian tribal governing body formally adopted the new or updated plan? |
| B. | Is supporting documentation, such as a resolution, included with the new or updated plan? |
| C. | Does the new or updated plan provide assurances that the Indian Tribal government will continue to comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR 13.11(d)? |
| Source: FEMA, March 2015. | |

The Native Village of Tazlina’s Tribal Council Supports 44 CFR 201.7 and assures compliance with all applicable federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in tribal or federal laws and statutes as required in 44 CFR 13.11(d).

The Native Village of Tazlina, with assistance from the State Hazard Mitigation Officer (SHMO), the State Hazard Mitigation Advisory Committee (SHMAC), and FEMA, is responsible for monitoring, evaluating, and updating the Glennallen /Tazlina Hazard Mitigation Plan in accordance with 44 CFR §201.7.

The Tazlina Tribal Council formally adopted the Glennallen/Tazlina MJHMP on [REDACTED], 2017 and submitted the final draft to FEMA for formal approval. A scanned copy of Tazlina’s formal included in Appendix C.

Section Five identifies and profiles the hazards that could affect Glennallen and the Native Village of Tazlina.

5.1 OVERVIEW

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

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

5.2 HAZARD IDENTIFICATION AND SCREENING

This is the first step of the hazard analysis. On November 10, 2016 the Planning Team reviewed seven possible hazards that could affect the Glennallen and Tazlina area. They then evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of their threat and the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard (Table 5-1). The Planning Team determined that six hazards pose a great threat to their area: earthquake, flood/scour, ground failure, severe weather, volcanic ash, and wildland/ tundra fire; some of which are influenced by increasing changing climate conditions such as late ice formation, early thaw conditions, increased, lack, or inconsistent rain.

Table 5-1 Identification and Screening of Hazards

| Hazard Type | Should It Be Profiled? | Explanation |
|---|------------------------|---|
| Natural Hazards | | |
| Earthquake | Yes | Periodic, unpredictable occurrences. The Glennallen and Tazlina area experienced damage from the 11/2002 Denali EQ, The area has withstood 337 earthquakes since 1958. |
| Flood (Riverine and/or coastal related floods and resultant erosive scour damages) | Yes | Glennallen is located above the Tazlina and Copper River flood plains and is not subject to significant flooding. Localized flooding may occur, particularly from snowmelt run-off (during spring thaw) and rainfall flooding (during fall rainy season). Events occur from soil saturation. Minor conditions may cause damage. <i>* The USACE classifies Tazlina as having a "Minimal" erosion threat. However flooding is not considered a major threat for Glennallen because most of the community is situated on high ground away from flood sources.</i> |

Table 5-1 Identification and Screening of Hazards

| Hazard Type | Should It Be Profiled? | Explanation |
|---|------------------------|---|
| Ground Failure (Avalanche, Landslide/Debris Flow, Permafrost, Subsidence) | Yes | Ground Failure occurs throughout Alaska from avalanches, landslides, melting permafrost, and ground subsidence. Glennallen is located in an area of discontinuous permafrost. Ground failure as a result of melting permafrost is a concern which could cause houses to shift due to ground sinking and upheaval, as well as high ground water melting the permafrost. Avalanches are a concern for the surrounding area, particularly as they may affect road access on the Richardson and Glenn Highways. |
| Severe Weather (Cold, Drought, Rain, Snow, Wind, etc.) | Yes | Severe weather impacts the community with climate change/global warming and changing El Niño/La Niña Southern Oscillation (ENSO) patterns generating increasingly severe weather events such as winter storms, heavy or freezing rain, thunderstorms and with subsequent secondary hazards such as riverine or coastal storm surge floods, landslides, snow, and wind etc. |
| Tsunami (Seiche) | No | This hazard does not exist for this location. |
| Volcano | Yes | Volcano generated ash periodically affects the community from local and distant Volcanos. |
| Wildland (Tundra) Fire | Yes | The community and the surrounding forest not too distant tundra areas become very dry in summer months with weather (such as drought and lightening) and human caused incidents igniting dry vegetation in the adjacent area (burning trash outside their landfill's burn box, camp fires, etc.). |

5.3 HAZARD PROFILES

DMA 2000 requirements and implementing jurisdictional governance regulations for hazard profile development include:

| DMA 2000 Requirements |
|---|
| Identifying Hazards §201.6(c)(2)(i): The risk assessment shall include a) description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events. §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area. |
| 1. REGULATION CHECKLIST |
| ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT |
| B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction? B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? |
| Source: FEMA, March 2015. |

DMA 2000 requirements and implementing Tribal governance regulations for hazard profile development include:

| DMA 2000 Requirements |
|--|
| <p>Risk Assessment: 201.7(c)(2): [The plan shall include a] risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Tribal risk assessments must provide sufficient information to enable the Indian Tribal government to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.</p> <p>Identifying Hazards</p> <p>§201.7(c)(2)(i): The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the tribal planning area. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.</p> <p>§201.7(c)(2)(iii): For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.</p> |
| 1. REQUIREMENTS CHECKLIST |
| ELEMENTS. Planning Area and Natural Hazard Profiles |
| <p>A. Does the new or updated plan describe the tribal planning area?</p> <p>B. Does the new or updated plan include a description of the types of all natural hazards that affect the tribal planning area?</p> |
| Source: FEMA, March 2015. |

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

- Nature (Type)
 - Potential climate change impacts are primarily discussed in the Severe Weather hazard profile but are also identified where deemed appropriate within each hazard profile.
- History (Previous Occurrences)
- Location
- Extent (breadth, magnitude, and severity)
- Impact (Section 5 provides general impacts associated with each hazard. Section 6 provides detailed impacts to Glennallen area residents and critical facilities)
- Recurrence Probability

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

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

Estimating magnitude and severity are determined based on historic events using Table 5-2 identified criteria from Section 5.3's narrative descriptions.

Table 5-2 Hazard Magnitude/Severity Criteria

| Magnitude / Severity | Criteria |
|-------------------------|--|
| <i>4 - Catastrophic</i> | <ul style="list-style-type: none"> Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50 percent (%) of property is severely damaged. |
| <i>3 - Critical</i> | <ul style="list-style-type: none"> Injuries and/or illnesses result in permanent disability. Complete shutdown of critical facilities for at least two weeks. More than 25% of property is severely damaged. |
| <i>2 - Limited</i> | <ul style="list-style-type: none"> Injuries and/or illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than one week. More than 10% of property is severely damaged. |
| <i>1 - Negligible</i> | <ul style="list-style-type: none"> 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% of property is severely damaged. |

5

Similar to estimating magnitude and severity, Probability is determined based on historic events, using Table 5-3 identified criteria, to provide estimated future event recurrence likelihood.

Table 5-3 Hazard Recurrence Probability Criteria

| Probability | Criteria |
|--------------------------|---|
| <i>4 - Highly Likely</i> | <ul style="list-style-type: none"> Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring (1/1=100 percent [%]). History of events is greater than 33% likely per year. Event is "Highly Likely" to occur. |
| <i>3 - Likely</i> | <ul style="list-style-type: none"> Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring (1/3=33%). History of events is greater than 20% but less than or equal to 33% likely per year. Event is "Likely" to occur. |
| <i>2 - Possible</i> | <ul style="list-style-type: none"> Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring (1/5=20%). History of events is greater than 10% but less than or equal to 20% likely per year. Event could "Possibly" occur. |
| <i>1 - Unlikely</i> | <ul style="list-style-type: none"> Event is possible within the next ten 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% likely per year. Event is "Unlikely" but is possible to occur. |

The hazards profiled for the Glennallen Area are presented throughout the remainder of Section 5.3. The presentation order does not signify their importance or risk level.

5.3.1 Earthquake

5.3.1.1 Nature

An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and after only a

few seconds can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, or the vibration or shaking of the ground during an earthquake.

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

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

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

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

intensity by quantifying how hard the earth shakes in a given location. PGA can be measured as acceleration due to gravity (g) (MMI 2006).

Magnitude (M) is the measure of the earthquake strength. It is related to the amount of seismic energy released at the earthquake's hypocenter, the actual location of the energy released inside the earth. It is based on the amplitude of the earthquake waves recorded on instruments, known as the Richter magnitude test scales, which have a common calibration (see Figure 5-1).

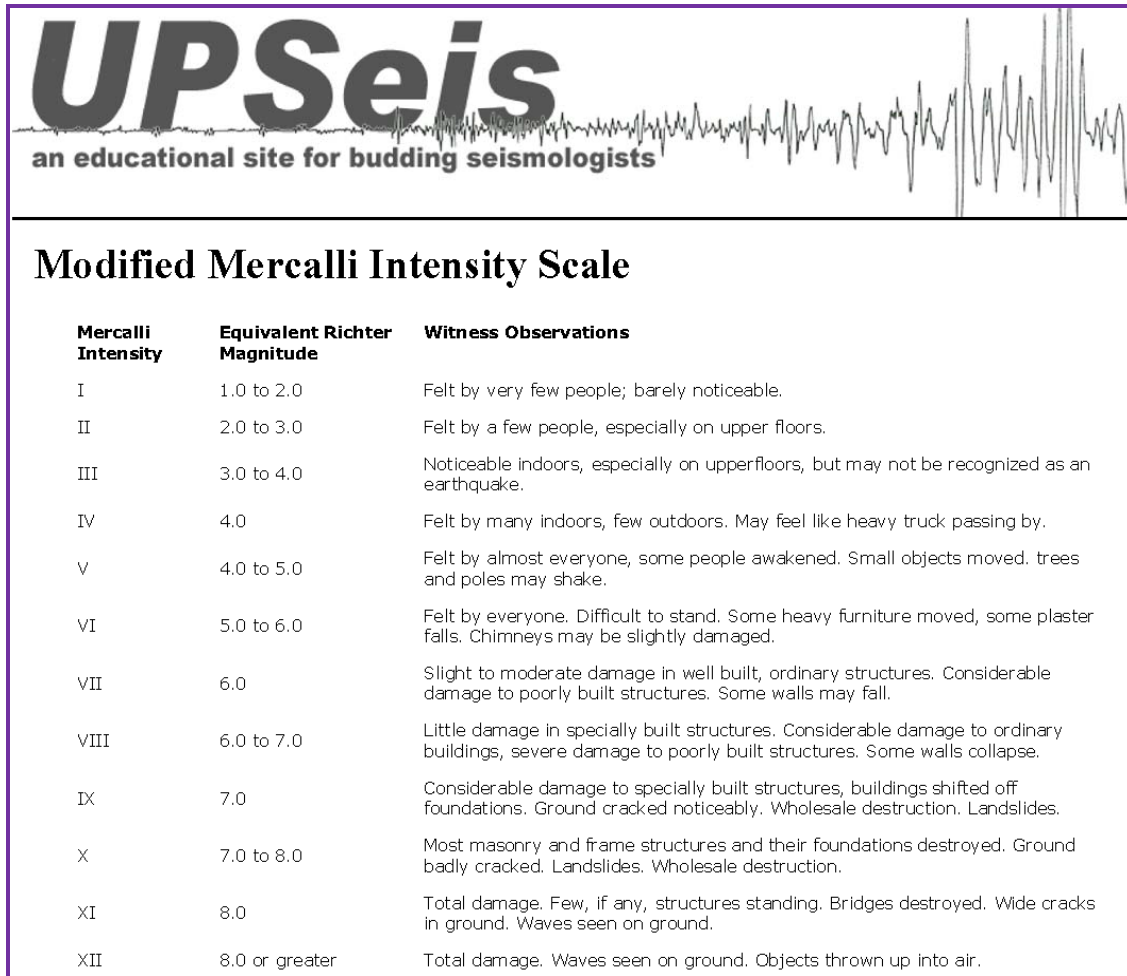


Figure 5-1 Modified Mercalli Intensity (MMI 2016)

5.3.1.2 History

The MJHMP's Alaska earthquake information is based on best available data; obtained from the US Geological Survey (USGS) and the State of Alaska, UAF Geophysical Institute's archives. Research included searching the US Geological Survey (USGS) earthquake database for events spanning from 1958 to present located within 100 miles of the Glennallen area.

The USGS identifies 2,435 historical earthquakes that occurred within 100 miles of Glennallen ranging from M2.5 to M7.9. The largest one (the M7.9 Denali Fault Earthquake occurring on November 3, 2003) was felt at great distances from its epicenter. Damages varied by

infrastructure location and geology.

Twenty-two (22) historical events exceeded M5.0 within 100 miles of the Glennallen and Tazlina area. There were no earthquakes greater than M4.7 since the Legacy 2011 HMP was implemented (Table 5-4). The community only experience minor shaking from these events. More intense long distant earthquake events can significantly damage infrastructure and residential facilities.

Table 5-4 Historical Earthquakes for the Glennallen Area over M5.0

| Date | Latitude | Longitude | Magnitude | Location |
|------------|----------|-----------|-----------|-----------------------------------|
| 11/6/2016 | 61.7493 | -148.2035 | 4.2 | 34km E of Sutton-Alpine, Alaska |
| 8/19/2016 | 61.6036 | -146.3339 | 4.2 | 52km N of Valdez, Alaska |
| 12/2/2015 | 61.6985 | -147.2653 | 4.6 | 80km NW of Valdez, Alaska |
| 5/9/2015 | 61.5162 | -146.5731 | 4 | 44km NNW of Valdez, Alaska |
| 3/4/2015 | 60.9311 | -145.812 | 4 | 35km SE of Valdez, Alaska |
| 11/29/2014 | 62.5442 | -148.058 | 4.6 | 93km NNE of Sutton-Alpine, Alaska |
| 9/24/2014 | 61.353 | -146.7779 | 4.5 | 33km NW of Valdez, Alaska |
| 4/18/2014 | 63.4061 | -144.9721 | 4.1 | 53km SSE of Deltana, Alaska |
| 6/20/2013 | 62.2325 | -145.6927 | 4.4 | 16km NNW of Glennallen, Alaska |
| 12/25/2012 | 61.301 | -147.437 | 4.7 | Southern Alaska |
| 10/31/2012 | 62.05 | -146.546 | 4 | Central Alaska |
| 8/7/2012 | 63.344 | -145.184 | 4.1 | Central Alaska |
| 6/8/2012 | 62.226 | -147.875 | 4.2 | Central Alaska |
| 2/26/2012 | 62.227 | -145.65 | 4.2 | Central Alaska |
| 1/8/2012 | 62.25 | -145.67 | 4 | Central Alaska |
| 12/9/2011 | 62.253 | -145.65 | 4.4 | Central Alaska |
| 6/18/2011 | 62.081 | -148.264 | 4.1 | Central Alaska |
| 4/5/2011 | 62.471 | -148.226 | 4.2 | Central Alaska |

(USGS 2017)

The USGS document “*The effects of the Earthquake March 27, 1964 in the Copper River Basin area, Alaska*” describes impacts to the Glennallen area from the 1964 M9.2 Good Friday Earthquake:

“Breakage of fragile items inside buildings was widespread, but structural damage generally was not severe.

A 5-unit motel, barracks-type building, and a trailer house were shaken off their foundations. The foundation of the elementary school building was severely damaged. Several relatively small ground cracks formed in cleared areas and locally damaged structures. At the Copper Valley Electric Co. station, damage to the plant foundation, flooring and equipment caused power disruption for a little more than 4 hours while repairs were being made and generating equipment was checked. The Glennallen Road Camp of the Alaska Department of Highways, the largest installment in Glennallen, sustained damage to underground sewers, steam and water lines, well casings, windows and a boiler” (USGS 1966).

The same report described damage to the Glenn Highway from the Matanuska Glacier at approximately Mile 100 to the Glenn Highway-Richardson Highway junction at Glennallen:

“Along the Glenn Highway...several small cracks formed in the pavement, and at a few places minor slumping of roadcuts occurred. The majority of these cracks were less than 6 inches wide, and no major differential movement took place” (USGS 1966)

The DHS&EM’s 2016 Disaster Cost Index summarizes area impacts from the Denali Fault earthquake:

“03-203 Denali Fault Earthquake (AK-DR-1440) Declared November 6, 2002 by Governor Knowles then FEMA Declared November 8, 2002: *A major earthquake with a preliminary magnitude of 7.9 occurred on the Denali Fault in Interior Alaska on November 3, 2002, with strong aftershocks. The earthquake caused severe & widespread damage and loss of property, and threat to life & property in the Fairbanks North Star Borough, the Denali Borough, the Matanuska-Susitna Borough, and numerous communities within the Delta Greely, Alaska Gateway, Copper River, and Yukon-Koyukuk Regional Education Attendance Areas including the cities of Tetlin, Mentasta Lake, Northway, Dot Lake, Chistochina and Tanacross, and the unincorporated communities of Slana and Tok. The areas experienced severe damage to numerous personal residences requiring evacuations and sheltering of residences; extensive damage to primary highways including the Richardson Highway, the Tok Cutoff, the Parks Highway and road links to communities including the road to Mentasta and Northway. Damage to supports for the Trans-Alaska Pipeline necessitated the shutdown of the pipeline. Additionally; fuel spills from residential storage tanks, significant damage to water, septic, sewer and electrical systems also occurred. Not all of the areas listed in the State disaster were included in the Federal Individual Assistance Program. Assistance to those areas was thought the State Individual Assistance Program. Additionally, not all of the areas listed in the State declaration were eligible for all categories of assistance under the federal Public Assistance Program. Those areas were only eligible for Debris Removal & Emergency Protective Measures under the Federal Public Assistance Program but were eligible for all Permanent Work categories under the State public Assistance Program. FEMA also authorized 404 Mitigation funding. DOT submitted an appeal letter after funding was denied by FEMA for permanent repair of the runways at Northway and Gulkana Airports. On August 10, 2004, FEMA granted the second appeal, which awarded DOT an extra \$13.5 million to conduct the repairs. Individual Assistance totaled \$67K for 12 applicants. Public Assistance totaled \$24.8 million for 17 applicants with 53 PW’s” (DHSEM 2016).*

North America's strongest recorded earthquake occurred on March 27, 1964 in Prince William Sound measuring M9.2. This significant event was felt by many residents throughout Alaska.

Glennallen experienced moderate ground motion from this historic event. However, Planning Team members stated that the entire Glennallen area experienced more intense shaking from the November 3, 2002 M7.9 Denali EQ. The 2002 USGS *Shake Map* indicated earthquake shake intensity for the Glennallen and Tazlina area (Figure 5-2).

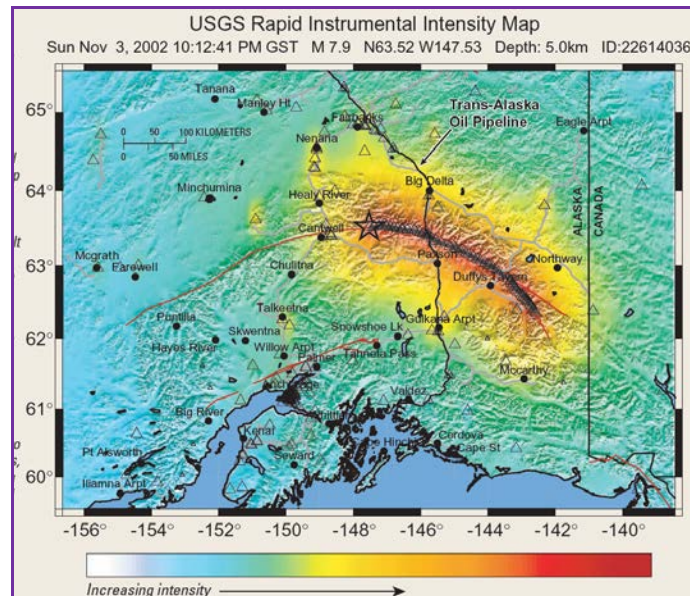


Figure 5-2 Denali Fault Earthquake Intensity Map (USGS 2002)

Figure 5-3 portrays the Denali Fault line as well as a multitude of smaller earthquake events (indicated by the orange circles) that occurred for weeks after the main M7.9 rupture.

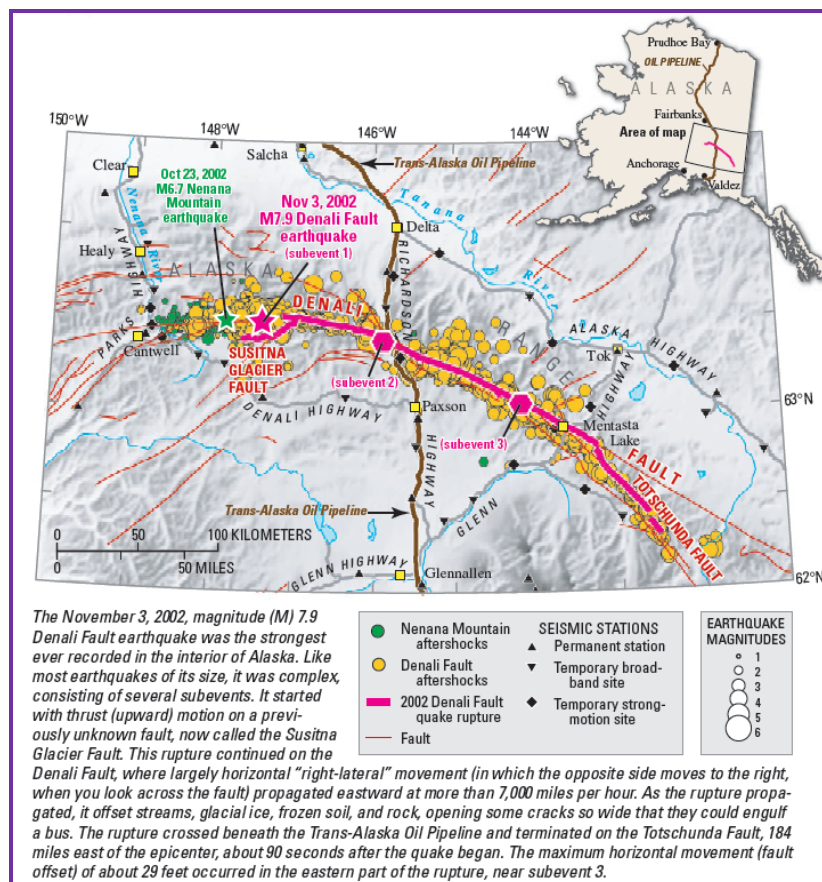


Figure 5-3 Rupture in South-Central Alaska (USGS 2003)

Based on Glennallen's minor historical impacts, the Planning Team determined they only need to be concerned with earthquakes with a magnitude greater than (>) M5.0 because this magnitude is where damage typically begins to occur.

5.3.1.3 Location, Extent, Impact, and Recurrence Probability

Location

The entire geographic area of Alaska is prone to earthquake effects. As such Glennallen has experienced 2,434 earthquakes since 1979 with 412 events occurring ranging from M2.5 to M4.7 since the legacy 2011 HMP was approved.

Figure 5-4 shows the locations of active and potentially active faults in Alaska.

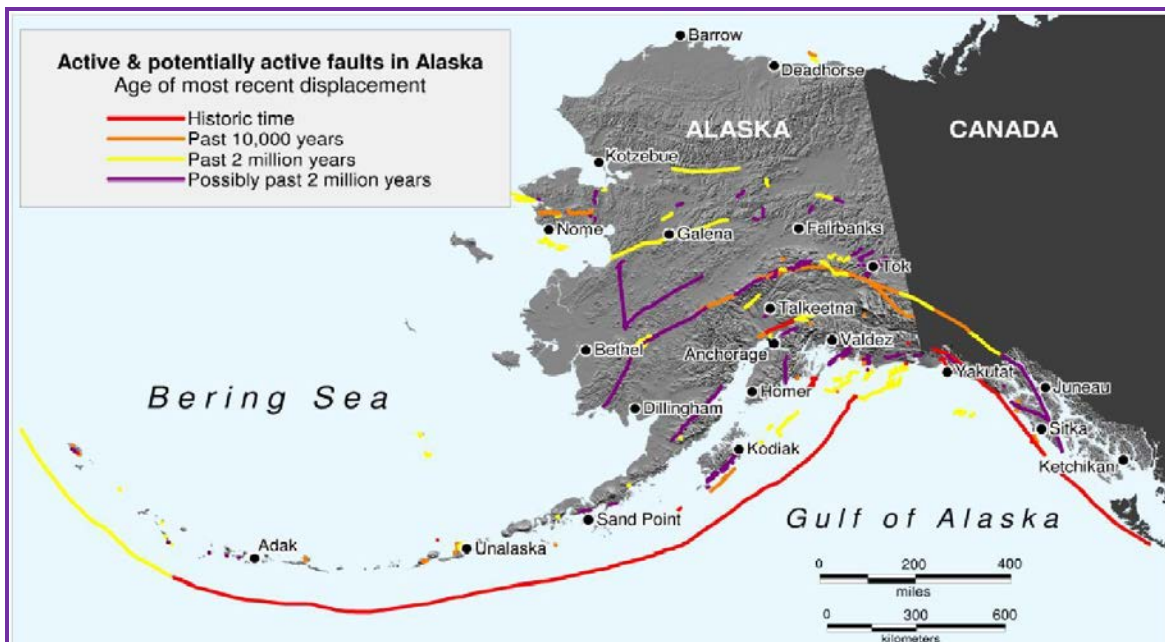


Figure 5-4 Active and Potentially Active Faults in Alaska (DGGs 2009)

Extent

The average distance of the Glennallen area's recorded earthquakes that exceeded M5.0 was less than 150 miles (with a range from 100 to 200) from Glennallen.

Based on historic earthquake events, the USGS Shake Map, and criteria defined in Table 5-2, the magnitude and severity of earthquake impacts in Glennallen range from "Limited" to potentially "Critical" with injuries and critical facility damages dependent on their location and geology from the earthquakes epicenter and its strength.

Glennallen is surrounded by numerous faults located at various distances (Figure 5-5). For example, the Denali Fault (red line) is approximately 115 miles distant from Glennallen.

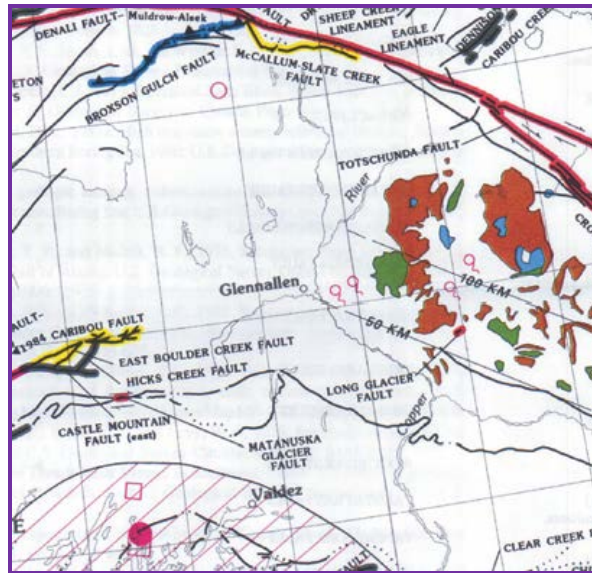


Figure 5-5 Neotectonic Map of Alaska (DGGS 1994)

Impact

Impacts to the community such as significant ground movement that may result in infrastructure damage are possible as exemplified by damages experienced by Cross Road Medical Center. Shaking could range from minor to significant as experienced during past events. Impacts to future populations, residences, critical facilities, and infrastructure are anticipated to remain the same.

The legacy 2011 HMP stated:

“Glennallen is 115 miles (184 kilometers) from the epicenter of this [Denali Fault] earthquake. According to the planning team, most damage was relatively minor and superficial. The Cross Road Medical Center, however, sustained substantial damage, primarily in cracks to the building foundation. Repairs were made to the building in 2009 to fix the damage due to the earthquake, as well as other necessary repairs. The cost of the earthquake damage was estimated at \$225,000” (Glennallen 2011).

Recurrence Probability

As indicated, while it is not possible to predict when an earthquake will occur, the Shake Map was generated using the United States Geological Survey (USGS) Earthquake Mapping Model to generate the 2014 Shake Map (Figure 5-5). This modelling effort incorporates current seismicity in its development and is the most current map available for this area. Peter Haeussler, USGS, Alaska Region states, it is a viable representation to support probability inquiries.

“The occurrence of various small earthquakes does not change earthquake probabilities. In fact, in the most dramatic case, the probability of an earthquake on the Denali fault was/is the same the day before the 2002 earthquake as the day afterward. Those are time-independent probabilities. The things that change the hazard maps is changing the number of active faults or changing their slip rate” (Haeussler, 2009).

As indicated in Figure 5-6, while it is not possible to predict when an earthquake will occur. The Shake Map was generated using the United States Geological Survey (USGS) Earthquake Mapping Model for the Glennallen area.

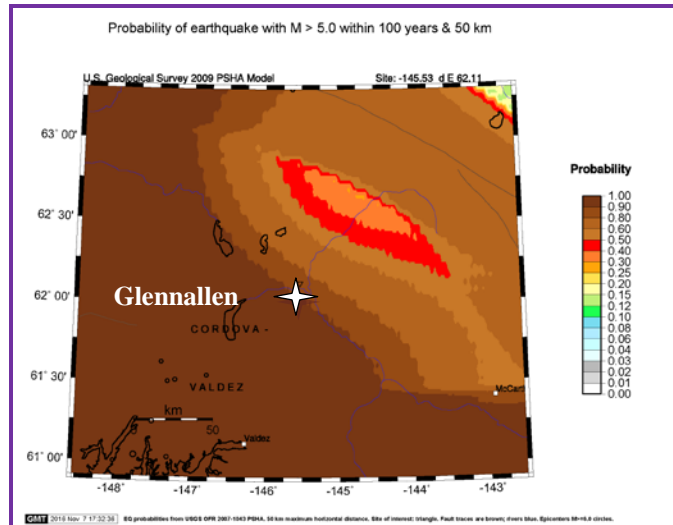


Figure 5-6 Glennallen's Earthquake Probability (USGS 2016)

The Shake Map indicates it is “Highly Likely” a M5.0 or greater earthquake will occur within the next calendar year with a 100% (1/1=100%) chance of occurring; due to an event history that is greater than 33% likely per year.

5.3.2 Flood

5.3.2.1 Nature

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

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

Four primary types of flooding occur in the Glennallen and Tazlina area: rainfall-runoff, snowmelt, ice jam, and ice scour impacts.

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

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

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

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

Riverine Scour results from the force of flowing water and ice formations in and adjacent to river channels. This scouring affects the river channel, riverbed, and embankments potentially altering or preventing channel navigation or riverbank development. In less stable braided channel reaches, scour, and material deposition are constant issues. In more stable meandering channels, scour episodes may only occasionally occur from human activities including boat wakes and dredging.

Attempts to control scour using shoreline protective measures such as groins, jetties, levees, or revetments can lead to increased embankment loss or damage.

Land surface loss results from high flowing surface water across roads due to poor or improper drainage. These events typically occur from rain and snowmelt run-off.

Event Recurrence Intervals

Many flood damages are predictable based on rainfall and seasonal thaw patterns. Most of the annual precipitation occurs from April through October with August being the wettest. This rainfall leads to flooding in early/late summer and/or fall. Spring snowmelt increases runoff, which can cause excessive surface flooding. It also breaks riverine winter ice cover, exacerbating localized ice-jam flood impacts.

5.3.2.2 History

The Community of Glennallen does not have a flood threat as stated within the legacy 2011 Glennallen HMP describing the community's location above the floodplain:

“Glennallen is located in the Copper River Valley, just north of the confluence of the Tazlina and Copper Rivers. It lies at an elevation of 1,434 feet, over 200 feet above the Tazlina River/Copper River Floodplain” (Glennallen 2011).

The communities within the Glennallen area periodically experience road surface damages from heavy rainfall, snowmelt, and spring run-off flooding and scour. Spring run-off causes the most damages to the community's road surfaces. LEPC Planning Team members shared that,

“There are places where there is significant erosion/landslide problems that will someday impact the Richardson Highway specifically on Simpson Hill which is between Glennallen and Tazlina. There are other areas as well...” (LEPC 2016).

The Copper Valley, Alaska 5-Year Area Plan: 2010-2015 provide the following ground failure information:

“Hydrology and Water

The major tributaries of the Copper River within the area are the Slana, Gakona, Gulkana, Tazlina, Klutina, Tonsina, and Chitina Rivers. Except for the Slana and Gulkana, all major rivers are glacial in origin. These rivers are characterized by steep gradients, braided floodplains, and high volumes of suspended sediments. Several mineralized springs, locally referred to as mud volcanoes, occur within 15 miles of Glennallen. Mud volcanoes are cone-shaped mounds of silt and clay from which mud, gas and mineralized water have been discharged.

There has been little documentation of the surface and groundwater sources in the area and their quantity and quality for drinking water and other uses; well log data are limited.

Subsurface water throughout much of the area is under artesian pressure beneath fine-grained material and/or permafrost. Water availability and quality varies dramatically throughout the region. Some of the Kenny Lake area has water at extremely deep levels; Glennallen water is highly mineralized and sometimes iron-rich. Wells drilled in Glennallen, Gulkana, and Gakona have produced water that is somewhat saline.

There are multiple lakes with potable water in the region, but their accessibility, ownership and use concerns, organizational capacities to develop their use, and cost of capita, operation, and maintenance need to be considered for long term viability” (CVDA 2015).

On September 22, 1982 the United States Army Corp of Engineers (USACE) reported the Copperville Subdivision had flood water rising approximately four feet intruding the Naganaast residence (Figure 5-7) and the pump house (Figure 5-8). The building site is in an inactive slough.



Figure 5-7 Naganaast Residence Outside Flood Height (USACE 2002)



Figure 5-8 Naganaast Pump House-Inside Wall (USACE 2002)

5

The 2009 USACE Alaska Baseline Erosion Assessment Reports', Erosion Information Paper – Tazlina, Alaska, dated February 29, 2009 describes Tazlina's "Minimal" high water flow source threat:

"Tazlina is on the north and south banks of the Tazlina River, near its junction with the Copper River. The Tazlina River is about 46 miles long and flows east from Tazlina Lake into the Copper River. The 25-mile long Tazlina Glacier is the primary source of silty glacial water in the river. The meandering river channel causes erosion at Tazlina. Steep, unvegetated slopes along road cuts also are slumping and sliding. The erosion associated with the seasonal flooding and river channel migration has impacted 4 riverbank areas. The south bank of the river channel is reported to have eroded 20 to 50 feet upstream of the Richardson Highway Bridge in the past 20 years. An ice jam that formed along the river channel on February 12, 2007 piled up to within 3 feet of the bottom of the Richardson Highway Bridge. No specific erosion damage was reported from this ice jam event, but ice jams are reported to contribute to erosion in the community" (USACE 2008).



Photo 1: Tazlina River at the Richardson Highway Bridge, ...photo courtesy of Michael L. Bird, November 14, 1998" USACE 2016d).

Figure 5-9 depicts Tazlina's USACE generated aerial photograph showing Tazlina's flood or high water flow induced scour impact locations.

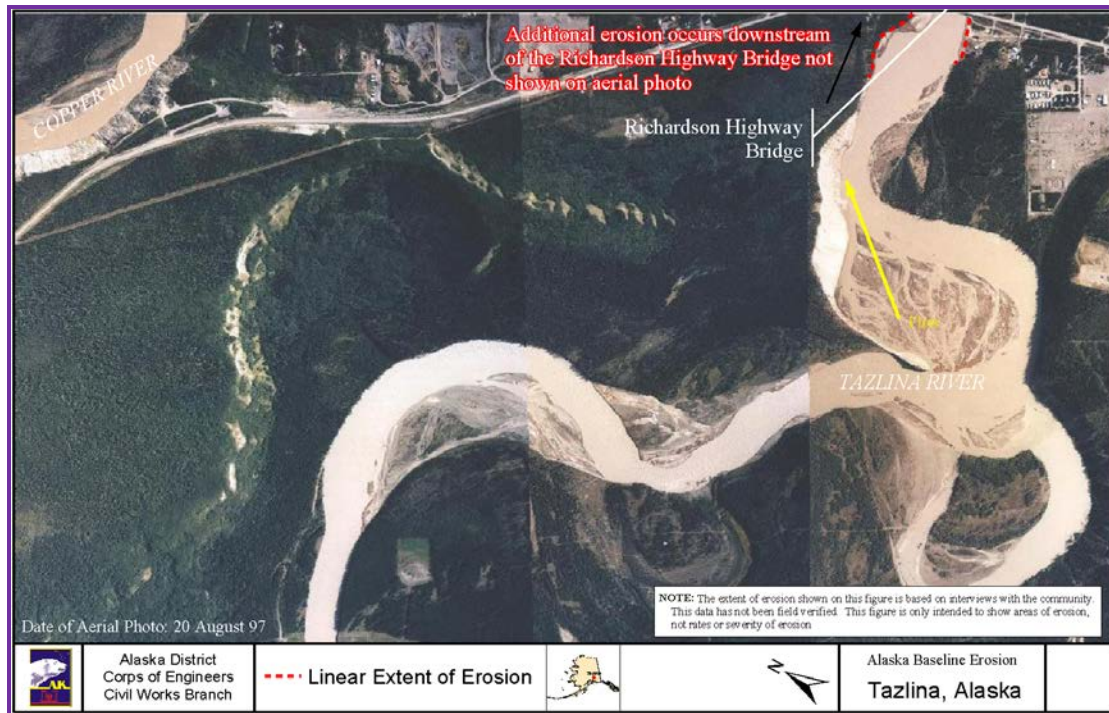


Figure 5-9 Tazlina's Scour Locations (USACE 2008)

The 2016 DHS&EM Disaster Cost Index delineates historical flood events affecting the Tazlina area. The index lists the following events:

“07-220 2006 August Southcentral Flooding (AK-07-220) declared August 29, 2006 by Governor Murkowski; FEMA declared (DR-1663) on October 16, 2006: Beginning on August 18, 2006 and continuing through August 24, 2006, a strong weather system centered causing severe flooding resulting in severe damage and threats to life and property, in the Southcentral part of the State including the Matanuska-Susitna Borough, the City of Cordova and the Copper River Highway area in the Chugach Rural Education Attendance Area (REAA), the Richardson Highway area in the Copper River REAA and Delta/Greely REAA, the Denali Highway area, and the Alaska Railroad and Parks Highway areas in the Matanuska-Susitna Borough and the Denali Borough. Damage cost estimates are near \$21 million in Public Assistance primarily for damage to roads, bridges and rail lines. Individual Assistance estimates are near \$2 million.

07-221 2006 October Southern Alaska Storm (AK-07-221) declared October 14, 2006 by Governor Murkowski; FEMA declared (DR-1669) on December 8, 2006: Beginning on October 8, 2006 and continuing through October 13, 2006, a strong large area of low pressure that developed in the Northern Pacific and moved into the Southwest area of the state, produced hurricane force winds throughout much of the state and heavy rains in the Southcentral and Northern Gulf coast areas, which resulted in severe flooding

and wind damage and threats to life in the Southern part of the state, to include the Kenai Peninsula Borough including the Cities of Seward and Seldovia, the Chugach Rural Education Area including the City of Cordova and the City of Valdez, and the **Copper River Rural Education Area** including the Richardson Highway to the **Glenallen** and highways and drainages in the McCarthy areas. Initial total damages are estimated at \$557,415 with a public assistance estimate of \$456,855. Federal declaration was made December 2006 including assistance for Public Assistance and Hazard Mitigation but not including Individual Assistance. Revised State of Alaska Cost estimates are \$1,265,000 in Individual Assistance and \$38,241,826 in Public Assistance for a total cost of \$39,506,826. There is \$26,825,918 available from the Federal Highway Administration leaving a requested amount of \$13,948,999. A total of 10 individuals or households applied for assistance through the State's IA Temporary Housing program. Six eligible applicants received a total of \$93,611.21 for home replacement, major repair and mitigation, and/or for temporary housing accommodations. Each TH applicant involved extensive case management. The temporary housing program closed 3/10/2008.

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

10-231 2010 July Interior Flooding declared by Governor Parnell on July 26, 2010: Beginning on July 10, 2010 and continuing through at least July 13, 2010, heavy rainfall through the Upper Tanana and Yukon River Basins caused severe flooding along several creeks along the Taylor Highway, Nabesna Road and the Alaska Highway. The damages are located within the Alaska Gateway Rural Education Attendance Area (REAA 3) and the **Copper River Rural Education Attendance Area (REAA 11)**. There are no official jurisdictions in the areas.

13-242 2013 Spring Floods declared by Governor Parnell on May 30, 2013 then FEMA declared on June 25, 2013 (DR-4122): Beginning on May 17, through June 10 2013, excessive snow pack and ice thickness, combined with rapid spring warming caused

*ice jams and severe flooding. The following jurisdictions and communities in Alaska have been impacted: Alaska Gateway Rural Regional Educational Attendance Area (REAA) including the City and Village of Eagle; the **Copper River REAA** including the Village Communities of Chisotchina and Gulkana; the Yukon Flats REAA including the Community of Circle, and City of Fort Yukon; the Yukon-Koyukuk REAA including the Cities of Galena; the Lower Yukon REAA including the Cities of Emmonak and Alakanuk. The impact of the flooding resulted in severe damage to approximately 194 homes (requiring evacuations and sheltering) to include loss and damage to personal property, multiple businesses (including loss of revenue), and public infrastructure to include: hazardous and non-hazardous debris removal, emergency protective measures (leading to ongoing mass care operations), damage to city and state roads, bridges, water and sewer systems, electrical generation and distribution systems, recreation areas and fuel storage facilities” (DHS&EM 2016).*

5.3.2.3 Location, Extent, Impact, and Future Events Probability

Location

5

The Planning Team indicated that Glennallen has limited flood impacts, however, Tazlina has a USACE classified “Minimal” flood threat; most of which occur from rainfall and snowmelt runoff. Water collects in low terrain depressions and may rise to just below a highway bridges which damages infrastructure or severely scours the embankment (see photos in Section 5.3.2.2). Tazlina’s erosion threatened locations along the Tazlina River include:

“Potential Damages

Residences, private wells, fuel tanks, smoke houses, outbuildings, a power pole, and a pathway by the old Catholic School are threatened by [Tazlina River] erosion. Erosion prevents use of a boat launch area east of the Richardson Highway and south of the bridge, and a picnic area at the launch has lost several feet of riverbank to erosion. A dike on the upstream north side of the river that deflects river flow to the south side has been effective in protecting the bridge, but the south bank of the river is now eroding” (USACE 2008).

Extent

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

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
- location related to identified-historical flood elevation

The US Army Corp of Engineers' (USACE) 2009 Erosion Information Paper described the community's erosion extent as:

"...The meandering [Tazlina R]iver channel causes erosion at Tazlina. Steep, unvegetated slopes along road cuts also are slumping and sliding. The erosion associated with the seasonal flooding and river channel migration has impacted 4 riverbank areas. The south bank of the river channel is reported to have eroded 20 to 50 feet upstream of the Richardson Highway Bridge in the past 20 years. An ice jam that formed along the river channel on February 12, 2007 piled up to within 3 feet of the bottom of the Richardson Highway Bridge. No specific erosion damage was reported from this ice jam event, but ice jams are reported to contribute to erosion in the community" (USACE 2008).

Based on past high water flow event history and the criteria identified in Table 5-2, the extent of resultant flooding and scour damage to infrastructure and protective embankments in Tazlina are considered "Limited" with potential injuries that do not result in permanent disability, where critical facilities could shut-down for more than one week, with more than 10% of property becoming severely damaged.

5

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
- High water flow storm surge floods scour (erode) coastal embankments, coastal protection barriers, and result in infrastructure and residential property losses. Additional impacts can include roadway embankment collapse, foundations exposure, and damaging impacts
- 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, decreasing water conveyance and increasing loads which may cause feature overtopping or backwater damages
- Sewage, hazardous or toxic materials release, materials transport from wastewater treatment plant or sewage lagoon inundation, storage tank damages, and/or severed pipeline damages can be catastrophic to rural remote communities

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 as well as embankment, coastal erosion or scour, and/or wind. Deposition is the accumulation of soil, silt, and other particles on a river bottom or delta. Deposition leads to the destruction of fish habitat, presents a challenge for

navigational purposes, and prevents access to historical boat and barge landing areas. Deposition also reduces channel capacity, resulting in increased flooding or bank erosion. Embankment scour involves material removal from the stream or river banks, coastal bluffs, and dune areas. When bank scour damage is excessive, it becomes a concern because it results in loss of embankment vegetation, fish habitat, and land, property, and essential infrastructure (BKP 1988). The US Army Corp of Engineers' (USACE) 2009 Erosion Information Paper lists the community as having a "Minimal" erosion threat. The Erosion Information Paper describes potential damage impacts to:

"Residences, private wells, fuel tanks, smoke houses, outbuildings, a power pole, and a pathway by the old Catholic School are threatened by erosion. Erosion prevents use of a boat launch area east of the Richardson Highway and south of the bridge, and a picnic area at the launch has lost several feet of riverbank to erosion. A dike on the upstream north side of the river that deflects river flow to the south side has been effective in protecting the bridge, but the south bank of the river is now eroding. The cost for the dike is unknown and other erosion protection measures were not reported.

There is concern that the Tazlina River may erode into an old gravel pit downstream from the Richardson Highway Bridge on the north (outside) bend of the river and adversely impact School Road, Tazlina Loop Road, and residences. The Tazlina Trailer Court, a campground, a watering point, and the Bradley Subdivision on the upstream side of the Richardson Highway Bridge, also are reported as areas and facilities at risk from continued erosion" (USACE 2008).

5

Recurrence Probability

Based on previous occurrences, USACE's Floodplain Manager's Report, the Erosion Information Report-Tazlina, and criteria in Table 5-3, it is "Likely" that Tazlina will experience high water flow scour affects during the next three years as there is a 1 in 3 year ($1/3=33\%$) chance of occurring. History of events is greater than 20% but less than or equal to 33% per year.

5.3.3 Ground Failure

5.3.3.1 Nature

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

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

Additionally, avalanches and landslides often occur secondary to other natural hazard events, thereby exacerbating conditions, such as:

- Earthquake ground movement can trigger events ranging from rock falls and topples to massive slides
- Intense or prolonged precipitation can cause slope over-saturation and subsequent destabilization failures such as avalanches and landslides.
- Climate change related drought conditions may increase wildfire conditions where a wildland fire consumes essential stabilizing vegetation from hillsides significantly increasing runoff and ground failure potential

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

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

- **Slides**, the more accurate and restrictive use of the term landslide, refers to a mass movement of material, originating from a discrete weakness area that slides from stable underlying material. A *rotational slide* occurs when there is movement along a concave surface; a *translational slide* originates from movement along a flat surface.
- **Debris Flows** arise from saturated material that generally moves rapidly down a slope. A debris flow usually mobilizes from other types of landslide on a steep slope, then flows through confined channels, liquefying and gaining speed. Debris flows can travel at speeds of more than 35 mph for several miles. Other types of flows include debris avalanches, mudflows, creeps, earth flows, debris flows, and lahars.
- **Lateral Spreads** are a type of landslide generally occurs on gentle slope or flat terrain. Lateral spreads are characterized by liquefaction of fine-grained soils. The event is typically triggered by an earthquake or human-caused rapid ground motion.
- **Falls** are the free-fall movement of rocks and boulders detached from steep slopes or cliffs.
- **Topples** are rocks and boulders that rotate forward and may become falls.
- **Complex** is any combination of landslide types.

In Alaska, earthquakes, seasonally frozen ground, and permafrost are often agents of ground failure. Permafrost is defined as soil, sand, gravel, or bedrock that has remained below 32°F for two or more years. Permafrost can exist as massive ice wedges and lenses in poorly drained soils or as relatively dry matrix in well-drained gravel or bedrock. During the summer, the surficial

soil material thaws to a depth of a few feet, but the underlying frozen materials prevent drainage. The surficial material that is subject to annual freezing and thawing is referred to as the “active layer”.

Seasonal freezing can cause frost heaves and frost jacking. Frost heaves occur when ice forms in the ground and separates sediment pores, causing ground displacement. Frost jacking causes unheated structures to move upwards. Permafrost is frozen ground in which a naturally occurring temperature below 32°F has existed for two or more years. (DHS&EM 2013)

Indicators of a possible ground failure include:

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

The State of Alaska 2013 State Hazard Mitigation Plan provides additional ground failure information defining mass movement types, topographic and geologic factors which influence ground failure which may pertain to the Glennallen and Tazlina area.

5.3.3.2 History

The Glennallen area legacy 2011 HMP describes permafrost within the area:

“Permafrost is common throughout the area. Many buildings in Glennallen are elevated a few feet above grade to dissipate building heat and prevent permafrost thawing. During summer, the soils above the permafrost layer are often saturated, and perched water tables occur.

A variety of vegetation types occur in areas around Glennallen. Forested areas occur where soils are well-drained. These forests are typically aspen, white spruce, mixed white spruce–aspen, and mixed white spruce–balsam poplar. Forests in areas with shallow permafrost or poor drainage or on north-facing slopes typically consist of stunted white and black spruce forests...” (Glennallen 2011).

The Copper Valley, Alaska 5-Year Area Plan: 2010-2015 provide the following ground failure information:

“Permafrost

Permafrost underlies the entire valley at varying depths except on flood plains and under lakes; its depth and ice content varies widely. Although not extensive near the soil surface, massive ice wedges and lenses do occur in the subsoil in some areas. A perched water table and saturated conditions are common above the permafrost during the summer due to restricted drainage.

The fire history of the site and the thickness of the insulating organic layer on the soil surface controls the depth to permafrost and water table. Disturbance of the organic layer usually results in increased soil temperatures and a lowering of the permafrost level. As permafrost thaws, a large volume of water is released. The occurrence of permafrost requires special consideration when selecting lands for clearing and agriculture and during construction of roads and buildings” (CVDA 2015).

The DGGS 1983 “Guidebook to Permafrost and Quaternary Geology Along the Richardson and Glenn Highways Between Fairbanks and Anchorage, Alaska, Reprinted in 1993”. Although a dated document, it appropriately describes permafrost conditions and locations within the planning area:

5



“Figure 92. View (to the north) of abandoned road cut on Simpson Hill showing successive slumps that destroyed old road surface... Photograph by O.J. Ferrians, Jr., September 1977.

182. Construction of the highway for the next 3.3 mi (5.3 km) has impeded the normal flow of drainage in a series of poorly drained swales and muskegs on the lacustrine plain. In these areas, water has collected along the shoulders of the highway. The resulting thawing of permafrost in the poorly drained swales and muskegs and under culverts causes differential subsidence of the road and slumping of the shoulders. Seasonal freezing of the wet ground produced considerable annual frost heaving in wet areas under the road prism...



Figure 94. View (to the north) of high bluff on west side of the copper River near Mile 112.5, Richardson Highway, exposing thick section of Pleistocene deposits. Photograph by O.J. Ferrians, Jr., September 8, 1956.

188.3 The Trans-Alaska Pipeline crosses the highway in a special buried mode. The pipeline is heavily insulated, and refrigerated brine circulating in pipes under the pipeline keeps the underlying ice-rich permafrost frozen. This pipeline was constructed in an above-ground mode on vertical support members (VSMs) across most of the Copper River basin to avoid thawing the permafrost (fig. 95)...

186.2 STOP 30. GLENNALLEN PERMAFROST PROBLEMS

(Bold for emphasis by MJHMP editor) Numerous buildings in the Glennallen area have had severe structural problems because of differential settlement caused by thawing of permafrost. Most buildings in Glennallen are constructed on colluvial-mantled terrace deposits of Moose Creek. Colluvial deposits [1 to 15 Ft (0.3 to 4.6m) thick] consist largely of gravelling silty clay; terrace deposits [10 to 30 ft. (3to 9m) thick] are largely silty sandy gravel or gravelly sand and overlie a thick sequence of fine-grained, ice-rich glaciolacustrine deposits. Permafrost generally lies 5 to 10 ft (1.5 to 3m) below the surface and is deeper in areas of ground scarring. Moisture content is low in unfrozen granular terrace deposits, but is sufficient to act as a cementing agent and to form local ice lenses and stringers. Small amounts of ground water perched on the permafrost provide limited season supplies of potable water...



Figure 95. The Trans-Alaska Pipeline elevated above the ground on steel vertical-support members (VSMs) to prevent thawing... Photograph by O.J. Ferrians, Jr., September 1977...

189. Southern junction of the Richardson And Glenn Highway near Glennallen. Much land around the junction of the Glenn and Richardson Highway was withdrawn from homesteading to evaluate the area as a townsite. Because of saline ground water and permafrost problems, plans for the townsite were abandoned. A well drilled to a depth of 323 ft. (98M) at the road junction (Rosent's Roadhouse) in the fall of 1959 encountered water with 2,270 ppm dissolved solids and some gas. This roadhouse has changed ownership several time over the years and burned down a few years ago. The Ahtna Lodge, which also is located at the junction across the highway from the Former Rosent's Roadhouse, doe not have a well, and water is hauled to the facility by tanker truck.

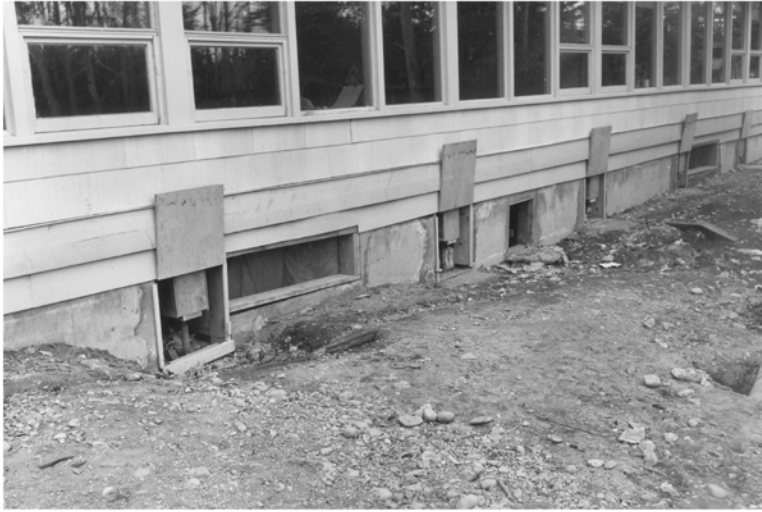


Figure 97 Schoolhouse at Glennallen built in 1952-1953 on Ice-rich permafrost. Air vents, which are open to allow cold air to enter the crawlway in winter to counteract heat from building. The vents are closed during the summer. Jacks are used to counteract differential settlement. The system was only partially successful and the school was demolished in the 1960s. Photograph 95 by T.L. Pew, May 4, 1954.

Although well water at Glennallen is hard, it is not the salty water typical of deep well in the area. Most wells at Glennallen are less than 100 ft (30m) deep and do not intersect saline aquifers 300 to 500 ft. (40 to 150 m) below the ground surface..." (DGGS 1983).

5

5.3.3.3 Location, Extent, Impact, and Recurrence Probability

Location

According to Permafrost Characteristics Map of Alaska (Figure 5-10) developed for the National Snow and Ice Data Center/World Data Center for Glaciology (Jorgenson et al 2008), shows that the Glennallen area has discontinuous permafrost.

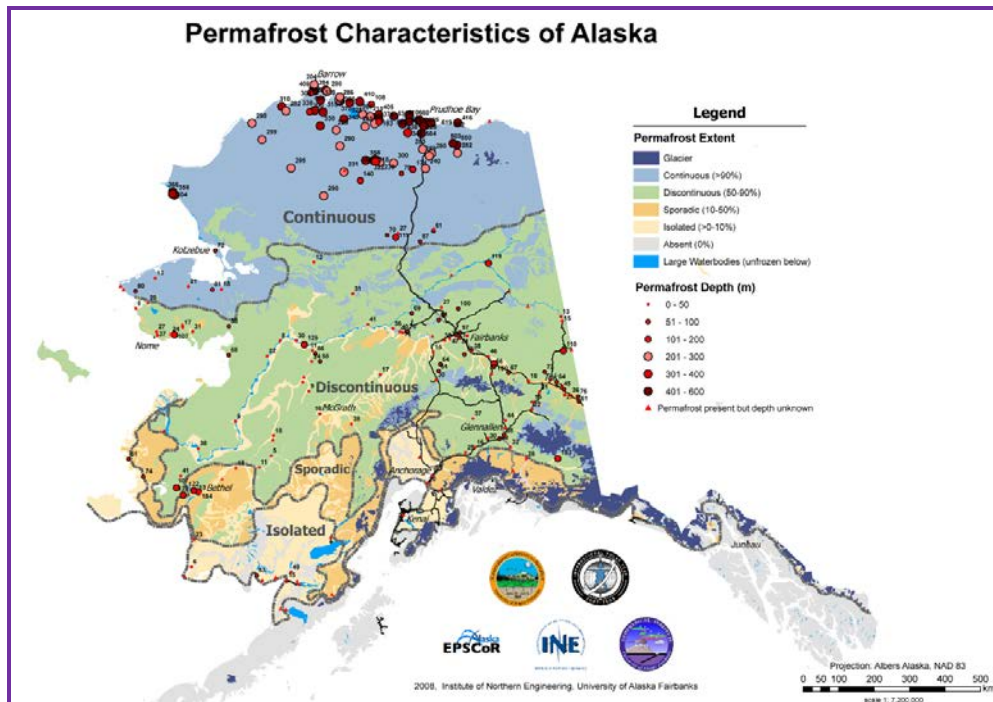


Figure 5-10 Permafrost Characteristics of Alaska (Jorgenson et al 2008)

Extent

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

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

Impact

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

Recurrence Probability

The Planning Team's area-wide knowledge supports the community has annually recurring landslide, avalanche, and ground failure damages throughout the community – to structures, roads, and river embankments. The Planning Team stated the probability for ground failure

follows the criteria in Table 5-3, the future damage probability resulting from ground failure is “Likely” in the next three years (event has up to 1 in 3 years ($1/3=33\%$) chance of occurring as the history of events is greater than 20% but less than 33% likely per year.

5.3.4 Severe Weather

5.3.4.1 Nature

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

Climate Change influences the environment, particularly historical weather patterns. Climate change and El Niño/La Niña Southern Oscillation (ENSO) determines create increased weather volatility such as hotter summers (drought) and colder winters, intense thunderstorms, lightning, hail, snow storms, freezing rain/ice storms, high winds and even a few tornadoes within and around Alaska.

ENSO is comprised of two weather phenomena known as El Niño and La Niña. While ENSO activities are not a hazard, they can lead to severe weather events and large-scale damage throughout Alaska’s varied jurisdictions. Direct correlations were found linking ENSO events to severe weather across the Pacific Northwest, particularly increased flooding (riverine, coastal storm surge) and severe winter storms. Therefore, increased awareness and understanding how ENSO events potentially impact Alaska’s vastly differing regional weather.

Climate change is described as a phenomena of water vapor, carbon dioxide, and other gases in the earth’s atmosphere acting like a blanket over the earth, absorbing some of the heat of the sunlight-warmed surfaces instead of allowing it to escape into space. The more gasses, the thicker the blanket, the warmer the earth. Trees and other plants cannot absorb carbon dioxide through photosynthesis if foliage growth is inhibited. Therefor carbon dioxide builds up and changes precipitation patterns, increases storms, wildfires, and flooding frequency and intensity; and substantially changes flora, fauna, fish, and wildlife habitats.

The governor’s Alaska’s Climate, Ecosystems & Human Health Work Group is tasked with determining how the changing ecosystems may impact human health and to identify, prioritize, and educate Alaskan’s about the connection between their health and changing environmental patterns.

Heavy Snow generally means snowfall accumulating to four inches or more in depth in 12 hours or less or six inches or more in depth in 24 hours or less.

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

Freezing Rain and Ice Storms occur when rain or drizzle freezes on surfaces, accumulating 12 inches in less than 24 hours. Ice accumulations can damage trees, utility poles, and communication towers which disrupts transportation, power, and communications.

Extreme Cold is the definition of extreme cold varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered

“extreme”. In Alaska, extreme cold usually involves temperatures between -20 to -50°F. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. Extreme cold accompanied by wind exacerbates exposure injuries such as frostbite and hypothermia.

High Winds occur in Alaska when there are winter low-pressure systems in the North Pacific Ocean and the Gulf of Alaska. Alaska’s high wind can equal hurricane force but fall under a different classification because they are not cyclonic nor possess other hurricane characteristics. In Alaska, high winds (winds in excess of 50 mph) occur rather frequently.

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

Winter Storms include a variety of phenomena described above and as previously stated may include several components; wind, snow, and ice storms. Ice storms, which include freezing rain, sleet, and hail, can be the most devastating of winter weather phenomena and are often the cause of automobile accidents, power outages, and personal injury. Ice storms result in the accumulation of ice from freezing rain, which coats every surface it falls on with a glaze of ice. Freezing rain is most commonly found in a narrow band on the cold side of a warm front, where surface temperatures are at or just below freezing temperatures. Typically, ice crystals high in the atmosphere grow by collecting water vapor molecules, which are sometimes supplied by evaporating cloud droplets. As the crystals fall, they encounter a layer of warm air where they particles melt and collapse into raindrops. As the raindrops approach the ground, they encounter a layer of cold air and cool to temperatures below freezing. However, since the cold layer is so shallow, the drops themselves do not freeze, but rather, are supercooled, that is, in liquid state at below-freezing temperature. These supercooled raindrops freeze on contact when they strike the ground or other cold surfaces.

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

Winter storm floods are discussed in Section 5.3.3.

Figure 5-11 displays Alaska’s annual rainfall map based on Parameter-elevation Regressions on Independent Slopes Model (PRISM) that combines climate data from NOAA and Natural Resources Conservation Service (NRCS) climate stations with a digital elevation model to generate annual, monthly, and event-based climatic element estimates such as precipitation and temperature.

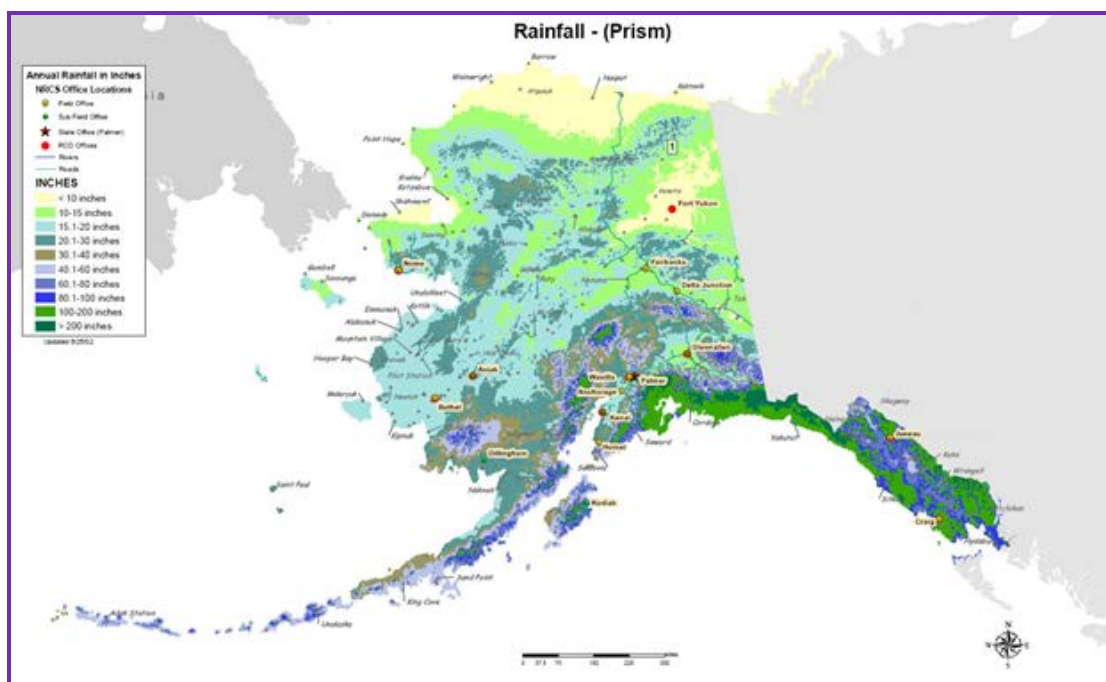


Figure 5-11 Statewide Rainfall Map (PRISM 2016)

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5.3.4.2 History

The entire Glennallen and Tazlina area is continually impacted by severe weather events such as hurricane force wind, rain, snow, and cold.

Climate Change. The University of Alaska Fairbanks (UAF) Arctic Climate Impact Assessment (ACIA) describes recent weather changes and how they impact Alaska:

“18.3.3.1. Changes in climate

Alaska experienced an increase in mean annual temperature of about 2 to 3 °C between 1954 and 2003... Winter temperatures over the same period increased by up to 3 to 4 °C in Alaska and the western Canadian Arctic, but Chukotka experienced winter cooling of between 1 and 2 °C...

The entire region, but particularly Alaska and the western Canadian Arctic, has undergone a marked change over the last three decades, including a sharp reduction in snow-cover extent and duration, shorter river- and lake ice seasons, melting of mountain glaciers, sea-ice retreat and thinning, permafrost retreat, and increased active layer depth. These changes have caused major ecological and socio-economic impacts, which are likely to continue or worsen under projected future climate change. Thawing permafrost and northward movement of the permafrost boundary are likely to increase slope instabilities, which will lead to costly road replacement and increased maintenance costs for pipelines and other infrastructure. The projected shift in climate is likely to convert some forested areas into bogs when ice-rich permafrost thaws. Other areas of Alaska, such as the North Slope, are expected to continue drying. Reduced sea-ice extent and thickness, rising sea level, and increases in the length of the open-water season in the region will increase the frequency and intensity of storm surges and wave development, which in turn will increase coastal erosion and flooding...

18.3.3.4. Impacts on people's lives

Traditional lifestyles are already being threatened by multiple climate-related factors, including reduced or displaced populations of marine mammals, seabirds, and other wildlife, and reductions in the extent and thickness of sea ice, making hunting more difficult and dangerous. Indigenous communities depend on fish, marine mammals, and other wildlife, through hunting, trapping, fishing, and caribou/reindeer herding. These activities play social and cultural roles that may be far greater than their contribution to monetary incomes. Also, these foods from the land and sea make significant contributions to the daily diet and nutritional status of many indigenous populations and represent important opportunities for physical activity among populations that are increasingly sedentary... ” (ACIA 2013).

Figure 5-12 delineates the Weather Service Office's (WSO) weather data. Actual community temperatures and depths may vary due to their relative proximity to the WSO.

GLENNALLEN KCAM, ALASKA (503304)

Period of Record Monthly Climate Summary

Period of Record : 12/16/1965 to 06/10/2016

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|-----------------------------------|-------|-------|------|------|------|------|------|------|------|------|------|-------|--------|
| Average Max. Temperature (F) | 4.1 | 15.2 | 29.4 | 44.3 | 57.6 | 67.2 | 70.6 | 66.5 | 55.5 | 36.5 | 14.5 | 7.4 | 39.1 |
| Average Min. Temperature (F) | -17.2 | -10.8 | -1.7 | 18.0 | 29.9 | 39.2 | 43.3 | 38.9 | 30.2 | 15.5 | -5.8 | -13.0 | 13.9 |
| Average Total Precipitation (in.) | 0.58 | 0.60 | 0.37 | 0.21 | 0.59 | 1.45 | 1.65 | 1.70 | 1.31 | 1.03 | 0.85 | 1.33 | 11.70 |
| Average Total Snowfall (in.) | 7.7 | 7.4 | 4.5 | 2.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.5 | 7.6 | 9.7 | 10.9 | 51.4 |
| Average Snow Depth (in.) | 13 | 15 | 13 | 5 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 11 | 5 |

Percent of possible observations for period of record.

Max. Temp.: 91.3% Min. Temp.: 92% Precipitation: 89.7% Snowfall: 88.4% Snow Depth: 83.1%

Check [Station Metadata](#) or [Metadata graphics](#) for more detail about data completeness.

Western Regional Climate Center, wrcc@ari.edu

Figure 5-12 Glennallen Area Climate Summary (WRCC 2016)

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

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

91. Glennallen, May 6, 1989 Ice damaged a bridge across Moose Creek, preventing access to the community sewage lagoon and a small subdivision. The Declaration of Disaster funded replacement of the bridge.

101. Richardson Highway, September 13, 1989 The same torrential rains that impacted Anchorage and the Kenai Peninsula Borough caused extensive damage to the Richardson & Copper River Highways. The Governor's Declaration enabled DOT/PF to

apply for and receive emergency assistance through the federal Dept. of Transportation. No State disaster funds were expended as a result of this Declaration.

119. Hazard Mitigation Cold Weather, 1990 *The Presidential Declaration of Major Disaster for the Omega Block cold spell of January and February 1989 authorized federal funds for mitigation of cold weather damage in future events. The Governor's declaration of disaster provided the State matching funds required for obtaining and using this federal money.*

96-180 South-central Fall Floods declared September 21, 1995 by Governor Knowles then FEMA declared (DR-1072) on October 13, 1996: *On September 21, 1995, the Governor declared a disaster as a result of heavy rainfall in South-central Alaska as a result the Kenai Peninsula Borough, Matanuska-Susitna Borough, and the Municipality of Anchorage were initially affected. On September 29, 1995, the Governor amended the original declaration to include Chugach, and the Copper River Regional Education Attendance areas, including the communities of Whittier and Cordova, and the Richardson, Copper River and Edgerton Highway areas which suffered severe damage to numerous personal residences, flooding, eroding of public roadways, destruction & significant damage to bridges, flood control dikes and levees, water and sewer facilities, power and harbor facilities. On October 13, 1995, the President declared this event as a major disaster (AK-1072-DR) under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Individual Assistance totaled \$699K for 190 applicants. Public Assistance totaled \$7.97 million for 21 applicants with 140 DSR's. Hazard Mitigation totaled \$1.2 million. The total for this disaster is \$10.5 million.*

98-185 Eastern Tanana River: *Continuing heavy rains, glacial melt due to warm temperatures and glacial dam dumping in the Eastern Tanana and Northern Copper River Valleys produced unusually high volume of runoff. This caused severe flooding along the Taylor Highway, Alaska Highway, Nebesna Road, Tok Cutoff, Richardson Highway, Copper River Highway, and Northway Road. The Village of Northway was evacuated and several families remained in emergency housing for an extended period. All along these drainages, homes were flooded and public property was damaged. Individual Assistance totaled \$105K. Public Assistance totaled \$794K for 8 applicants with 20 DSR's.. The total for this disaster is \$946K. (closed after Jan 03)" (DHSEM 2016)*

Severe weather events have historically impacted the entire Copper River area. Rural communities generally lack capacity to track changing climate conditions. It is fortunate the University of Alaska Fairbanks Scenarios Network for Alaska and Arctic Planning (SNAP) is part of the International Arctic Research Center provides this data for planning purposes. The following provides a guideline for using SNAP data:

"Due to variability among climate models and among years in a natural climate system, these graphs are useful for examining trends over time, rather than for precisely predicting monthly or yearly values.

How to interpret climate outlooks for your community

You can examine SNAP community outlooks for certain key changes and threshold values—for example, higher mean monthly temperatures in the spring and fall may be of particular interest. This could signify any or all of these conditions:

- *a longer growing season*
- *a loss of ice and/or frozen ground needed for travel or food storage*

- a shift in precipitation from snow to rain, which impacts water storage capacity and surface water availability

Note: Precipitation may occur as either rain or snow, but is reported for all months in terms of rainwater equivalent.

Warmer, drier spring weather may also be an indicator for increased fire risk. In many locations, winter temperatures are projected to increase dramatically. Warmer winters may favor growth of species that are less cold-hardy (including desirable crops and invasive species), or it may decrease snowpack and increase the frequency of rain-on-snow events that impact wildlife. Higher temperatures across all seasons will likely impact permafrost and land-fast ice” (SNAP 2016).

SNAP data tools depict historic and future predicted precipitation and temperatures. (Glennallen’s in Figures 5-13 and 5-14 and Tazlina’s in Figures 5-15 and 5-16 respectively)

Note: Both precipitation and temperature are projected to remain fairly consistent throughout the various seasons for Glennallen as well as Tazlina. However, the warm weather months (July through October) may experience slightly higher temperatures and precipitation due to anticipated climatic changes. Rain and snow variations could dramatically determine wildland fire potential as well as adversely impact future subsistence food source and wildlife habitat support capacity.

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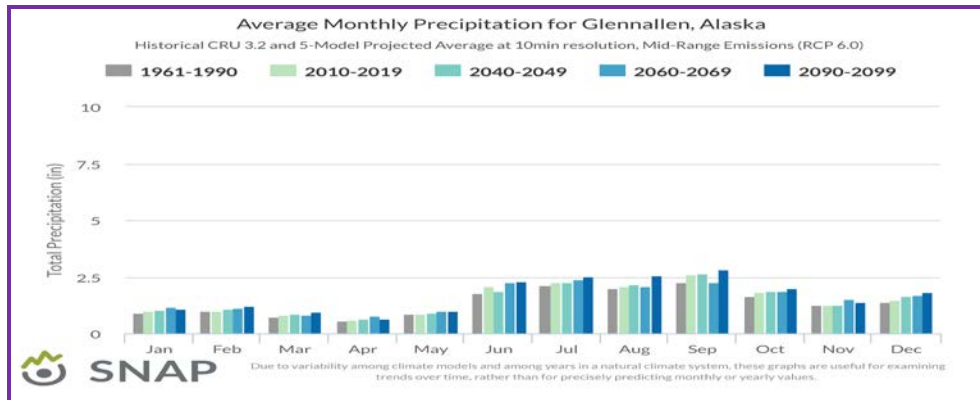


Figure 5-13 Glennallen’s Historic and Predicted Precipitation (SNAP 2016).

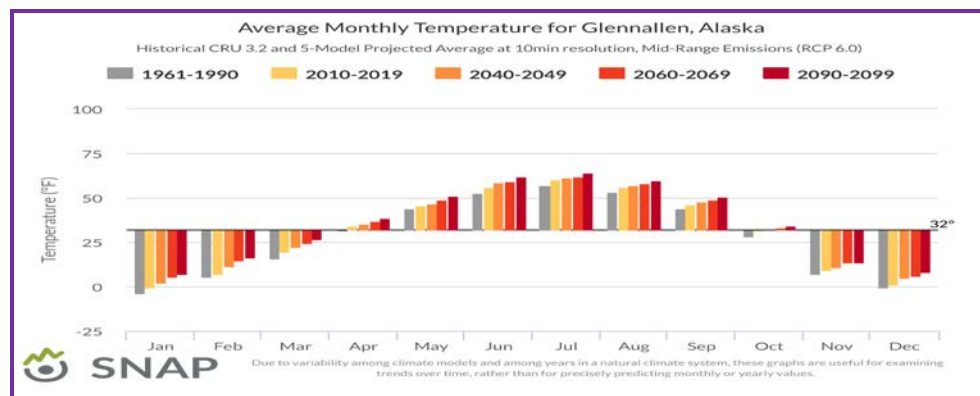


Figure 5-14 Glennallen’s Historic and Predicted Temperatures (SNAP 2016)

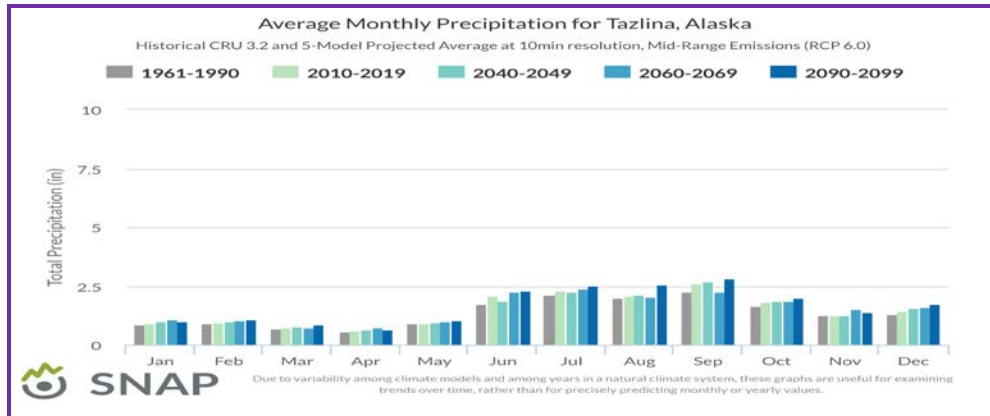


Figure 5-15 Tazlina’s Historic and Predicted Precipitation (SNAP 2016)

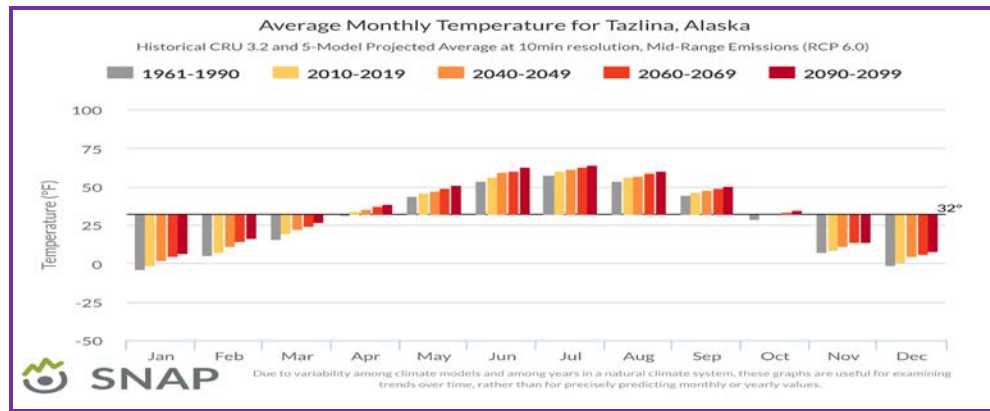


Figure 5-16 Tazlina’s Historic and Predicted Temperatures (SNAP 2016)

Table 5-5 lists a representative sample of the area’s major storm events the National Weather Service (NWS) identified for Glennallen and Tazlina Weather Zone. Each weather event may not have specifically impacted the Glennallen area.

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

Table 5-5 Severe Weather Events

| Location | Date | Event Type | Magnitude |
|---------------------------|-------------|------------|--|
| Copper River Basin (Zone) | 4/11/2016 | Avalanche | N/A |
| Copper River Basin (Zone) | 4/3/2016 | Avalanche | N/A |
| Copper River Basin (Zone) | 2/27/2016 | Avalanche | N/A |
| Copper River Basin (Zone) | 2/21/2015 | Ice Storm | N/A |
| AKZ226 | 11/22-24/10 | Ice Storm | Freezing rain across much of interior Alaska |

Table 5-5 Severe Weather Events

| Location | Date | Event Type | Magnitude |
|--------------------|----------|-------------------------|---|
| AKZ226 | 12/14/09 | Heavy Snow | Heavy snowfall to parts of the Eastern Alaska Range. A total of 26 inches of snow fell at Isabel Pass, which included 20 inches of snow in 24 hours on the 14th. The Co-op Weather Observer at Bartell Creek, seven miles east of Mentasta Lake reported 14.0 inches of snow in 24 hours. |
| Copper River Basin | 08/30/09 | Flood | The Tazlina and Nelchina glacial dam lakes release beginning August 25th. The subsequent rises in water levels produced flooding along the Tazlina River near the Richardson Highway on the 30th |
| Copper River Basin | 05/06/09 | Flood | N/A |
| AKZ226 | 02/19/09 | High Wind | Heavy snow and blizzard conditions to much of northern Alaska. High winds were also observed in the passes of the Alaska Range |
| AKZ226 | 01/14/09 | High Wind | High winds in the Alaska Range... |
| AKZ226 | 01/08/09 | Extreme Cold/Wind Chill | Very cold air mass that was established in late December, and a period of strong wind, combined to produce low wind chills. Tok Cutoff (Mentasta Pass MP 79.2): 67 below. |

(WRCC 2016)

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5.3.4.3 Location, Extent, Impact, and Recurrence Probability

Location

The entire Glennallen and Native Village of Tazlina area experiences periodic severe weather impacts. The most common to the area are high winds and severe winter storms. Table 5-19 depicts weather events that have historically affected the area.

Extent

The entire area is equally vulnerable to the severe weather effects with severe storm conditions, moderate snow depths; wind speeds exceeding 90 mph; and extreme low temperatures that reach -67°F.

Based on past severe weather events and the criteria identified in Table 5-2, the extent of severe weather in the area are considered “Limited” where injuries do not result in permanent disability, shutdown of critical facilities and services occurs for 24 hours or less, and less than 10% of property is severely damaged.

Impact

The intensity, location, and the land’s topography influence a severe weather event’s impact within a community. Hurricane force winds, rain, snow, and storm surge can be expected to impact the entire Glennallen area.

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

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

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

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

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

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Recurrence Probability

Based on previous occurrences and the criteria identified in Table 5-3, it is “Highly Likely” a severe storm event will occur in the next calendar year, an event has up to 1 in 1 (1/1=100%) chance of occurring as the history of events is greater than 33% likely per year.

5.3.5 Volcanic Hazards

5.3.5.1 Nature

Alaska is home to 41 historically active volcanoes stretching across the entire southern portion of the state from the Wrangell Mountains to the far western Aleutian Islands. “Historically active” refers to actual eruptions that have occurred during Alaskan historic time, in general the time-period in which written records have been kept; from about 1760. Alaska averages 1-2 eruptions per year. In 1912, the largest eruption of the 20th century occurred at Novarupta and Mount Katmai, located in what is now Katmai National Park and Preserve on the Alaska Peninsula (AVO 2016, USGS 2016).

A volcano is a vent or opening in the earth’s crust from which molten lava (magma), pyroclastic materials, and volcanic gases are expelled onto the surface. Volcanoes and other volcanic phenomena can unleash cataclysmic destructive power greater than nuclear bombs, and can pose serious hazards if they occur in populated and/or cultivated regions.

There are four general volcano types:

- Lava domes are formed when lava erupts and accumulates near the vent
- Cinder cones are shaped and formed by cinders, ash, and other fragmented material accumulations that originate from an eruption
- Shield volcanoes are broad, gently sloping volcanic cones with a flat dome shape that usually encompass several tens or hundreds of square miles, built from overlapping and inter-fingering basaltic lava flows
- Composite or stratovolcanoes are typically steep-sided, large dimensional symmetrical cones built from alternating lava, volcanic ash, cinder, and block layers. Most composite volcanoes have a crater at the summit containing a central vent or a clustered group of vents.

Along with the different volcano types there are different eruption classifications. Eruption types are a major determinant of the physical impacts an event will create, and the particular hazards it poses. Six main types of volcano hazards exist including:

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- Volcanic gases are made up of water vapor (steam), carbon dioxide, ammonia, as well as sulfur, chlorine, fluorine, and boron compounds, and several other compounds. Wind is the primary source of dispersion for volcanic gases. Life, health, and property can be endangered from volcanic gases within about 6 miles of a volcano. Acids, ammonia, and other compounds present in volcanic gases can damage eyes and respiratory systems of people and animals, and heavier-than-air gases, such as carbon dioxide, can accumulate in closed depressions and suffocate people or animals.
- Lahars are usually created by shield volcanoes and stratovolcanoes and can easily grow to more than 10 times their initial size. They are formed when loose masses of unconsolidated, wet debris become mobilized. Eruptions may trigger one or more lahars directly by quickly melting snow and ice on a volcano or ejecting water from a crater lake. More often, lahars are formed by intense rainfall during or after an eruption since rainwater can easily erode loose volcanic rock and soil on hillsides and in river valleys. As a lahar moves farther away from a volcano, it will eventually begin to lose its heavy load of sediment and decrease in size.
- Landslides are common on stratovolcanoes because their massive cones typically rise thousands of feet above the surrounding terrain, and are often weakened by the very process that created the mountain – the rise and eruption of molten rock (magma). If the moving rock debris is large enough and contains a large content of water and soil material, the landslide may transform into a lahar and flow down valley more than 50 miles from the volcano.
- Lava flows are streams of molten rock that erupt from a vent and move downslope. Lava flows destroy everything in their path; however, deaths caused directly by lava flows are uncommon because most move slowly enough that people can move out of way easily, and flows usually do not travel far from the source vent. Lava flows can bury homes and agricultural land under tens of feet of hardened rock, obscuring landmarks and property lines in a vast, new, hummocky landscape.

- Pyroclastic flows are dense mixtures of hot, dry rock fragments and gases that can reach 50 mph. Most pyroclastic flows include a ground flow composed of coarse fragments and an ash cloud that can travel by wind. Escape from a pyroclastic flow is unlikely because of the speed at which they can move.
- Tephra is a term describing any size of volcanic rock or lava that is expelled from a volcano during an eruption. Large fragments generally fall back close to the erupting vent, while smaller fragment particles can be carried hundreds to thousands of miles away from the source by wind. Ash clouds are common adaptations of tephra.

Ash fall poses a significant volcanic hazard to the Glennallen area because, unlike other secondary eruption effects such as lahars and lava flows, ash fall can travel thousands of miles from the eruption site.

Volcanic ash consists of tiny jagged particles of rock and natural glass blasted into the air by a volcano. Ash can threaten the health of people, livestock, and wildlife. Ash imparts catastrophic damage to flying jet aircraft, operating electronics and machinery, and interrupts power generation and telecommunications. Wind can carry ash thousands of miles, affecting far greater areas and many more people than other volcano hazards. Even after a series of ash-producing eruptions has ended, wind and human activity can stir up fallen ash for months or years, presenting a long-term health and economic risk. Special concern is extended to aircraft because volcanic ash completely destroys aircraft engines.

Ash clouds have caused catastrophic aircraft engine failure, most notably in 1989 when KLM Flight 867, a 747 jetliner, flew into an ash cloud from Mt. Redoubt's eruption and subsequently experienced flameout of all four engines. The jetliner fell 13,000 feet before the flight crew was able to restart the engines and land the plane safely in Anchorage. The significant trans-Pacific and intrastate air traffic traveling directly over or near Alaska's volcanoes, has necessitated developing strong communication and warning links between the Alaska Volcano Observatory (AVO), other government agencies with responsibility for aviation management, and the airline and air cargo industry (AVO 2012a, USGS 2002).

5.3.5.2 History

The AVO, and its constituent organizations (USGS, DNR, and UAF), has volcano hazard identification and assessment responsibility for Alaska's active volcanic centers. The AVO monitors active volcanoes several times each day using Advanced Very High Resolution Radiometers (AVHRR) and satellite imagery.

DHS&EM's Disaster Cost Index records the following volcanic eruption disaster events:

"103. Mt. Redoubt Volcano, December 20, 1989 *When Mt. Redoubt erupted in December 1989, posing a threat to the Kenai Peninsula Borough, Mat-Su Borough, and the Municipality of Anchorage, and interrupting air travel, the Governor declared a Disaster Emergency. The Declaration provided funding to upgrade and operate a 24-hr. monitoring and warning capability.*

104. KPB-Mt. Redoubt, January 11, 1990 *The Kenai Peninsula Borough, most directly affected by Mt. Redoubt, experienced extraordinary costs in upgrading air quality in schools and other public facilities throughout successive volcanic eruptions.*

The Borough also sustained costs of maintaining 24-hr. operations during critical periods. The Governor's declaration of Disaster Emergency supported these activities.

161. Mt. Spurr, September 21, 1992 *Frequent eruptions and the possibility of further eruptions has caused health hazards and property damage within the local governments of the Municipality of Anchorage, Kenai Peninsula Borough and Mat-Su Borough. These eruptions caused physical damage to observation and warning equipment. Funds to replace equipment for AVO” (DHSEM 2016)*

The AVO’s Service Review, Mount Redoubt Volcanic Eruptions, March – April 2009 states,

“Mount Redoubt volcano in continuous eruption on March 31, 2009. Plume height is no more than 15,000 feet above sea level. The small amount of ash in the plume is creating a haze layer downwind of the volcano and dustings of fine ash are falling out of the plume. View is from the northwest...”

Photo Credit: Kristi Wallace, AVO...



On March 22, 2009, Mount Redoubt volcano, 106 miles southwest of Anchorage, Alaska, began a series of eruptions after persisting in Orange or “Watch” status since late January 2009. Plume heights were observed at or above 60,000 feet during two of the six significant eruptions. Ashfall occurred over south central Alaska, including in Anchorage, with amounts ranging from a trace to one-half inch in depth.

The Redoubt eruptions also disrupted air traffic in the region. Hundreds of commercial flights were cancelled and cargo companies were significantly impacted. This resulted in employees being placed on unpaid leave during periods when airport operations were shut down. Anchorage is Alaska’s major population center; its airport serves as a critical strategic transportation hub as the third busiest cargo airport in the world.

The impacts of the unrest at Mount Redoubt volcano continued through spring and into the summer. The threat of continuing eruptions and lahars (volcanic mud flows composed of water, ash, mud, and debris) necessitated the removal of millions of gallons of oil from Chevron's nearby Drift River Terminal. Residents, emergency management, and health officials remained on alert until Mount Redoubt volcano was downgraded to Yellow or “Advisory” status on June 30, 2009, and finally to Green or “Normal” status on September 29, 2009” (AVO 2009b).

Alaska’s volcanoes have very diverse eruption histories spanning thousands of years. Activity spanning such an extensive timeline is nearly impossible to define. However modern science has enabled the AVO with determining fairly recent historical eruption dates. Table 5-9 lists the AVO’s identified Aleutian Chain volcano’s historical eruption dates with explanatory symbols to designate the data’s accuracy.

Table 5-6 lists recent volcano eruption history which demonstrates Glennallen's potential vulnerability from close proximity volcanic ash sources.

Table 5-6 Aleutian Volcano Eruption Events

| Glennallen Area Volcanoes and Their Respective Eruption History | | |
|---|---|--|
| Jarvis | Wrangell | |
| 6 ⓘ <i>non-eruptions:</i> 1981, 1993, 1994, 1997, 2009, 2010 | 10 ⓘ <i>non-eruptions</i> 1908, 1996, 1997, 1999, 2000, 2002, 2003, 2007, 2010, 2012 | 11: ✱ <i>Questionable Eruptions</i> 1784, 1819, 1884, 1890, 1899, 1900, 1902, 1907, 1911, 1921, 1930 |
| Key: ⓘ Eruption ✱ Questionable eruption ⓘ Non-eruptive activity | | |

(AVO 2016)

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

Location

Figure 5-17 indicates the most likely volcanoes to impact Glennallen area residents.

Alaska contains 80+ volcanic centers and is at continual risk for volcanic eruptions. Most of Alaska's volcanoes are far from settlements that could be affected by lahars, pyroclastic flows, and lava flows; however ash clouds and ash fall have historically caused significant impact to human populations and threaten aircraft.

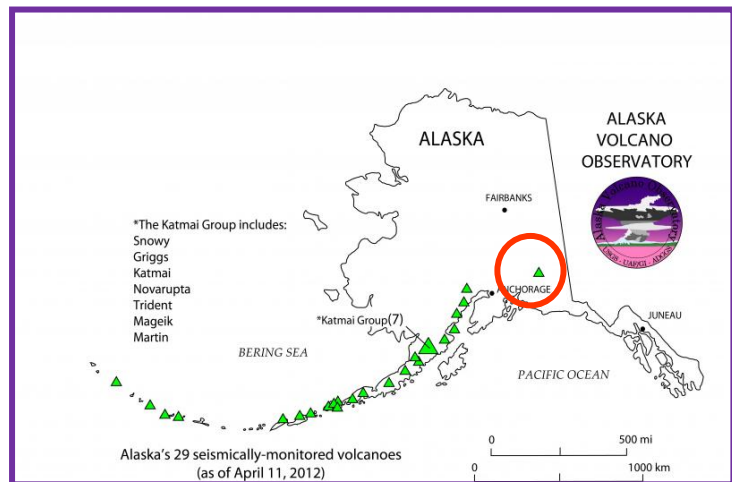


Figure 5-17 Alaska's Seismically Monitored Volcanoes (AVO 2012)

The AVO explains how vulnerable Alaska is to volcanic eruptions:

"When volcanoes erupt explosively, high-speed flows of hot ash (pyroclastic flows) and landslides can devastate areas 10 or more miles away, and huge mudflows of volcanic ash and debris (lahars) can inundate valleys more than 50 miles downstream. . . Explosive eruptions can also produce large earthquakes. . . the greatest hazard posed by eruptions of most Alaskan volcanoes is airborne dust and ash; even minor amounts of ash can cause the engines of jet aircraft to suddenly fail in flight" (AVO 1998).

Many of the volcanoes in Alaska are capable of producing eruptions that can affect Alaska travel and shipping. A large ash plume has the capability of shutting down air and ground shipping as well as vehicular travel because tephra is damaging to all engine types. Large tephra could cause further damage from direct impact damages.

Figure 5-18 depicts the AVO monitoring program’s active and inactive volcanoes in close proximity to Glennallen.

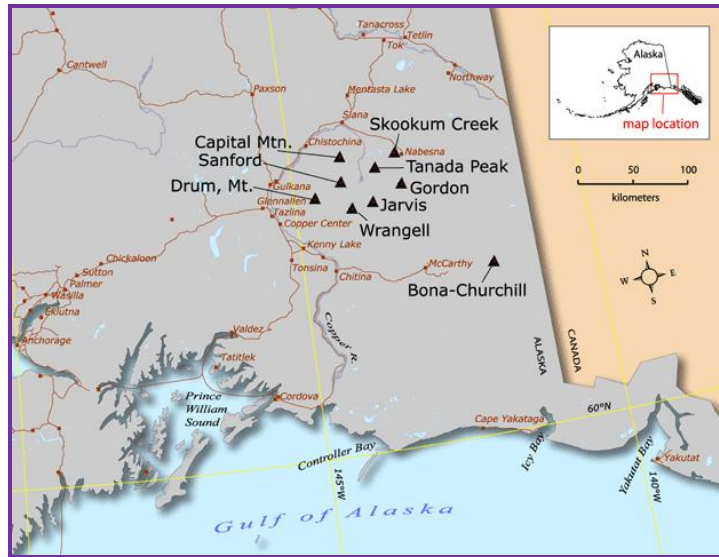


Figure 5-18 Glennallen Area Volcano Locations (AVO 2016)

The AVO publishes individual hazard assessments for the most active volcano in Alaska. However, volcanoes in the Glennallen area do not pose a significant risk the close proximity populations or commercial aircraft.

Table 5-7 lists volcanoes within close proximity to the Glennallen area.

Table 5-7 List of Glennallen Area Volcanoes

| Volcano Names | | |
|---------------|----------------|---------------|
| Mount Drum | Mount Jarvis | Tanada Peak |
| Mount Capital | Mount Sanford | Skookum Creek |
| Mount Gordon | Mount Wrangell | |

USGS Bulletin 1028-N describes Mount Katmai’s volcanic eruption on June 5, 1912 that was then classified as “the greatest volcanic catastrophe in the recorded history of Alaska. More than six cubic miles of ash and pumice were blown into the air from Mount Katmai and the adjacent vents in the Valley of Ten Thousand Smokes.” The eruption lasted for 3 days. The USGS Fact Sheet 075-98, Version 1.0 states:

“The ash cloud, now thousands of miles across, shrouded southern Alaska and western Canada, and sulfurous ash was falling on Vancouver, British Columbia; and Seattle, Washington. The next day the cloud passed over Virginia, and by June 17th it reached Algeria in Africa” (USGS 1998).

Figure 5-19 shows the extent of four ash cloud impact areas. The 1912 Katmai ash cloud is gray; the Augustine (blue plume), Redoubt (orange plume), and Spurr (yellow plume) were each dwarfed by the Katmai event. “Volcanologist’s discovered that [this] 1912 [Katmai] eruption was actually from Novarupta, not Mount Katmai” (USGS 1998).



Figure 5-19 1912 Katmai Volcano Impact (USGS 1998)

Archaeological evidence suggests that an eruption of Aniakchak volcano 3,500 years ago spread ash over much of Bristol Bay and generated a tsunami which washed up onto the tundra around Nushagak Bay. Within the past 10,000 years, Aniakchak volcano has significantly erupted on at least 40 occasions.

The 1989-90 Mt. Redoubt eruption seriously affected the population, commerce, oil production, and transportation throughout the Cook Inlet region.

“Redoubt Volcano is a strato-volcano located within a few hundred kilometers of more than half of the population of Alaska. This volcano has erupted explosively at least six times since historical observations began in 1778. The most recent eruption occurred in 1989-90 and similar eruptions can be expected in the future. The early part of the 1989-90 eruption was characterized by explosive emission of substantial volumes of volcanic ash to altitudes greater than 12 kilometers above sea level and widespread flooding of the Drift River valley. Later, the eruption became less violent, as developing lava domes collapsed, forming short-lived pyroclastic flows associated with low-level ash emission. Clouds of volcanic ash had significant effects on air travel as they drifted across Alaska, over Canada, and over parts of the conterminous United States causing damage to jet aircraft, as far away as Texas. Total estimated economic costs are \$160 million, making the eruption of Redoubt the second most costly in U.S. history” (USGS 1998).

Mt. Spurr’s 1992 eruption brought business to a halt and forced a 20 hour Anchorage International Airport closure. Communities 400 miles away reported light ash dustings.

“Eruptions from Crater Peak on June 27, August 18, and September 16–17, 1992, produced ash clouds (fig. 11) that reached altitudes of 13 to 15 kilometers [8-9 miles] above sea level. These ash clouds drifted in a variety of directions and were tracked in satellite images for thousands of kilometers beyond the volcano (Schneider and others, 1995). One ash cloud that drifted southeastward over western Canada and over parts of

the conterminous United States and eventually out across the Atlantic Ocean (fig. 12) significantly disrupted air travel over these regions but caused no direct damage to flying aircraft” (USGS 2002).

In 1992, another eruption series occurred, resulting in three separate eruption events. The first, in June, dusted Denali National Park and Manley Hot Springs with 2 mm of ash – a relatively minor event. In August, the mountain again erupted, covering Anchorage with ash, bringing business to a halt and forcing officials to close Anchorage International Airport for 20 hours. St. Augustine’s 1986 eruption caused similar air traffic disruption.

Small ash clouds from the 2001 eruption of Mt. Cleveland eruption were noted by USGS to have reached Fairbanks. These clouds dissipated somewhere along the line between Cleveland and Fairbanks. A full plume, visible on satellite imagery, was noted in a line from Cleveland to Nunivak Island.

Figure 5-20 displays the air travel routes in the North Pacific, Russia, and Alaska and the active volcanoes which could easily disrupt air travel during significant volcanic eruptions with ash fall events.

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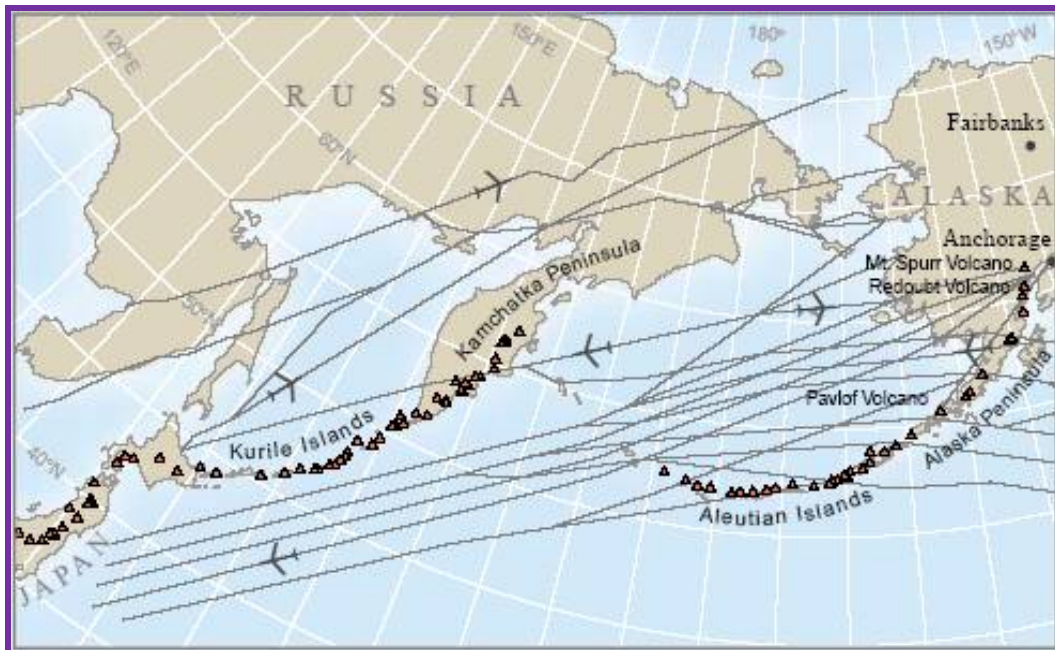


Figure 5-20 North Pacific Air Travel Routes (AVO 2001)

Extent

Volcanic effects include severe blast, turbulent ash and gas clouds, lightning discharge, volcanic mudflows, pyroclastic flows, corrosive rain, flash flood, outburst floods, earthquakes, and tsunamis. Some of these activities include ash fallout disrupting communities, air traffic, road and rail transportation, and maritime activity.

The Glennallen area could experience ash fall during a massive volcanic eruption that could potentially have prolonged impacts such as air and land traffic disruptions preventing essential

community resupply e.g. food and medicine delivery, and medical evacuation service capabilities to full service hospitals.

A massive eruption anywhere on earth, as depicted in Figure 5-21, could severely affect the global climate; radically affecting everyone's lives by increasing respiratory health risks lasting for weeks, months, or even years.

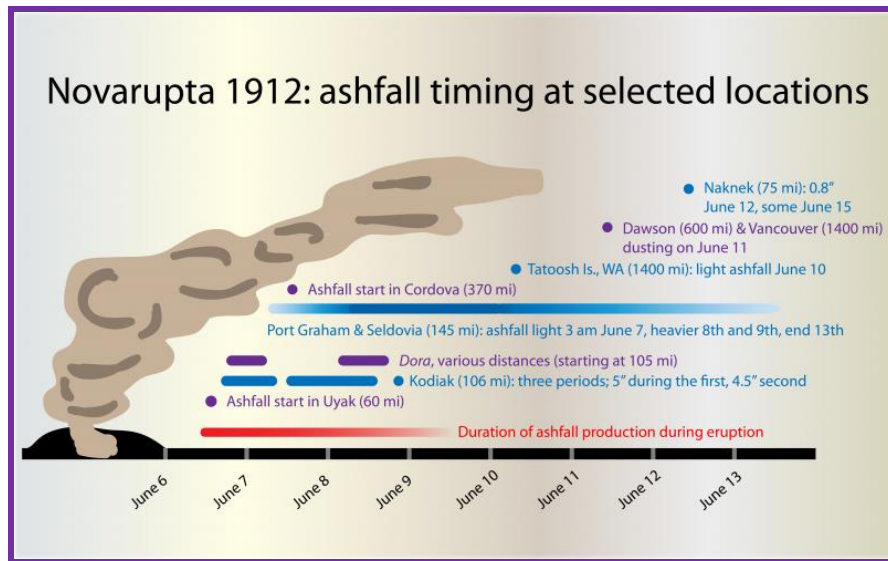


Figure 5-21 Novarupta's Historic Ashfall Timeline (AVO 2012)

Based on historic volcanic activity impacts and the criteria identified in Table 5-3, the magnitude and severity of impacts in the Glennallen area are considered "Negligible" with minor injuries, the potential for critical facilities to be shut down for 24 hours or less, less than 10% of property or critical infrastructure being severely damaged, minimal long-term economic impacts.

Impact

An ash fall event would undoubtedly be devastating to Alaska by straining its resources as well as transportation (air, ocean, land, and rail routes); especially if other hub communities are also significantly affected by a volcanic eruption. Many would likely experience respiratory problems from airborne ash, personal injury, and potential residential displacement or lack of shelter with general property damage (electronics and unprotected machinery), structural damage from ash loading, state/regional transportation interruptions, loss of commerce, as well as water supply contamination.

These impacts can range from inconvenience – a few days with no transportation capability; to disastrous – heavy, debilitating ash fall throughout the state, forcing Alaskans to be completely self-sufficient.

Probability of Future Events

Geologists can make general forecasts of long-term activity associated with individual volcanoes by carefully analyzing past activity, but these are on the order of trends and likelihood, rather than specific events or timelines. Short-range forecasts are often possible with greater accuracy.

Several signs of increasing activity can indicate that an eruption will follow within weeks or months. Magma moving upward into a volcano often causes a significant increase in small, localized earthquakes, and measurable carbon dioxide and compounds of sulfur and chlorine emissions increases. Shifts in magma depth and location can cause ground level elevation changes that can be detected through ground instrumentation or remote sensing.

Based on the criteria identified in Table 5-2 and information presented in the SHMP, it is “Unlikely” a volcanic eruption will occur in close proximity to the Glennallen area within the next ten years. Event has up to 1 in 10 years ($1/3=33\%$) chance of occurring. History of events is less than 10% likely per year. Vulnerability depends on the type of activity and current weather, especially wind patterns.

5.3.6 Wildland Fire

5.3.6.1 Nature

5

A wildland fire is a wildfire type that spreads through vegetation consumption. 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 unattended burns 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 tundra fires, urban fires, interface or intermix fires, and prescribed burns.

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

Topography describes slope increases, which influences the rate of wildland fire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildland fire behavior. However, ridge tops may mark the end of wildland fire spread since fire spreads more slowly or may even be unable to spread downhill.

Fuel is the type and condition of vegetation plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the “fuel load”). The ratio of living to dead plant matter is also important. Climate change is deemed to increase wildfire risk significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel load continuity, both horizontally and vertically, is also an important factor.

Weather is the most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. Climate change increases the susceptibility of vegetation to fire due to longer dry seasons. By contrast, cooling and higher humidity often signal reduced wildland fire occurrence and easier containment.

The frequency and severity of wildland fires is also dependent on other hazards, such as lightning, drought, and infestations (such as the damage caused by spruce-bark beetle infestations). If not promptly controlled, wildland fires may grow into an emergency or disaster.

Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildland fires may severely affect livestock and pets. Such events may require emergency water/food, evacuation, and shelter.

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

5.3.6.2 History

The Alaska Interagency Coordination Center (AICC) identified 243 historical wildland fires since 1939. The 1947 Tazlina River human caused fire burned 125,000 acres; the 1951 Charlie Lake #2 lightning fire burned 66,000 acres, the 1958 Copper Canyon event burned 2,500 acres.

Table 5-7 lists only those fires that occurred since the legacy 2011 HMP was formally approved. There was only one fire that burned 16 acres (highlighted). The remaining fires burned less than 0.5 acres. Figure 5-22 depicts the Glennallen area's historical fire locations.

Table 5-7 Glennallen and Tazlina Area Wildfire Locations since 2011

| Fire Name | Fire Year | Acres | Total Cost | Latitude | Longitude | Cause |
|-----------------------------------|-----------|-------|------------|------------|--------------|-------------|
| Mile 108 Richardson Highway (Hwy) | 2016 | 0.1 | \$2,000 | 62.0298611 | -145.4021667 | Human |
| Mile 105 Richardson Hwy | 2016 | 0.1 | \$350 | 61.9979167 | -145.3636111 | Human |
| Mile 116 Richardson Hwy | 2016 | 0.1 | \$2,000 | 62.116667 | -145.466667 | Human |
| Wolf Point | 2016 | 0.1 | \$2,000 | 62.01975 | -145.3384445 | Human |
| Mile 183.3 Glenn. Hwy | 2016 | 0.1 | \$2,000 | 62.1063333 | -145.6461944 | Human |
| Old Richardson 104 mile | 2016 | 0.1 | \$2,000 | 61.9821944 | -145.3494167 | Human |
| Copper River | 2016 | 0.3 | \$32,753 | 61.945467 | -145.254933 | Lightning |
| Princess | 2015 | 0.1 | \$5,024 | 61.9538333 | -145.3481667 | Human |
| Gravel Pit | 2015 | 0.1 | \$1,403 | 61.9489722 | -145.3041945 | Human |
| Powerline 1 | 2015 | 0.1 | \$2,000 | 62.1916667 | -145.4475 | Human |
| Indian Lake | 2015 | 0.1 | \$1,998 | 61.9916111 | -145.3311944 | Human |
| Copper River #2 | 2015 | 0.2 | \$22,724 | 62.1555278 | -145.4138056 | Lightning |
| Old Copper | 2015 | 0.1 | \$2,000 | 61.972083 | -145.319217 | Human |
| False Alarm # 6 | 2015 | 0 | \$1,500 | 62.1669444 | -145.4677778 | False Alarm |
| Dry Creek | 2015 | 0.4 | \$49,373 | 62.1364445 | -145.4223333 | Human |
| Mile 116 Glenn | 2014 | 0.1 | \$2,000 | 61.82115 | -147.4276 | Human |
| Mile 5.5 Old Edge | 2014 | 0.1 | \$1,461 | 61.813 | -145.096833 | Human |
| Edgerton MP 15 | 2014 | 0.1 | \$2,000 | 61.66875 | -144.674883 | Human |
| False Alarm #1 | 2014 | 0 | \$1,500 | 62.011125 | -146.410833 | False Alarm |
| Sailor's Pit #1 | 2014 | 0.1 | \$2,000 | 62.3010556 | -145.3681389 | Human |
| Mile 93 Richardson Highway | 2014 | 0.1 | \$1,046 | 61.847 | -145.224333 | Human |

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Table 5-7 Glennallen and Tazlina Area Wildfire Locations since 2011

| Fire Name | Fire Year | Acres | Total Cost | Latitude | Longitude | Cause |
|---------------------------|-----------|-------|------------|------------|--------------|-----------------|
| AG Fire #1 | 2014 | 3 | 5,483 | 61.841167 | -145.258033 | Human |
| False Alarm #2 | 2014 | 0 | \$1,500 | 62.064167 | -146.450833 | False Alarm |
| Lost Cabin Lake | 2014 | 2 | \$11,232 | 62.0863611 | -146.1620278 | Human |
| Mile 103.5 Richardson Hwy | 2013 | 0.3 | \$2,000 | 61.9826111 | -145.3323056 | Human |
| Moose Creek | 2013 | 0.5 | \$17,571 | 62.2505667 | -145.6891333 | Lightning |
| Moose Creek | 2013 | 0 | \$1,500 | 62.0922167 | -145.5660367 | False Alarm |
| Copper Center # 1 | 2013 | 0.1 | \$2,000 | 61.9541944 | -145.3107778 | Human |
| McKinley | 2013 | 0 | \$1,500 | 61.9804166 | -145.3301389 | False Alarm |
| Slemsek Way | 2013 | 0.1 | \$5,952 | 61.95065 | -145.3109333 | Human |
| Klutina Camper | 2013 | 0.5 | \$7,488 | 61.9518667 | -145.3108333 | Campfire |
| Co-op | 2013 | 0.1 | \$2,000 | 62.1090667 | -145.5338 | Debris Burning |
| Copper Center #2 | 2012 | 0.1 | \$1,033 | 61.9536095 | -145.2936096 | Debris Burning |
| Tazlina Bluff | 2012 | 0.1 | \$2,000 | 62.0494461 | -145.4686127 | Campfire |
| Silver Springs | 2012 | 0.1 | \$2,000 | 62.021389 | -145.3408356 | Human |
| Brenwick Craig Road East | 2012 | 0.1 | \$1,725 | 61.9613876 | -145.3291626 | Human |
| Klutina Bridge | 2012 | 0.1 | \$2,000 | 61.9541664 | -145.3233337 | Campfire |
| Copperville | 2012 | 0.1 | \$652 | 62.0683327 | -145.3977814 | Human, Campfire |
| Old Dump Road | 2012 | 0.3 | \$726 | 62.1056111 | -145.5544167 | Human |
| Copper Center | 2012 | 0.5 | \$2,374 | 61.9538879 | -145.2936096 | Human |
| WRST HQ RX | 2011 | 16 | | 62.0166664 | -145.3500061 | Prescribed |
| Widgem Way | 2011 | 0.3 | \$1,630 | 62.06725 | -145.40975 | Human |
| Gulkana Village | 2011 | 0.1 | \$217 | 62.0554167 | -145.4237 | Human |
| Copperville Access | 2011 | 0.3 | \$587 | 62.0751669 | -145.4225374 | Human |
| Old Richardson Hwy | 2011 | 0.1 | \$380 | 61.986 | -145.334 | Human |
| Old School Road | 2011 | 0.1 | \$54 | 62.057 | -145.426 | Smoking |

(AICC 2016)

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Figure 5-25 depicts all historical fires that occurred within 50 miles of the Glennallen area.

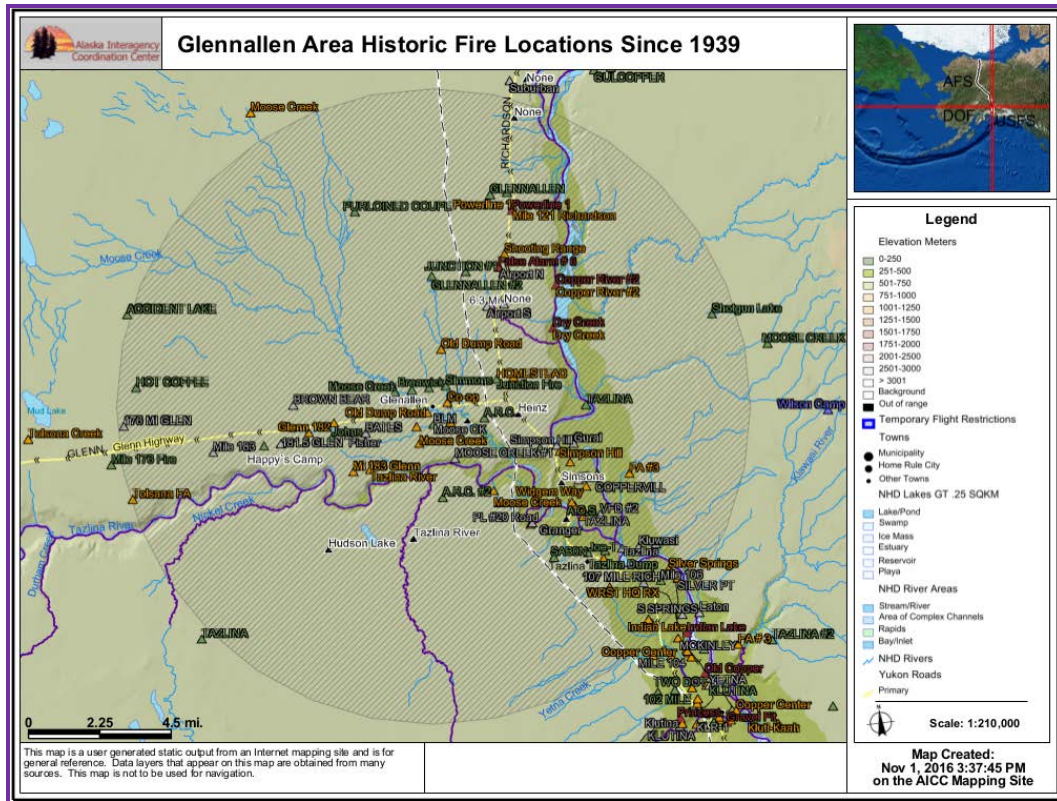


Figure 5-22 Glennallen Area's Historical Wildfire Locations (AICC 2016)

Figure 5-23 depicts the Glennallen's fire hazard areas.

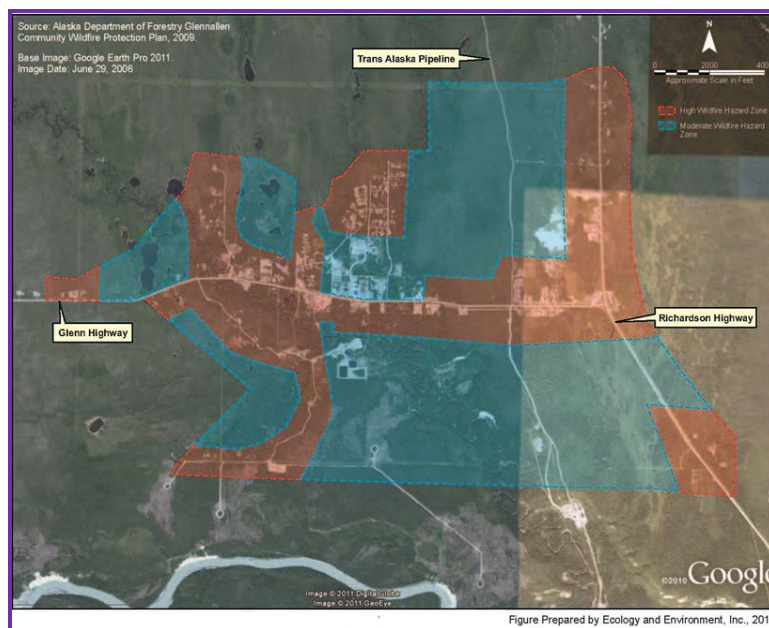


Figure 5-23 Glennallen's Wildfire Hazard Areas (E&E 2011)

5.3.6.3 Location, Extent, Impact, and Recurrence Probability

Location

Under certain conditions wildland fires may occur near the when weather, fuel availability, topography, and ignition sources combine. Since fuels data is not readily available, for the purposes of this plan, all areas outside limits are considered to be vulnerable to tundra/wildland fire impacts. Since 1938, only four wildland fire events have occurred within 50 miles of the (Figure 5-25).

Extent

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

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

Based on the number of past wildland fire events and the criteria identified in Table 5-2, the magnitude and severity of impacts in the Glennallen area are considered “Catastrophic” with the potential for multiple deaths, all critical facilities being shutdown for 30 or more days; and more than 50% of property being severely or completely damaged.

Impact

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

Fire is recognized as a critical feature of the natural history of many ecosystems. It is essential to maintain the biodiversity and long-term ecological health of the land. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process and the full range of fire management activities is exercised in Alaska, to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighters, public safety and welfare; natural and cultural resources

threatened; and the other values to be protected dictate the appropriate management response to the fire. In Alaska, and within 50 miles of the Glennallen area, the natural fire regime is characterized by a nearly annual return interval due to extensive forestation, combustible vegetation, and gently rolling topography.

Recurrence Probability

An important issue related to the wildland fire recurrence probability is the amount and proximity of development throughout the community, accumulation of hazardous wildfire fuels, and the uncertainty of weather patterns that may accompany climate change. These three combined elements are reason for concern and heightened mitigation management of Glennallen's community's wildland interface areas, natural areas, and open spaces.

Based on the history of wildland fires in the Glennallen area and applying the criteria identified in Table 5-3, it is "Highly Likely" that a wildland fire event will occur within in the next calendar year. The event has up to 1 in 1 years (1/1=100%) chance of occurring, and the history of events is greater than or equal to 33% likely each year. Climate change and flammable vegetation species are prolific throughout Alaska's forests and tundra locations. Fire frequency may increase in the future as a result.

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

6.1 OVERVIEW

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

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

DMA 2000 requirements and implementing jurisdictional governance regulations for current assets, and area future development initiatives:

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| DMA 2000 Recommendations |
|--|
| Assessing Risk and Vulnerability, and Analyzing Development Trends §201.6(c)(2)(ii): The risk assessment shall include a) description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. <i>All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods.</i> The plan should describe vulnerability in terms of: §201.6(c)(2)(ii)(A): The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; §201.6(c)(2)(ii)(B): An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate. §201.6(c)(2)(ii)(C): Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions. §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area. |
| 1. REGULATION CHECKLIST |
| ELEMENT B. Risk Assessment, Assessing Vulnerability, Analyzing Development Trends |
| B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii)) |
| B4. Does the Plan address NFIP insured structures within each jurisdiction that have been repetitively damaged by floods? |
| C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii)) |
| Source: FEMA, March 2015. |

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DMA 2000 requirements and implementing Tribal governance regulations for current assets, and area future development initiatives:

| DMA 2000 Recommendations | |
|---|--|
| Assessing Vulnerability: Overview | |
| §201.7(c)(2)(ii): [The risk assessment shall include a] description of the Indian Tribal government's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the tribe. | |
| 1. REGULATION CHECKLIST | |
| ELEMENTS. Hazard Impacts | |
| A. | Does the new or updated plan include an overall summary description of the Indian tribe's vulnerability to each hazard? |
| B. | Does the new or updated plan address the impact of each hazard on the Indian tribe? |
| 2. REGULATION CHECKLIST | |
| Assessing Vulnerability: Estimating Potential Losses | |
| §201.7(c)(2)(ii)(A): [The plan should describe vulnerability in terms of the] types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas. | |
| ELEMENTS. Structural Vulnerability | |
| 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? |
| 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? |
| 3. REGULATION CHECKLIST | |
| Assessing Vulnerability: Analyzing Development Trends | |
| §201.7(c)(2)(ii)(B): [The plan should describe vulnerability in terms of the] types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas. | |
| ELEMENTS. Methodology and Damage Estimates | |
| A. | Does the new or updated plan estimate potential dollar losses to vulnerable structures? |
| B. | Does the new or updated plan describe the methodology used to prepare the estimate? |
| C. | Does the updated plan reflect the effects of changes in development on loss estimates? |
| 4. REGULATION CHECKLIST | |
| Assessing Vulnerability: Assessing Cultural and Sacred Sites | |
| §201.7(c)(2)(ii)(D): [The plan should describe vulnerability in terms of] cultural and sacred sites that are significant, even if they cannot be valued in monetary terms. | |
| ELEMENTS. Culturally Sacred Sites | |
| A. | Does the new or updated plan describe significant cultural and sacred sites that are located in hazard areas? |
| Source: FEMA, March 2015. | |

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Vulnerability assessment requirements include:

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

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Table 6-1 lists the Glennallen area infrastructures' hazard vulnerability synopsis.

Table 6-1 Glennallen Infrastructure Vulnerability Overview

| Hazard | Area's Hazard Vulnerability | | | |
|----------------|---|-----------------------|---------------------------|--|
| | Percent of Jurisdiction's Geographic Area | Percent of Population | Percent of Building Stock | Percent of Critical Facilities and Utilities |
| Earthquake | 100 | 100 | 100 | 100 |
| Flood | 0 | 0 | 0 | 0 |
| Ground Failure | 100 | 100 | 100 | 100 |
| Severe Weather | 100 | 100 | 100 | 100 |
| Volcanic Ash | 100 | 100 | 100 | 100 |
| Wildland Fire | 100 | 100 | 100 | 100 |

The only difference between Glennallen's natural hazard threats and Tazlina's is that Tazlina has a greater flood threat as shown in Table 6-2:

Table 6-2 Tazlina Infrastructure Vulnerability Overview

| Hazard | Area's Hazard Vulnerability | | | |
|----------------|---|-----------------------|---------------------------|--|
| | Percent of Jurisdiction's Geographic Area | Percent of Population | Percent of Building Stock | Percent of Critical Facilities and Utilities |
| Earthquake | 100 | 100 | 100 | 100 |
| Flood | 15 | 25 | 50 | 10 |
| Ground Failure | 100 | 100 | 100 | 100 |
| Severe Weather | 100 | 100 | 100 | 100 |
| Volcanic Ash | 100 | 100 | 100 | 100 |
| Wildland Fire | 100 | 100 | 100 | 100 |

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6.2 CULTURALLY AND SACRED SITE SENSITIVITY

6.2.1 Location

The following sites possess very important cultural significance for Glennallen and Tazlina residents.

- The Glennallen Legislative Office is over 50 years old and one of the community's historical landmarks.
- The Native Village of Tazlina has several cultural and sacred sites and many individual tribal family cemeteries located within their lands. Specific information is not available to the public. Anyone desiring information concerning these sites must contact the Tribal President or Tribal Administrator.

* **NOTE:** *Anyone desiring information concerning culturally sensitive information must contact the Native Village of Tazlina.*

6.3 AREA LAND USE AND DEVELOPMENT TRENDS

6.3.1 Glennallen Area Land Use

The community of Glennallen has experienced several land use and development activities throughout their long history. The Tok Cut-off was constructed in the 1950s and 1960s, which contributed to Glennallen becoming a commercial center. The population of Glennallen increased considerably in 1956, when the Copper Valley School opened. Since the 1950s and 1960s, Trans-Alaska Pipeline System construction and continued service needs have bolstered the Glennallen economy. However, the construction and opening of the George Parks Highway, which bypasses Glennallen, has negatively affected the economy.

Over the past 20 years, land ownership and management in Alaska has undergone major changes. Many areas previously available for public use are included in federal conservation areas or have been conveyed to an Alaska Native Corporation or other private entity. In 1998, 1,528,000 acres were conveyed to Ahtna, Inc., through the Alaska Native Claims Settlement Act. Large landowners in areas surrounding Glennallen include the National Park Service, Ahtna, Inc., the State of Alaska, and the Bureau of Land Management (BLM).

A bulk fuel facility is also located in Glennallen. An additional bulk fuel facility in the Glennallen area is located at the Gulkana Airport north of the community, and another is located a few miles west on the Glenn Highway. The Trans Alaska Pipeline runs through the community, and Pump Station 11 is located in Glennallen, south of the Glenn Highway

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Less than one-third of Glennallen's housing units are "owner-occupied," compared with three-quarters of the housing units in nearby Copper Center. (Approximately one-third of housing units are renter-occupied and one-third is vacant.) The low rate of owner-occupancy may be attributed to employer-provided housing; however, absentee or non-resident landowners need to be considered in mitigation actions.

6.3.1.1 *Glennallen land use and development activities since the Legacy 2009 HMP was implemented*

The Community Wildfire Protection Plan for Glennallen (ADOF 2009) identifies 80 business and public offices.

6.3.1.2 *Tazlina land use and development activities since the Legacy 2009 HMP was implemented*

The Native Village of Tazlina no longer allows development within their identified floodplain.

6.3.2 Industry

There are no major industries in either Glennallen or Tazlina. Some residents are involved in small-production or industrial activities servicing the entire Copper River Basin. For example, the bulk fuel facilities in Glennallen serve the greater Copper River Valley. Copper Valley Electric and Copper Valley Telephone are headquartered in Glennallen where they also serve the Copper River Basin.

In Glennallen, there are 182 business licenses and the Native Village of Tazlina has three current business licenses on file with the Department of Community and Economic Development, Division of Occupational Licensing, Business Licensing Section. However many of these businesses may be outside of Glennallen's and Tazlina's immediate vicinity.

6.4 CURRENT ASSET EXPOSURE ANALYSIS

6.4.1 Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population (for community-wide hazards), residential buildings (where data is available), and critical facilities and infrastructure.

6.4.1.1 Population and Building Stock

Glennallen Residential Building Stock

The 2015 US Census (Census) estimated Glennallen's population at 366; and the 2016 Department of Labor reported a population of 459 (Table 6-3).

Table 6-3 Estimated Area Population and Building Inventory

| Population | | Residential Buildings | |
|-------------|------------|-----------------------|---|
| 2015 Census | DCCED 2016 | Total Building Count | Total Value of Buildings ¹ |
| 483 | 459 | 387 | US Census: \$59,056,200 Glennallen: \$96,750,000 |

¹ Sources: US Census 2015, population data. US Census listed Glennallen's average housing value at \$152,600. The Project Team determined that the average structural replacement value of all single-family residential buildings for the Glennallen area is \$250,000.

Tazlina Residential Building Stock

The 2015 US Census (Census) estimated Tazlina's population at 358; and the 2016 Department of Labor reported a population of 260 (Table 6-4).

Table 6-4 Estimated Area Population and Building Inventory

| Population | | Residential Buildings | |
|-------------|------------|-----------------------|--|
| 2015 Census | DCCED 2015 | Total Building Count | Total Value of Buildings ¹ |
| 358 | 260 | 206 | US Census: \$44,412,600 Tazlina: \$51,500,000 |

¹ Sources: US Census 2015, population data. US Census listed housing value varies from \$152,600 (Glennallen) and \$215,600 (Tazlina). The Project Team determined that the average structural replacement value of all single-family residential buildings for the Tazlina area is \$250,000.

Estimated replacement values for each community's structures, as shown in Table 6-2 and 6-3, were obtained from the 2016 US Census estimated, and 2016 DCCED certified estimates.

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The Planning Team stated that residential replacement values are generally understated because replacement costs exceed US Census structure estimates due to material purchasing, road, barge or airplane delivery, along with elevated construction costs in rural Alaska. The Planning Team estimates an average 30ft by 40 ft (1,200 sq ft) residential structure costs \$250,000 for the Copper River Basin area.

6.4.1.2 Existing Infrastructure

Since approximately 2010, the State Division of Community and Regional Affairs (DCRA) is no longer able to collect diverse agency project data for Alaskan communities. The more recent data depicts only grants managed by DCRA. This plan update will list Glennallen (Table 6-5) and Tazlina's (Table 6-6) historical "completed" grant funded resources. The older grants depict their ongoing efforts toward improving their aging infrastructure.

Note: recent infrastructure improvement projects are still ongoing, however there is no current information repository for these data.

Table 6-5 Glennallen Area Completed Capital Improvement Project List

| Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|--|------------|--|----------------|--------------|------------|
| GlennRich Fire Rescue | 2013 | Fire Suppression Equipment and Personal Protective Equipment | Closed | \$15,000 | 8/30/2012 |
| GlennRich Fire Rescue | 2009 | Building Construction | Closed | \$150,000 | 5/15/2009 |
| Copper Basin Senior Citizens, Inc. | 2008 | (Copper Basin Senior Citizens, Inc.) Senior Building Upgrades | Closed | \$35,000 | 10/31/2011 |
| Copper Valley Community Library Assoc. | 2007 | (Copper Valley Community Library Assn) Community Projects and Improvements | Closed | \$13,608 | 7/31/2008 |
| GlennRich Fire Rescue | 2007 | (Glenn Rich fire and Rescue) Building Construction | Closed | \$40,000 | 10/31/2006 |
| Nelchina/Mendeltna Community Corporation | 2007 | (Nelchina/Mendeltna Community Corp) Solid Waste Removal and Repair | Closed | \$25,000 | 8/1/2010 |
| Copper Valley Community Library Assoc. | 2006 | (Copper Valley Community Library Assn Inc.) Building Extension | Closed | \$11,784 | 2/29/2008 |
| GlennRich Fire Rescue | 2006 | (Glenn Rich Fire & Rescue) Purchase Fire-Fighting Equipment | Closed | \$0 | 6/29/2006 |
| GlennRich Fire Rescue | 2005 | (Glenn Rich Fire & Rescue) Willow Road Improvements | Closed | \$6,000 | 10/31/2005 |
| Copper Valley Community Library Assoc. | 2005 | (Copper Valley Community Library Assn) Library Renovations | Closed | \$12,000 | 12/31/2005 |
| Copper Basin Senior Citizens, Inc. | 2005 | (Community of Glennallen) Senior Center Renovations/Addition | Closed | \$12,000 | 1/31/2007 |
| Copper Valley Community Library Assoc. | 2004 | Temporary Fiscal Relief Grant | Closed | \$3,500 | Undefined |
| Glenn Rich Volunteer Fire Department | 2004 | Temporary Fiscal Relief Grant | Closed | \$2,138 | Undefined |
| Copper Valley Community Library Assoc. | 2004 | (Copper Valley Community Library Assoc.) Library Rehabilitation and Improvements | Closed | \$42,023 | 9/30/2004 |

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Table 6-5 Glennallen Area Completed Capital Improvement Project List

| Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|--|------------|--|----------------|--------------|------------|
| GlennRich Fire Rescue | 2004 | Willow Lake Road Project, ADA Compliance/Final Stage | Closed | \$30,000 | 9/30/2003 |
| Ahtna Heritage Foundation | 2004 | Ahtna Historical Village Feasibility Study | Closed | \$22,850 | 6/30/2004 |
| Copper Valley Community Library Assoc. | 2004 | (Copper Valley Community Library Assoc.) Glennallen Community Library Renovations and Construction | Closed | \$50,000 | 9/30/2007 |
| Copper Valley Community Library Assoc. | 2003 | Library Rehabilitation | Closed | \$26,380 | 6/30/2007 |
| Copper Valley Community Library Assoc. | 2003 | State Revenue Sharing | Closed | \$3,631 | 3/31/2004 |
| Glennallen Volunteer Fire Dept. | 2003 | State Revenue Sharing | Closed | \$1,603 | 3/31/2004 |
| Copper Valley Community Library Assoc. | 2002 | Defibrillator Purchase for Ambulance Service | Closed | \$10,265 | 6/30/2003 |
| Copper Valley Community Library Assoc. | 2002 | State Revenue Sharing | Closed | \$3,681 | 3/31/2003 |
| Glennallen Volunteer Fire Dept. | 2002 | State Revenue Sharing | Closed | \$1,625 | 3/31/2003 |
| Copper Valley Community Library Assoc. | 2002 | (Copper Valley Community Library Assoc.) Visitor Welcome Signs; Purchase, Repair, Replace Exit Signs | Closed | \$1,392 | 6/29/2006 |
| Copper Valley Community Library Assoc. | 2001 | Bookmobile Carport & Cold Storage Lockers | Closed | \$0 | 6/30/2003 |
| Copper Valley Community Library Assoc. | 2001 | Historic Building Renovation | Closed | \$10,000 | 6/30/2005 |
| Copper Valley Community Library Assoc. | 2000 | Bookmobile Purchase | Closed | \$0 | 6/30/2003 |
| Copper Valley Community Library Assoc. | 2000 | Water Supply | Closed | \$13,000 | 11/30/2000 |
| Copper Valley Community Library Assoc. | 1999 | Bookmobile Upgrade | Closed | \$0 | 6/30/2003 |
| Copper Valley Community Library Assoc. | 1999 | Library Renovation | Closed | \$10,344 | 6/30/2003 |
| Copper Valley Community Library Assoc. | 1998 | Library Automation | Closed | \$25,031 | 11/30/2002 |
| Copper Valley Community Library Assoc. | 1997 | Bookmobile purchase changed from Building Expansion and Renovation per SLA 99, Chapter 2, Sec 44 | Closed | \$25,589 | 6/30/2002 |
| Copper Valley Community Library Assoc. | 1996 | Bookmobile Purchase | Closed | \$23,750 | 6/30/2000 |
| Copper Valley Community Library | 1995 | Building Expansion/Renovation | Closed | \$40,000 | 6/30/1999 |

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Table 6-5 Glennallen Area Completed Capital Improvement Project List

| Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|--|------------|--------------------------------|----------------|--------------|-----------|
| Assoc. | | | | | |
| Glennallen Volunteer Fire Dept. | 1994 | Water Storage Tank | Closed | \$20,000 | 6/30/1995 |
| Glennallen Improvement Corp. | 1994 | Distance Learning Medical Link | Closed | \$10,000 | 6/30/1995 |
| Greater Copper Valley Chamber of Comm. | 1994 | Visitor Center Summer Program | Closed | \$15,000 | 6/30/1994 |
| Glennallen Improvement Corp. | 1993 | Sewage Lagoon Bridge | Closed | \$20,000 | 11/1/1994 |
| Ahtna Heritage Foundation | 1993 | Positive Pathways | Closed | \$43,036 | 6/30/1997 |
| Glennallen Economic Development | 1993 | Hockey Equipment/Zamboni Shed | Closed | \$30,000 | 6/30/1993 |
| Glennallen Volunteer Fire Dept. | 1992 | Fire Dept. Capital/Liability | Closed | \$25,000 | 9/30/1993 |

(DCRA 2015)

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Table 6-6 Tazlina's Completed Capital Improvement Project List

| Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|--------------------------------------|------------|---|----------------|--------------|------------|
| The Association of Tazlina Residents | 2010 | Purchase Bulk Fuel | Closed | \$6,251 | 6/30/2011 |
| Association of Tazlina Residents | 2004 | Temporary Fiscal Relief Grant | Closed | \$3,500 | Undefined |
| Association of Tazlina Residents | 2003 | Multi-Road Improvements | Closed | \$25,000 | 6/30/2007 |
| Association of Tazlina Residents | 2003 | State Revenue Sharing | Closed | \$3,631 | 3/31/2004 |
| Association of Tazlina Residents | 2002 | Old School Loop Road Improvements | Closed | \$25,000 | 6/30/2003 |
| Association of Tazlina Residents | 2002 | State Revenue Sharing | Closed | \$3,681 | 3/31/2003 |
| Association of Tazlina Residents | 2001 | Equipment Purchase | Closed | \$12,786 | 12/31/2001 |
| Association of Tazlina Residents | 2001 | Road Improvement and Equipment Purchase | Closed | \$13,311 | 6/30/2001 |
| Native Village of Tazlina | 2000 | Community Hall Construction | Closed | \$25,023 | 10/31/2004 |
| Association of Tazlina Residents | 1999 | Fire Truck Tank Replacement/Equipment | Closed | \$15,374 | 2/11/1999 |
| Association of Tazlina Residents | 1999 | Recreational Facilities Upgrade | Closed | \$10,000 | Undefined |
| Association of Tazlina Residents | 1998 | Road Improvements | Closed | \$24,600 | 9/30/1999 |
| Association of Tazlina Residents | 1997 | Firehall Roof Repair | Closed | \$15,888 | 6/30/1997 |
| Association of Tazlina Residents | 1997 | Road Improvements | Closed | \$24,770 | 9/30/1997 |

Table 6-6 Tazlina's Completed Capital Improvement Project List

| Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|----------------------------------|------------|-------------------------------------|----------------|--------------|-----------|
| Association of Tazlina Residents | 1996 | Purchase of Fire Fighting Equipment | Closed | \$10,000 | 6/30/2002 |
| Association of Tazlina Residents | 1996 | School Bus Stop Shelters | Closed | \$0 | Undefined |
| Association of Tazlina Residents | 1996 | Hockey Rink Construction | Closed | \$10,000 | 6/30/1996 |
| Association of Tazlina Residents | 1995 | Distance Learning/Medical Link | Closed | \$20,000 | 3/1/1996 |
| Association of Tazlina Residents | 1994 | Distance Learning / Medical Link | Closed | \$10,000 | 3/1/1996 |
| Association of Tazlina Residents | 1994 | Hockey Rink Building Completion | Closed | \$10,000 | 1/1/2000 |

6.4.1.3 Glennallen and Tazlina Area's Critical Facilities

A critical facility is defined as a facility that provides essential products and services to the general public, such as preserving the quality of life in the and fulfilling important public safety, emergency response, and disaster recovery functions. Due to many of Alaska's remote rural locations – a long distance from their nearest neighboring community, most all facilities are deemed critical or essential to their survival. The critical facilities profiled in this plan include the following:

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

***Note:** it is important to stress that Glennallen and Tazlina are located at a critical road system area hub. Therefore both communities state that “over 150 road system miles are very critical infrastructure facilities. Access and egress in this area is critical to their survival and longevity.”*

Glennallen and Native Village of Tazlina Critical facilities are listed separately within Table 6-7 and 6-8 respectively.

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Figure 6-1 depicts an aerial view of Glennallen's critical facilities. Image adapted from legacy HMP and edited to reflect infrastructure changes.



Figure 6-1 Glennallen Critical Facilities Location Reference Map (E&E 2011)

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Table 6-7 lists the Glennallen's critical facilities and infrastructure.

Table 6-7 Glennallen Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|--------------------|--|---|-----------------------------------|-----------|-------------|-----------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| Government | Glennallen Government Facilities | | | | | | | | | | | | |
| | 20 | Ahtna Native Corporation Offices- 1 & Court House | Mile 115 Richardson Highway (Hwy) | 62.110711 | -145.474869 | \$2,000,000 | W2 | X | | X | X | X | X |
| | 5 | Glennallen Chamber of Commerce Office | Mile 189 Glenn Hwy | 62.108543 | -145.477801 | \$300,000 | W2 | X | | X | X | X | X |
| | 18 | Bureau of Land Management Office | Mile 186.5 Glenn Hwy | 62.109547 | -145.545573 | \$1,000,000 | Log Historic | X | | X | X | X | X |
| | 6 | AK Fish and Game Offices | Mile 186.3 Glenn Hwy | 62.108977 | -145.552628 | \$350,000 | W2 | X | X | X | X | X | X |
| | 3 | Glennallen Job Center | Mile 186.5 Glenn Hwy | 62.109172 | -145.554827 | \$150,000 | W1 | X | | X | X | X | X |
| | 0 | Glennallen Improvement Office | Mile 187 Glenn Hwy | 62.108207 | -145.526027 | \$150,000 | W1 | X | | X | X | X | X |
| | 8 | US Postal Service Office (USPS) | 2 Aurora Drive | 62.109706 | -145.529642 | \$500,000 | SL1 | X | | X | X | X | X |
| | 4 | Alaska Dept of Motor Vehicles (DMV) | Mile 187 Glenn Hwy | 62.108397 | -145.526892 | \$100,000 | W1 | X | | X | X | X | X |
| | 0 | Legislative Information Office | Mile 186 Glenn Hwy | 62.11004 | -145.556084 | \$200,000 | Log Historic | X | | X | X | X | X |
| Emergency Response | Glennallen Emergency Response | | | | | | | | | | | | |
| | 0 | GlennRich Fire & Rescue - Glennallen | Mile 186.3 Glenn Highway | 62.110059 | -145.552360 | \$150,000 | EFFS | X | | X | X | X | X |
| | 0 | GlennRich Fire & Rescue - Silver Springs | Silver Springs Loop Road | 62.0075 | -145.3278 | \$150,000 | EFFS | X | X | X | X | X | X |
| | 0 | GlennRich Fire & Rescue - Copper Center | Mile 100.5 Old Richardson Highway | 61.9542 | -145.3074 | \$150,000 | EFFS | X | X | X | X | X | X |
| | 0 | GlennRich Fire & Rescue - Tolsona | Tolsona Lake Road | 62.107847 | -146.036953 | \$150,000 | EFFS | X | | X | X | X | X |
| Educational | 10 | Alaska State Trooper Post (In IGA Store Bldg) | Mile 187.5 Glenn Highway | 62.10842 | -145.529119 | N/A | EFPS | X | | X | X | X | X |
| | Glennallen Educational Facilities | | | | | | | | | | | | |

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Table 6-7 Glennallen Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|------------|--|--|-------------------------|-----------|-------------|-----------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| | 154 | Glennallen Elementary School Section PK-6 grade (144/10) | School Access Road | 62.11296 | -145.526689 | \$17,000,000 | EFS1 | X | | X | X | X | X |
| | 152 | Glennallen Jr/Sr High School Section 7-12 grade (142/10) | | | | | | | | | | | |
| | 10 | Copper River School District Bldgs | School Access Road | 62.112493 | -145.529747 | \$2,000,000 | EFS1 | X | | X | X | X | X |
| | 56 | Upstream Learning Correspondence KG-12 (53/3) | | | | | | | | | | | |
| | 8 | Prince William Sound Community College | | | | | | | | | | | |
| | 0 | Alaska Bible College Campas (Multiple Bldgs) | College Road | 62.11492 | -145.529364 | \$3,000,000 | EFS2 | X | | X | X | X | X |
| Medical | Glennallen Medical Facilities | | | | | | | | | | | | |
| | 35 | Cross Road Medical Center (CRMC) Urgent Care Facility | Mile 187 Glenn Hwy | 62.108935 | -145.540964 | \$8,000,000 | EFHM | X | | X | X | X | X |
| | 0 | CRMC Ambulance Storage | Mile 187 Glenn Hwy | 62.108935 | -145.540964 | \$200,000 | W1 | X | | X | X | X | X |
| | 8 | Dr. Shedlock - Dentist | Mable Lane | 62.107379 | -145.54087 | \$500,000 | W2 | X | | X | X | X | X |
| | 8 | Glennallen Chiropractic Center, | Mile 187.6 Glenn Hwy | 62.108241 | -145.519097 | \$400,000 | EFMC | X | | X | X | X | X |
| | 8 | Copper Basin Pregnancy Center | Aurora Drive | 62.108881 | -145.531064 | \$300,000 | EFMC | X | | X | X | X | X |
| Community | Glennallen Community Facilities | | | | | | | | | | | | |
| | 20 | Glennallen Community Chapel | Mile 188.5 Glenn Hwy | 62.10795 | -145.492324 | \$300,000 | W2 | X | | X | X | X | X |
| | 20 | Old Paths Baptist Church | Mile 188 Glenn Hwy | 62.108094 | -145.482072 | \$200,000 | W1 | X | | X | X | X | X |
| | 20 | Holy Family Catholic Church | Aurora Drive | 62.10859 | -145.530628 | \$150,000 | W1 | X | | X | X | X | X |
| | 5 | Copper Basin Assembly of God | Copperville Access Road | 62.07326 | -145.432655 | \$300,000 | Log Historic | X | | X | X | X | X |
| | 10 | American Legion | Aurora Drive | 62.108199 | -145.530795 | \$200,000 | W1 | X | | X | X | X | X |
| | 0 | Copper Valley Construction Office & Shops | Terrace Drive | 62.109271 | -145.523501 | \$300,000 | W1 | X | X | X | X | X | X |

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Table 6-7 Glennallen Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|------------|--|---|---|-----------|-------------|-----------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| | 50 | IGA (Parks Place), 1st National Bank, AK State Trooper Post | Mile 187.5 Glenn Hwy | 62.10842 | -145.529119 | \$2,000,000 | WL1 | X | | X | X | X | X |
| | 15 | Copper Valley Chamber of Commerce (CVCC) Visitor Center | Glenn/ Richardson Hwy Intersection | 62.108753 | -145.477395 | \$300,000 | W2 | X | | X | X | X | X |
| | 10 | Wells Fargo Bank | Mile 187.5 Glenn Hwy | 62.108179 | -145.527239 | \$1,500,000 | SL1 | X | | X | X | X | X |
| | 3 | CREMS Business Office (In KCAM Bldg) | Mile 186.7 Glenn Hwy | Undefined | Undefined | \$800,000 | W1 | X | | X | X | X | X |
| | 3 | Laundry Mat | Glenn Hwy | 62.107073 | -145.513094 | \$300,000 | W1 | X | | X | X | X | X |
| | 15 | Blackburn Place Apartments (1) | Blackburn Drive | 62.11 | -145.5347 | \$1,000,000 | W2 | X | | X | X | X | X |
| | 15 | Blackburn Place (2) | | | | | | | | | | | |
| | 30 | Glennallen Heights-1 | Co-Op Road & North 1st Avenue | 62.1126 | -145.5153 | \$1,500,000 | W2 | X | | X | X | X | X |
| | | Glennallen Heights-2 | | | | | | X | | X | X | X | X |
| | | Glennallen Heights-3 | | | | | | X | | X | X | X | X |
| | 5 | Copper Valley Community Library | Mile 186 Glenn Hwy | 62.11004 | -145.556084 | \$700,000 | W2 | X | X | X | X | X | X |
| | 15 | Fireweed Grill | Mile 187 Glenn Hwy | 62.107078 | -145.536763 | \$400,000 | W1 | X | | X | X | X | X |
| | 50 | Caribou Hotel | Mile 187 Glenn Hwy | 62.107078 | -145.536763 | \$1,000,000 | W2 | X | | X | X | X | X |
| | 3 | Caribou Gift Store | Mile 187 Glenn Hwy | 62.107078 | -145.536763 | \$150,000 | Log Historic | X | | X | X | X | X |
| | 10 | Tazlina River Trading Post | Mile 111 Richardson Hwy | 62.059328 | -145.426479 | \$600,000 | W2 | X | X | X | X | X | X |
| | 10 | Glennallen True Value-Lumber Yard | Mile 185 Glenn Hwy | 62.109648 | -145.589272 | \$1,000,000 | SL1 | X | | X | X | X | X |
| | 3 | Kunick Machine Shop | Richardson Hwy | 62.126606 | -145.476884 | \$750,000 | W2 | X | | X | X | X | X |
| | 10 | NAPA Auto Parts | Glenn Hwy | 62.107916 | -145.536812 | \$750,000 | W2 | X | | X | X | X | X |
| | 0 | Glennallen Cemetery | College Drive | 62.111154 | -145.535828 | \$50,000 | Undefined | X | | X | X | X | X |
| Roads | Glennallen Roads (Total Community Road Miles: 150) | | | | | | | | | | | | |
| | 0 | Aurora Drive | Approximate Cost per Road Mile: \$2,000,000 | N/A | | \$300,000,000 | HRD 2 | X | | X | X | X | X |
| | | Ballpark Road | | | | | | X | | X | X | X | X |
| | | Birch Street | | | | | | X | | X | X | X | X |
| | | Blackburn Court | | | | | | X | X | X | X | X | X |

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Table 6-7 Glennallen Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|----------------|---|---|----------------------|-----------|-------------|-----------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| | | BLM Housing Access Road | | | | | | X | | X | X | X | X |
| | | College Drive | | | | | | X | | X | X | X | X |
| | | Co-Op Road | | | | | | X | | X | X | X | X |
| | | Dry Creek State Recreation Site Road | | | | | | X | | X | X | X | X |
| | | Drum Drive | | | | | | X | | X | X | X | X |
| | | Fire Station Access Road | | | | | | X | | X | X | X | X |
| | | First Avenue | | | | | | X | | X | X | X | X |
| | | Gulkana Airport Access Road | | | | | | X | X | X | X | X | X |
| | | Government Access Road | | | | | | X | | X | X | X | X |
| | | KCAM Radio Station Road | | | | | | X | | X | X | X | X |
| | | Lakeshore Drive | | | | | | X | | X | X | X | X |
| | | Mable Lane | | | | | | X | | X | X | X | X |
| | | Mt. Sanford Drive | | | | | | X | | X | X | X | X |
| | | 1st Avenue | | | | | | X | | X | X | X | X |
| | | Pilcho Drive | | | | | | X | | X | X | X | X |
| | | Sasha Drive | | | | | | X | | X | X | X | X |
| | | Second Avenue | | | | | | X | | X | X | X | X |
| | | School Access Road | | | | | | X | | X | X | X | X |
| | | Snowshoe Street | | | | | | X | | X | X | X | X |
| | | Terrace Drive | | | | | | X | | X | X | X | X |
| | | Third Avenue | | | | | | X | | X | X | X | X |
| | | Glenn Highway | | | | | | X | X | X | X | X | X |
| | | Richardson Highway | | | | | | X | | X | X | X | X |
| Bridges | 0 | Klutina River Bridge | 110.7 Richardson Hwy | 62.05473 | -145.42794 | \$20,000,000 | HWB 2 | X | X | X | X | X | X |
| | | Tonsina River Bridge | Richardson Hwy | 61.662926 | -145.181891 | 10,000,000 | HWB 2 | X | X | X | X | X | X |
| | | Caribou Creek Bridge | Richardson Hwy | 61.806650 | -147.683795 | 20,000,000 | HWB 2 | X | X | X | X | X | X |
| | | Tazlina River Dike | Richardson Hwy | 62.053437 | -145.427859 | \$500,000 | HWB 2 | X | X | X | X | X | X |
| Transportation | <i>Glennallen Transportation Facilities</i> | | | | | | | | | | | | |
| | 10 | Gulkana Airport (PAGK), Runway 15: 5001 x 100 ft, asphalt runway, private owner | 110.7 Richardson Hwy | 62.054555 | -145.430167 | \$2,000,000 | ARW | X | | X | X | X | X |

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Table 6-7 Glennallen Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|------------|----------------------|--|------------------------------------|------------|--------------|---------------------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| | 3 | Chevron/Glennallen Fuel | Glenn Hwy | 62.1549444 | -145.4543333 | \$1,000,000 | SL1 | X | | X | X | X | X |
| | 11 | First Student (Offices and Shop) | Glenn Hwy | 62.107792 | -145.534608 | \$1,000,000 | BMF | X | | X | X | X | X |
| | 4 | Glenn Freight Transport | Aurora Drive | 62.109239 | -145.530081 | \$350,000 | SL1 | X | | X | X | X | X |
| | 4 | National Park Service Shop | Aurora Drive | 62.111108 | -145.548233 | \$300,000 | SL1 | X | | X | X | X | X |
| | 5 | EGM Automotive and Towing | Richardson Hwy | 62.137508 | -145.479005 | \$500,000 | SL1 | X | | X | X | X | X |
| Utilities | Glennallen Utilities | | | | | | | | | | | | |
| | 3 | Glennallen Water Works | Glenn Hwy | 62.106626 | -145.516813 | \$250,000 | PWTS | X | | X | X | X | X |
| | 35 | Copper Valley Electric Association (CVEA) Office | Co-op Drive | 62.110316 | -145.531093 | \$800,000 | W2 | X | | X | X | X | X |
| | 10 | Copper Valley Electric Plant | Aurora Drive | 62.110352 | -145.531 | \$3,000,000 | EPPM | X | | X | X | X | X |
| | 25 | The Hub of Alaska | Mile 188 Glenn Hwy | 62.108506 | -145.488641 | \$2,000,000 | W2 | X | | X | X | X | X |
| | 5 | Sparks General Store | Mile 187 Glenn Hwy | 62.107792 | -145.534608 | \$400,000 | W1 | X | | X | X | X | X |
| | 5 | Crowley Fuels | Glenn/ Richardson Hwy Intersection | 62.108272 | -145.478003 | \$1,000,000 | W1 | X | | X | X | X | X |
| | 5 | Copper Basin Sanitation (CBS) Shop | Tazlina Terrace | 62.063594 | -145.423022 | \$800,000 | W1 | X | | X | X | X | X |
| | 3 | Glennallen Landfill, Class II, Permit #: SW2A009-20 | Mile 123 Richardson Hwy | Undefined | Undefined | \$500,000 | N/A | X | | X | X | X | X |
| | 2 | Alascom Building | Mile 186 Glenn Hwy | Undefined | Undefined | \$400,000 | CBO | X | | X | X | X | X |
| | 0 | Alascom Tower 2 | | 62.109635 | -145.548776 | \$800,000 | CBR | X | | X | X | X | X |
| | 30 | Copper Valley Telephone Coop Office and Yard | Glenn Hwy | 62.110392 | -145.533596 | \$3,000,000 | CBO | X | | X | X | X | X |
| | 6 | KCAM 790 Radio Station (Crem Building) | Mile 185.6 Glenn Hwy | 62.108308 | -145.533041 | \$750,000 | CBR | X | | X | X | X | X |
| | 0 | KCAM 790 Transmission Tower | | | | \$200,000 | CBR | X | | X | X | X | X |
| | Total Occ | 979 | | | | Potential Damages (Total) | \$389,550,000 | | | | | | |

(LEPC 2017, DHS&EM 2016)

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Table 6-8 lists the Tazlina's critical facilities and infrastructure.

Table 6-8 Tazlina's Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|--------------------|--------------------------------|--|--|-----------|-------------|-----------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| Government | Tazlina Government Facilities | | | | | | | | | | | | |
| | 6 | Tazlina Village Council (TVC) Office | Richardson Hwy | 62.05212 | -145.425389 | \$25,000 | MH | X | X | X | X | X | X |
| | 75 | Copper River Native Association Office | Mile 111.5 Richardson Hwy | 62.067561 | -145.429845 | \$20,000,000 | S1L | X | X | X | X | X | X |
| | 8 | Copper River Basin Housing Authority | Richardson Hwy | 62.064448 | -145.429463 | \$250,000 | W1 | X | X | X | X | X | X |
| | 20 | Department of Natural Resources (DNR) Office 1 | DNR Access Road | 62.042233 | -145.429566 | \$800,000 | W2 | X | X | X | X | X | X |
| | 10 | Department of Transportation (DOT) Office 1 | DOT Access Road | 62.04404 | -145.426014 | \$800,000 | W2 | X | X | X | X | X | X |
| Emergency Response | Glennallen Emergency Response | | | | | | | | | | | | |
| | 0 | GlennRich Fire & Rescue - Tazlina | Bottom of Simpson Hill; Richardson Hwy | 62.068988 | -145.431956 | \$150,000 | EFFS | X | X | X | X | X | X |
| | 0 | GlennRich Fire & Rescue - Silver Springs | Silver Springs Loop Road | 62.0075 | -145.3278 | \$150,000 | EFFS | X | X | X | X | X | X |
| | 0 | GlennRich Fire & Rescue - Copper Center | Mile 100.5 Old Richardson Hwy | 61.9542 | -145.3074 | \$150,000 | EFFS | X | X | X | X | X | X |
| | 0 | GlennRich Fire & Rescue - Tolsona | Tolsona Lake Road | 62.107847 | -146.036953 | \$150,000 | EFFS | X | X | X | X | X | X |
| Educational | Tazlina Educational Facilities | | | | | | | | | | | | |
| | 154 | Glennallen Elementary School Section PK-6 (144/10) | School Access Road | 62.11296 | -145.526689 | \$17,000,000 | EFS1 | X | | X | X | X | X |
| | 152 | Glennallen Jr/Sr High School Section 7-12 (142/10) | | | | | | X | | X | X | X | X |
| Medical | Tazlina Medical Facilities | | | | | | | | | | | | |
| | 75 | Copper River Native Association Medical | Mile 111.5 Richardson | 62.067561 | -145.429845 | \$2,000,000 | EFHL | X | X | X | X | X | X |

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Table 6-8 Tazlina's Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland / Tundra Fire |
|------------|--|---|---|-----------|-------------|-----------------|---------------|------------|-------|----------------|----------------|--------------|------------------------|
| | | Clinic | Hwy | | | | | | | | | | |
| | 8 | Native Village of Tazlina Health Clinic | Mile 111.5 Richardson Hwy | 62.05186 | -145.42715 | \$300,000 | W1 | X | X | X | X | X | X |
| Community | Tazlina Community Facilities | | | | | | | | | | | | |
| | 10 | Tazlina Community Hall & Tazlina Fellowship | 110.5 Richardson Hwy | 62.052122 | -145.42789 | 1,000,000 | W2 | X | X | X | X | X | X |
| | 75 | Copper River Native Association Office | Mile 111.5 Richardson Hwy | 62.067561 | -145.429845 | \$20,000,000 | S1L | X | X | X | X | X | X |
| | 2 | O & S Construction Building | Hillside Drive | | | \$500,000 | W1 | X | X | X | X | X | X |
| | -- | Jim Cline's Enterprises | Hillside Drive | Undefined | Undefined | Undefined | W1 | X | X | X | X | X | X |
| | -- | Sy Neeley's Pit | Nugget Avenue | Undefined | Undefined | Undefined | W1 | X | X | X | X | X | X |
| | 0 | Tazlina Cemetery | Undefined | 62.056174 | -145.423359 | Undefined | N/A | X | X | X | X | X | X |
| | Tazlina Roads (Total Community Road Miles: 150) | | | | | | | | | | | | |
| Roads | 0 | Bornite Street | Approximate Cost per Road Mile: \$2,000,000 | N/A | | \$300,000,000 | HRD 2 | X | X | X | X | X | X |
| | | Bradley Road | | | | | | X | X | X | X | X | X |
| | | Cheshnina Way | | | | | | X | X | X | X | X | X |
| | | Chitina Street | | | | | | X | X | X | X | X | X |
| | | Copperville Road | | | | | | X | X | X | X | X | X |
| | | Copperville Access Road | | | | | | X | X | X | X | X | X |
| | | Copper Boulevard | | | | | | X | X | X | X | X | X |
| | | Cordova Street | | | | | | X | X | X | X | X | X |
| | | DNR Access Road | | | | | | X | X | X | X | X | X |
| | | DOT Access Road | | | | | | X | X | X | X | X | X |
| | | Hillside Drive | | | | | | X | X | X | X | X | X |
| | | Luebke Road | | | | | | X | X | X | X | X | X |
| | | Nebesna Street | | | | | | X | X | X | X | X | X |
| | | Pipeline Road | | | | | | X | X | X | X | X | X |
| | | Poplar Street | | | | | | X | X | X | X | X | X |
| | | Rose's Avenue | | | | | | X | X | X | X | X | X |
| | | School Road | | | | | | X | X | X | X | X | X |
| | | Tazlina Loop Road | | | | | | X | X | X | X | X | X |
| | | Tazlina Terrace | | | | | | X | X | X | X | X | X |
| | | Trailer Court Road | | | | | | X | X | X | X | X | X |
| | | Widgeon Way | | | | | | X | X | X | X | X | X |

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Table 6-8 Tazlina's Critical Facilities and Infrastructure

| Facilities | Number of Occupants | Facilities | Address | Latitude | Longitude | Estimated Value | Building Type | Earthquake | Flood | Ground Failure | Severe Weather | Volcanic Ash | Wildland/ Tundra Fire |
|------------------|--|--------------------------------|----------------------|-----------|----------------------------------|----------------------|---------------|------------|-------|----------------|----------------|--------------|-----------------------|
| | | Wrangell Way | | | | | | X | X | X | X | X | X |
| Bridges | Tazlina Bridges | | | | | | | | | | | | |
| | 0 | Klutina River Bridge | 110.7 Richardson Hwy | 62.05473 | -145.42794 | \$20,000,000 | HWB 2 | X | X | X | X | X | X |
| | | Tonsina River Bridge | Richardson Hwy | 61.662926 | -145.181891 | 10,000,000 | HWB 2 | X | X | X | X | X | X |
| | | Caribou River Bridge | Richardson Hwy | 61.806650 | -147.683795 | 20,000,000 | HWB 2 | X | X | X | X | X | X |
| | | Tazlina River Dike | Richardson Hwy | 62.053437 | -145.427859 | \$500,000 | HWB 2 | X | X | X | X | X | X |
| Transportation | Tazlina Transportation Facilities | | | | | | | | | | | | |
| | 0 | Tazlina Boat Launch | Richardson Hwy | 62.053437 | -145.427859 | Undefined | N/A | X | X | X | X | X | X |
| Utilities | Tazlina Utilities | | | | | | | | | | | | |
| | 2 | Copper Valley Telecom Building | Richardson Hwy | 62.059346 | -145.428193 | \$1,000,000 | CBT | X | X | X | X | X | X |
| | 0 | Tazlina Well | College Drive | 62.10909 | -146.17142 | \$40,000 | PWE | X | X | X | X | X | X |
| Total Occ | 589 | | | | Potential Damages (Total) | \$414,315,000 | | | | | | | |

(Tazlina 2017, DHS&EM 2016)

6.5 REPETITIVE LOSS PROPERTIES

DMA 2000 requirements and implementing jurisdictional governance regulations for estimating the number and type of structures at risk to repetitive flooding include:

| DMA 2000 Requirements |
|--|
| Addressing Risk and Vulnerability to NFIP Insured Structures §201.6(c)(2)(ii): The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. <i>All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:</i> §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of] the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; §201.6(c)(2)(ii)(B): The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; §201.6(c)(2)(ii)(C): The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions. §201.6(c)(3)(ii): The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. |
| 1. REGULATION CHECKLIST |
| ELEMENT B. NFIP Insured Structures |
| B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? |
| C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? |
| Source: FEMA, March 2015. |

DMA 2000 requirements and implementing jurisdictional governance regulations for estimating the number and type of structures at risk to repetitive flooding include:

| DMA 2000 Requirements |
|---|
| Repetitive Loss Strategy (Optional) §201.7(c)(3)(vi): An Indian Tribal government applying to FEMA as a grantee may request the reduced cost share authorized under 79.4(c)(2) of this chapter of the FMA and SRL programs if they have an approved Tribal Mitigation Plan meeting the requirements of this section that also identifies actions the Indian Tribal government has taken to reduce the number of repetitive loss properties (which must include severe repetitive loss properties), and specifies how the Indian Tribal government intends to reduce the number of such repetitive loss properties. [Note: While submittal of a Repetitive Loss Strategy is optional, if the Indian Tribal government wants to request the reduced cost share authorized under 44 CFR 79.4(c)(2) for the FMA and SRL programs as a grantee, then all of the following requirements must be met.] |
| 1. REGULATION CHECKLIST |
| ELEMENTS. Repetitive Loss Requirements |
| A. Does the new or updated plan address repetitive loss properties in its risk assessment (see 201.7(c)(2))? |
| B. Does the new or updated plan describe the Indian Tribal government's mitigation goals that support the selection of mitigation activities for repetitive loss properties (see 201.7(c)(3)(i))? |
| C. Does the new or updated plan identify mitigation actions for repetitive loss properties (see 201.7(c)(3)(iii))? |
| D. Does the new or updated plan describe specific actions that have been implemented to mitigate repetitive loss properties, including actions taken to reduce the number of severe repetitive loss properties? |
| E. Does the new or updated plan consider repetitive loss properties in its evaluation of the Indian Tribal government's hazard management laws, regulations, policies, programs, and capabilities and its general description of mitigation capabilities (see 201.7(c)(3)(iv))? |
| F. Does the new or updated plan identify current and potential sources of Federal, tribal, or private funding to implement mitigation activities for repetitive loss properties (see 201.7(c)(3)(v))? |
| Source: FEMA, March 2015. |

6.5.1 NFIP Participation

Neither the community of Glennallen nor the Native Village of Tazlina participate in the National Flood Insurance Program (NFIP) neither do they have repetitive flood property inventories that meets NFIP criteria as the loss thresholds are substantially below FEMA values.

6.6 VULNERABILITY ASSESSMENT METHODOLOGY

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

The Community Planning Team determined their facility locations within identified hazard impact zones. This data was used to develop a vulnerability assessment for those hazards.

Structure replacement values were estimated by the LEPC Planning Team for their physical assets. The community's aggregate exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced) for each physical asset located within identified hazard areas. 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.

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6.7 DATA LIMITATIONS

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

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

6.8 VULNERABILITY EXPOSURE ANALYSIS

There is limited GIS data available for the Copper River Basin area. The following discussion contains data obtained from the Glennallen LEPC Project Team and their subsequent analysis. The results of the Glennallen area's loss estimation / exposure analysis is summarized in Tables 6-9 and 6-10.

There is also limited GIS data available for the Native Village of Tazlina. The results of the Village of Tazlina's loss estimation / exposure analysis is summarized in Tables 6-11 and 6-12.

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Table 6-9 Glennallen's Potential Hazard Exposure Analysis – Critical Facilities

| Hazard Type | Methodology | Government and Emergency Response | | Educational | | Medical | | Community | |
|----------------|-------------|--------------------------------------|---------------|------------------------|---------------|------------------------|---------------|------------------------|---------------|
| | | * # Bldgs/ # Occ | Value (\$) | * # Bldgs/ # Occ | Value (\$) | * # Bldgs/ # Occ | Value (\$) | * # Bldgs/ # Occ | Value (\$) |
| Earthquake | Descriptive | 15/79 | 4,850,000 | 6/380 | 22,000,000 | 5/59 | 9,400,000 | 24/307 | 14,250,000 |
| Flood | Descriptive | 2/0 | 300,000 | -0- | -0- | -0- | -0- | 2/10 | 900,000 |
| Ground Failure | Descriptive | 15/79 | 4,850,000 | 6/380 | 22,000,000 | 5/59 | 9,400,000 | 24/307 | 14,250,000 |
| Severe Weather | Descriptive | 15/79 | 4,850,000 | 6/380 | 22,000,000 | 5/59 | 9,400,000 | 24/307 | 14,250,000 |
| Volcanic Ash | Descriptive | 15/79 | 4,850,000 | 6/380 | 22,000,000 | 5/59 | 9,400,000 | 24/307 | 14,250,000 |
| Wildland Fire | Descriptive | 15/79 | 4,850,000 | 6/380 | 22,000,000 | 5/59 | 9,400,000 | 24/307 | 14,250,000 |

Table 6-10 Glennallen's Potential Hazard Exposure Analysis – Critical Infrastructure (Con't.)

| Hazard Type | Methodology | Highway | | Bridges | | Transportation Facilities | | Utilities | |
|----------------|-------------|---------|---------------|---------|---------------|------------------------------|---------------|-------------------|---------------|
| | | Miles | Value (\$) | No. | Value (\$) | # Bldgs/ # Occ | Value (\$) | # Bldgs/ # Occ | Value (\$) |
| Earthquake | Descriptive | 150 | \$300,000,000 | 3 | 50,000,000 | 6/27 | 5,150,000 | 13/128 | 13,900,000 |
| Flood | Descriptive | 2.5? | 4,500,000 | 3 | 50,000,000 | -0- | -0- | 1/5 | 800,000 |
| Ground Failure | Descriptive | 150 | \$300,000,000 | 3 | 50,000,000 | 6/27 | 5,150,000 | 13/128 | 13,900,000 |
| Severe Weather | Descriptive | 150 | \$300,000,000 | 3 | 50,000,000 | 6/27 | 5,150,000 | 13/128 | 13,900,000 |
| Volcanic Ash | Descriptive | 150 | \$300,000,000 | 3 | 50,000,000 | 6/27 | 5,150,000 | 13/128 | 13,900,000 |
| Wildland Fire | Descriptive | 150 | \$300,000,000 | 3 | 50,000,000 | 6/27 | 5,150,000 | 13/128 | 13,900,000 |

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Table 6-11 Tazlina's Potential Hazard Exposure Analysis – Critical Facilities

| Hazard Type | Methodology | Government and Emergency Response | | Educational | | Medical | | Community | |
|----------------|-------------|--------------------------------------|---------------|------------------------|---------------|------------------------|---------------|------------------------|---------------|
| | | * # Bldgs/ # Occ | Value (\$) | * # Bldgs/ # Occ | Value (\$) | * # Bldgs/ # Occ | Value (\$) | * # Bldgs/ # Occ | Value (\$) |
| Earthquake | Descriptive | 9/119 | 22,475,000 | 2/306 | 17,000,000 | 2/83 | 2,300,000 | 6/79 | 21,000,000 |
| Flood | Descriptive | 9/119 | 22,475,000 | -0- | -0- | 1/8 | 300,000 | 4/79 | 21,000,000 |
| Ground Failure | Descriptive | 9/119 | 22,475,000 | 2/306 | 17,000,000 | 2/83 | 2,300,000 | 6/79 | 21,000,000 |
| Severe Weather | Descriptive | 9/119 | 22,475,000 | 2/306 | 17,000,000 | 2/83 | 2,300,000 | 6/79 | 21,000,000 |
| Volcanic Ash | Descriptive | 9/119 | 22,475,000 | 2/306 | 17,000,000 | 2/83 | 2,300,000 | 6/79 | 21,000,000 |
| Wildland Fire | Descriptive | 9/119 | 22,475,000 | 2/306 | 17,000,000 | 2/83 | 2,300,000 | 6/79 | 21,000,000 |

Table 6-12 Tazlina's Potential Hazard Exposure Analysis – Critical Infrastructure (Con't.)

| Hazard Type | Methodology | Highway | | Bridges | | Transportation Facilities | | Utilities | |
|----------------|-------------|---------|---------------|---------|---------------|------------------------------|---------------|-------------------|---------------|
| | | Miles | Value (\$) | No. | Value (\$) | # Bldgs/ # Occ | Value (\$) | # Bldgs/ # Occ | Value (\$) |
| Earthquake | Descriptive | 150 | 300,000,000 | 4 | 50,500,000 | 1/0 | Undefined | 2/2 | 1,040,000 |
| Flood | Descriptive | .5 | 1,000,000 | 4 | 50,500,000 | 1/0 | Undefined | -0- | -0- |
| Ground Failure | Descriptive | 150 | 300,000,000 | 4 | 50,500,000 | 1/0 | Undefined | 2/2 | 1,040,000 |
| Severe Weather | Descriptive | 150 | 300,000,000 | 4 | 50,500,000 | 1/0 | Undefined | 2/2 | 1,040,000 |
| Volcanic Ash | Descriptive | 150 | 300,000,000 | 4 | 50,500,000 | 1/0 | Undefined | 2/2 | 1,040,000 |
| Wildland Fire | Descriptive | 150 | 300,000,000 | 4 | 50,500,000 | 1/0 | Undefined | 2/2 | 1,040,000 |

6.8.1 Exposure Analysis – Narrative Summaries

Earthquake

Glennallen and the surrounding area can expect to experience significant to catastrophic earthquake ground movement that may result in infrastructure damage. Intense shaking may be seen or felt based on past events. Although all structures are exposed to earthquakes, buildings within the constructed with wood have slightly less vulnerability to the effects of earthquakes than those with masonry.

Based on earthquake probability (PGA) maps produced by the USGS, the entire area is at risk of experiencing significant to catastrophic earthquake impacts as a result of its close proximity to known earthquake faults.

The probability is “Highly Likely” (see Section 5.3.1.3) that impacts to the community such as “severe” ground movement may result in infrastructure damage and personal injury.

Glennallen’s and Tazlina’s entire existing, transient, and future population, residential structures, and critical facilities are exposed to the effects of “moderate to significant” earthquake events.

Glennallen’s potential earthquake damages include:

- 459 people in 387 residences (approximate value \$96,750,000)
- 79 people in 15 government and emergency response facilities (approximate value \$4,850,000)
- 380 people in six educational facilities (approximate value \$22,000,000)
- 59 people in five medical facilities (approximate value \$9,400,000)
- 307 people in 24 community facilities (approximate value \$14,250,000)
- 150 road system miles (approximate value \$300,000,000)
- Three bridges (approximate value \$50,000,000)
- Six people in 27 transportation facilities (approximate value \$5,150,000)
- 128 people in 13 utility facilities (approximate value \$13,900,000)

Tazlina’s potential earthquake damages include:

- 260 people in 206 residences (approximate value \$51,500,000)
- 119 people in nine government and emergency response facilities (approximate value \$22,745,000)
- 306 people in two educational facilities (approximate value \$17,000,000)
- 83 people in two medical facility (approximate value \$2,300,000)
- 79 people in six community facilities (approximate value \$21,000,000)
- 150 road system miles (approximate value \$300,000,000)

- Four bridges (approximate value \$50,500,000)
- One transportation facilities (approximate value \$Undefined)
- Two people in two utility facilities (approximate value \$1,040,000)

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

Flood

The Glennallen community does not experience flood impacts.

However, Tazlina may experience damaging flood events that could displace infrastructure such as bridges and other infrastructure as well as residents and businesses located in or near Tazlina's floodplain. Tazlina's flood probability is "Likely" (see Section 5.3.2.3). They could experience high water flood and scour impacts. There is no detailed 100-year flood analysis for the Tazlina area.

Tazlina's potential flood damages include:

- Undefined residences (approximate value \$Undefined)
- Two emergency response facilities (approximate value \$300,000)
- 10 people in two community facilities (approximate value \$900,000)
- 2.5? road system miles (approximate value \$4,500,000)
- Three bridge (approximate value \$50,000,000)
- Five people in one utility facilities (approximate value \$800,000)

HMP participants anticipate that impacts to future populations, residential structures, critical facilities, and infrastructure will be at the same historical impact level.

Ground Failure

The potential ground failure impacts can affect transportation, utility systems, and water and waste treatment infrastructure along with public, private, and business structures located adjacent to steep slopes, along riverine embankments, within alluvial fans or natural drainages and discontinuous permafrost. Response and recovery efforts will likely vary from minor cleanup to more extensive utility system rebuilding. Utility disruptions are usually local and terrain dependent. Initial debris clearing from emergency routes and high traffic areas may be required.

According to mapping completed by the DGGs, the entire Glennallen and Tazlina area has discontinuous permafrost. The probability is "Likely" (see Section 5.3.3.3) the area will continue to experience ground failure impacts.

Glennallen's ground failure threatened facilities include:

- 459 people in 387 residences (approximate value \$96,750,000)
- 79 people in 15 government and emergency response facilities (approximate value \$4,850,000)

- 380 people in six educational facilities (approximate value \$22,000,000)
- 59 people in five medical facilities (approximate value \$9,400,000)
- 307 people in 24 community facilities (approximate value \$14,250,000)
- 150 road system miles (approximate value \$300,000,000)
- Three bridges (approximate value \$50,000,000)
- Six people in 27 transportation facilities (approximate value \$5,150,000)
- 128 people in 13 utility facilities (approximate value \$13,900,000)

Tazlina's ground failure threatened facilities include:

- 260 people in 206 residences (approximate value \$51,500,000)
- 119 people in nine government and emergency response facilities (approximate value \$22,745,000)
- 306 people in two educational facilities (approximate value \$17,000,000)
- 83 people in two medical facility (approximate value \$2,300,000)
- 79 people in six community facilities (approximate value \$21,000,000)
- 150 road system miles (approximate value \$300,000,000)
- Four bridges (approximate value \$50,500,000)
- One transportation facilities (approximate value \$Undefined)
- Two people in two utility facilities (approximate value \$1,040,000)

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

Severe Weather

Impacts associated with severe weather events includes roof collapse, trees and power lines falling, damage to light aircraft and sinking small boats, injury and death resulting from snow machine or vehicle accidents, overexertion while shoveling all due to heavy snow. A quick thaw after a heavy snow can also cause substantial flooding. Impacts from extreme cold include hypothermia, halting transportation from fog and ice, congealed fuel, frozen pipes, utility disruptions, frozen pipes, and carbon monoxide poisoning. Additional impacts may occur from secondary weather hazards or complex storms such as extreme high winds combined with freezing rain, and warm temperatures causing snowmelt aufeis flooding. Section 5.3.4.3 provides additional detail regarding severe weather impacts. Buildings that are older and/or not constructed with materials designed to withstand heavy snow and wind (e.g., hurricane ties on crossbeams) are more vulnerable to the severe weather damage.

Glennallen's entire existing, transient, and future population, residential structures, and critical facilities are exposed to future severe weather impacts.

Glennallen's potential weather impacts includes:

- 459 people in 387 residences (approximate value \$96,750,000)
- 79 people in 15 government and emergency response facilities (approximate value \$4,850,000)
- 380 people in six educational facilities (approximate value \$22,000,000)
- 59 people in five medical facilities (approximate value \$9,400,000)
- 307 people in 24 community facilities (approximate value \$14,250,000)
- 150 road system miles (approximate value \$300,000,000)
- Three bridges (approximate value \$50,000,000)
- Six people in 27 transportation facilities (approximate value \$5,150,000)
- 128 people in 13 utility facilities (approximate value \$13,900,000)

Tazlina's entire existing, transient, and future population, residential structures, and critical facilities are exposed to future severe weather impacts.

Tazlina's potential weather impacts includes:

- 260 people in 206 residences (approximate value \$51,500,000)
- 119 people in nine government and emergency response facilities (approximate value \$22,745,000)
- 306 people in two educational facilities (approximate value \$17,000,000)
- 83 people in two medical facility (approximate value \$2,300,000)
- 79 people in six community facilities (approximate value \$21,000,000)
- 150 road system miles (approximate value \$300,000,000)
- Four bridges (approximate value \$50,500,000)
- One transportation facilities (approximate value \$Undefined)
- Two people in two utility facilities (approximate value \$1,040,000)

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

Volcano

Impacts to the Glennallen and Tazlina area from volcanic ash fall in southcentral Alaska has historically affected air travel anywhere in the state. Impacts include respiratory problems from airborne ash, displaced persons, lack of shelter, and personal injury; as well as general property damage to electronics and unprotected machinery, structural damage from ash loading; state and regional supply delivery interruptions, loss of commerce, and contaminated water supply. (See Section 5.3.5.3)

All community residential structures, critical facilities, and infrastructure are equally vulnerable to volcanic ash impacts.

Glennallen's potential volcanic ash impacts include:

- 459 people in 387 residences (approximate value \$96,750,000)
- 79 people in 15 government and emergency response facilities (approximate value \$4,850,000)
- 380 people in six educational facilities (approximate value \$22,000,000)
- 59 people in five medical facilities (approximate value \$9,400,000)
- 307 people in 24 community facilities (approximate value \$14,250,000)
- Three bridges (approximate value \$50,000,000)
- Six people in 27 transportation facilities (approximate value \$5,150,000)
- 128 people in 13 utility facilities (approximate value \$13,900,000)

Tazlina's potential volcanic ash impacts include:

- 260 people in 206 residences (approximate value \$51,500,000)
- 119 people in nine government and emergency response facilities (approximate value \$22,745,000)
- 306 people in two educational facilities (approximate value \$17,000,000)
- 83 people in two medical facility (approximate value \$2,300,000)
- 79 people in six community facilities (approximate value \$21,000,000)
- Four bridges (approximate value \$50,500,000)
- One transportation facilities (approximate value \$Undefined)
- Two people in two utility facilities (approximate value \$1,040,000)

Participants anticipate that impacts to future populations, residences, critical facilities, and infrastructure are at the same historical impact level.

Wildland Fire

Impacts associated with a wildland fire event include the potential for loss of life and property. It can also affect 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. Section 5.3.6.3 provides additional detail regarding wildland/tundra fire impacts

Wildland fires have occurred within a 50-mile radius of the of the Glennallen and Tazlina area (see Section 5.3.6.3). Wildland fire can potentially interface with the Glennallen and Tazlina area population center.

Glennallen's potential wildland fire damages include:

- 459 people in 387 residences (approximate value \$96,750,000)
- 79 people in 15 government and emergency response facilities (approximate value \$4,850,000)
- 380 people in six educational facilities (approximate value \$22,000,000)
- 59 people in five medical facilities (approximate value \$9,400,000)
- 307 people in 24 community facilities (approximate value \$14,250,000)
- 150 road system miles (approximate value \$300,000,000)
- Three bridges (approximate value \$50,000,000)
- Six people in 27 transportation facilities (approximate value \$5,150,000)
- 128 people in 13 utility facilities (approximate value \$13,900,000)

Tazlina's potential wildland fire damages include:

- 260 people in 206 residences (approximate value \$51,500,000)
- 119 people in nine government and emergency response facilities (approximate value \$22,745,000)
- 306 people in two educational facilities (approximate value \$17,000,000)
- 83 people in two medical facility (approximate value \$2,300,000)
- 79 people in six community facilities (approximate value \$21,000,000)
- 150 road system miles (approximate value \$300,000,000)
- Four bridges (approximate value \$50,500,000)
- One transportation facilities (approximate value \$Undefined)
- Two people in two utility facilities (approximate value \$1,040,000)

6

6.9 FUTURE DEVELOPMENT

Table 6-13 delineates Glennallen's future, planned, and funded projects and their tentative completion status.

Table 6-13 Glennallen's Planned and Funded Projects

| Grant Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|-----------------------|------------|-------------------------------|----------------|--------------|-----------|
| GlennRich Fire Rescue | 2014 | New Fire Station | Active | \$500,000 | 6/30/2019 |
| GlennRich Fire Rescue | 2014 | Personal Protective Equipment | Active | \$50,000 | 6/30/2019 |

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6 Vulnerability Assessment

Table 6-13 Glennallen's Planned and Funded Projects

| Grant Recipient | Award Year | Project Description/Comments | Project Status | Award Amount | End Date |
|---|------------|---|----------------|--------------|-----------|
| The Greater Copper Valley Chamber of Commerce | 2014 | Deferred Maintenance for the Visitor Information Center | Active | \$28,850 | 6/30/2019 |
| Ahtna, Inc. | 2013 | Gulkana Village - Land Exchange | Active | \$300,000 | 6/30/2017 |
| GlennRich Fire Rescue | 2013 | Rescue Truck | Active | \$135,000 | 6/30/2017 |
| GlennRich Fire Rescue | 2013 | Water Tender Trucks | Active | \$120,000 | 6/30/2017 |
| Ahtna, Inc. | 2013 | Public Boat Landing Completion | Active | \$300,000 | 6/30/2018 |

(DCRA 2016)

Note: DCRA does not list any open or ongoing projects for the Native Village of Tazlina.

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Section Seven delineates Glennallen and Tazlina’s MJHMP mitigation strategy.

7.1 OVERVIEW

The mitigation strategy provides the blueprint for implementing desired activities that will enable the community to continue to save lives and preserve infrastructure by systematically reducing hazard impacts, damages, and community disruption. A vulnerability analysis is divided into six steps:

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

DMA 2000 and its jurisdictional governance implementing regulations for comprehensive mitigation strategy development include:

| DMA 2000 Requirements |
|--|
| Identification and Analysis of Mitigation Actions §201.6(c)(3): [The plan shall include the following:] A <i>mitigation strategy</i> that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards. §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. §201.6(c)(3)(iii): [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. §201.6(c)(3)(iv): [For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan. Requirement §201.6(c)(4): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate. |
| 1. REGULATION CHECKLIST |
| ELEMENT C. Mitigation Strategy |
| C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? |
| C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? <i>(Addressed in Section 6.4)</i> |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? |
| C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? |

| DMA 2000 Requirements |
|--|
| C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? |
| Source: FEMA, March 2015. |

DMA 2000 and its Tribal governance implementing regulations for comprehensive mitigation strategy development include:

| DMA 2000 Requirements |
|--|
| Identification and Analysis of Mitigation Actions §201.7(c)(3): [The plan shall include the following:] A <i>mitigation strategy</i> that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. §201.7(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards. §201.7(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. §201.7(c)(3)(iii): [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. §201.7(c)(3)(iv): [For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan. Requirement §201.7(c)(4): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvements, when appropriate. |
| ELEMENT C. Mitigation Strategy |
| C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? |
| C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Addressed in Section 6.4) |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? |
| C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? |
| C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? |
| Source: FEMA, March 2015. |

7.2 GLENNALLEN AND TAZLINA'S CAPABILITY ASSESSMENT

The capability assessment reviews the technical and fiscal resources available to each community.

DMA 2000 and its implementing jurisdictional governance regulations for technical and fiscal resources available to the community for MJHMP project implantation and management include:

| DMA 2000 Requirements |
|---|
| Incorporation into Existing Planning Mechanisms §201.6(c)(3): [The plan shall include the following:] A <i>mitigation strategy</i> 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. |
| 1. REGULATION CHECKLIST |
| ELEMENT C. Incorporate into Other Planning Mechanisms |
| C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? |
| Source: FEMA, March 2015. |

Local Resources

Tables 7-1, 7-2, and 7-3 delineate Glennallen's regulatory tools, technical specialists, financial and training resource available for project management. Appendix A provides a detailed list of potential funding resources.

Table 7-1 Glennallen's Regulatory Tools

| Regulatory Tools (ordinances, codes, plans) | Existing Yes/No? | Comments (Year of most recent update; problems administering it, etc.) |
|---|---------------------|---|
| Copper Valley Area Plan: 2010-2015 | Yes | 2010-2015 |
| Comprehensive Economic Development Plan | Yes | 2009 |
| Comprehensive Economic Development Strategy, Copper Valley Development Association | Yes | 2003 |
| Copper Valley Emergency Response Plan | Yes | Developed and maintained by the Copper River LEPC |
| Wildland Fire Protection Plan | No | |
| Building code | No | |
| Zoning ordinances | No | |
| Subdivision ordinances or regulations | No | |
| Special purpose ordinances | No | |

Glennallen has access to planning and land management resources to allow them to implement hazard mitigation activities. The resources available in these areas were assessed by the Glennallen and Tazlina Planning Teams, and are summarized below.

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Table 7-2 Glennallen Area's Technical Specialists

| Staff/Personnel Resources | Yes / No | Department/Agency and Position |
|---|----------|---|
| Planner or engineer with knowledge of land development and land management practices | No | The LEPC and community business hire planners and consultants once funding is available |
| Engineer or professional trained in construction practices related to buildings and/or infrastructure | No | The LEPC and community businesses hire planners and engineering consultants once funding is available |
| Planner or engineer with an understanding of natural and/or human-caused hazards | No | The LEPC and community businesses hire planners and engineering consultants once funding is available |
| Floodplain Manager | No | The LEPC works with the State NFIP Coordinator as needs arise |
| Surveyors | No | The LEPC hires surveyors and consultants once funding is available |
| Staff with education or expertise to assess the jurisdiction's vulnerability to hazards | Yes | The Glennallen LEPC consult with long-time residents and Elders to assess their respective hazard vulnerabilities |
| Personnel skilled in Geospatial Information System (GIS) | No | The LEPC hires GIS consultants once funding is available |
| Scientists familiar with the hazards of the jurisdiction | No | The LEPC work with U.S. Fish & Wildlife Service (USFWS) and Fish & Game (ADF&G), and the Alaska Department of Transportation and Public Facilities and other pertinent agencies on an as needed basis |
| Emergency Manager | Yes | The LEPC and Community Emergency Response Personnel as applicable |
| Finance (Grant writers) | Yes | Copper River Development Association Accounting Office |
| Public Information Officer | Yes | Copper River LEPC |

Table 7-3 Glennallen Area's Financial Resources

| Financial Resource | Accessible or Eligible to Use for Mitigation Activities |
|---|---|
| Copper Valley Development Association, Inc. | A regional nonprofit that serves the region as an Alaska Regional Development Association and a USDA Resources Conservation and Development Council. Incorporated in 1991, it assists small businesses and non-profits organizations with economic development opportunities and resources. |
| Receives Capital Matching Grant Funds | Provides operating support funding |
| Payment in Lieu of Taxes (PILT) | Provides operating support funding |
| Revenue Sharing Funds | Provides operating support funding |
| Municipal Energy Assistance Program (MEAP) | Provides operating support funding |
| Hazard Mitigation Grant Program (HMGP) | FEMA funding available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. |
| Pre-Disaster Mitigation (PDM) grant program | FEMA funding available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only |
| Flood Mitigation Assistance (FMA) grant program | FEMA funding available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures. |

Table 7-3 Glennallen Area's Financial Resources

| Financial Resource | Accessible or Eligible to Use for Mitigation Activities |
|--|--|
| | <i>Note: Glennallen does not have a flood threat.</i> |
| United State Fire Administration (USFA) Grants | The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors, and firefighters. |
| Fire Mitigation Fees | Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts. |

DMA 2000 and its implementing Tribal governance regulations for technical and fiscal resources available to the community for MJHMP project implantation and management include:

| DMA 2000 Requirements |
|---|
| Tribal Funding Sources §201.7(c)(3)(v): [The mitigation strategy shall include an] identification of current and potential sources of Federal, tribal, or private funding to implement mitigation activities. |
| REQUIREMENTS CHECKLIST |
| ELEMENT |
| A. Does the new or updated plan identify current sources of Federal, tribal, or private funding to implement mitigation activities? |
| B. Does the new or updated plan identify potential sources of Federal, tribal, or private funding to implement mitigation activities? |
| C. Does the updated plan identify the sources of mitigation funding used to implement activities in the mitigation strategy since approval of the previous plan? |
| Source: FEMA, March 2015. |

Tazlina's Local Resources

Tazlina has few funding, technical planning, land management, and financial resources available to implement hazard mitigation activities and project management. The hazard mitigation Planning Team assessed available resources as listed in Table 7-4, 7-5, and 7-6.

Note: Appendix A provides a detailed list of potential funding resources.

Table 7-4 Tazlina's Regulatory Tools

| Regulatory Tools (ordinances, codes, plans) | Existing Yes/No? | Comments (Year of most recent update; problems administering it, etc.) |
|---|------------------|--|
| Tribal Economic Development Plan | Yes | Explains the Village's economic and infrastructure initiatives and natural hazard impacts. |
| Tribal Land Use Plan | Yes | Describes the Village's community development goals and initiatives and potential natural hazard considerations. |
| Copper Basin Sanitation Plan | Yes | Identifies community sanitation process and needs. Additionally provides soils data pertinent to area describing Village potential ground failure impacts. |
| Village Indian Reservation Roads (IRR) Plan | Yes | Identifies existing or needed Indian Village roads, trails, and routes. |

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Table 7-4 Tazlina's Regulatory Tools

| Regulatory Tools (ordinances, codes, plans) | Existing Yes/No? | Comments (Year of most recent update; problems administering it, etc.) |
|--|---------------------|---|
| Long Range Transportation Plan (LRTP) | Yes | Identifies existing or needed Indian Village roads, trails, and routes. |
| Emergency Response Plan | Yes | Provides community emergency response to potential hazard impacts. |
| Wildland Fire Protection Plan | Yes | Describes Village's potential wildfire impacts and processes to mitigate future events. |

Table 7-5 Tazlina's Technical Specialists

| Staff/Personnel Resources | Yes / No | Department/Agency and Position |
|---|----------|---|
| Planner or engineer with knowledge of land development and land management practices | Yes | The Tazlina Village works with Ahtna Inc. Land Department planners and consultants to assist villages |
| Engineer or professional trained in construction practices related to buildings and/or infrastructure | Yes | The Tazlina Village works with Ahtna Inc. Land Department planners and consultants to assist villages |
| Planner or engineer with an understanding of natural and/or human-caused hazards | Yes | The Tazlina Village works with Ahtna Inc. Land Department planners and consultants to assist villages |
| Floodplain Manager | Yes | The Tazlina Village works with the State NFIP Coordinator as needs arise |
| Surveyors | Yes | The Tazlina Village works with Ahtna Inc. Land Department planners and consultants to assist villages |
| Staff with education or expertise to assess the jurisdiction's vulnerability to hazards | Yes | The Tazlina Village works with Ahtna Inc. Land Department planners and consultants to assist villages |
| Personnel skilled in Geospatial Information System (GIS) software | Yes | The Tazlina Village works with Ahtna Inc. Land Department planners and consultants to assist villages |
| Scientists familiar with the hazards of the jurisdiction | Yes | The Tazlina Village works with U.S. Fish & Wildlife Service (USFWS) and Fish & Game (ADF&G), and the Alaska Department of Transportation and Public Facilities and other pertinent agencies on an as needed basis |
| Emergency Manager | Yes | The Tribal President, or Tribal Administrator as applicable |
| Finance (Grant writers) | Yes | Tribal Bookkeeper |
| Public Information Officer | Yes | The Tribal President, or Tribal Administrator as applicable |

Table 7-6 Tazlina's Financial Resources

| Financial Resource | Accessible or Eligible to Use for Mitigation Activities |
|---|--|
| Indian Community Development Block Grants (ICDBG) | Provides operational funds for tribal management |
| EPA, Indian Environmental General Assistance Program (IGAP) | Provides funding for tribal environmental improvement activities |

Table 7-6 Tazlina's Financial Resources

| Financial Resource | Accessible or Eligible to Use for Mitigation Activities |
|---|--|
| HUD, Indian Housing Block Grant (IHBG) | Assists IRA Tribes with obtaining adequate housing |
| HUD, Native American Housing Assistance and Self Determination Act (NAHASDA) | Assists IRA Tribes with housing management resources |
| DOL, Employment and Training Administration, Disaster Unemployment Assistance | Provides disaster related unemployment by supporting employment and training activities |
| Hazard Mitigation Grant Program (HMGP) | FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. |
| Pre-Disaster Mitigation (PDM) grant program | FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only |
| Flood Mitigation Assistance (FMA) grant program | FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures. |
| United State Fire Administration (USFA) Grants | The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors, and firefighters. |
| Fire Mitigation Fees | Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts. |

The Planning Team developed their mitigation goals and potential mitigation actions to address identified potential hazard impacts (refer to Section 5.3) for the Glennallen and Tazlina area.

7.3 DEVELOPING MITIGATION GOALS

DMA 2000 stipulated and implementing jurisdictional governance regulations for developing hazard mitigation goals include:

| DMA 2000 Requirements |
|---|
| Local Hazard Mitigation Goals §201.6(c)(3)(i): The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards. |
| 1. REGULATION CHECKLIST |
| ELEMENT C. Mitigation Goals |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? |
| Source: FEMA, March 2015. |

DMA 2000 stipulated and implementing Tribal governance regulations for developing hazard mitigation goals include:

| DMA 2000 Requirements |
|---|
| Local Hazard Mitigation Goals §201.7(c)(3)(i): The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards. |
| ELEMENT C. Mitigation Goals |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? |
| Source: FEMA, March 2015. |

The Planning Team developed the mitigation goals and potential mitigation actions to address identified potential hazard impacts for the Copper River Basin area within Section 5.3.

The exposure analysis results form the basis for developing the mitigation goals and actions (Table 7-4). Mitigation goals are 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, Glennallen and Tazlina's joint goals were developed to reduce or avoid identified long-term hazard vulnerabilities.

Table 7-7 lists joint Glennallen and Native Village of Tazlina's newly refined strategic mitigation goals that form the foundation for the following processes and culminate within the Mitigation Action Plan (MAP) Matrices depicted in Table 7-13 and 7-14.

Table 7-7 Glennallen's (G) and Tazlina's (T) Joint Mitigation Goals

| No. | Goal Description |
|---------------------------|--|
| Multi-Hazards (MH) | |
| MH 1 | Provide outreach activities to educate and promote recognizing and mitigating all natural hazards that affect the Copper River Basin. |
| MH 2 | Cross-reference mitigation goals and actions with other LEPC and Village planning mechanisms and projects. |
| MH 3 | Develop construction activities that reduce possibility of losses from all natural hazards that affect the Copper River Basin. |
| Natural Hazards | |
| EQ 4 | Reduce structural vulnerability to earthquake (EQ) damage. |
| FL 5 | Reduce flood and erosive scour (FL) damage and loss possibility. |
| GF 6 | Reduce ground failure (GF) damage and loss possibility. |
| SW 7 | Reduce structural vulnerability to severe weather (SW) damage. |
| VO 8 | Reduce vulnerability, damage, or loss of structures from volcanic debris impacts (VO) |
| WF 9 | Reduce structural vulnerability to tundra/wildland fire (WF) damage. |

7.4 IDENTIFYING MITIGATION ACTIONS

DMA 2000 requirements and implementing jurisdictional governance regulations for identifying and analyzing jurisdictional governmental mitigation actions include:

| DMA 2000 Requirements |
|--|
| Identification and Analysis of Mitigation Actions §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. |
| 1. REGULATION CHECKLIST |
| ELEMENT C. Mitigation Actions |
| C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? |
| Source: FEMA, March 2015. |

DMA 2000 requirements and implementing Tribal governance regulations for identifying and analyzing mitigation actions include:

| DMA 2000 Requirements |
|--|
| Identification and Analysis of Mitigation Actions §201.7(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. |
| ELEMENT C. Mitigation Actions |
| C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? |
| Source: FEMA, March 2015. |

7

FEMA Hazard Mitigation Assistance Guidance and Addendum (HMA) states the importance of considering, evaluating, and implementing the most effective projects, activities, and potential alternatives:

“Reviewing and incorporating information from the State, tribal, or local mitigation plan can help an Applicant or subapplicant facilitate the development of mitigation project alternatives. Linking the existing mitigation plan to project scoping can support the Applicant and subapplicant in selecting the most appropriate mitigation activity that best addresses the identified hazard(s), while taking into account community priorities, climate change, and resiliency. In particular, the mitigation strategy section of the plan identifies a range of specific mitigation activities that can reduce vulnerability and includes information on the process that was used to identify, prioritize, and implement the range of mitigation actions considered...”

It is important to reference the mitigation plan as potential project alternatives may have been considered during the planning process. If the project alternatives were not considered during the mitigation planning process, they should be considered in the next mitigation plan update” (FEMA 2015b)

Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into three broad categories: property protection, public education and awareness, and construction projects.

The Glennallen Planning Team assessed the legacy 2011 MHMP's existing mitigation actions status and provided an explanation as to any changes that may have occurred. The Planning Team defined legacy MHMP mitigation project's status as: "Completed", "Deleted", "Deferred" or "Ongoing", and "Re-Defined" to better meet Participant's needs (Table 7-8).

The Planning Team then considered, reviewed, and selected new projects from a comprehensive list of potential actions. Newly considered projects were not carried forward into the MAP.

Table 7-8 Glennallen's Existing and New Mitigation Action Status

(Blue text items are the Legacy 2009 HMP Identified Mitigation Action Items and their current status determinations)

| Goals | | Status | | Actions |
|---------------------------------------|---|--|--|--|
| No. | Description | New <i>Considered, Selected</i> Brought Forward Complete, Deferred, Deleted, or Ongoing | Explain Status | Description |
| Glennallen Multi-Hazards (GMH) | | | | |
| GMH 1 | <i>Provide outreach activities to educate and promote recognizing and mitigating all natural hazards that affect the Copper River Basin</i> | New | Selected | * Key effort for Copper River LEPC due to limited funding: Identify and pursue funding opportunities to implement mitigation actions that will enable the Copper River LEPC and Tazlina Tribe to implement mitigation actions or projects. |
| | | <i>Deleted</i> | <i>Completed</i> | Original 4a: <i>Promote public awareness of importance of developing an emergency plan and public education program on emergency preparedness and supplies.</i> |
| | | New | Selected | Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all identified natural hazards. <ul style="list-style-type: none"> Articles in the local paper (Copper River Record) Our website: www.copperriverlepc.net Through our Facebook page PSA with local radio station (KCAM) |
| | | <i>Deleted</i> | <ul style="list-style-type: none"> <i>No longer needed</i> <i>Alternative option available</i> | Original 4c: <i>Develop a system for notifying residents of urgent need to evacuate.</i> <ul style="list-style-type: none"> <i>KCAM has an emergency system that only broadcasts weather alerts</i> |
| | | New | Selected | Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events. <ul style="list-style-type: none"> Produce and distribute a tourist flyer informing tourist about our local emergency resources |
| GMH 2 | Cross-reference mitigation | New | Selected | Establish the Copper River LEPC as a joint member of the Copper River area Hazard Mitigation Planning Committee to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions. |

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Table 7-8 Glennallen's Existing and New Mitigation Action Status
(Blue text items are the Legacy 2009 HMP Identified Mitigation Action Items and their current status determinations)

| Goals | | Status | | Actions |
|-----------------------------------|--|--|--|---|
| No. | Description | New <i>Considered, Selected Brought Forward Complete, Deferred, Deleted, or Ongoing</i> | Explain Status | Description |
| | <i>goals and actions with other Tribal planning mechanisms and projects</i> | New | Considered | Review ordinances and develop outreach programs to guide how propane tanks are properly anchored; and hazardous materials are properly stored and protected from; known natural hazards such as flood or seismic events. <ul style="list-style-type: none">Crowley and Fisher's Fuel do this on a regular basis.IGAP investigates above ground tanks. |
| | | New | Selected | Integrate the Mitigation Plan's hazard vulnerability assessment into Emergency Response Plans for enhanced emergency planning. |
| | | New | Considered | Update Emergency Response Plans to discuss volcanic ashfall and stormwater event management, prioritize response actions, and initiate actions to fill capability gaps. <ul style="list-style-type: none">Done by the LEPC level thru the SCERP and HMP.Done on individual levels such as CRMS or Electric Company, etc. |
| GMH 3 | <i>Develop construction activities that reduce possibility of losses from all natural hazards that affect the Copper River Basin</i> | <i>Deleted</i> | <i>No Available Staffing or funding source to pursue this effort.</i> | Original 5a: Identify and construct/retrofit a building or room to be a designated 'clean building' or 'clean room' for use during periods of poor air quality. (Wildfires, even distant fires, can produce heavy smoke that threatens the health of individuals, particularly those experiencing, or at risk for respiratory ailments. Volcanoes can also deposit large amounts of ash creating poor air quality. During periods of poor air quality, at risk individuals are advised to remain indoors, but not all residents have housing that adequately protects them from this the airborne particulate pollution.) |
| | | New | Considered | Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder, medical, schools, correctional, and water and sewage treatment plant facilities, etc.) <ul style="list-style-type: none">Ongoing discussions to have the electric company provide for the school and Cross Road Medical Center. |
| Glennallen Natural-Hazards (G...) | | | | |
| GEO4 | <i>Reduce vulnerability, damage, or loss of structures from earthquake damage</i> | <i>Deleted</i> | <ul style="list-style-type: none">No available staffing or funding source to pursue this effort. | Original 4b: <i>Develop a public education program on earthquake vulnerability. (Include information on reducing damage and need to stabilize and secure non-structural building components (i.e. electrical fixtures and hot water heater), furniture and other possessions which can cause injury and damage if they fall during an earthquake.)</i> |
| | | <i>Deleted</i> | <ul style="list-style-type: none">No available staffing or funding source to | Original 3a: <i>Identify buildings and facilities that must remain open following an earthquake. (Create a targeted education program to inform facility owners/operators of measures to reduce vulnerability to</i> |

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Table 7-8 Glennallen's Existing and New Mitigation Action Status
(Blue text items are the Legacy 2009 HMP Identified Mitigation Action Items and their current status determinations)

| Goals | | Status | | Actions |
|-------|--|--|---|---|
| No. | Description | New <i>Considered, Selected</i> Brought Forward Complete, Deferred, Deleted, or Ongoing | Explain Status | Description |
| | | | <i>pursue this effort.</i> | <i>earthquake damage.)</i> |
| | | <i>Deleted</i> | <ul style="list-style-type: none"> No available staffing or funding source to pursue this effort. | Original 3b: Assess the structural and non-structural earthquake vulnerability of Cross Road Medical Center. Perform structural upgrades recommended in vulnerability assessment to reduce potential earthquake damage to building. Secure and stabilize non-structural building elements and contents per assessment recommendations. (The clinic is one of the older buildings in Glennallen and pre-dates building standards to reduce earthquake damaged. It is the primary medical service provider for the Copper River valley and will provide critical services after a disaster.) |
| | | New | Considered | Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances to prevent toppling damage and resultant injuries to small children, elderly, and pets. <ul style="list-style-type: none"> We could promote this during the Alaska Shake Out in October. Promote in the local paper |
| GGF 6 | Reduce vulnerability, damage, or loss of structures from flooding. | New | Selected | Promote permafrost sensitive construction practices in permafrost areas. |
| GSW 7 | Reduce structural vulnerability to severe weather (SW) damage. | New | Selected | Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms (snow load, ice, and wind). |
| GWF 9 | Reduce vulnerability, damage, or loss of structures from wildland or tundra fires. | <i>Ongoing Deferred</i> | <ul style="list-style-type: none"> Ongoing No Available Staffing or funding source to pursue this effort. Reworded to better reflect community needs | Original 1a. Create defensible space around structures. (Clear potential fuels away from structures using FireWise guidelines - their minimum standards; additional clearing can be necessary in high-risk areas or around critical facilities.) |
| | | Ongoing Deferred | <ul style="list-style-type: none"> Ongoing No Available | Ahetna Wildland Fire Interface grant awarded to "Create defensible space around tribal structures by clearing potential fuels 100 feet away from facilities following FireWise guidelines." |
| | | | | Original 1b: Reduce the risk of wildfire through site-specific fuel reduction. In addition to creating defensible space, fuel reduction in private land near structures is |

Table 7-8 Glennallen's Existing and New Mitigation Action Status
(Blue text items are the Legacy 2009 HMP Identified Mitigation Action Items and their current status determinations)

| Goals | | Status | | Actions |
|-------|-------------|--|---|---|
| No. | Description | New <i>Considered, Selected</i> Brought Forward Complete, Deferred, Deleted, or Ongoing | Explain Status | Description |
| | | | <i>Staffing or funding source to pursue this effort.</i> <ul style="list-style-type: none"> <i>Reworded for clarity and to reduce repetition</i> | <i>advised by area foresters. Fuel reduction on agency and native land is also recommended by foresters.</i> Remove combustible fuels sources around all structures, throughout the community to reduce risk of wildfire damages. |
| | | <i>Ongoing Deferred</i> | <ul style="list-style-type: none"> <i>Ongoing</i> <i>No Available Staffing or funding source to pursue this effort.</i> <i>Reworded for clarity</i> | <i>Original 1c: Promote public awareness and use of FireWise principles and fire prevention.</i> Edited to read: <i>Promote public awareness and use of FireWise principles and fire prevention</i> and construction materials and principles. |
| | | <i>Ongoing Deferred</i> | <ul style="list-style-type: none"> <i>Ongoing</i> <i>No Available Staffing or funding source to pursue this effort.</i> <i>Will need to hire a Project Manager</i> | <i>Original 2a: Clear and reduce fuels along roads with poor access.</i> <i>(Dense spruce forests line many residential roads, which may prevent evacuation during a wildfire event.)</i> |
| | | <i>Deleted</i> | <i>No Available Staffing or funding source to pursue this effort.</i> | <i>Original 2b: Work with Alaska Department of Transportation (ADOT) to ensure adequate brushing and fuel reduction along Glenn and Richardson Highways.</i> <i>(In the event of a significant fire, the highways will need to remain open for emergency response operations and resident/visitor evacuation.)</i> |

The Native Village of Tazlina was not included within the 2009 Legacy Glennallen HMP. Therefore, the Village agree with those actions identified by the LEPC's Table 7-8 because those actions with benefit the entire Copper River Basin area. The Village further desires to add Tazlina specific actions within Table 7-9.

Note: reviewed and considered projects were not carried forward into Table 7-14 Tazlina's MAP (TMAP).

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Table 7-9 Tazlina's Existing and Potential New Mitigation Actions
(Ongoing and newly selected items will be carried forward into the TMAP for implementation)

| Supports Goal No. | Hazard | Criteria <i>Considered Selected Ongoing</i> | Action Description |
|---------------------------------------|--|--|--|
| Tazlina Multi-Hazards (TMH) | | | |
| TMH 1 | Provide outreach activities to educate and promote recognizing and mitigating natural hazards that affect the Village of Tazlina (Village). | Selected | * Key effort for Tazlina due to limited funding: Identify and pursue funding opportunities to implement mitigation actions that will enable the Copper River LEPC and Tazlina Tribe to implement mitigation actions or projects. |
| TMH 2 | Cross-reference mitigation goals and actions with other Tribal planning mechanisms and projects. | Selected | The Village will strive to coordinate and incorporate mitigation planning provisions into all tribal planning processes to demonstrate multi-benefit consideration and multiple funding source consideration. |
| | | Selected | Establish the Native Village of Tazlina as a joint member of the Copper River area Hazard Mitigation Planning Committee to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions. |
| TMH 3 | Develop construction activities that reduce possibility of losses from natural hazards that affect the Village. | Selected | Construct a Tazlina Bike and Pedestrian Pathway along their streets, roads, or highways to assure safe pedestrian bicycling lanes away from heavy traffic areas. |
| Tazlina Natural Hazards (T...) | | | |
| TEQ 4 | Reduce vulnerability of structures to earthquake damage. | None | |
| TFL 5 | Reduce flood and erosive scour (FL) damage and loss possibility. | Selected | Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding, significant historical damages, or road closures. |
| | | Selected | Install rolled erosion control blanket along the Tazlina River embankment to stabilize and prevent continued erosive high water flow scour. |
| | | Selected | Install riprap along the Tazlina River waterway to stabilize the embankment at crucial locations. |
| TGF 6 | Reduce possibility of damage and losses from ground failure. | Selected | Reinforce soil slopes along the Tazlina River to stabilize slopes that exacerbate damage for water run-off. |
| TSW 7 | Reduce vulnerability of structures to severe weather damage. | None | |
| TVO 8 | Reduce vulnerability, damage, or loss of structures from volcanic debris impacts | None | |
| TWF 9 | Reduce vulnerability of population and infrastructure to wildland or tundra fire impacts. | Ongoing | <i>Ref: Legacy 1a.</i> Ahtna Wildland Fire Interface grant awarded to "Create defensible space around tribal structures by clearing potential fuels 100 feet away from facilities following FireWise guidelines." |

7.5 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

DMA 2000 requirements and Jurisdictional governance regulations for implementing mitigation actions are as follows.

| DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions |
|--|
| Implementation of Mitigation Actions §201.6(c)(3)(iii): [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. |
| 1. REGULATION CHECKLIST |
| ELEMENT C. MITIGATION STRATEGY |
| C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii)) |
| Source: FEMA, March 2015. |

DMA 2000 regulation requirements and Tribal governance for evaluating and implementing mitigation actions are as follows.

| DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions |
|--|
| Implementation of Mitigation Actions §201.7(c)(3)(iii): [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. |
| 1. REGULATION CHECKLIST |
| ELEMENTS. MITIGATION STRATEGY |
| C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.7(c)(3)(iv)); (Requirement §201.7(c)(3)(iii)) |
| Source: FEMA, March 2015. |

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The Planning Team evaluated and prioritized each of the mitigation actions in July 13, 2017 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 Glennallen and Tazlina area MJHMP update participants. To complete this task, the Planning Team first prioritized the hazards that were regarded as the most significant within the community (earthquake, flood, ground failure, severe weather, volcanic ash, and wildland/tundra fire).

The Planning Team reviewed the simplified social, technical, administrative, political, legal, economic, and environmental (STAPLEE) evaluation criteria (Table 7-10) and the Benefit-Cost Analysis Fact Sheet (Appendix G) to consider the opportunities and constraints of implementing each particular mitigation action. For each action considered for implementation, a qualitative statement is provided regarding the benefits and costs and, where available, the technical feasibility. A detailed cost-benefit analysis is anticipated as part of the application process for those projects the Planning Teams choose to implement.

Table 7-10 Evaluation Criteria for Mitigation Actions

| Evaluation Category | Discussion "It is important to consider..." | Considerations |
|-----------------------|--|--|
| <u>S</u> ocial | The public support for the overall mitigation strategy and specific mitigation actions. | Community acceptance Adversely affects population |
| <u>T</u> echnical | If the mitigation action is technically feasible and if it is the whole or partial solution. | Technical feasibility Long-term solutions Secondary impacts |
| <u>A</u> ministrative | 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 |
| <u>P</u> olitical | 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 |
| <u>L</u> egal | 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 |
| <u>E</u> conomic | If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a Federal Emergency Management Agency (FEMA) Benefit-Cost Analysis. | Benefit/cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis |
| <u>E</u> nvironmental | 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 |

Glennallen: In May, 2017, Glennallen prioritized nine legacy and 10 newly selected natural hazard mitigation actions that were selected for implementation.

Tazlina: In May, 2017, Tazlina reviewed, considered, then selected and prioritized eight natural hazard mitigation actions from an extensive potential projects list for implementation.

The hazard mitigation Planning Teams' considered each hazard's history, extent, and probability to determine each potential actions priority. A rating system based on high, medium, or low community priorities.

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

Prioritizing the mitigation actions within Glennallen’s MAP (Table 7-13) and Tazlina’s MAP Matrices (Table 7-14) was essential to provide Glennallen and Tazlina their respective MAP Matrices implementation approaches.

7.6 POTENTIAL FUNDING AGENCY ACRONYM LIST

Table 7-11 delineates the acronyms used in Glennallen and Tazlina’s respective Mitigation Action Plans (Table 7-12 and Table 7-13 respectively).

See Appendix A for summarized funding agency resource descriptions.

Table 7-11 Potential Funding Source Acronym List
(See complete funding resource description in Appendix A)

| |
|--|
| <p>Copper River Local Emergency Planning Committee (LEPC) Lead</p> <p>Tazlina Tribal Council Office (Tribal Office)</p> <p>US Department of Homeland Security (DHS) <i>Citizens Corp Program (CCP)</i> <i>Emergency Operations Center (EOC)</i> <i>Homeland Security Grant Program (HSGP)</i> <i>Emergency Management Performance Grant (EMPG)</i> <i>State Homeland Security Program (SHSP)</i></p> <p>Federal Management Agency (FEMA)/ <i>Hazard Mitigation Assistance Grant Programs (HMA)</i> <i>Emergency Management Program Grant (EMPG)</i> <i>Debris Management Grant (DM)</i> <i>Flood Mitigation Assistance Grants (FMA)</i> <i>National Earthquake Hazards Reduction Program (NEHRP)</i> <i>National Dam Safety Program (NDS)</i></p> <p>US Department of Commerce (DOC)/ <i>Remote Community Alert Systems Program (RCASP)</i></p> <p>National Oceanic and Atmospheric Administration (NOAA) <i>Economic Development Administration (EDP)</i> <i>Public Works and Development Facilities Program (PWDFP)</i></p> <p>US Environmental Protection Agency (EPA)/ <i>Indian Environmental General Assistance Program (IGAP)</i></p> <p>US Department of Agriculture (USDA)/ USDA, Farm Service Agency <i>Emergency Conservation Program (ECF)</i> <i>Rural Development (RD)</i></p> <p>USDA, Natural Resources Conservation Service (NRCS) <i>Conservation Technical Assistance Program (DCT)</i> <i>Conservation Innovation Grants (CIG)</i> <i>Environmental Quality Incentives Program (EQIP)</i> <i>Emergency Watershed Protection Program (EWP)</i> <i>Watershed Planning (WSP)</i></p> <p>US Geological Survey (USGS) <i>Alaska Volcano Observatory (AVO)</i></p> <p>Assistance to Native Americans (ANA) <i>Native American Housing Assistance and Self Determination Act (NAFSMA),</i></p> <p>US Army Corp of Engineers (USACE)/ <i>Planning Assistance Program (PAP)</i> <i>Capital Projects: Erosion, Flood, Ports & Harbors</i></p> <p>Alaska Department of Military and Veterans Affairs (DMVA), Division of Homeland Security and Emergency Management (DHS&EM) <i>Mitigation Section (for PDM & HMGP projects and plan development)</i> <i>Preparedness Section (for community planning)</i></p> |
|--|

Table 7-11 Potential Funding Source Acronym List
(See complete funding resource description in Appendix A)

| |
|---|
| <p><i>State Emergency Operations Center (SEOC for emergency response)</i></p> <p>Alaska Department of Community, Commerce, and Economic Development (DCCED)</p> <p><i>Division of Community and Regional Affairs (DCRA)/</i></p> <p><i>Community Development Block Grant (CDBG)</i></p> <p><i>Alaska Climate Change Impact Mitigation Program (ACCIMP)</i></p> <p><i>Flood Mitigation Assistance Grants (FMA)</i></p> <p>Alaska Department of Transportation</p> <p><i>State road repair funding</i></p> <p>Alaska Energy Authority (AEA)</p> <p><i>AEA/Bulk Fuel (ABF)</i></p> <p><i>AEA/Alternative Energy and Energy Efficiency (AEEE)</i></p> <p>Alaska Department of Environmental Conservation (DEC)/</p> <p><i>Village Safe Water (VSW)</i></p> <p><i>DEC/Alaska Drinking Water Fund (ADWF)</i></p> <p><i>DEC/Alaska Clean Water Fund [ACWF]</i></p> <p><i>DEC/Clean Water State Revolving Fund (CWSRF)</i></p> <p>Alaska Division of Forestry (DOF)/</p> <p><i>Volunteer Fire Assistance and Rural Fire Assistance Grant (VFAG/RFAG)</i></p> <p><i>Assistance to Firefighters Grant (AFG)</i></p> <p><i>Fire Prevention and Safety (FP&S)</i></p> <p><i>Staffing for Adequate Fire and Emergency Response Grants (SAFER)</i></p> <p><i>Emergency Food and Shelter (EF&S)</i></p> <p>Denali Commission (Denali)</p> <p><i>Energy Program (EP)</i></p> <p><i>Solid Waste Program (SWP)</i></p> <p>Lindbergh Foundation Grant Programs (LFGP)</p> <p>Rasmussen Foundation Grants (RFG)</p> |
|---|

7

7.7 MITIGATION ACTION PLAN MATRICES

The Glennallen LEPC and Native Village of Tazlina have limited budgets; therefore, no funding is available for developing and maintaining community infrastructure responsibilities. The LEPC has no governing authority. The Village is managed by their tribal president led Tribal Council.

The LEPC and Village's diverse governmental authorities' inhibits their capacity to coordinate project prioritization and project development. Therefore, the MJHMP will separate their respective MAP Matrices to better encapsulate their respective authorities and project priorities.

7.7.1 Glennallen's Mitigation Action Plan (GMAP)

Glennallen's MJHMP Mitigation Action Plan (GMAP) Matrix, Table 7-12, depicts how each mitigation action is implemented and administered by the Glennallen Planning Team. The GMAP delineates each selected mitigation action, its priorities, the responsible entity, the anticipated implementation timeline, and provides a brief explanation as to how the overall benefit/costs and technical feasibility are considered.

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Table 7-12 Glennallen's Mitigation Action Plan (GMAP) Matrix
(Blue Italicized Initiatives were brought forward from existing MJHMP or other identified plans)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|--------------------------------------|---|---------------------------------------|---|---|---|--|
| Glennallen Multi-Hazard (GMH) | | | | | | |
| GMH 1.1 | Identify and pursue funding opportunities to implement mitigation actions. | High | Copper River Local Emergency Planning Committee (LEPC) | LEPC through: DHS&EM & DCRA | Ongoing <i>* Key effort for Copper River LEPC and Tazlina due to limited available funding</i> | B/C: Remote Community and Village life requires this as an ongoing activity; it is essential for rural communities as there are limited funds available to accomplish effective mitigation actions. TF: This project is feasible through the LEPC's or Tribal Council's current project fund management mechanisms. |
| GMH 1.2 | <i>Ref. Legacy 4a., 4b.</i> Develop a public education program on natural hazard emergency preparedness and the importance of having at least 7-days supplies on-hand for various emergency situations. <ul style="list-style-type: none"> Articles in the local paper (Copper River Record) Our website www.copperriverlepc.net Thru our Facebook page PSA with local radio station (KCAM) Display board at IGA Store | High | LEPC | DHS&EM/PM selected Contract Manager, Tribal Office, FG, FP&S, SAFER | Ongoing | B/C: Sustained emergency response planning, notification, and mitigation outreach programs have minimal cost and will help build and support community capacity enabling the public to prepare for, respond to, and recover from disasters. TF: This project is feasible using a project funded Project Manager or Tribal Council as applicable to manage contractors with expertise required for technological complexity. |

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Table 7-12 Glennallen's Mitigation Action Plan (GMAP) Matrix
(Blue *Italicized Initiatives* were brought forward from existing MJHMP or other identified plans)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|-----------------------|--|---------------------------------------|------------------------------------|---|--|---|
| GMH 1.3 | Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the Copper Basin. | Medium | LEPC | LEPC through: FEMA HMA, AFG, FP&S, SAFER, ANA, EEFS, Lindbergh, Rasmussen, Denali Commission | 1-3 years | 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. |
| GMH 1.4 | Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events. <ul style="list-style-type: none"> Produce and distribute a tourist flyer informing tourist about our local emergency resources | Medium | LEPC | DHS&EM/PM, EPA/IGAP, Denali Commission, Division of Community and Regional Affairs (DCRA), DHS/SHSP | 1-3 years | B/C: This project will ensure the community looks closely at their hazard areas to ensure they can safely evacuate their residents and visitors during a natural hazard event. TF: This project is feasible using a project funded Project Manager or Tribal Council as applicable to manage contractors with expertise required for technological complexity. |
| GMH 2.1 | Establish the Copper River LEPC as a joint member of the Copper River Area Hazard Mitigation Planning Committee to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions. | Medium | LEPC | DHS&EM/PM, Tribal Office as applicable | 5 year duration | B/C: The existing team has gained experienced throughout this process which can provide invaluable insight for ensuring a sustained effort toward mitigating natural hazard damages. TF: This is feasible to accomplish, as no cost is associated with the action and only relies on community, tribal, or LEPC member availability and willingness to serve their community. |

Table 7-12 Glennallen's Mitigation Action Plan (GMAP) Matrix
(Blue Italicized Initiatives were brought forward from existing MJHMP or other identified plans)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|-----------------------|---|---------------------------------------|------------------------------------|--|--|---|
| GMH 2.2 | The LEPC will strive to coordinate and incorporate mitigation planning provisions into all community planning processes to demonstrate multi-benefit consideration and multiple funding source consideration. | Medium | LEPC | DHS&EM/PM, Tribal Office, Denali Commission, Division of Community and Regional Affairs (DCRA) | 5 year duration | B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and residents. TF: This is feasible to accomplish as cost can be associated with plan reviews and updates. The action relies on community, tribal, or LEPC member availability and willingness to serve their community. |
| GMH 2.3 | Integrate the Mitigation Plan's hazard vulnerability assessment into Emergency Response Plans for enhanced emergency planning. | Medium | LEPC | DHS&EM/Operations, Tribal Office, EPA/IGAP, Denali Commission, Division of Community and Regional Affairs (DCRA), DHS/SHSP | Ongoing | B/C: This project will ensure the community looks closely at their hazard areas to ensure they can safely evacuate their residents and visitors during a natural hazard event. TF: This project has proven feasible because of its continuous coordination processes with SCERP, HMP, CRMS and utility companies. |
| GMH 2.4 | Update Emergency Response Plans to discuss volcanic ashfall and stormwater event management, prioritize response actions, and initiate actions to fill capability gaps. | Medium | LEPC | LEPC, Denali Commission, Division of Community and Regional Affairs (DCRA) | 1-3 years | B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and residents. TF: This is feasible to accomplish as cost can be associated with plan reviews and updates. The action relies on staff and review committee availability and willingness to serve their community. |

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Table 7-12 Glennallen's Mitigation Action Plan (GMAP) Matrix
(Blue *Italicized Initiatives* were brought forward from existing MJHMP or other identified plans)
(See Table 7-10 Potential Funding Agency List; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|---------------------------------------|--|---------------------------------------|------------------------------------|---|--|---|
| GMH 2.5 | Review ordinances and develop outreach programs to guide how propane tanks are properly anchored; and hazardous materials are properly stored and protected from; known natural hazards such as flood or seismic events. <ul style="list-style-type: none"> Crowley and Fisher's Fuel do this on a regular basis. | Medium | LEPC | LEPC, Tribe, Natural Resources Conservation Service (NRCS), ANA, USACE, US Department of Agriculture (USDA), Lindbergh Grants Program | 2-5 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. Sustained mitigation outreach program is minimal in cost and will help build and support community capacity to enable the public to prepare for, respond to, and recover from disasters. TF: This action is feasible with limited fund expenditures. |
| Glennallen Natural Hazards (G) | | | | | | |
| GGF 6.1 | Promote permafrost sensitive construction practices in permafrost areas. | Medium | LEPC | LEPC, DHS&EM, SERC, HMA, DCRA, Denali Commission | 2-4 years | B/C: This outreach project would decrease damage to facilities if they were sited and used the most appropriate construction practices. TF: Technically feasible as the community is currently working with UAF and other entities to determine most viable permafrost construction practices. |
| GSW 7.1 | Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms (snow load, ice, and wind). | Low | LEPC | LEPC, DHS&EM, SERC, HMA, DCRA, Denali Commission | 3-5 years | B/C: Scheduling maintenance and implementing mitigation activities will potentially reduce severe winter storm damages caused by heavy snow loads, wind, and freezing 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. |

Table 7-12 Glennallen's Mitigation Action Plan (GMAP) Matrix
(Blue Italicized Initiatives were brought forward from existing MJHMP or other identified plans)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|-----------------------|---|---------------------------------------|------------------------------------|---|--|---|
| GWF 9.1 | <i>Ref: Legacy 1b:</i> Remove combustible fuels sources around all structures, throughout the community to reduce risk of wildfire damages. | Medium | LEPC | DHS&EM/CM, Tribal Office, FEMA, DNR/DOF: AFG, VFAG, RFAG FP&S, SAFER, HSEP | Ongoing 1-5 years | B/C: Infrastructure protection to reduce disaster impacts to residents and essential facilities are critical disaster management tools. TF: This project is feasible using a project funded Project Manager or Tribal Council, with assistance from State and Federal agency support and guidance as applicable to manage contractors with expertise required for technological complexity. |
| GWF 9.2 | <i>Ref Legacy 1c.</i> Promote FireWise public awareness, fire prevention, and construction materials, and principles. | Medium | LEPC | DHS&EM selected Contract Manager, Tribal Office, FEMA, DNR/DOF: AFG, VFAG, RFAG FP&S, SAFER, HSEP | Ongoing 1-3 Years | B/C: Sustained mitigation outreach programs have minimal cost and will help build and support community capacity enabling the public to appropriately prepare for, respond to, and recover from disasters. TF: This project is feasible using a project funded Project Manager or Tribal Council, with assistance from State and Federal agency support and guidance as applicable to manage contractors with expertise required for technological complexity. |
| GWF 9.3 | <i>Ref: Legacy 2a.</i> <i>Clear and reduce fuels along roads with poor access.</i> <i>(Dense spruce forests line many residential roads, which may prevent evacuation during a wildfire event.)</i> | Medium | LEPC | DHS&EM/CM, Tribal Office, FEMA, DNR/DOF: AFG, VFAG, RFAG FP&S, SAFER, HSEP | 1-5 years | B/C: Infrastructure protection reduces disaster damages, resident evacuation is essential for population life safety. These initiatives are critical disaster management tools. TF: This project is feasible using a project funded Project Manager or Tribal Council, with assistance from State and Federal agency support and guidance as applicable to manage contractors with expertise required for technological complexity. |

7.7.2 Tazlina Mitigation Action Plan (TMAP)

Tazlina’s MJHMP Mitigation Action Plan (TMAP), Table 7-13, depicts how each mitigation action will be implemented and administered by the Tribal Planning Team. The TMAP delineates each selected mitigation action, its priorities, the responsible entity, the anticipated implementation timeline, and provides a brief explanation as to how the overall benefit/costs and technical feasibility are considered.

Table 7-13 Tazlina’s Mitigation Action Plan (TMAP)
(Blue Italicized Initiatives were brought forward from existing planning activities)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|-----------------------------------|--|---------------------------------------|------------------------------------|--|---|---|
| Tazlina Multi-Hazard (TMH) | | | | | | |
| TMH 1.1 | Identify and pursue funding opportunities to implement mitigation actions. | High | Tribal Office | DHS&EM/ Selected Project Manager (PM) and/or Tribal Office as applicable (See Appendix A) | Ongoing <i>* Key effort for Tazlina due to limited available funding</i> | B/C: Remote Community and Village life requires this as an ongoing activity; it is essential for rural communities as there are limited funds available to accomplish effective mitigation actions. TF: This project is feasible through the LEPC or Tribal Council. However, all MJHMP projects will require grantees to provide a project funded for all projects other than for those awarded to the Native Village of Tazlina. |

GLENNALLEN/TAZLINA
MULTI-JURISDICTIONAL Hazard Mitigation Plan
7 Mitigation Strategy

Table 7-13 Tazlina's Mitigation Action Plan (TMAP)
(Blue Italicized Initiatives were brought forward from existing planning activities)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|---------------------------------------|---|---------------------------------------|------------------------------------|--|--|---|
| TMH 2.1 | The Native Village of Tazlina will strive to coordinate and incorporate mitigation planning provisions into all community planning processes to demonstrate multi-benefit consideration and multiple funding source consideration. | Medium | Tribal Office | DHS&EM/PM, Tribal Office, Denali Commission, Division of Community and Regional Affairs (DCRA) | 5 year duration | B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and residents. TF: This is feasible to accomplish as cost can be associated with plan reviews and updates. The action relies on community, tribal, or LEPC member availability and willingness to serve their community. |
| TMH 2.2 | Establish the Native Village of Tazlina as a joint member of the Copper River area Hazard Mitigation Planning Committee to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions. | Medium | Tribal Council Office | Tribal Council | 1-3 years | B/C: The existing team has gained experienced throughout this process which can provide invaluable insight for ensuring a sustained effort toward mitigating natural hazard damages. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community. |
| TMH 3.1 | Construct a Tazlina Bike and Pedestrian Pathway along their streets, roads, or highways to assure safe pedestrian bicycling lanes away from heavy traffic areas. | Medium | Tribal Council Office | Tribe, DOT/PF, HMA, ANA, Denali Commission, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/DOT/PF | 3-8 years | B/C: This project would protect pedestrians – elders, and youth from potentially dangerous situations. This will protect future motor vehicle accidents. TF: This project is feasible using contracted vendors who could provide specialized staff skills, equipment, and materials. |
| Tazlina Natural Hazards (T...) | | | | | | |
| TEQ 4.1 | None | | | | | |

GLENNALLEN/TAZLINA
MULTI-JURISDICTIONAL Hazard Mitigation Plan
7 Mitigation Strategy

Table 7-13 Tazlina's Mitigation Action Plan (TMAP)
(Blue Italicized Initiatives were brought forward from existing planning activities)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|-----------------------|--|---------------------------------------|---|---|--|---|
| TFL 5.1 | Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding, significant historical damages, or road closures. | High | Tribal Council Office as applicable | Tribe, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP | 1-3 years | B/C: Flood hazard mitigation is among FEMA's highest national priorities. FEMA desires communities focus on repetitive flood loss properties. This activity will ensure the City and Tribal Councils focus on priority flood locations and projects. TF: Low to no cost makes this outreach activity very feasible. |
| TFL 5.2 | Install rolled erosion control blanket along the Tazlina River embankment to stabilize and prevent continued erosive high water flow scour. | High | Tribal Council Office as applicable | Tribe, HMA, ANA, NRCS, USACE | 3-5 years | B/C: Improving embankment and slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh lost facility replacement costs. TF: The community has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected. |
| TFL 5.3 | Install riprap along the Tazlina River waterway to stabilize the embankment at crucial locations. | High | Tribal Council Office as applicable | Tribe, HMA, ANA, NRCS, USACE | 3-5 years | B/C: Improving embankment and slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh lost facility replacement costs. TF: The community has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected. |

Table 7-13 Tazlina's Mitigation Action Plan (TMAP)
(*Blue Italicized Initiatives were brought forward from existing planning activities*)
(See Table 7-10 Potential Funding Agency list; Appendix 9 for agency programmatic details)

| Goal/ Action ID | Description | Priority (High, Medium, Low) | Responsible Office or Agency | Potential Funding Source(s) | Timeframe (1-3 Years 2-4 Years 3-5 Years) | Benefit-Costs (BC) / Technical Feasibility (T/F) |
|-----------------------|--|---------------------------------------|-------------------------------------|---|--|--|
| TGF 6.1 | Reinforce soil slopes along the Tazlina River to stabilize slopes that exacerbate damage for water run-off. | High | Tribal Council Office as applicable | Tribe, HMA, ANA, NRCS, USACE | 3-5 years | B/C: Improving embankment and slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh lost facility replacement costs. TF: The community has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected. |
| TSW 7.1 | None | | | | | |
| TWF 9.1 | <i>Ref: Legacy 1a.</i> Ahtna Wildland Fire Interface grant awarded to "Create defensible space around tribal structures by clearing potential fuels 100 feet away from facilities following FireWise guidelines." | Medium | Ahtna Contact: Karen Lanell | DHS&EM, HMA, DNR/DOF: AFG, VFAG, RFAG FP&S, SAFER, HSEP | Ongoing 1-5 years | B/C: Infrastructure protection using FireWise guidelines and standards will assist communities with reducing potential disaster impacts to structures and essential facilities. TF: T This project is feasible using a project funded Project Manager or Tribal Council, with assistance from State and Federal agency support and guidance as applicable to manage contractors with expertise required for technological complexity. |

7.8 MONITORING MITIGATION ACTIONS PROGRESS

The Planning Team determined that Mitigation Strategy, Section 7.4, Table 7-5, is the most appropriate location to support DMA 2000 initiatives found in 44CFR §201.7(c)(4), Monitoring Progress of Mitigation Actions data. Table 7-5 provides the status of each legacy HMP project's or initiative's status.

DMA 2000 requirements and Jurisdictional governance regulations for monitoring mitigation action progress include:

| DMA 2000 Requirements | |
|--|--|
| Monitoring Progress of Mitigation Activities | |
| §201.6(d)(3): [A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.] | |
| REGULATION CHECKLIST | |
| ELEMENT | |
| A. | Does the new or updated plan describe how mitigation measures and project closeouts will be monitored? |
| B. | Does the new or updated plan identify a system for reviewing progress on achieving goals and implementing activities and projects in the Mitigation Strategy? |
| C. | Does the updated plan describe any modifications, if any, to the system identified in the previously approved plan to track the initiation, status, and completion of mitigation activities? |
| D. | Does the updated plan discuss whether mitigation actions were implemented as planned? |
| Source: FEMA, March 2015. | |

7

DMA 2000 requirements and Tribal governance regulations for monitoring mitigation action progress include:

| DMA 2000 Requirements | |
|--|--|
| Monitoring Progress of Mitigation Activities | |
| §201.7(c)(4)(ii): [The plan maintenance process shall include a] system for monitoring implementation of mitigation measures and project closeouts. | |
| §201.7(c)(4)(v): [The plan maintenance process shall include a] system for reviewing progress on achieving goals as well as activities and projects identified in the mitigation strategy. | |
| 1. REGULATION CHECKLIST | |
| ELEMENTS. Plan Maintenance | |
| A. | Does the new or updated plan describe how mitigation measures and project closeouts will be monitored? |
| B. | Does the new or updated plan identify a system for reviewing progress on achieving goals and implementing activities and projects in the Mitigation Strategy? |
| C. | Does the updated plan describe any modifications, if any, to the system identified in the previously approved plan to track the initiation, status, and completion of mitigation activities? |
| D. | Does the updated plan discuss whether mitigation actions were implemented as planned? |
| Source: FEMA, March 2015. | |

7.8.1 Reviewing MJHMP Successes

Glennallen and Tazlina will review their success(es) for achieving the MJHMP's mitigation goals and implementing the Mitigation Action Plan's activities and projects during the annual review process.

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

7.8.2 Copper River Area Project Successes

Table 7-14 and 7-15 list the Cooper River Area's and Native Village's (respectively) new and ongoing successful mitigation activities and initiatives. Many are ongoing annual activities due to their success.

Table 7-14 Copper River Area Mitigation Successes

| Responsible Agency | Project or Activity Title | Progress |
|--|---|---|
| Copper River Local Emergency Planning Committee (LEPC) | Original 4a: Promote importance and public awareness of developing an emergency response plan and public education program on emergency preparedness and personal use supplies. | Ongoing activities: LEPC presentations, public education program on natural hazard emergency preparedness and the importance of having at least 7-days supplies on-hand for various emergency situations. |
| Cross Road Medical Center (CRMC) | Original 5a: Identify and construct/retrofit a building or room to be a designated 'clean building' or 'clean room' for use during periods of poor air quality. (Wildfires, even distant fires, can produce heavy smoke that threatens the health of individuals, particularly those experiencing, or at risk for respiratory ailments. Volcanoes can also deposit large amounts of ash creating poor air quality. During periods of poor air quality, at risk individuals are advised to remain indoors, but not all residents have housing that adequately protects them from this the airborne particulate pollution.) | Ongoing activity: Cross Road Medical Center (CRMC) investigating capacity, effectiveness, and practicality. |
| Red Cross | Original 3a: Identify buildings and facilities that must remain open following an earthquake. (Create a targeted education program to inform facility owners/operators of measures to reduce vulnerability to earthquake damage.) | Performed a walk through at the school to help improve the facility for use as shelter following a catastrophic disaster event. |
| Alaska Department of Natural Resources, (DNR), Division of Forestry (DOF) | Original 1c: Promote public awareness and use of FireWise principles and fire prevention. | Ongoing activities: Home and business owners |
| Alaska Department of Transportation and Public Facilities (DOT/PF) | Original 2b: Work with Alaska Department of Transportation (ADOT) to ensure adequate brushing and fuel reduction along Glenn and Richardson Highways. (In the event of a significant fire, the highways will need to remain open for emergency response operations and resident/visitor evacuation.) | Ongoing activity due to seasonal vegetation growth. Partially complete as DOT/PF has capacity and resources. Reducing wildfire fuels promotes evacuation safety |

Table 7-14 Copper River Area Mitigation Successes

| Responsible Agency | Project or Activity Title | Progress |
|--|---|---|
| Utility companies, SCERP, and CRMS | Update Emergency Response Plans to discuss volcanic ashfall and stormwater event management, prioritize response actions, and initiate actions to fill capability gaps. Done on the LEPC level thru the SCERP and HMP. Done on individual levels too such as CRMC or Electric Company for example. | Ongoing activity coordinated with LEPC membership |
| Utility companies | Encourage utility companies to evaluate and harden vulnerable infrastructure elements (power lines, utility poles, fuel headers, etc.) for sustainability. Done thru utility companies representatives at LEPC monthly meetings and monthly e-mail list. | Ongoing activity coordinated with LEPC membership |
| Local Legislation Office | Elevate residential, public, or critical facilities at least two feet above the (BFE). | Completed within the past five years |
| Glennallen: Moose Creek and Creek near Rustic B&B | Increase culvert sizes to increase their drainage capacity or efficiency. | Completed within the past five years |
| Glennallen: KCAM Radio Station | Local radio station KCAM installed a NOAA/NWS rainfall measuring gauge for local community analysis. | Ongoing activity |
| Copper River EMS | Copper River EMS runs an ad in the local paper reminding residents to always dial 9-1-1 for any emergency. | Ongoing activity |

Many of the Copper River area mitigation successes were inclusive to community tribal members and infrastructure. Table 7-15 reflects tribal specific successes.

7

Table 7-15 Native Tribal Mitigation Successes

| Responsible Agency | Project or Activity Title | Progress |
|---------------------------------|--|--|
| Ahetna Corporation | The Ahetna Tribe has a Wildland Fire Urban Interface (WUI) grant to clear land around village. | Working to fulfill grant within participating tribal jurisdictions |
| Tazlina: DOT/PF | Improved the Tazlina Dike protection capacity | Completed 2017 summer construction season |
| VIA Fire Fuels Reduction | Funding for Village to clear fire fuels within 100 ft of village home perimeters | Ongoing |

7.9 IMPLEMENTING MITIGATION STRATEGY INTO EXISTING PLANNING MECHANISMS

DMA 2000 requirements and Jurisdictional governance regulations for implementing the MJHMP into existing planning mechanisms include:

| DMA 2000 Requirements |
|--|
| Incorporation into Existing Planning Mechanisms §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate. |
| 1. REGULATION CHECKLIST |
| ELEMENT C. Incorporate into Other Planning Mechanisms |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan |

| DMA 2000 Requirements |
|---|
| into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? |
| <i>Source: FEMA, March 2015.</i> |

DMA 2000 requirements and Tribal governance regulations for implementing the MJHMP into existing planning mechanisms include:

| DMA 2000 Requirements |
|--|
| Incorporation into Existing Planning Mechanisms §201.7(c)(4)(iii): [The plan maintenance process shall include a] process by which the Indian Tribal government incorporates the requirements of the mitigation plan into other planning mechanisms such as reservation master plans or capital improvement plans, when appropriate.. |
| REGULATION CHECKLIST |
| ELEMENT |
| A. Does the new or updated plan identify other tribal planning mechanisms available for incorporating the requirements of the mitigation plan? B. Does the new or updated plan include a process by which the Indian Tribal government will incorporate the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate? |
| <i>Source: FEMA, March 2015.</i> |

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

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

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Section Eight provides a comprehensive reference list used to develop the MJHMP.

- ACIA 2013. University of Alaska Fairbanks (UAF), Arctic Climate Impact Assessment (ACIA), 2013. Available: <http://www.amap.no/documents/doc/arctic-arctic-climate-impact-assessment/796>. (November 2016)
- AICC (Alaska Interagency Coordination Center) 2016. Available: <http://fire.ak.blm.gov/aicc.php>. (November 2016)
- Alaska101. Alaska 101 website sponsored by Real Alaska Bearfoot, Alaska's Travel Magazines. Copper River area locations. Available: http://www.alaska101.com/exploreAlaska/copperrc/alaska_travel_copperrc.htm. (November 2016)
- BKP 1988. Baker, V.R.; Kochel, R.C.; Patton, P.C. *Flood Geomorphology*, Published by Wiley-Interscience, April 1988. Available: http://books.google.com/books?id=snLfvo2w-ngC&pg=PA176&lpg=PA176&dq=geomorphology+debris+deposition+during+floods&source=bl&ots=cixFIUnKLb&sig=3gLzWfoyciL3vcYfCOIUcky-ErM&hl=en&ei=E-JxSs-8CYzatAOL2tTMDA&sa=X&oi=book_result&ct=result&resnum=5. (December 2016)
- Census (United States Census Bureau) 2014. American Fact Finder, 2014 Estimates. Alaska. <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>. (October 2016)
- CEHHWG 2016. The Climate, Ecosystems & Human Health Work Group. 2016. Available: <http://www.climatechange.alaska.gov/chh.htm>. (January 2017)
- CRC 2016. Copper Valley Country (CRC) Map. Available: <http://www.alaska101.com/exploreAlaska/maps/copperRiverCountry.gif>. (January 2017).
- CVDA 2015. Copper Valley Development Association (CVDA), Inc. Copper Valley, Alaska 5-Year Area Plan: 2010-2015, Appendix I. Available: http://www.crks.org/docs/CREDC/CVDA.AreaPlan.2010-15._AppendixI.pdf. (February 2017)
- DCRA 2015. Department of Community Commerce and Economic Development (CCED)/Division of Community and Regional Affairs (DCRA)'s, Research & Analysis staff provided historically pertinent Capital Improvement Projects from their archived database. This is historical information that is no longer online accessible. (December 2016)
- DCRA 2016. DCCED/DCRA, Community Plans and Infrastructure Libraries 2016. Available <http://commerce.state.ak.us/dnn/dcra/PlanningLandManagement/CommunityPlansAndInfrastructure.aspx>. (November 2016).

- DGGS 1994. (Division of Geological and Geophysical Survey [DGGS]). Neotectonic Map of Alaska. 1994. Available: <http://www.dggs.alaska.gov/pubs/id/22331>. (October 2016)
- DGGS 2016. DGGS Available Publication. 1990 Volcanoes of North America: United States and Canada, 1990. Wood, C. A., and Kienle, Juergen, (eds.), 1990, Volcanoes of North America: United States and Canada: New York, Cambridge University Press. Available: <http://www.avo.alaska.edu/downloads/reference.php?citid=3284>, and [http://www.avo.alaska.edu/volcanoes/volcinfo.php?volcname=Klawasi Group](http://www.avo.alaska.edu/volcanoes/volcinfo.php?volcname=Klawasi%20Group) , <http://www.avo.alaska.edu/volcanoes/volcinfo.php?volcname=Drum>, and <http://www.avo.alaska.edu/volcanoes/volcinfo.php?volcname=Sanford>, (November 2016)
- DGGS 2016. DGGS Available Image: Index map to Quaternary volcanoes of the Wrangell Volcanic Field. Schaefer, J.R.G. Photographer/Creator. Available: <http://www.avo.alaska.edu/images/image.php?id=50301>. (November 2016)
- DGGS 1993. DGGS Publication: Glennallen Ground Failure Susceptibility. Guidebook To Permafrost and Quaternary Geology Along the Richardson and Glenn Highways Between Fairbanks, and Anchorage, Alaska, Reprinted 1993. Edited by T.L. Pewe, Arizona State University and R.D. Reager, Alaska DGGS. First Edition 1983, Reprinted 1993. Available: <http://pubs.dggsalaskagov.us/webpubs/dggs/gb/text/gb001.pdf>. (November 2016)
- DGGS 1983. DGGS Publication: Miller, T. P., McGimsey, R. G., Richter, D. H., Riehle, J. R., Nye, C. J., Yount, M. E., and Dumoulin, J. A., 1998, Catalog of the historically active volcanoes of Alaska: U.S. Geological Survey Open-File Report OF 98-0582. Available: <http://www.avo.alaska.edu/volcanoes/volcinfo.php?volcname=Wrangell>. (November 2016)
- DHS&EM (Division of Homeland Security and Emergency Management) 2013. *Alaska State Hazard Mitigation Plan, 2013*. Available: <http://ready.alaska.gov/plans/documents/2013%20State%20Mitigation%20Plan%20Draft.pdf> (October 2016)
- DHS&EM 2012. *Critical Facilities Inventory*, 2012. (October 2016)
- DHS&EM 2016. *Disaster Cost Index 2016*. (October 2016)
- DOF (Alaska Division of Forestry). 2016. Role of Fire in the Alaskan Environment. <http://forestry.alaska.gov/fire/fireplans.htm>. (December 2016)
- FEMA 2002. Federal Emergency Management Agency (FEMA), *Mitigation Planning How-To Guides*, 2002. FEMA 386-1. Available: <http://www.fema.gov/hazard-mitigation-planning-resources#1>. (November 2016)
- FEMA 2010. FEMA, *Mitigation Planning Fact Sheet*. Available: <http://www.fema.gov/library/viewRecord.do?id=2066>. (November 2016)
- FEMA 2011. FEMA Hazard Mitigation Plan Review Guide. October 1, 2011. Available: <https://www.fema.gov/media-library/assets/documents/23194>. (November 2016)

- FEMA 2013. FEMA, Local Mitigation Planning Handbook, March 1, 2013. Available: <http://www.fema.gov/library/viewRecord.do?id=7209> . (November 2016)
- FEMA 2015a. *Code of Federal Regulations (CFR), Title 44 – Emergency Management and Assistance*. Available: <http://www.ecfr.gov/cgi-bin/text-id?SID=3e6e6ed90d4fe2483bb7b781f2e31362&node=pt44.1.201&rgn=div5>. (November 2016)
- FEMA 2015b. FEMA, *Hazard Mitigation Assistance Guidance and Addendum, February 27, 2015*. Available: <https://www.fema.gov/media-library/assets/documents/103279>. (November 2016)
- FEMA 2015c. FEMA Flood Map Service Center Portal. Available: <http://msc.fema.gov/portal/search>. (November 2016)
- FEMA 2016a. FEMA, *Flooding and Flood Risks*. Available: http://www.floodsmart.gov/floodsmart/pages/flooding_flood_risks/ffr_overview.jsp. (November 2016)
- FEMA 2016b. FEMA, *Flood Frequently Asked Questions* Available: http://www.floodsmart.gov/floodsmart/pages/faqs/faqs_flood.jsp. (November 2016)
- FEMA 2016c. FEMA, *Flood Facts*. Available: http://www.floodsmart.gov/floodsmart/pages/flood_facts.jsp. (November 2016)
- Haeussler, P. USGS (United States Geologic Survey). 2009. E-mail correspondence concerning Shake Maps. (November 2016)
- Jin 2011. Sridhar, Venkataramana and Jin, Xin. (2011). "Climate Change Impacts: An Assessment for Water Resources Planning and Management in the Pacific Northwest of the U.S". *Climate Change / Book 1*. Available: http://scholarworks.boisestate.edu/cgi/viewcontent.cgi?article=1016&context=civileng_facpubs. (November 2016)
- Jorgenson 2008 et al. Jorgenson, T., Yoshikawa, K., Kanevskiy, M., Shur, Y., Romanovsky, V., Marchenko, S., Grosse, G., Brown, J., and Jones, B (2008). *Permafrost characteristics of Alaska – A new permafrost map of Alaska*. In: Kane, D.L. and Hinkel, K.M. (eds.), Institute of Northern Engineering, University of Alaska Fairbanks, *Extended Abstracts of the Ninth International Conference on Permafrost*, June 29-July 3, Fairbanks, Alaska, 2008, pp. 121-122. Available: http://permafrost.gi.alaska.edu/sites/default/files/AlaskaPermafrostMap_Front_Dec2008_Jorgenson_et_al_2008.pdf. (November 2016)
- MMI 2016. *Modified Mercalli Intensity Scale*. Michigan Technical University. Available: <http://www.geo.mtu.edu/UPSeis/Mercalli.html>. (November 2016)
- Mote 2003. Mote, P.W., 2003: Trends in temperature and precipitation in the Pacific Northwest during the twentieth century. *Northwest Science*. 77(4):271-282. (January 2016)
- NCDC 2016. National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC). Storm Events Database. Available: <http://www.ncdc.noaa.gov/stormevents/> . (December 2016)

- NOAA 2008. *Winter Storms: The Deceptive Killers: A Preparedness Guide*. National Weather Service. Available:
http://www.nws.noaa.gov/os/winter/resources/Winter_Storms2008.pdf. (October 2016)
- NOAA 2016. *National Weather Service Definitions*. Available:
<http://www.weather.gov/glossary/index.php?letter=F>. (November 2016)
- NWS 2016a (National Weather Service (NWS), Climate Search Results 201x. Available:
<http://w2.weather.gov/climate/>. (November 2016)
- SNAP 2016. UAF, Scenarios Network for Alaska and Arctic Planning (SNAP), Community Temperature and Precipitation Charts, 2016. Historic, current, and predicted weather data. Available:
https://www.snap.uaf.edu/sites/all/modules/snap_community_charts/charts.php. (October 2016)
- Tazlina 2016. Native Village of Tazlina website. Available: <http://www.tazlina.org/>. (November 2016)
- USACE 2016a. US Army Corp of Engineers (USACE), *Study Findings and Technical Report. Alaska Baseline Erosion Assessment. March 2009*. Available:
http://206.174.16.211/usace_disclaimer.html . (October 2016)
- USACE. 2016b. USACE, Civil Works Branch, *Alaska Floodplain Manager's Flood Hazard Data*, Glennallen, Alaska. Available: http://206.174.16.211/usace_disclaimer.html. (October 2016)
- USACE. 2016c. USACE, Civil Works Branch, *Alaska Floodplain Manager's Flood Hazard Data*, Tazlina, Alaska. Available: http://206.174.16.211/usace_disclaimer.html. (October 2016)
- 8 USACE. 2016d. USACE, Civil Works Branch, *Alaska Baseline Erosion Assessment; Erosion Information Paper - Tazlina, Alaska, February 29, 2008*. Available:
http://206.174.16.211/Erosion_Info/Minimal%20Communities/Tazlina_Final%20Report.pdf. (November 2016)
- USGS 1959. US Geological Survey (USGS) Some effects of recent volcanic ash falls, with special reference to Alaska: U.S. Geological Survey Bulletin 1028-N, 1959. Available: <http://www.dggs.alaska.gov/pubs/id/3580>. (December 2016).
- USGS 2003. US Geological Survey (USGS) *Rupture in South-Central Alaska – The Denali Fault Earthquake of 2002*. 2003. Gary S. Fuis and Lisa A. Wald. Available:
<http://pubs.usgs.gov/fs/2003/fs014-03/fs014-03.pdf>. (November 2016)
- USGS 2016a. USGS, *NEIC Historic Earthquake Search Results*. Available:
<http://earthquake.usgs.gov/earthquakes/search/>. (October 2016)
- USGS 2016b. USGS National Earthquake Information Center, Probability Mapping; based on 2009 parameters,,: Available: <https://geohazards.usgs.gov/eqprob/2009/index.php>. (November 2016)

- USGS 2016c. USGS North Pacific and Russian Far East Air Routes pass over volcanoes. U.S. Geological Survey Fact Sheet 030-97. Online Version 1.0. Available: <http://pubs.usgs.gov/fs/fs030-97/>. (November 2016)
- WRCC 2016. Western Regional Climate Center, 2016. Available: <http://www.wrcc.dri.edu/summary/Climsmak.html>. (November 2016)

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Appendix A

Funding Resources

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Funding Resources

Federal Funding Resources

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

- FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from FEMA Publication Warehouse (1-800-480-2520) and are briefly described here:
 - How-to Guides. FEMA has developed a series of how-to guides to assist states, communities, and tribes in enhancing their hazard mitigation planning capabilities. The first four guides describe the four major phases of hazard mitigation planning. The last five how-to guides address special topics that arise in hazard mitigation planning such as conducting cost-benefit analysis and preparing multi-jurisdictional plans. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting DMA 2000 requirements (<http://www.fema.gov/hazard-mitigation-planning-resources#1>).
 - Local Mitigation Planning Handbook, March 2013. This handbook explains the basic concepts of hazard mitigation and provides guidance to local governments on developing or updating hazard mitigation plans to meet the requirements of Title 44 Code of Federal Regulations (CFR) §201.6 for FEMA approval and eligibility to apply for FEMA Hazard Mitigation Assistance grant programs. (<http://www.fema.gov/library/viewRecord.do?id=7209>)
 - A Guide to Recovery Programs FEMA 229(4), September 2005. The programs described in this guide may all be of assistance during disaster incident recovery. Some are available only after a Presidential declaration of disaster, but others are available without a declaration. Please see the individual program descriptions for details. (<http://www.fema.gov/txt/rebuild/ltrc/recoveryprograms229.txt>)
 - The Emergency Management Guide for Business and Industry. FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to a community's industries and businesses located in hazard prone areas. (<https://www.fema.gov/media-library/assets/documents/3412>)
 - The 2015 Hazard Mitigation Assistance (HMA) Guidance and Addendum, February 27 and March 3, 2015 respectively. Part I of the Hazard Mitigation Assistance (HMA)

Guidance introduces the three HMA programs, identifies roles and responsibilities, and outlines the organization of the document. This guidance applies to Hazard Mitigation Grant Program (HMGP) disasters declared on or after the date of publication unless indicated otherwise. This guidance is also applicable to the Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA) Programs; the application cycles are announced via <http://www.grants.gov/>. The guidance in this document is subject to change based on new laws or regulations enacted after publication.

- FEMA, <http://www.fema.gov> - includes links to information, resources, and grants that communities can use in planning and implementing community resilience and sustainability measures.
- FEMA also administers emergency management grants (<http://www.fema.gov/help/site.shtm>) and various firefighter grant programs (<http://www.firegrantsupport.com/>) such as
 - Emergency Management Performance Grant (EMPG). This is a pass through grant. The amount is determined by the State. The grant is intended to support critical assistance to sustain and enhance State and local emergency management capabilities at the State and local levels for all-hazard mitigation, preparedness, response, and recovery including coordination of inter-governmental (Federal, State, regional, local, and tribal) resources, joint operations, and mutual aid compacts state-to-state and nationwide. Sub-recipients must be compliant with National Incident Management System (NIMS) implementation as a condition for receiving funds. Requires 50% match. (<https://www.fema.gov/fiscal-year-2015-emergency-management-performance-grant-program>)
 - National Earthquake Hazards Reduction Program (NEHRP). The National Earthquake Hazards Reduction Program (NEHRP) seeks to mitigate earthquake losses in the United States through both basic and directed research and implementation activities in the fields of earthquake science and engineering. (<https://www.fema.gov/national-earthquake-hazards-reduction-program>)

The NEHRP is the Federal Government's coordinated approach to addressing earthquake risks. Congress established the program in 1977 (Public Law 95-124) as a long-term, nationwide program to reduce the risks to life and property in the United States resulting from earthquakes. The NEHRP is managed as a collaborative effort among FEMA, the National Institute of Standards and Technology, the National Science Foundation, the United States Geological Survey, and the Department of Interior.

The four goals of the NEHRP are to:

- Develop effective practices and policies for earthquake loss-reduction and accelerate their implementation.
- Improve techniques to reduce seismic vulnerability of facilities and systems.
- Improve seismic hazards identification and risk-assessment methods and their use.
- Improve the understanding of earthquakes and their effects.

- NEHRP information may be found at:
<http://www.fema.gov/plan/prevent/earthquake/nehrrp.shtm>, and
http://www.ehow.com/info_7968511_disaster-research-grant-funding.html
- Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), and Assistance to Firefighters Station Construction Grant programs. Information can be found at: (<http://forestry.alaska.gov/fire/vfa.htm>).
 - Department of Homeland Security (DHS) provides the following grants:
 - Homeland Security Grant Program (HSGP), State Homeland Security Program (SHSP) are 80% pass through grants. SHSP supports implementing the State Homeland Security Strategies to address identified planning, organization, equipment, training, and exercise needs for acts of terrorism and other catastrophic events. In addition, SHSP supports implementing the National Preparedness Guidelines, the NIMS, and the National Response Framework (NRF). Must ensure at least 25% of funds are dedicated towards law enforcement terrorism prevention-oriented activities. (<https://www.dhs.gov/homeland-security-grant-program-hsgp>)
 - Citizen Corps Program (CCP). The Citizen Corps mission is to bring community and government leaders together to coordinate involving community members in emergency preparedness, planning, mitigation, response, and recovery activities. (<http://www.dhs.gov/citizen-corps>)
 - Emergency Operations Center (EOC) Guidance. This program is intended to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located, and fully interoperable Emergency Operations Centers (EOCs) with a focus on addressing identified deficiencies and needs. Fully capable emergency operations facilities at the State and local levels are an essential element of a comprehensive national emergency management system and are necessary to ensure continuity of operations and continuity of government in major disasters or emergencies caused by any hazard. Requires 25% match. (<https://www.fema.gov/media-library/assets/documents/20622>)
 - Emergency Alert System (EAS). Resilient public alert and warning tools are essential to save lives and protect property during times of national, state, regional, and local emergencies. The Emergency Alert System (EAS) is used by alerting authorities to send warnings via broadcast, cable, satellite, and wireline communications pathways. Emergency Alert System participants, which consist of broadcast, cable, satellite, and wireline providers, are the stewards of this important public service in close partnership with alerting officials at all levels of government. The EAS is also used when all other means of alerting the public are unavailable, providing an added layer of resiliency to the suite of available emergency communication tools. The EAS is in a constant state of improvement to ensure seamless integration of CAP-based and emerging technologies. (<https://www.fema.gov/emergency-alert-system>)
 - U.S. Department of Commerce's grant programs include:
 - National Oceanic and Atmospheric Administration (NOAA), provides funds to the State of Alaska due to Alaska's high threat for tsunami. The allocation supports the

- promotion of local, regional, and state level tsunami mitigation and preparedness; installation of warning communications systems; installation of warning communications systems; installation of tsunami signage; promotion of the Tsunami Ready Program in Alaska; development of inundation models; and delivery of inundation maps and decision-support tools to communities in Alaska.
(http://www.tsunami.noaa.gov/warning_system_works.html)
- Remote Community Alert Systems (RCASP) grant for outdoor alerting technologies in remote communities effectively underserved by commercial mobile service for the purpose of enabling residents of those communities to receive emergency messages.
(<http://www.federalgrants.com/Remote-Community-Alert-Systems-Program-11966.html>) This program is a contributing element of the Warning, Alert, and Response Network (WARN) Act.
 - Public Works and Development Facilities Program. This program provides assistance to help distressed communities attract new industry, encourage business expansion, diversify local economies, and generate long-term, private sector jobs. Among the types of projects funded are water and sewer facilities, primarily serving industry and commerce; access roads to industrial parks or sites; port improvements; business incubator facilities; technology infrastructure; sustainable development activities; export programs; brownfields redevelopment; aquaculture facilities; and other infrastructure projects. Specific activities may include demolition, renovation, and construction of public facilities; provision of water or sewer infrastructure; or the development of stormwater control mechanisms (e.g., a retention pond) as part of an industrial park or other eligible project.
(http://cfpub.epa.gov/fedfund/program.cfm?prog_num=51)
 - US Environmental Protection Agency (EPA). Under EPA's Clean Water State Revolving Fund (CWSRF) program, each state maintains a revolving loan fund to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects, including: municipal wastewater treatment projects; non-point source projects; watershed protection or restoration projects; and estuary management projects.
(<http://yosemite.epa.gov/R10/ecocomm.nsf/6da048b9966d22518825662d00729a35/7b68c420b668ada5882569ab00720988!OpenDocument>)
 - Indian Environmental General Assistance Program (IGAP). 1992, Congress passed the Indian Environmental General Assistance Program Act (42 U.S.C. 4368b) which authorizes EPA to provide General Assistance Program (GAP) grants to federally-recognized tribes and tribal consortia for planning, developing, and establishing environmental protection programs in Indian country, as well as for developing and implementing solid and hazardous waste programs on tribal lands.
- The goal of this program is to assist tribes in developing the capacity to manage their own environmental protection programs, and to develop and implement solid and hazardous waste programs in accordance with individual tribal needs and applicable federal laws and regulations.

<http://www.epa.gov/Indian/gap.htm>

- Department of Agriculture (USDA). Provides diverse funding opportunities; providing a wide benefit range. Their grants and loans website provides a brief programmatic overview with links to specific programs and services.
(<http://www.rd.usda.gov/programs-services>)
 - Farm Service Agency: Emergency Conservation Program, Non-Insured Assistance, Emergency Forest Restoration Program, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service.
(<http://www.fsa.usda.gov/FSA/stateoffapp?mystate=ak&area=home&subject=landing&topic=landing>)
 - Natural Resources Conservation Service (NRCS) has several funding sources to fulfill mitigation needs.
(<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/alphabetical/>)
 - Conservation Technical Assistance Program (CTA) is voluntary program available to any group or individual interested in conserving their natural resources and sustaining agricultural production. The program assists land users with addressing opportunities, concerns, and problems related to using their natural resources enabling them to make sound natural resource management decisions on private, tribal, and other non-federal lands.
(<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/>)
 - Conservation Innovation Grants (CIG) is a voluntary program intended to stimulate developing and adopting innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program funds are used to award competitive grants to non-Federal governmental or nongovernmental organizations, Tribes, or individuals.

CIG enables NRCS to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the Nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with Federal, State, and local regulations.
(<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig/>)
 - The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides financial and technical assistance to agricultural producers through contracts up to a maximum term of ten years in length. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition, a purpose of EQIP is to help producers meet Federal, State, Tribal and local environmental regulations.
(<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1242633>)

- The Emergency Watershed Protection Program (EWP) is designed is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.
(<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/>)
- Watershed Surveys and Planning. NRCS watershed activities in Alaska are voluntary efforts requested through conservation districts and units of government and/or tribes. The purpose of the program is to assist Federal, State, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries.
(<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/wsp/>)
- 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.
(<http://www1.eere.energy.gov/wip/wap.html>)
 - The Tribal Energy Program offers financial and technical assistance to Indian tribes to help them create sustainable renewable energy installations on their lands. This program promotes tribal energy self-sufficiency and fosters employment and economic development on America's tribal lands. (<http://energy.gov/eere/wipo/tribal-energy-program>)
- Department of Health and Human Services, Administration of Children & Families, Administration for Native Americans (ANA). The ANA awards funds through grants to American Indians, Native Americans, Native Alaskans, Native Hawaiians, and Pacific Islanders. These grants are awarded to individual organizations that successfully apply for discretionary funds. ANA publishes in the Federal Register an announcement of funds available, the primary areas of focus, review criteria, and application information.
(<http://www.acf.hhs.gov/grants/open/foa/>)
- Department of Housing and Urban Development (HUD) provides a variety of disaster resources. They also partner with Federal and state agencies to help implement disaster recovery assistance. Under the *National Response Framework* the FEMA and the Small Business Administration (SBA) offer initial recovery assistance.
(http://www.hud.gov/info/disasterresources_dev.cfm)

- HUD, Office of Homes and Communities, Section 108 Loan Guarantee Programs. This program provides loan guarantees as security for Federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing.
(<http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/index.cfm>)
- HUD, Office of Homes and Communities, Section 184 Indian Home Loan Guarantee Programs (IHLGP). The Section 184 Indian Home Loan Guarantee Program is a home mortgage specifically designed for American Indian and Alaska Native families, Alaska Villages, Tribes, or Tribally Designated Housing Entities. Section 184 loans can be used, both on and off native lands, for new construction, rehabilitation, purchase of an existing home, or refinance.
- Because of the unique status of Indian lands being held in Trust, Native American homeownership has historically been an underserved market. Working with an expanding network of private sector and tribal partners, the Section 184 Program endeavors to increase access to capital for Native Americans and provide private funding opportunities for tribal housing agencies with the Section 184 Program.
(<http://www.hud.gov/offices/pih/ih/homeownership/184/>)
- Indian Housing Block Grant / Native American Housing Assistance and Self Determination Act (IHBG/NAHASDA) administration, operating, & construction funds. The act is separated into seven sections:

The Indian Housing Block Grant Program (IHBG) is a formula grant that provides a range of affordable housing activities on Indian reservations and Indian areas. The block grant approach to housing for Native Americans was enabled by the Native American Housing Assistance and Self Determination Act of 1996 (NAHASDA).

Eligible IHBG recipients are Federally recognized Indian tribes or their tribally designated housing entity (TDHE), and a limited number of state recognized tribes who were funded under the Indian Housing Program authorized by the United States Housing Act of 1937 (USHA). With the enactment of NAHASDA, Indian tribes are no longer eligible for assistance under the USHA.

An eligible recipient must submit to HUD an Indian Housing Plan (IHP) each year to receive funding. At the end of each year, recipients must submit to HUD an Annual Performance Report (APR) reporting on their progress in meeting the goals and objectives included in their IHPs.

Eligible activities include housing development, assistance to housing developed under the Indian Housing Program, housing services to eligible families and individuals, crime prevention and safety, and model activities that provide creative approaches to solving affordable housing problems.

(http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ihgrants/ihbg)

- Community Development Block Grants (CDBG) provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would

- primarily benefit low-and moderate-income. persons
(<http://www.hud.gov/offices/cpd/communitydevelopment/programs/>)
- National Disaster Resilience (NDR) grant is a HUD/CDBG. The grant opportunity is called the Community Block Development Grant-National Disaster Resilience (CDBG-NDR). HUD sponsors the National Disaster Resilience Competition (NDRC) to help eligible communities impacted by federally declared disasters in 2011, 2012 and 2013 become more resilient. The NDRC is a two-phase process that will competitively award nearly \$1 billion in HUD Disaster Recovery funds to the most impacted, distressed and needy eligible communities. The grant opportunity is called the Community Block Development Grant-National Disaster Resilience (CDBG-NDR). The State of Alaska is one of many applicants nationwide eligible to apply on behalf of its impacted communities. (<https://www.hudexchange.info/course-content/ndrc-nofa-phase-1-factors/NDRC-NOFA-Phase-1-Factors-Slides-2014-11-03.pdf>)
 - HUD/Indian Community Development Block Grants (ICDBG) provide grant assistance and technical assistance to aid communities or Indian tribes in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income. persons
(http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/i/h/grants/icdbg)
 - Department of Labor (DOL), Employment and Training Administration, Disaster Unemployment Assistance (DUA). Provides weekly unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible.
(<http://www.workforcesecurity.doleta.gov/unemploy/disaster.asp>)
 - The Workforce Investment Act contains provisions aimed at supporting employment and training activities for Indian, Alaska Native, and Native Hawaiian individuals. The Department of Labor's Indian and Native American Programs (INAP) funds grant programs that provide training opportunities at the local level for this target population. (<http://www.dol.gov/dol/topic/training/indianprograms.htm>)
 - Department of Transportation (DOT), Hazardous Materials Emergency Preparedness (HMEP) Grant. The Hazardous Materials Transportation Safety and Security Reauthorization Act of 2005 authorizes the U.S. DOT to provide assistance to public sector employees through training and planning grants to States, Territories, and Native American tribes for emergency response. The purpose of this grant program is to increase State, Territorial, Tribal, and local effectiveness in safely and efficiently handling hazardous materials accidents and incidents, enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), and encourage a comprehensive approach to emergency training and planning by incorporating the unique challenges of responses to transportation situations.
(<http://www.phmsa.dot.gov/hazmat/grants>)

- Federal Financial Institutions. Member banks of Federal Deposit Insurance Corporation, Financial Reporting Standards or Federal Home Loan Bank Board may be permitted to waive early withdrawal penalties for Certificates of Deposit and Individual Retirement Accounts.
- Internal Revenue Service (IRS), Disaster Tax Relief. Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous year's tax returns (<http://www.irs.gov/Businesses/Small-Businesses-%26-Self-Employed/Disaster-Assistance-and-Emergency-Relief-for-Individuals-and-Businesses-1>).
- Small Business Administration (SBA) Disaster Assistance Loans and Grants program provides information concerning disaster assistance, preparedness, planning, cleanup, and recovery planning. (<https://www.sba.gov/category/navigation-structure/loans-grants>)
 - May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. (<https://www.sba.gov/category/navigation-structure/loans-grants/small-business-loans/disaster-loans>). Requests for SBA loan assistance should be submitted to DHS&EM.
- United States Army Corps of Engineers (USACE) Alaska District's Civil Works Branch studies potential water resource projects in Alaska. These studies analyze and solve water resource issues of concern to the local communities. These issues may involve navigational improvements, flood control or ecosystem restoration. The agency also tracks flood hazard data for over 300 Alaskan communities on floodplains or the sea coast. These data help local communities assess the risk of floods to their communities and prepare for potential future floods. The USACE is a member and co-chair of the Alaska Climate Change Sub-Cabinet.
 - Civil Works and Planning
(<http://www.poa.usace.army.mil/Missions/CivilWorksandPlanning.aspx>)
 - Environmental Resources Section
(<http://www.poa.usace.army.mil/About/Offices/Engineering/EnvironmentalResources.aspx>)
 - USACE Alaska District Grants
(http://search.usa.gov/search?affiliate=alaska_district&query=grants)
- The Grants.gov program management office was established, in 2002, as a part of the President's Management Agenda. Managed by the Department of Health and Human Services, Grants.gov is an E-Government initiative operating under the governance of the Office of Management and Budget.

Under the President's Management Agenda, the office was chartered to deliver a system that provides a centralized location for grant seekers to find and apply for federal funding opportunities. Today, the Grants.gov system houses information on over 1,000 grant programs and vets grant applications for 26 federal grant-making agencies.

State Funding Resources

- Department of Military and Veterans Affairs (DMVA): Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits.
(<http://veterans.alaska.gov/links.htm>)
 - DHS&EM within DMVA is responsible for improving hazard mitigation technical assistance for local governments for the State of Alaska. Providing hazard mitigation training, current hazard information and communication facilitation with other agencies will enhance local hazard mitigation efforts. DHS&EM administers FEMA mitigation grants to mitigate future disaster damages such as those that may affect infrastructure including elevating, relocating, or acquiring hazard-prone properties.
(<http://ready.alaska.gov/plans/mitigation.htm>)

DHS&EM also provides mitigation funding resources for mitigation planning on their Web site at <http://ready.alaska.gov/grants>.

- Division of Health and Social Services (DHSS): On this site you will find information intended to assist all who are interested in DHSS grants and services they support.
(<http://dhss.alaska.gov/fms/grants/Pages/grants.aspx> and
<http://dhss.alaska.gov/fms/Documents/FY15GrantBook.pdf>)
- Division of Health and Social Services (DSS): Provides special outreach services for seniors, including food, shelter and clothing.
(<http://dhss.alaska.gov/dsds/Pages/hcb/hcb.aspx>)
- Division of Insurance (DOI): Provides assistance in obtaining copies of policies and provides information regarding filing claims.
(<http://commerce.state.ak.us/dnn/ins/Consumers/AlaskaConsumerGuide.aspx>)
- DCRA within the DCCED administers the HUD/CDBG, FMA Program, and the Climate Change Sub-Cabinet's Interagency Working Group's program funds and administers various flood and erosion mitigation projects, including the elevation, relocation, or acquisition of flood-prone homes and businesses throughout the State. This division also administers programs for State's "distressed" and "targeted" communities.
(<http://www.commerce.state.ak.us/dca/>)
 - DCRA Planning and Land Management staff provide Alaska Climate Change Impact Mitigation Program (ACCIMP) funding to Alaskan communities that meet one or more of the following criteria related to flooding, erosion, melting permafrost, or other climate change-related phenomena: Life/safety risk during storm/flood events; loss of critical infrastructure; public health threats; and loss of 10% of residential dwellings.
(<http://commerce.state.ak.us/dnn/dkra/PlanningLandManagement/ACCIMP.aspx>)

The Hazard Impact Assessment is the first step in the ACCIMP process. The HIA identifies and defines the climate change-related hazards in the community, establishes current and predicted impacts, and provides recommendations to the community on alternatives to mitigate the impact.

(http://commerce.alaska.gov/dca/planning/accimp/hazard_impact.html)

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

Alaska's Revolving Loan Fund Program, prescribed by Title VI of the Clean Water Act as amended by the Water Quality Act of 1987, Public Law 100-4. DEC will use the ACWF account to administer the loan fund. This Agreement will continue from year-to-year and will be incorporated by reference into the annual capitalization grant agreement between EPA and the DEC. DEC will use a fiscal year of July 1 to June 30 for reporting purposes.
(http://www.epa.gov/region10/pdf/water/srf/cwsrf_alaska_operating_agreement.pdf)
- Department of Transportation and Public Facilities (DOT/PF) personnel provide technical assistance to the various emergency management programs, to include mitigation. This assistance is addressed in the DHS&EM-DOT/PF Memorandum of Agreement and includes but is not limited to: environmental reviews, archaeological surveys, and historic preservation reviews.
 - DOT/PF and DHS&EM coordinate buy-out projects to ensure that there are no potential right-of-way conflicts with future use of land for bridge and highway projects, and collaborate on earthquake mitigation.

- Additionally, DOT/PF provides the safe, efficient, economical, and effective State highway, harbor, and airport operation. DOT/PF uses its Planning, Design and Engineering, Maintenance and Operations, and Intelligent Transportation Systems resources to identify hazards, plan and initiate mitigation activities to meet the transportation needs of Alaskans, and make Alaska a better place to live and work. DOT/PF budgets for temporary bridge replacements and materials necessary to make the multi-modal transportation system operational following natural disaster events.
- DNR administers various projects designed to reduce stream bank erosion, reduce localized flooding, improve drainage, and improve discharge water quality through the stormwater grant program funds. Within DNR,
 - The Division of Geological and Geophysical Survey (DGGS) is responsible Alaska's mineral, land, and water resources use, development, and earthquake mitigation collaboration.

Their geologists and support staff are leaders in researching Alaska's geology and implementing technological tools to most efficiently collect, interpret, publish, archive, and disseminate information to the public.
(<http://dggs.alaska.gov/pubs/advanced-search>)

- The DNR's Division of Forestry (DOF) participates in a statewide wildfire control program in cooperation with the forest industry, rural fire departments and other agencies. Prescribed burning may increase the risks of fire hazards; however, prescribed burning reduces the availability of fire fuels and therefore the potential for future, more serious fires.
(<http://forestry.alaska.gov/pdfs/08FireSuppressionMediaGuide.pdf>)
- DOF also manages various wildland fire programs, activities, and grant programs such as the FireWise Program (<http://forestry.alaska.gov/fire/firewise.htm>), Community Forestry Program (CFP) (<http://forestry.alaska.gov/community/>), Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), and Volunteer Fire Assistance and Rural Fire Assistance Grant (VFA-RFA) programs (<http://forestry.alaska.gov/fire/vfarfa.htm>). Information can be found at <http://forestry.alaska.gov/fire/current.htm>.
- The Alaska Interagency Coordination Center (AICC) is the Geographic Area Coordination Center for Alaska. AICC serves as the focal point for initial attack resource coordination, logistics support, and predictive services for all state and federal agencies involved in wildland fire management and suppression in Alaska.

Fire management planning, preparedness, suppression operations, prescribed burning, and related activities are coordinated on an interagency basis. DOF has cooperative agreements with the Departments of Agriculture and Interior, and numerous local government and volunteer fire departments to respond to wildland fires, reduce duplication of efforts, and share resources.

In 1984 the State of Alaska adopted the National Interagency Incident Management System Incident Command System concept for managing fire suppression. The Incident Command System (ICS) guiding principles are followed in all wildland fire

management operations. All State of Alaska Departments adopted ICS in 1996 through the Governor's administrative order.

Other Funding Resources

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

- Rural Alaska Community Action Program Inc. (RurAL CAP) In the nearly 50 years since it began, it is difficult to imagine any aspect of rural Alaskan lives which has not been touched in some way by the people and programs of RurAL CAP. From Head Start, parent education, adult basic education, and elder-youth programs, to Native land claims and subsistence rights, energy and weatherization programs, and alcohol and substance abuse prevention, RurAL CAP has left a lasting mark on the history and development of Alaska and its rural Peoples. (http://ruralcap.com/?page_id=334)
 - Weatherization Assistance Program assists low to moderate income households in weatherization needs. The program is available to homeowners as well as renters and includes; single family homes, cabins, mobile homes, condominiums and multifamily dwellings. (http://ruralcap.com/?page_id=794)
 - Solid Waste Management. RurAL CAP continues to host an expert solid waste liaison, Ted Jacobson, through funding provided by the Environmental Protection Agency (EPA) and Senior Services America, Inc. The liaison provides solid waste management technical assistance to rural communities through training, site visits, hands-on demonstrations, and remote contact. Resources are provided for dump management activities, collaborating with funders for funding and technical assistance on solid waste management, recycling, and backhaul. (http://ruralcap.com/?page_id=198)
- 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), an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters. (<http://www.disastersafety.org/>)
- 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. (<http://www.redcross.org/find-help>)
- Catalog of Federal Domestic Assistance (DFDA) Crisis Counseling Program (CCP). Provides grants to State and Borough Mental Health Departments, which in turn provide training for screening, diagnosing and counseling techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster. (<http://dialoguemakers.org/Resourses4states+Nonprofits.htm>)
- Denali Commission. Introduced by Congress in 1998, the Denali Commission is an independent federal agency designed to provide critical utilities, infrastructure, and economic support throughout Alaska. With the creation of the Denali Commission,

Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities. Since its first meeting in April 1999, the Commission is credited with providing numerous cost-shared infrastructure projects across the State that exemplifies effective and efficient partnership between federal and state agencies, and the private sector. (<http://www.denali.gov/grants>)

- The Energy Program primarily funds design and construction of replacement bulk fuel storage facilities, upgrades to community power generation and distribution systems, alternative-renewable energy projects, and some energy cost reduction projects. The Commission works with the Alaska Energy Authority (AEA), Alaska Village Electric Cooperative (AVEC), Alaska Power and Telephone and other partners to meet rural communities' fuel storage and power generation needs.
- The goal of the solid waste program at the Denali Commission is to provide funding to address deficiencies in solid waste disposal sites which threaten to contaminate rural drinking water supplies.
- Lindbergh Foundation Grants. Each year, The Charles A. and Anne Morrow Lindbergh Foundation provides grants of up to \$10,580 (a symbolic amount representing the cost of the Spirit of St. Louis) to men and women whose individual initiative and work in a wide spectrum of disciplines furthers the Lindberghs' vision of a balance between the advance of technology and the preservation of the natural/human environment. (<http://www.thelindberghfoundation.org/awards>)
- Rasmuson Foundation Grants. The Rasmuson foundation invests both in individuals and well-managed 501(c)(3) organizations dedicated to improving the quality of life for Alaskans.

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

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

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

Appendix B
FEMA Review Tool
Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

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Appendix C
Glennallen's MJHMP Promulgation
and
The Native Village of Tazlina's Tribal Adoption

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Appendix D
Public Outreach Activities

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From: Simmons, Scott

Sent: Thursday, October 13, 2016 12:35 PM

To: "hdenny@anthc.org"; 'tneal@usgs.gov'; 'swhite@avcp.org'; 'steve.heppner.bia.ak@gmail.com'; 'alexa.greene@alaska.gov'; 'jneimeyer@denali.gov'; 'DOT Harvey Smith'; 'michelle.torres@alaska.gov'; 'ryan.anderson@alaska.gov'; 'jimmy.smith@alaska.gov'; 'terri.lomax@alaska.gov'; 'Soderlund.Dianne@epamail.epa.gov'; 'john.lingaas@noaa.gov'; 'joel.curtis@noaa.gov'; 'sam.albanese@noaa.gov'; 'meg.mueller@ak.usda.gov'; 'merlaine.kruse@ak.usda.gov'; 'ak_le@fws.gov'; 'eddie.zingone@noaa.gov'; 'patty.burns@alaska.gov'; 'margie.goatley1@alaska.gov'; 'khoward@blm.gov'; 'BischofbergerKL@ci.anchorage.ak.us'; 'nicole.kinsman@noaa.gov'; 'bruce.r.sexaur@usace.army.mil'; 'mtavelton@usace.army.mil'; 'steve.mcgroarty@alaska.gov'; 'megan.kohler@alaska.gov'; 'jade.gamble@alaska.gov'; 'steven.russell@alaska.gov'; 'deanne.stevens@alaska.gov'

Cc: Young, Laura; Evans, Jessica; Appleby, Elizabeth; Seims, Tux; Schultz, Thomas

Subject: Agency Involvement Participant Invitation Letter

Dear Potential HMP Development Participants,

AECOM (formerly URS) has received a 2014 contract from the State Division of Homeland Security and Emergency Management (DHS&EM) to develop Local/Tribal Multi-Jurisdictional Hazard Mitigation Plans (MJHMPs) for the following communities: Each group defines the HMP type and targeted communities.

The following communities' do not currently have an HMP. These communities will develop plans that meet FEMA's current MJHMP requirements:

New MJHMP and Tribal HMP Development

Organized Cities with Co-Located Villages

- Diomed (2nd Class City with Tribal Village)
- Goodnews Bay (2nd Class City with Tribal Village)
- White Mountain (2nd Class City with Tribal Village)

Stand Alone Tribal HMPs

- Native Village of Minto
- Native Village of Tyonek
- Native Village of Venetie

The following communities' currently have expired HMPs. These communities will have their plans updated from HMP to MJHMPs to meet current FEMA requirements:

MJHMP/Tribal HMP Update Required

Organized Cities with Co-Located Villages

- Allakaket (2nd Class City with Tribal Village)
- Nulato (2nd Class City with Tribal Village)
- Saint Mary's (2nd Class City with Tribal Village)

Stand Alone Tribal HMPs

- Native Village of Alatna
- Native Village of Koyukuk
- Native Village of Kwethluk

The Northwest Arctic Borough (NWAB) Multi-Jurisdictional HMP (MJHMP) consists of nine organized cities and 2 unorganized communities. NWAB is currently expired. These Borough's plan as well as constituent communities will have their plans updated to meet current FEMA requirements:

The NWAB Borough, MJHMP

Organized Cities with Co-Located Villages

- Ambler (2nd Class City with Tribal Village)
- Buckland (2nd Class City with Tribal Village)
- Deering (2nd Class City with Tribal Village)
- Kiana (2nd Class City with Tribal Village)
- Kobuk (2nd Class City with Tribal Village)
- Kotzebue (2nd Class City with Tribal Village)

- Noorvik (2nd Class City with Tribal Village)
- Selawik (2nd Class City with Tribal Village)
- Shungnak (2nd Class City with Tribal Village)

Unorganized Communities

- Native Village of Noatak
- Red Dog Mine

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

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

I encourage you to acknowledge receiving this invitation at your earliest convenience to allow me to include your participation (with appropriate acknowledgments) within the Draft and Final HMPs prior to State and FEMA review and subsequent approvals.

Kind Regards

-Scott-

R. Scott Simmons, CFM, CPM

Emergency Management, Mitigation, and Resilience Planner

scott.simmons@aecom.com



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From: Simmons, Scott
To: ["tazlina@cvinternet.net"](mailto:tazlina@cvinternet.net)
Cc: ["copperriverlepc@gmail.com"](mailto:copperriverlepc@gmail.com)
Subject: 2016 Glennallen HMP Update
Date: Wednesday, October 26, 2016 1:42:00 PM
Attachments: [GlnAllen UpdateHMP Nwsltr 1 10-2016.pdf](#)

Good Afternoon, President Stickwan,

I am writing to introduce myself Scott Simmons, Lead Hazard Mitigation Planner, AECOM. Please contact me at your earliest convenience once you have reviewed this email and the attached draft Newsletter 1.

AECOM was contracted by the Alaska Division of Homeland Security and Emergency Management (DHS&EM) to assist the Glennallen Community with updating their legacy 2011 Hazard Mitigation Plan (HMP) to fulfill current FEMA Hazard Mitigation Plan (HMP) criteria. This HMP update includes all-inclusive communities such as agencies, tribes, and Villages within the area.

It is important to note that neither the community nor the village needs to pay anything for this project. It is funded by FEMA through DHS&EM.

Mitigation Defined:

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

AECOM has been developing HMPs nationwide since 2000. Our Alaska office has completed nearly 100 State, Borough (County) and local community, State reviewed, and FEMA approved MJHMPs to-date.

Hazard Mitigation plans identify hazards which routinely impact a community, defines those hazards so community members understand their nature, hazard impact location(s) within the community, and their potential impact extent.

AECOM's role in this project is to ensure that the HMP meets state and federal requirements -- part of this requirement are to describe community and tribal participation processes and involvement. We are at the beginning stages of this project, and it is our experience that successful plans are a result of an involved community. We are seeking information about the community and villages, and other agencies' infrastructure, residents, and jurisdictional authorities.

Our task is to write the plan while teaching you the hazard mitigation plan development process. We have been very successful accomplishing this by using a community Planning Team process. AECOM will write the plan. The community Planning Team will work with us to provide us information to:

- Describe the plan's development process, include interested community members as plan participants or reviewers,
- Identify which hazards routinely impact your community,
- Help us explain your historical damages,
- Identify the community's critical facilities and their location within each identified hazard's impact area (street addresses, GPS coordinates, etc.),
- Determine "estimated" critical facility replacement costs,
- Determine how many employees and residents/customers may be in each facility during a typical point-in-time,
- Develop hazard mitigation goals,
- Select a few potential projects which could reduce or eliminate future disaster related damages,

Our first goal for the community is to encourage you to select a Planning Team Leader and a few team members from throughout the community consisting with consideration for City, Tribal, and agency membership. We suggest you look for team members from the City, Village elders, the health clinic, school, volunteer fire fighters, law enforcement, and others as you deem appropriate. Team members should have knowledge of natural hazards that continually cause damages; what facilities are critical for protection from these hazards; as well as, what resources and capabilities are available within the community to mitigate those hazards.

Local Planning Team membership needs to be manageable, with four or five members. However, a few communities selected their joint community council as their Community Planning Team.

Who do you recommend for inclusion on the team?

2016 HMP Planning Team Membership

Name Title Organization

(Glennallen Community; Native Village of Tazlina, or Agency Name , etc.)

Involvement

Libby Bengtson Chairman Local Emergency Planning Committee (LEPC)
HMP Planning Team Leader

Community data gathering and HMP plan review

Community data gathering and HMP plan review

Community data gathering and HMP plan review

Gloria Stickwan President Native Village of Tazlina Tribal data gathering and HMP review

Native Village of Tazlina Tribal data gathering and HMP review

Tribal data gathering and HMP review

Scott Simmons HMP Planning Project Team Lead AECOM, Alaska Responsible for HMP development, review, and quality

There will be opportunities for the entire community to review the team's work during the public involvement process because FEMA requires at least two public involvement activities. These activities can include distributing or posting newsletters to enable community wide knowledge, providing information during Community Meetings (or other public meeting opportunities), and while working with us over the phone as we capture needed information.

AECOM will provide two (2) newsletters.

- The first newsletter (attached) will introduce the project and explain the planning process, encourage public involvement; ask the community to identify known hazards, and to confirm their critical infrastructure as identified by DHS&EM's statewide small community Critical Facility Database.
- The second newsletter will introduce the draft MJHMP and encourage the community to review and provide comments to make the plan better or more usable to mitigate your hazards.

I have attached draft Newsletter one (1) for your review. Please provide your Planning Team membership names so she can update Newsletter 1 and return the final version for distribution and/or posting throughout the community.

I will be contacting you to schedule an introductory meeting or work session with the team leader and team members to introduce the project and plan development process; and coordinate information collection.

Please work with me to schedule a teleconference as soon as feasible within the next two weeks.

I look forward to working with you to complete the 2016 Glennallen's HMP Update.
Thank you for your time.

Kind Regards

-Scott-

R. Scott Simmons, CFM, CPM

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GLENNALLEN COMMUNITY AREA HAZARD MITIGATION PLAN UPDATE

Newsletter #1

November 2016

This newsletter describes the Glennallen Area's Hazard Mitigation Plan Update project's development processes to all interested agencies, stakeholders, and the public and to solicit comments. It can also be viewed on the State of Alaska Division of Homeland Security and Emergency Management Website at <http://ready.alaska.gov/plans/localhazmitplans>.

The State of Alaska, Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management (DHS&EM) was awarded a Pre-Disaster Mitigation Program grant from the Federal Emergency Management Agency (FEMA) to update your 2011 Glennallen Hazard Mitigation Plan (HMP).

AECOM was contracted to assist the community with preparing a 2016 FEMA approvable HMP update.

The HMP will identify all natural hazards, such as earthquake, flood/erosion, ground failure, severe weather, volcano, and wildland/tundra fire hazards, etc. The plan will also identify the people and facilities potentially at risk and ways to mitigate damage from future hazard impacts. We will document the public participation and planning process as part of these project.

What is Hazard Mitigation?

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

Why Do We Need A Hazard Mitigation Plan?

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

A FEMA approved and community adopted HMP enables the Local government to apply for the Hazard Mitigation Grant Program (HMGP), a disaster related assistance program; the Pre-Disaster Mitigation (PDM), and the National Flood Insurance Program (NFIP) Flood Mitigation Assistance (FMA) grant programs.

The Planning Process

There are very specific federal requirements that must be met when preparing a FEMA approvable HMP. These requirements are commonly referred to as the Disaster

Mitigation Act of 2000, or DMA2000 criteria. Information about the criteria and other applicable laws and regulations may be found at: <http://www.fema.gov/mitigation-planning-laws-regulations-guidance>.

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

- ❑ New Planning Team membership and processes
- ❑ HMP update participation and plan reviewers,
- ❑ Identify new hazards not formerly addressed,
- ❑ Help us explain your hazard impacts since 2008,
- ❑ Identify changes to new and existing participating community's critical facilities and their relative location within each identified hazard's impact area,
- ❑ Determine their "estimated" replacement costs,
- ❑ Define the community's population risk and critical facility vulnerabilities,
- ❑ Review current and update the existing hazard mitigation goals if applicable,
- ❑ Determine the current status of each project within the Mitigation Strategy; was it completed, deleted, delayed, combined/changed, or is it still viable and ongoing? We will need to provide a brief explanation for any changes.
- ❑ Update the HMP Maintenance section to reflect how the (City, Village, or Borough) completed HMP annual review commitments and identify whether it was effective or not, then update the process to make it more effective for future use.
- ❑ Provide a copy of the community's HMP Adoption Resolution

FEMA has prepared Local (available at: http://emilms.fema.gov/is318/assets/local_mtgtn_plan_guide_0708.pdf) that explains how the HMP Update meets each of the DMA2000 requirements.

We are currently in the very beginning stages of preparing the plan update. We have conducting a Planning Team Meeting with the Copper River LEPC to introduce the project and determine planning team membership, to gather comments from community residents update hazards lists, and collect data to refine the legacy 2009 HMP's hazard inventory and vulnerability assessment.

We Need Your Help

Please use the following table to confirm the hazards AND identify new hazards not formerly addressed.

| Glennallen's Hazard Worksheet | | |
|--|---------|-------------------------|
| Hazard | 2009HMP | 2016 Hazards to Profile |
| Earthquake (EQ) | Yes | Yes |
| Flood (Erosion) (FL) | No | Yes |
| Ground Failure (GF) includes: Landslide, Mudslide, Melting Permafrost, and/or Subsidence | No | Yes |
| Severe Weather (SW) | No | Yes |
| Tsunami & Seiche (TS) | No | No |
| Volcano (VO) | Yes | Yes |
| Wildland/Tundra Fire | Yes | Yes |

The 2011 HMP identified critical facilities within the Glennallen area, but the list needs to be reviewed and updated and their estimated value and location (latitude/longitude) determined.

In addition, the number and value of structures, and the number of people living in each structure will need to be documented. Once this information is collected we will determine which critical facilities, residences, and populations are vulnerable to specific hazards (earthquake (EQ), ground failure (GF), Severe Weather (SW), Volcanic Ash (VO), and wildland fire (WF) in the Glennallen area. Please review and update the facilities list to assist us with better defining your vulnerabilities and potential losses.

| Critical Facility * | Current Natural Hazards | | | | | |
|---|-------------------------|----|----|----|----|----|
| | EQ | FL | GF | SW | VO | WF |
| Glennallen Area | | | | | | |
| Copper Valley Elec Glennallen Diesel PI | X | | X | X | X | X |
| Glennallen Elementary School | X | | X | X | X | X |
| Glennallen High School | X | | X | X | X | X |
| Glennallen Volunteer Fire Dept | X | | X | X | X | X |
| Kcam 790 | X | | X | X | X | X |

The Planning Team

The planning team is being led by Libby Bengtson, LEPC Coordinator with assistance from the LEPC, community members, and AECOM (contracted by DHS&EM) providing assistance and guidance to the planning team throughout the planning process.

Public Participation

Public involvement will continue throughout the project. The goal is to receive comments, identify key issues or concerns, and improve mitigation ideas and to guide the community

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

**Glennallen Area
Planning Team Leader**
Libby Bengtson, LEPC Coordinator
Phone: 907.822.3203
eMail: copperriverlepc@gmail.com

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Scott Simmons, HMP Planner
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DHS&EM
Michelle Torres, SHMO
P.O. Box 5750
Fort Richardson, AK 99505
Phone: 907.428.7032
eMail: michelle.torres@alaska.gov

| Critical Facility * | Current Natural Hazards | | | | | |
|-------------------------------------|-------------------------|----|----|----|----|----|
| | EQ | FL | GF | SW | VO | WF |
| 2009Kxga Ch 213 | X | | X | X | X | X |
| Alaska Bible College | X | | X | X | X | X |
| Copper River Assembly of God Church | X | | X | X | X | X |
| Caribou Cafe & Motel | X | | X | X | X | X |
| Crossroad Medical Center | x | | X | X | X | X |
| CRSD Copper Center School | x | | X | X | X | X |
| CRSD Glennallen High School | x | | X | X | X | X |
| CRSD Glennallen Elementary | x | | X | X | X | X |
| CRSD Kenny Lake Elem. | x | | X | X | X | X |
| CRSD Kenny Lake High School | x | | X | X | X | X |
| Div of Parks Army Point | x | | X | X | X | X |
| Little Tonsina | x | | X | X | X | X |
| McCarthy Lodge | x | | X | X | X | X |
| Ranch House Lodge | x | | X | X | X | X |
| Send International of Alaska | x | | X | X | X | X |
| Tazlina River MHP | x | | X | X | X | X |
| The Point at Lake Louise | x | | X | X | X | X |
| Tolsona Lake Resort | x | | X | X | X | X |
| Tolson's Wildness Camp | x | | X | X | X | X |
| Wolverine Lodge | x | | X | X | X | X |
| Hickok & Sons Enterprises-1 | x | | X | X | X | X |
| Hickok & Sons Enterprises-2 | x | | X | X | X | X |
| Kamping Resorts of Alaska | x | | X | X | X | X |
| Tazlina Area | | | | | | |
| Airstrip | X | | X | X | X | X |
| Bridge over Tazlina River | X | | X | X | X | X |
| Store | X | | X | X | X | X |
| Tazlina Cemetery | X | | X | X | X | X |
| Tazlina Clinic | X | | X | X | X | X |
| Tazlina Community Hall | X | | X | X | X | X |
| Tazlina Community Offices | X | | X | X | X | X |
| Volunteer Fire Station | X | | X | X | X | X |

* Alaska Critical Facilities Inventory

Please email or fax updated hazard and critical facility information directly to S or provide it to your community Planning Team Leader.

Updating Glennallen's Hazard Mitigation Plan

January 16, 2017

Rural Alaskan communities face a broad range of risks such as such as earthquakes, floods, severe weather, volcanic ash, and wildland fire. These events can be brought on by natural events and human activity. Disasters can cause loss of life, damage buildings and infrastructure and have devastating consequences for a community's economic, social, and environmental well-being. Hazard Mitigation Planning for rural communities is an important aspect in providing proper emergency management services to the community and its citizens. The plan eliminates or reduces the hazard impact to people in crises and disaster-related incidents. In some cases, a disaster cannot be fully prevented and completely eliminated but the effects can often be reduced to where there is no major impact of those who are living in and/or traveling through the community.

To ensure that Glennallen has a comprehensive plan, we invite and encourage all agencies and local industries to participate in our LEPC meetings, which are held on the second Thursday of the month at 10:00AM at Copper Valley Telecom. This includes but is not limited to local airlines, banks, churches, store managers, clinics, emergency responders (i.e. Alaska State Troopers, VPSO's, fire departments, CREMS) government agencies (i.e. Division of Forestry, Bureau of Land Management), utility companies, transportation service (i.e. First Student, Soaring Eagle), contractors, radio stations, schools, agencies that transport hazardous materials through the area, and local citizens.

The goal of the Hazard Mitigation Plan Committee will be to identify critical facilities within the Glennallen area. These facilities include utility companies, schools, emergency response agencies (EMS and fire departments), businesses, churches, library, lodges, clinics, and communication centers (i.e. KCAM). In addition, the number and value of structures, and the number of people living in each structure will need to be documented. The committee will then identify actions to reduce risk in the community that are agreed upon by stakeholders and the public. It will focus on resources that pose the greatest risks and vulnerabilities, build partnerships by involving citizens, organizations, and businesses, increase education and awareness of threats and hazards. Once the assessment is completed the planning committee will communicate priorities to State and Federal officials.

The Copper River Local Emergency Planning committee (LEPC) will be updating the Glennallen Community area hazard mitigation plan and we need your help. Any interested community member may join the plan update team. For more information, please contact the Glennallen Community Area planning Team leader Libby Bengtson at 822-3203 or copperriverlepc@gmail.com.

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COPPER RIVER LEPC

Regular Monthly Meeting

November 10, 2016

Draft Agenda

| Activity | Description | Materials |
|-----------------|--|---|
| Welcome/Review | <ul style="list-style-type: none">• Call to Order/Roll Call ~ Laura Thiesen• Approval of Agenda• Approval of October Meeting Minutes | <ul style="list-style-type: none">• Draft Agenda• Draft Minutes October 13, 2016 |
| Business | <ul style="list-style-type: none">• Public Comment• Reports Subcommittees<ul style="list-style-type: none">- Bylaws Approval• ACTION ITEMS<ul style="list-style-type: none">○ Empty Board Member Position○ Responder Ready Class – December 8th○ Establish Hazard Mitigation Planning Committee | |
| Review | <ul style="list-style-type: none">• Future Meeting Date, Time and Location• Adjournment | |

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From: [Bob Sloma](#)
To: [Simmons, Scott](#)
Subject: Copper River LEPC
Date: Thursday, November 10, 2016 12:37:18 PM

Greetings:

I was in the meeting today and reviewed the paper title Glennallen Community Area Hazard. On the second page, I found a bunch of things that are not correct.

You said you wanted help so below is the list.

In the top left chart no erosion is listed. Richardson Highway "parallels" the Copper River. There are places where there is significant erosion/landslide problems that will someday impact the Richardson Highway specifically on Simpson Hill which is between Glennallen and Tazlina. There are other areas and this was mentioned in the meeting.

Left hand lower chart labelled "Critical Facility"-

Glennallen Volunteer Fire is called Glenn-Rich Volunteer Fire and consists of 5 barns throughout the area.

Cross Road Medical Center has the only Urgent Care (Emergency Care type) in the area.

Should it be listed there?

Cross Road Medical Center (CRMC) (Glennallen) and Copper River Native Association (CRNA) (Tazlina) both have clinics open to patients.

Right hand chart-

Gulkana Airport is used for medical life-flights and is large enough to handle some military flights.

Caribou Cafe & Motel. Caribou Cafe is no longer. Fireweed Gills is in its place. Caribou Hotel is still there.

Crossroad is spelled Cross Road Medical Center

Send International is no longer in the area having left around 2011. Their are in Anchorage.

Lake Louis is in Mat-Su Bourough

Tolsona Wilderness is spelled wrong

If you are going to include cemeteries, Glennallen Cemetary is on College Drive, Glennallen.

Local churches in Glennallen and Tazlina are:

Glennallen Community Chapel

Old Paths Baptist Church

Holy Family Catholic Church

Tazlina Fellowship

Copper Basin Seventh Day Adventist Church

Copper Basin Assembly of God (not Copper River Assembly)

While we can be impacted by the Redoubt volcano, etc..., we have an active volcano 50 miles away that is active. Steam is often seen coming from the top. Wrangell Mountain, is the largest shield volcano in North America at 225 square miles (15x15 miles). It is monitored due to the thick ice pack on top that has the potential to cause massive flooding if it melted.

Blessings. Bob

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**Copper River LEPC
Regular Committee Meeting
November 10, 2016**

| BOARD PRESENT | ABSENT/EXCUSED BOARD |
|---------------------------|-----------------------------|
| Laura Thiesen, LEPC Chair | Joel Medendorp, Vice Chair |
| Tana Mae Pete, Secretary | Willard Hand, Information |
| | Jason Hoke, Treasurer |
| | |

Others in Attendance:

Libby Bengtson, LEPC Coordinator, CRMC

Jack Von Thaer, CRSD

David Abbott, CREMS

Bob Sloma, CRMC

Robert Cyr, CVTC

Jason Sever, GVFD

Matthew Catledge, CREMS

Scott Simmons, Emergency Management, Mitigation, and Resilience Planner with AECOM

Call to Order

Laura Thiesen, LEPC Chair, called the meeting to order at 10:09 am at Copper Valley Telecom, Glennallen, Alaska.

Review of Agenda

Laura Thiesen, LEPC Chair, request that the agenda remain open.

Approval of Minutes

David Abbott, CREMS, made a motion to accept the October 13, 2016 meeting minutes.

Tana Mae Pete, Gulkana Village Council, seconded this motion and motioned passed.

Introductions made

Public Comment

Laura Thiesen, LEPC Chair, informed the committee that she is working with the Red Cross to bring the 'Pillowcase Project' to the Glennallen School District. Jack VonThaer, CRSD, said he would be very interested in bring this to the Kenny Lake School.

Reports – Elected Officials

Reports – Sub Committees

LEPC Bylaws – Changes to bylaws presented to the committee. Those present at the meeting approved these changes and added an additional business to Utility Providers. Bylaws were also reviewed by J. Woody, DHS&EM. The Copper River LEPC will take a final vote on accepting the updated Bylaws at the January 2017 meeting.

Reports – Coordinator

Action Items

Empty Board Member Position – Joel Medendorp, Vice-Chair, submitted his resignation from the Copper River LEPC board on October 20, 2016. The Copper River LEPC accepted his

resignation. David Abbott, CREMS, volunteered to fill the Vice-Chair position. Tana Mae Pete, LEPC Secretary made a motion to accept David Abbott's nomination for LEPC Vice-Chair and Laura Thiesen, LEPC Chair seconded the motion. A motion was made by Tana Mae Pete to vote on accepting David Abbott, CREMS, as the new LEPC Vice-Chair, Matthew Catledge, CREMS seconded the motion. The members of the Copper River LEPC voted on accepting David Abbott, CREMS as the new LEPC Vice-Chair and the vote passed without objection.

Responder Ready Class – Libby Bengtson, LEPC Coordinator, reported to the LEPC that the class is scheduled for December 8th at 10am at the Robert Marshall Building. Trooper Heinbaugh will be teaching the class. Libby Bengtson will send out an invitation of participation and send the roster to Trooper Heinbaugh before the start of the class.

Establish a Hazard Mitigation Planning Committee – Scott Simmons, Emergency Management, Mitigation, and Resilience Planner with AECOM, telephoned in to the Copper River LEPC meeting to discuss the first steps in updating the Glennallen Hazard Mitigation Plan. Scott has been contacted with the State of Alaska to review and update many Hazard Mitigation Plans. The first step in reviewing our plan is to establish a Planning Team. It was determined by Copper River LEPC that the general committee will be the Planning Team with Libby Bengtson, LEPC Coordinator, as the main point of contact for Scott. The second step was to define our land boundaries for our Hazard Mitigation Plan. It was agreed that the land markers for the Glennallen Hazard Mitigation would be Gulkana Airport to the North, the Tazlina Bridge to the South and Mile 177 of the Glenn Highway to the West. The third step is to promote community participation. Scott Simmons will update the Glennallen Community Area Hazard Mitigation Plan Update, Newsletter #1 and the Copper River LEPC will distribute the newsletter throughout the community. Scott Simmons will also send Libby Bengtson a newspaper ad to publish in the Copper River Record. Vanessa Goodlataw, Native Village of Tazlina, will be the point of contact for the Tazlina portion of the Glennallen Hazard Mitigation Plan and will work alongside Libby Bengtson and Scott Simmons. Updating this plan will be an on-going project for the Copper River LEPC.

Public Comment

Set Future Meeting Date, Time and Location

The Responder Ready Class on December 8, 2016 at 10am will take the place of the Copper River LEPC December meeting. A regular Copper River LEPC will be held on January 12th at 10am at Copper Valley Telecom.

Adjournment

Jason Sever, Gulkona Volunteer Fire Department, made a motion to adjourn the meeting at 11:20 am and David Abbott, CREMS, seconded the motion. Motion passed, meeting adjourned.

COPPER RIVER LEPC

Regular Monthly Meeting May 11, 2017 Draft Agenda

| Activity | Description | Materials |
|----------------|--|--|
| Welcome/Review | <ul style="list-style-type: none">• Call to Order/Roll Call ~ Laura Thiesen• Approval of Agenda• Approval of March Meeting Minutes | <ul style="list-style-type: none">• Draft Agenda• Draft Minutes March 9, 2017 |
| Business | <ul style="list-style-type: none">• Public Comment• Reports Subcommittees• ACTION ITEMS<ul style="list-style-type: none">○ Hazard Mitigation Plan Discussion○ Logo Design Approval to Start Process○ 2018 LEPC Grant Application | |
| Review | <ul style="list-style-type: none">• Future Meeting Date, Time and Location• Adjournment | |

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**Copper River LEPC
Regular Committee Meeting
March 8, 2017**

| BOARD PRESENT | ABSENT/EXCUSED BOARD |
|---------------------------|-----------------------------|
| Laura Thiesen, LEPC Chair | David Abbott, Vice-Chair |
| Tana Mae Pete, Secretary | Jason Hoke, Treasurer |
| Willard Hand, Information | |

Others in Attendance:

Libby Bengtson, LEPC Coordinator, CRMC
Gina Hoke, CRBCAC
Benjamin Endres, AST
Sharla Huckabey, CRNA
Brandi Radigan, by phone

Call to Order

Laura Thiesen, LEPC Chair, called the meeting to order at 10:20 am at Cross Road Medical Center, Glennallen, Alaska.

Review of Agenda

Laura Thiesen, LEPC Chair, request that the agenda remain open.

Approval of Minutes

Benjamin Endres, AST, made a motion to accept the February 9, 2017 meeting minutes. Gina Hoke, CRB CAC, seconded this motion and motioned passed.

Public Comment

Reports – Sub Committees

Reports – Coordinator

Action Items

Pillowcase Project – Laura Thiesen, LEPC Chair, reported to the committee that the Pillowcase Project occurred on February 16th and 17th. Approximately 100 students in the Copper River School District participated in the project. She reports that the project was a success and she plans to make this a yearly event with the Red Cross for all 3rd graders in the district.

Tier II Reports – Libby Bengtson, LEPC Coordinator, reported that the Copper River LEPC has received two paper Tier II reports this year and no online Tier II reports. She published the community right-to-know act information in the Copper River Record. If more Tier II reports are received she will report them to the LEPC committee.

Youth Environment Summit - This year the Youth Environment Summit (YES) is scheduled for June 6,7,8th at the Kenny Lake School. The Copper River LEPC has been asked to participate. It was discussed among those present at the meeting to purchase a tri-fold presentation board and to research items that could

be given away to those who attend. L. Bengtson, LEPC coordinator, will price out the cost of a felt tri-fold presentation board and educational material for distribution.

Mitigation Action Items – L. Bengtson, LEPC Coordinator, had e-mailed the document 'Mitigation Action Items to Consider' for the Hazard Mitigation Update process. The committee reviewed the first two pages regarding goals that the community would like to add to their plan. Those present at today's meeting will review the last two pages and send L. Bengtson with any further input.

Public Comment

Alaska Trucking Spill Management Workshop – Willard Hand, NV of Tazlina & LEPC informations, informed the committee of a spill management workshop to take place both in Fairbanks and Anchorage. The hope is to have at least one person from the Copper River LEPC to attend and bring back the information to the LEPC. L. Bengtson, LEPC coordinator, will e-mail this training opportunity to all members on the LEPC e-mail contacts list.

Set Future Meeting Date, Time and Location

The monthly Copper River LEPC meeting will be held on April 13, 2017 at 10am at Copper Valley Telecom.

Adjournment

Sharla Huckabey, CRNA, made a motion to adjourn the meeting at 11:06 am and Willard Hand, NV Tazlina & LEPC Informations, seconded the motion. Motion passed and meeting adjourned.



August 28, 2017

Copper River LEPC
Libby Bengtson
PO Box 711
Glennallen, Alaska 99588

Native Village of Tazlina
Russell Scribner, Tribal Administrator
PO Box 87
Glennallen, AK 99588-0087

RE: Glennallen/Tazlina's Draft Hazard Mitigation Plan Review

Dear Ms. Bengtson and Mr. Scribner,
Please give me a call when you receive this package.

Here is your Draft Hazard Mitigation Plan for your review. This plan is not completed yet. Please make it available for the public to also review. You may desire to place a copy in the LEPC Office and maybe the Tribal Office or some other location(s) more suitable for your community. You may want to punch holes and place it in a 3-ring binder to make it easier for people to review.

Also, please make a log sheet, have people sign it, and keep track of any comments to help us make the changes that may be beneficial to the community. Please send me the log sheet and any LEPC or Tribal Council meeting minutes so I may insert them into the plan to demonstrate the public review process.

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

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

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

We would like to have the draft reviewed and returned by September 15, 2017.

A handwritten signature in blue ink, appearing to read "R. Scott Simmons".

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

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COMMUNITY OF GLENNALLEN AND THE NATIVE VILLAGE OF TAZLINA'S HAZARD MITIGATION PLAN (HMP)

August 28, 2017

Newsletter 2

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

HMP Development

The Community of Glennallen and the Native Village of Tazlina was one of 21 communities selected by the State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) for a Hazard Mitigation Planning (HMP) development project. The plan identifies natural hazards that affect the community including earthquake, flood, ground failure, severe weather, volcano, and tundra/wildland fire. The HMP also identifies the people and facilities potentially at risk and potential actions to mitigate community hazards. The public participation and planning process is documented as part of the project.

What is Hazard Mitigation?

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

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

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

Why Do We Need A Hazard Mitigation Plan?

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

The Planning Process

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

The DMA2000 requires the plan to document the following topics:

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

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

The planning process kicked-off on October 28, 2016 by establishing a local planning committee involving the LEPC and the Native Village of Tazlina. The planning committee examined the full spectrum of hazards listed in the State Hazard Mitigation Plan and identified six natural hazards the HMP would address.

After the first public meeting, community and Village staff with AECOM 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, AECOM helped to determine which critical facilities and estimated populations are vulnerable to the identified hazards in Dillingham.

A mitigation strategy was the next component of the plan to be developed. Understanding the community's local

capabilities and using information gathered from the public and the local planning committee and the expertise of the consultants and agency staff, a mitigation strategy was developed. The mitigation strategy is based on an evaluation of the hazards, and the assets at risk from those hazards. Mitigation goals and a list of potential actions/projects were developed as the foundation of the mitigation strategy.

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goals are positively stated future situations that are typically long-range, policy-oriented statements representing community-wide visions. Mitigation actions and projects are undertaken in order to achieve your stated objectives. During July, 2017, the planning committee identified projects and/or actions for each hazard that focus on six categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. A representative sample of the mitigation actions identified as a priority by the planning team are listed below, and explained in more detail in the plan.

The selected projects and/or actions will potentially be implemented over the next five years as funding becomes available. A maintenance plan was also been developed for the hazard mitigation plan. It outlines how the community

will monitor progress on achieving the projects and actions that will help meet the stated goals and objectives, as well as an outline for continued public involvement.

The draft plan is available in the City and Tribal offices for public review and comment. Comments should be made via email, fax, or phone to Scott Simmons (listed below) and be received no later than September 15, 2017. The plan will be provided to DHS&EM and FEMA for their preliminary approval and returned to the DHS&EM for promulgation and Tazlina's Tribal Council for formal adoption.

The Planning Committee

The plan was developed with the assistance from the community's planning committee consisting of a cross section from the community. Planning Team members who helped with developing the plan include Libby Bengtson, LEPC Coordinator and HMP update Team Leader, Ms. Vanessa Goodlataw Tribal HMP coordinator, Mr. Russell Scribner, Tribal Administrator, with assistance from the LEPC and the Tazlina Tribal Council with guidance and plan compliance assistance from AECOM.

Sample of Glennallen and Tazlina's Mitigation Actions. *(Review the draft HMP for a complete project list)*

| Community of Glennallen | Native Village of Tazlina | Both |
|---|---|---|
| Identify and pursue funding opportunities to implement mitigation actions that will enable the Copper River LEPC and Tazlina Tribe to implement mitigation actions or projects. | Establish the Native Village of Tazlina as a joint member of the Copper River area Hazard Mitigation Planning Committee to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions. | Promote public awareness and use of FireWise principles and fire prevention and construction materials and principles. |
| Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all identified natural hazards. | Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events. | Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding, significant historical damages, or road closures. |
| Install rolled erosion control blanket along the Tazlina River embankment to stabilize and prevent continued erosive high water flow scour. | Install riprap along the Tazlina River waterway to stabilize the embankment at crucial locations. | The Village will strive to coordinate and incorporate mitigation planning provisions into all tribal planning processes to demonstrate multi-benefit consideration and multiple funding source consideration. |
| Promote permafrost sensitive construction practices in permafrost areas. | Reinforce soil slopes along the Tazlina River to stabilize slopes that exacerbate damage for water run-off. | Remove combustible fuels sources around all structures, throughout the community to reduce risk of wildfire damages. |

We encourage you to learn more about the Community of Glennallen's and Native Village of Tazlina'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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AECOM
700 G Street, Suite 500
Anchorage, Alaska 99501
907.261.9706 or 800.909.6787
scott.simmons@aecom.com

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907.428.7055 or 800.478.2337
George.grady@alaska.gov

Appendix E
Benefit–Cost Analysis Fact Sheet

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Benefit-Cost Analysis Fact Sheet

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

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

All Benefit-Costs must be:

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

General Data Requirements:

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

Damage and Benefit Data

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

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

Building Data

- Should include FEMA Elevation Certificates for elevation projects or projects using First Floor Elevations (FFE's).
- 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% 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%.
- 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 FFE's.
- Use of incorrect Project Useful Life (not every mitigation measure = 100 years).

Appendix F
Plan Maintenance Documents

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Plan Maintenance Documents
Annual Review Questionnaire

| 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 Planning Team undertaken any public outreach activities regarding the HMP or implementation of mitigation actions? | | | |
| HAZARD PROFILES | Has a natural and/or manmade/ technologically caused disaster occurred during this reporting period? | | | |
| | Are there natural and/or manmade/ technologically 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 critical facilities or infrastructure need to be added to the asset lists? | | | |
| | Have there been development patterns changes 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 Jurisdictional or Village as applicable? | | | |
| | Are the goals still applicable? | | | |
| | Should new mitigation actions be added to the Mitigation Action Plan (MAP)? | | | |
| | Do existing mitigation actions listed in the Mitigation Strategies' MAP need to be reprioritized | | | |
| | Are the mitigation actions listed in the MAP appropriate for available resources? | | | |

Plan Maintenance Documents
Mitigation Action Progress Report

MITIGATION ACTION PROGRESS REPORT

1 of 2

Progress Report Period: _____ To _____
(Date) (Date)

Project Title: _____ Project ID#: _____

Responsible Agency: _____

Address: _____

: _____

Contact Person: _____ Title: _____

Phone #(s): _____ eMail Address(s): _____

List Supporting Agencies and Contacts: _____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

Project Approval Date: _____ Project Start Date: _____

Anticipated Completion Date: _____

Description of Project (describe each phase, if applicable, and the time frame for completing each phase: _____

| Milestones | Complete | Projected Completion Date |
|------------|----------|---------------------------|
| | | |
| | | |
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| | | |
| | | |
| | | |

Plan Maintenance Documents
Mitigation Action Progress Report *(Continued)*

MITIGATION ACTION PROGRESS REPORT

2 of 2

Plan Goal(s) Addressed: _____

Goal: _____

Success Indicators: _____

Project Status

☐ On Schedule

☐ Completed

☐ Delayed*

* Explain: _____

☐ 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 accomplish over the next reporting period?

Other Comments: _____

