

# LAKE AND PENINSULA BOROUGH MULTI-JURISDICTIONAL Hazard Mitigation Plan Update

**Planning Commission Meeting May 11, 2015**

City of Chignik 1986 Flood (Photo: City)



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## Acronyms/Abbreviations

°F	Degrees Fahrenheit
ACCIMP	Alaska Climate Change Impact Mitigation Program
ACWF	Alaska Clean Water Fund
ADWF	Alaska Drinking Water Fund
AEA	Alaska Energy Authority
AEEE	Alternative Energy And Energy Efficiency
AFG	Assistance To Firefighters Grant
AHFC	Alaska Housing Finance Corporation
AICC	Alaska Interagency Coordination Center
AIDEA	Alaska Industrial Development And Export Authority
AK	Alaska
ANA	Administration For Native Americans
ARC	American Red Cross
AVEC	Alaska Village Electric Cooperative
BIA	Bureau Of Indian Affairs
CCP	Citizen Corps Program
CDBG	Community Development Block Grant
CFR	Code Of Federal Regulations
CFP	Community Forestry Program
CGP	Comprehensive Grant Program
Borough	Lake and Peninsula Borough
CP	Lake and Peninsula Borough's Comprehensive Plan
CVRF	Coastal Villages Region Fund
CWSRF	Clean Water State Revolving Fund
DCCED	Department Of Commerce, Community, And Economic Development
DCRA	Division Of Community And Regional Affairs
DEC	Department Of Environmental Conservation
Denali	Denali Commission
DHS	Department Of Homeland Security
DHS&EM	Division Of Homeland Security And Emergency Management
DHSS	Department Of Health And Social Services
DGGS	Division Of Geological And Geophysical Survey
DMA 2000	Disaster Mitigation Act Of 2000
DMVA	Department Of Military And Veterans Affairs
DNR	Department Of Natural Resources
DOE	Department Of Energy
DOF	Division Of Forestry
DOI	Division Of Insurance
DOL	Department Of Labor
DOT/PF	Department Of Transportation And Public Facilities
DSS	Division Of Senior Services
EOC	Emergency Operations Center

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**Acronyms/Abbreviations**

EMPG	Emergency Management Performance Grant
EPA	Environmental Protection Agency
EQ	Earthquake
ER	Erosion
EWP	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	Hazard United States – Multi-Hazard Software
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
HSGP	Homeland Security Grant Program
HUD	Housing And Urban Development
IBHS	Institute For Business And Home Safety
ICDBG	Indian Community Development Block Grant
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
Kts	Knots
LEG	Legislative Energy Grant
LEPC	Local Emergency Planning Committee
L&PB	Lake and Peninsula Borough
M	Magnitude
MAP	Mitigation Action Plan
MGL	Municipal Grants And Loans
MMI	Modified Mercalli Intensity
mph	Miles Per Hour
msl	Mean Sea Level
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

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**Acronyms/Abbreviations**

NWS	National Weather Service
PCR	Parks Culture & Recreation Center
PDM	Pre-Disaster Mitigation
PGA	Peak Ground Acceleration
PNP	Private Non-Profits
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	U.S. Small Business Administration
SHMP	Alaska State Hazard Mitigation Plan
SHSP	State Homeland Security Program
SOA	State Of Alaska
Sq.	Square
Stafford Act	Robert T. Stafford Disaster Relief And Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, And Environmental
URS	URS Corporation
US or U.S.	United States
USACE	United States Army Corps Of Engineers
USC	United States Code
USDA	United States Department Of Agriculture
USGS	United States Geological Survey
VFA-RFA	Volunteer Fire Assistance And Rural Fire Assistance Grant
VSW	Village Safe Water
WARN	Warning, Alert, And Response Network
WHIP	Wildlife Habitat Incentives Program
WX	Weather



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## 1. Introduction

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

### 1.1 Hazard Mitigation Planning

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

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

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 January 1, 2014 and applicable guidance documents.

### 1.2 Grant Programs with Mitigation Plan Requirements

FEMA HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local Mitigation Plan. Two of the grants are authorized under the Stafford Act and DMA 2000, while the remaining three are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act.

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*
- ♦ *Planning*

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- ◆ *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.*

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*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 2015).*

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### 1.2.1 Hazard Mitigation Assistance HMA Grant Programs

HMA grant program activities include the following.

**Table 1-1 MJHMP Eligible Activities**

Activities	HMGP	PDM	FMA
<b>1. Mitigation Projects</b>	✓	✓	✓
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 <sup>(1)</sup>	✓	✓	✓
<b>2. Hazard Mitigation Planning</b>	✓	✓	✓
Planning Related Activities	✓		
<b>3. Technical Assistance</b>			✓
<b>4. Management Cost</b>	✓	✓	✓
<sup>(1)</sup> 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 2012)

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.*

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*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 plans development and is appropriated by Congress. 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 2015)*

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.*



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*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) manage 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 Lake and Peninsula Borough (Borough), 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 Borough and the surrounding area. This section documents public outreach activities (support documents are located in Appendix D); the review and incorporation of relevant plans, reports, and other appropriate information; actions the Borough 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 MJHMP Adoption**

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

### **Section 5 Hazard Profile 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 Analysis**

Identifies the Borough’s potentially vulnerable assets—people, residential and nonresidential buildings (where available), critical facilities, and critical infrastructure. The resulting

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information identifies the full range of hazards that the Borough could face and potential social impacts, damages, and economic losses. Land use and development trends are also discussed.

### **Section 7      Mitigation Strategy**

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

The Planning Team developed a list of mitigation goals and potential actions to address the risks facing the Borough. 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**

*Not in April 6, 2015 L&PB Planning Commission (L&PB) draft plan.*

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 the adoption resolution for the Borough

Appendix D: Provides public outreach information, including newsletters.

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.

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## **2. Community Description**

**S**ection Two provides the Lake and Peninsula Borough location, geography, history, and demographic information.

### **2.1 Location, Geography, and History**

Aniakchak National Monument & Preserve); two National Wildlife Refuges (Becharof NWR and the Alaska Peninsula NWR); and numerous designated Wild and Scenic Rivers and State Critical Habitat Area.

The Lake and Peninsula Borough is geographically and ecologically diverse. It is bordered on the west by Bristol Bay and on the east by the Pacific Ocean. Numerous volcanoes of the Aleutian Range, which runs the length of the Borough from Lake Clark to Ivanof Bay, dominate the Bristol Bay coast and are comprised of low lying wetlands and the rugged Pacific coast.

Iliamna Lake, located in the north, is the largest fresh water lake in Alaska and the second largest in the United States.

Iliamna Lake has one of only two colonies of freshwater seals in the world. Becharof Lake, located in the Bristol Bay region, is the second largest fresh water lake in Alaska. These lakes provide nurseries to the largest red salmon runs in the world.

Figure 2-1 shows the location of the L&PB in relation to the State of Alaska.



**Figure 2-1      Vicinity Map**

The Lake and Peninsula Borough provides large amounts of high quality habitat that support a phenomenal amount of flora and fauna. The Bristol Bay region is recognized as a world leader in salmon productivity. Commercial fishing, sport fishing and hunting, bear viewing, recreation and tourism, and subsistence are important economic activities that rely on the bounty of the Borough's landscape. Salmon spawning streams attract some of the largest concentrations of brown bear in Alaska. Approximately 10,000 brown (grizzly) bears populate the region, making them more numerous than people. Abundant moose and caribou inhabit the region. Other mammals include wolves, wolverines, river otters, red fox, and beaver. Sea otters, sea lions, harbor seals and migratory whales inhabit the shoreline and offshore waters. Coastal estuaries are home to waterfowl while nesting eagles, peregrine falcons, and thousands of seabirds inhabit the sea cliffs.

The Lake and Peninsula Borough region has been inhabited almost continuously for the past 9,000 years. The area is rich in cultural resources and diversity. Yup'ik Eskimos, Aleuts, Athabascan Indians, and Inupiaq people have jointly occupied the area for the past 6,000 years.

Russian explorers came to the region during the late 1700's. The late 1800's brought the first influx of non-Native fishermen and cannery operations. A flu epidemic in 1918 was tragic to the Native population. Reindeer were introduced to assist the survivors, but the experiment eventually failed. In the 1930's, additional disease epidemics further decimated villages. After

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the Japanese attack on Dutch Harbor during World War II, numerous military facilities were constructed on the Alaska Peninsula including Fort Marrow at Port Heiden.

### 2.2 Demographics

The 2010 census recorded 1,631 residents, of which the median age was 30.8 indicating a relatively young population. The population of 1,631 is expected to remain steady because over half of the population is between 1 and 34 years of age. The Borough population is principally an Alaska Native heritage. The male and female composition is approximately 53 and 47 % respectively. The 2010 census revealed that there are 1,502 households with the average household having approximately three individuals. The most recent 2014 DCCED certified population is 1,672. Figure 2-2 illustrates the Borough's historic population.

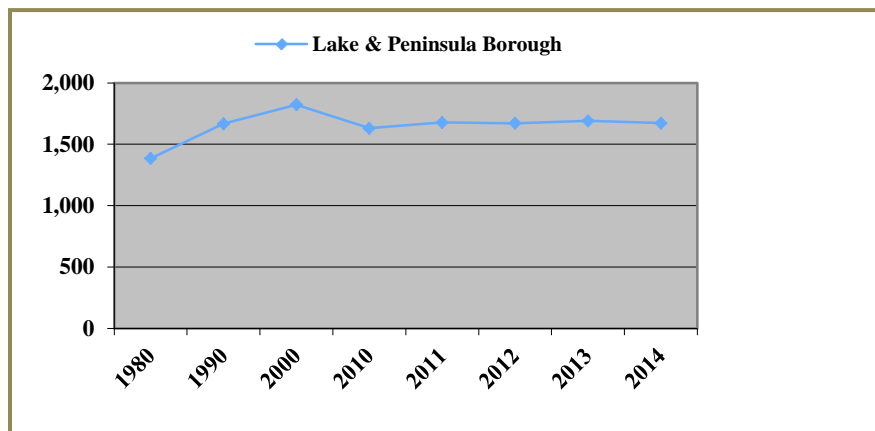


Figure 2-2 L&PB Historic Population

#### Economy

Commercial fishing and fish processing are the most significant sectors of the economy within the Borough, which contains three of the State's most important salmon fishing districts: Egegik and Ugashik on the Bristol Bay, and Chignik on the Pacific coast. This industry provides approximately 90% of all locally generated tax revenue for the Borough. The majority of Borough residents rely upon commercial fishing as a primary source of cash income. Seven shore-based processors and numerous floating processors operate within Borough boundaries, generally importing their workforce from outside the area.

Tourism and recreational activities are the second most important industry in the Borough, and are rapidly increasing in economic importance. The Borough contains over 100 hunting and fishing lodges and approximately 368 professional guides are registered to operate within Borough boundaries.

Figure 2-3 depicts the L&PB corporate boundaries and communities.

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Figure 2-3 L&PB Regional Map

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## 3. Planning Process

**S**ection 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.

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

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

### 3.1 Planning Process Overview

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

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The planning process began at a meeting on November 11, 2015 with Borough Planning Commission. The group met from 9 a.m. to 3 p.m. with break out sections with the Borough Planning Commission to review sections of the 2009 MJHMP. AECOM explained how the Division of Homeland Security and Emergency Management 2012 Pre-Disaster Mitigation Grant award selected their community. AECOM staff described the MJHMP development requirement to enable the Borough to qualify for Hazard Mitigation Grant Program grants and the overall MJHMP development process.

The Borough was encouraged to develop a community Planning Team to assist the community's efforts to identify available resources and capabilities for MJHMP development. AECOM explained how the MJHMP differed from current emergency plans. The Planning Team will assist the Borough by acting as an 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 flooding, sediment deposition, and permafrost impacts, which are increasing in intensity due to climate changes.

### 3.2 Multi-Jurisdictional Hazard Mitigation Planning Team

Table 3-1 lists the planning team comprised of Ranya Aboras (Planning Team Leader) and representatives from each of the incorporated cities and Port Alsworth.

**Table 3-1 Planning Team Members**

Team Member	Title	Involvement
Ranya Aboras	L&PB Community Development Planner	MJHMP Team Leader, data gathering and plan review
L&PB Planning Commission	Planning Commissioners	MJHMP plan review
Becky Bottcher	City Clerk/Treasurer	Chignik plan
Don Strand	City Manager	Egegik plan
Greg Anelon	City Manager	Newhalen plan
Joanna Trefon	City Administrator	Nondalton plan
Barbara Chester	City Manager	Pilot Point plan
Angela Simpson	City Manager	Port Heiden plan
Beth Hill	Port Alsworth Improvement Corporation	Port Alsworth plan
Scott Simmons	AECOM, Project Manager	MJHMP update manager, lead writer, and MJHMP project coordination
Eileen Bechtol	BP&D/Community Planner	MJHMP update, project planner

### 3.3 Public Involvement & Opportunity for Interested Parties to participate

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

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federal agencies on November 20, 2014. 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 2009 MJHMP 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 MJHMP update inclusion and document recommendations for future MJHMP updates.

Meeting minutes are included in Appendix C, Community Outreach.

Table 3-2 lists relevant meeting information for inclusion with the 2015 MJHMP update to include newly identified hazards that have impacted the L&PB area locations during the 2009 MJHMP's 5-year lifecycle.



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**Table 3-2 Planning Team Meeting Summaries**

Meeting Date	Meeting Attendees	Summary
11/13/2015	L&PB Planning Commission and staff, AECOM, DHS&EM	Please see minutes in Public Involvement Appendix
04/06/2015	Residents of L&PB, L&PB Planning Commission and staff, AECOM	Please see minutes in Public Involvement Appendix
05/11/2015	Residents of L&PB, L&PB Planning Commission and staff, AECOM	Please see minutes in Appendix, Public Involvement

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 (February 14, 2015)	In February and March 2015, the jurisdiction distributed a newsletter introducing the upcoming planning activity. The newsletter encouraged the Borough and the communities to provide hazard and critical facility information. It was posted at Borough offices, bulletin boards, shopping centers, and Borough website to enable the widest dissemination.
Agency Involvement eMail (November 20, 2015)	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: <a href="http://ready.alaska.gov/plans/localhazmitplans.htm">http://ready.alaska.gov/plans/localhazmitplans.htm</a>
Newsletter #2 Distribution (April, 2015)	In April 2015, the jurisdiction distributed Newsletter #2 describing the HMPs availability and present potential MJHMP projects for review. The newsletter encouraged the L&PB communities to provide comments or input. It was posted at the Borough office, and distributed to each of the communities to post and disseminate as appropriate in their communities.
Public Meeting Notice (April 6, 2015 L&PB PC Meeting)	Notice of the April 6, 2015 meeting was posted at Borough Hall, and distributed to communities using their usual public notice procedures.
Public Meeting Notice (May 11, 2015 L&PB PC Meeting)	Notice of the May 11, 2015 meeting was posted at Borough Hall, and distributed to communities using their usual public notice procedures.
Public Meeting Notice (2015) L&PB Assembly Meeting	Notice of the 2015 meeting was posted at Borough Hall, and distributed to communities using their usual public notice procedures.

Initial contact was made with the L&PB Planning Commission on November 13, 2015. The Planning Commission was very excited that L&PB was included within DHS&EM's Pre-Disaster Mitigation grant and the prospects of updating the 2009 Multi-Jurisdictional plan. At the meeting the L&PB broke out into small groups and went over the Borough and the communities with AECOM staff.

The newsletter was placed on the DSH&EM website and posted throughout the community, each of the cities and Port Alsworth also got an individual newsletter to distribute.

The Planning Team identified natural hazards: earthquake, flood, ground failure, severe weather, and wildland/tundra fire which periodically impact the Borough. A few of the legacy MJHMP's hazards have been combined within broader categories to better reflect their impacts and relationships.



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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 2015, 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 L&PB and the communities.

The Planning Team held a public meeting April 6, 2015 with the L&PBPC to review the draft MJHMP for accuracy – ensuring it meets the Borough’s needs. The L&PB PC reviewed the 2009 mitigation plan actions (Section 7, Table 7-5) to determine whether these actions should be brought forward, and if completed, deferred, deleted or ongoing. New mitigations actions were also identified.

Another public meeting was held with the L&PB PC on May 11, 2015 to adopt the draft plan and to recommend approval to the L&PB Assembly. The meeting was productive with the Planning Commission highlighting several minor corrections or refinements. Changes were specifically targeted to plan development information, hazard impacts, community vulnerability analysis, and the mitigation strategy.

The incorporated cities and Port Alsworth reviewed the drafts and recommended approval of the final draft as outlined within their respective HMPs.

### 3.4 Review and Analysis of the 2009 MJHMP

The Legacy 2009 MJHMP document was revised as described below.

- Section 1. ***Introduction:*** added entire new section explaining the Multi-Jurisdictional plan process.
- Section 2. ***Community Description:*** updated and expanded community information, including new census and State data.
- Section 3. ***Planning Process:*** updated this section to reflect 2015 public process including newsletters, public meetings and 2015 Planning Team.
- Section 4. ***Plan Adoption:*** 2015 resolutions and dates.
- Section 5. ***Hazard Profile Analysis:*** reviewed hazard identification and risk assessment for earthquake, flooding, ground failure, tsunami and volcano, adding 2009 to 2015 descriptions and data.
- Section 6. ***Vulnerability Analysis:*** added a new section to analyze vulnerability with 2015 critical facilities and infrastructure tables.
- Section 7. ***Mitigation Strategy:*** reviewed 2009 mitigation goals and actions and added new goals and action for the 2015 Mitigation Action Plan.
- Section 8. ***References:*** revised to reflect 2015 Update.

Appendices A through G

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AECOM described the specific MJHMP information needs during the initial November 2014 teleconference to form the foundation for their updated 2015 MJHMP.

The Planning Team did not complete their designated annual MJHMP reviews or plan maintenance activities. Therefore it became a primary consideration to update the existing 2009 MJHMP to include all hazards that have, or could potentially have, impacted the community during the legacy MJHMP's 5-year lifecycle.

Table 3-4 delineates Planning Team identified MJHMP 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 2015 MJHMP Update process included inviting new and existing stakeholders to review the existing MJHMP to determine what was accomplished versus what was intended to accomplish.

Pertinent section data are identified within Table 3-4, which provided the foundation for completing the 2015 MJHMP Update.

**Table 3-4 MJHMP Review and Update Needs Determination**

2009 MJHMP Section	2009 MJHMP Items to be Updated	Status: F: Fulfilled NF: Not Fulfilled	2015 MJHMP Identified items for Deletion	Newly Identified Items to be Added for MJHMP Compliance	New Action Commitments
Planning Process	<ul style="list-style-type: none"> <li>Planning process</li> <li>Planning team membership</li> <li>Mitigation resource list</li> <li>Public outreach initiatives</li> <li>Plan Maintenance Activities</li> <li>Plan Review Obligations</li> </ul>	<ul style="list-style-type: none"> <li>NF: Did not meet or complete annual MJHMP review</li> <li>NF: Adding Manmade/ Technological Hazards</li> <li>NF: Continued Plan Development</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Refine plan maintenance processes and responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>Planning Team will begin to hold annual review meetings and</li> <li>Strive to integrate MJHMP initiatives into other plans, ordinances, and resolutions.</li> <li>Planning Team will continue meetings and strive to integrate MJHMP initiatives into other plans, ordinances, and resolutions.</li> </ul>
Hazard Profile Update	<ul style="list-style-type: none"> <li>Update hazard profile and new event history</li> <li>Profile newly identified hazard risks</li> </ul>	<ul style="list-style-type: none"> <li>NF: Update hazard profile and new event history</li> </ul>	<ul style="list-style-type: none"> <li>Mitigation projects that were deleted or combined due to similarity</li> </ul>	<ul style="list-style-type: none"> <li>Identify new hazards</li> <li>Develop new Mitigation Action Plan (MAP)</li> <li>Update existing hazards' impacts Include Manmade and Technological Hazards identified in</li> </ul>	<ul style="list-style-type: none"> <li>Delineate new actions within the MAP</li> </ul>

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**Table 3-4 MJHMP Review and Update Needs Determination**

2009 MJHMP Section	2009 MJHMP Items to be Updated	Status: F: Fulfilled NF: Not Fulfilled	2015 MJHMP Identified items for Deletion	Newly Identified Items to be Added for MJHMP Compliance	New Action Commitments
				former MJHMP	
Risk Analysis and Vulnerability Assessment	<ul style="list-style-type: none"> <li>Asset inventory</li> <li>Vulnerability analysis &amp; summaries</li> </ul>	<ul style="list-style-type: none"> <li>NF: Identify development and land use changes</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Develop asset inventory</li> <li>Determine infrastructure vulnerabilities</li> <li>Determine residential structure vulnerabilities</li> <li>Identify repetitive loss properties as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>Fill data gaps</li> <li>Locate scientific information to augment these data.</li> <li>Delineate climate change scenario future development analysis</li> </ul>
Mitigation Strategy	<ul style="list-style-type: none"> <li>Determine existing mitigation actions status</li> <li>Define mitigation action implementation successes or barriers</li> </ul>	<ul style="list-style-type: none"> <li>NF: Did not track project implementation processes</li> </ul>	<ul style="list-style-type: none"> <li>Delete completed, combined, or deleted actions</li> <li>Implemented &amp; non-relevant mitigation actions</li> </ul>	<ul style="list-style-type: none"> <li>Identify existing (20xx) mitigation plan actions' status</li> <li>Identify new mitigation actions for newly identified hazard implementation</li> <li>Develop community specific capability assessment(s)</li> </ul>	<ul style="list-style-type: none"> <li>Annually review action's status and feasibility</li> </ul>

### 3.5 Incorporation of Existing Plans and Other Relevant Information

During the planning process, the Planning Team reviewed and incorporated information from existing plans, studies, reports, and technical reports into the MJHMP.

Table 3-5 lists existing plans and other documents that were available regarding the L&PB and were reviewed and used as references for the jurisdiction information and hazard profiles in the risk assessment of the MJHMP for the Borough.

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**Table 3-5 Existing Plans and Other Relevant Information**

Existing plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)
Lake and Peninsula Borough Comprehensive Economic Development Strategy	Determination of Borough-wide philosophy and plans for economic development
Lake and Peninsula Borough Coastal Management Plan	Determination of Borough-wide philosophy and plans for coastal zone management
Lake and Peninsula Borough Title 9: Zoning and Land Use Code	Reference for land uses throughout the Borough
L&PB 2013-2014 Capital Improvement Plan	List For Legislative Funding Requests
L&PB Comprehensive Plan, 2012	Identify community values, community goals and objectives, desired community projects, community challenges. Adopted on 10/16/12, Ordinance 4/12/10.
<ul style="list-style-type: none"> <li>Chignik Comprehensive Plan</li> </ul>	Identify community values, community goals, desired community projects, community goals and objectives, and community challenges
<ul style="list-style-type: none"> <li>Egegik Comprehensive Plan</li> </ul>	Identify community values, community goals, desired community projects, community goals and objectives, and community challenges
<ul style="list-style-type: none"> <li>Newhalen Comprehensive Plan</li> </ul>	Identify community values, community goals, desired community projects, community goals and objectives, and community challenges
<ul style="list-style-type: none"> <li>Nondalton Comprehensive Plan</li> </ul>	Identification of community values, identification of community goals, identification of desired community projects, identification of community goals and objectives, identification of community challenges
<ul style="list-style-type: none"> <li>Pilot Point Draft Comprehensive Plan</li> </ul>	Identify community values, community goals, desired community projects, community goals and objectives, and community challenges
<ul style="list-style-type: none"> <li>Port Alsworth Comprehensive Plan</li> </ul>	Identify community values, community goals, desired community projects, community goals and objectives, and community challenges
<ul style="list-style-type: none"> <li>Port Heiden Draft Comprehensive Plan</li> </ul>	Identify community values, community goals, desired community projects, community goals and objectives, and community challenges
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
US Army Corps of Engineers, Erosion Information Paper, Lake and Peninsula Borough, Alaska, November 10, 2007	US Army Corps of Engineers, Erosion Information Paper, Lake and Peninsula Borough, Alaska, November 10, 2007
US Army Corps of Engineers, Alaska Baseline Erosion Assessment, 2009	Defined the area's erosion impacts
US Army Corps of Engineers, October 2011 Floodplain Managers Reports	Describes locational floodplain within Borough communities

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

### 3.6 Plan Maintenance

This section describes a formal plan maintenance process to ensure that the MJHMP remains an active and applicable document. It includes an explanation of how the Borough'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

#### 3.6.1 Implementation into Existing Planning Mechanisms

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

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

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 undertaking the following activities.

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

#### 3.6.2 Continued Public Involvement

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

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DMA 2000 Requirements
<b>Continued Public Involvement</b> <b>§201.6(c)(4)(iii):</b> The plan maintenance process shall include a) discussion on how the community will continue public participation in the plan maintenance process.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT A Planning Process (Continued)</b>
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.

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

The Planning Team will continue to identify opportunities to raise community awareness about the MJHMP and the hazards that affect the area. This effort could include attendance and provision of materials at Borough-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.

### 3.6.3 Monitoring, Reviewing, Evaluating, and Updating the MJHMP

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

DMA 2000 Requirements
<b>Monitoring, Evaluating and Updating the Plan</b> <b>§201.6(c)(4)(i):</b> The plan maintenance process shall include a) discussion on how the community will continue public participation in the plan maintenance process.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT A. Planning Process (Continued)</b>
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle?)
Source: FEMA, March 2015.

This section provides an explanation of how the Borough'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. Review and revise the MJHMP to reflect development changes, 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

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### **3.6.3.1     *Monitoring the MJHMP***

The MJHMP was prepared as a collaborative effort. To maintain momentum and build upon previous Multi-Jurisdictional Hazard Mitigation Planning efforts and successes, the Borough 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.

### **3.6.3.2     *Reviewing the MJHMP***

The Borough 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 appropriate strategies to overcome them), and a statement of whether or not the project has helped achieve the appropriate goals identified in the plan.

### **3.6.3.3     *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 Borough 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

### **3.6.3.4     *Updating the MJHMP***

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



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DMA 2000 Requirements
<b>Reviewing, Evaluating, and Implementing the Plan</b> <b>§201.6(d)(3):</b> 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 D. Planning Process (Continued) <i>Update activities not applicable to the plan version</i>
D1. Was the Plan revised to reflect changes in development? (Requirement §201.6(d)(3))
D2. Was the Plan revised to reflect progress in local mitigation effort? (Requirement §201.6(d)(3))
D3. Was the Plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))
Source: FEMA, March 2015.

The Borough will annually review the MJHMP as described in Section 3.5.3.2 and update the MJHMP every five years (or when significant changes are made) by having the identified Planning Team review all Annual Review Questionnaires (Appendix F) to determine the success of implementing the MJHMP's Mitigation Action Plan.

The Annual Review Questionnaire will enable the Team to identify possible changes 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



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- Update ongoing processes, and to change the proposed implementation date/duration timeline for delayed actions the Borough still desires to implement
- Prepare a “new” MAP matrix for the Borough.
- 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

### **3.6.3.5     *Formal State and FEMA MJHMP Review***

Completed Hazard Mitigation Plans do not qualify the Borough for mitigation grant program eligibility until they have been reviewed and adopted by the Borough Assembly, and received State and FEMA final approval.

The Borough will submit the draft MJHMP to the Division of Emergency Management (DHS&EM) for initial review and preliminary approval. Once any 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, the Borough will pass an MJHMP Adoption Resolution. Each of the incorporated cities will pass a resolution for their jurisdictions. The State of Alaska DHS&EM will approve the Port Alsworth portions. Copies will be sent to FEMA for final MJHMP approval.

FEMA’s final approval assures the Borough is eligible for applying for appropriate mitigation grant program funding. AECOM will send a final copy of the FEMA approved MJHMP to the Borough.

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## 4. Plan Adoption

Section Four is included to fulfill the Borough MJHMP adoption requirements.

### 4.1 Adoption by Local Governing Bodies and Supporting Documentation

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

DMA 2000 Requirements
<b>Local Plan Adoption</b> §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., Borough Assembly, County commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT E. Plan Adoption</b>
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.

The Borough is represented in this MJHMP and meets the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000, and 44 CFR §201.6(c)(5).

The L&PB Borough Assembly and cities' council's formal adoption resolutions and Port Allworth's letter stating compliance with MJHMP initiatives were submitted with the final draft MJHMP to FEMA for formal approval.

A scanned copy of the Borough's formal adoption is included in Appendix C. The cities resolutions and Port Alsworth promulgation are included in Appendix G.

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## 5. Hazard Profile Analysis

Section Five identifies and profiles the hazards that could affect the L&PB Borough.

### 5.1 Overview of a Hazard Analysis

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

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

DMA 2000 Requirements
<b>Identifying Hazards</b> §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.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>
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.

### 5.2 Hazard Identification and Screening

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

For the first step of the hazard analysis, on November 13, 2014 the Planning Commission reviewed the 2009 MJHMP nine listed hazards that could affect the L&PB Borough. They 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 Commission determined that seven hazards (combining

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flood and erosion and ground failure and avalanche) still pose a great threat to the Borough: earthquake, flood/erosion, ground failure (includes: avalanche, landslide, permafrost, and/or subsidence) severe weather, tsunami & Seiche, volcano and wildland (tundra) fire.

**Table 5-1 Hazard Identification and Screening**

Hazard Type	Should It Be Profiled?	Explanation
<b>Natural Hazards</b>		
Earthquake	Yes	Periodic, unpredictable occurrences. The Borough area experienced no damage from the 11/2003 Denali EQ, but experienced minor shaking from the earthquake and its aftershocks, from the 1964 Good Friday Earthquake. The Borough has experienced 2,916 earthquakes below 5.8M with epicenters located from 0.3 to 208 miles from the area since 1978.
Flood (Riverine and/or coastal related floods and resultant erosion)	Yes	Snowmelt run-off and rainfall flooding occurs during spring thaw and the fall rainy season. Events occur from soil saturation. Several minor flood events cause damage. Severe damages occur from major floods. The Borough experiences storm surge, coastal ice run-up, and coastal wind erosion along the shoreline and riverine erosion along the area's rivers, streams, and creek embankments from high water flow, riverine high water ice flows, wind, surface runoff, and boat traffic wakes.
Ground Failure (Avalanche, Landslide/Debris Flow, Permafrost, Subsidence)	Yes	Ground Failure occurs throughout Alaska from avalanches, landslides, melting permafrost, and ground subsidence. However subsidence and permafrost are the primary hazards causing houses to shift due to ground sinking and upheaval, and high ground water melting the permafrost.
Severe Weather (Cold, Drought, Rain, Snow, Wind, etc.)	Yes	Severe weather impacts the Borough 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. Severe weather events cause fuel price increases and frozen pipes. Heavy snow loads potentially damage house roofs. Winds potentially remove or damage roofs and moved houses off their foundations.
Tsunami (Seiche)	Yes	Tsunamis pose a threat to portions of the Borough from local and/or distant events.
Volcano	Yes	Volcano generated ash periodically impacts portions of the Borough.
Fire (Wildland and Tundra)	Yes	Fires pose a threat to the Borough.

### 5.3 Hazard Profile and Risk Assessment

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

DMA 2000 Requirements
<b>Profiling Hazards</b> <b>Requirement §201.6(c)(2)(i):</b> [The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i)) B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?
Source: FEMA, 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 (to include magnitude and severity)
- Impact (Section 5 provides general impacts associated with each hazard. Section 6 provides detailed impacts to Borough's residents and critical facilities)
- Future event 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 the criteria identified in the introductory narrative description of Section 5.3.

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**Table 5-2 Hazard Magnitude/Severity Criteria**

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

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

**Table 5-3 Hazard Recurrence Probability Criteria**

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

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



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### 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.

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to measure intensity is the Modified Mercalli Intensity (MMI) Scale. As shown in, 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).

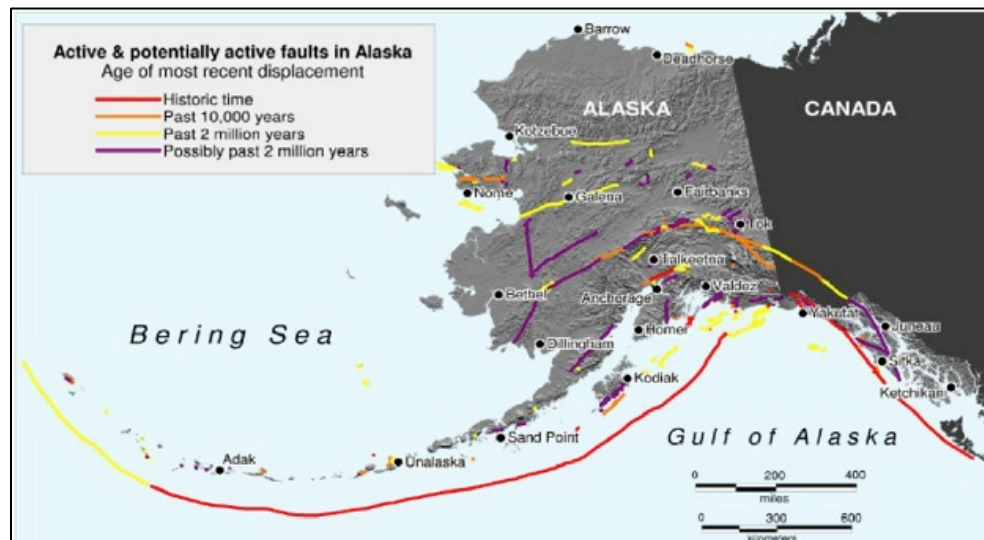
Magnitude (M) is the measure of the earthquake strength. It is related to the amount of seismic energy released at the earthquake's hypocenter, the actual location of the energy released inside the earth. It is based on the amplitude of the earthquake waves recorded on instruments, known as the Richter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

### 5.3.1.2 History

Accurate seismology for Alaska is relatively young with historic data beginning in 1973 for most locations. Therefore data is limited for acquiring long-term earthquake event data. The MJHMP's Alaska earthquake data is based on best available data; obtained from the US Geological Survey (USGS) and the State of Alaska, UAF Geophysical Institute's archives. Research included searching the US Geological Survey (USGS) earthquake database for events spanning from 1978 to present; none of which exceeded M5.8 located within 100 miles of the midpoint of the Borough.

North America's strongest recorded earthquake occurred on March 27, 1964 in Prince William Sound measuring M9.2 and was felt by many residents throughout Alaska. L&PB experienced minimal ground motion from this historic event. Planning Team members further stated that the Borough has experienced no ground shaking from the November 3, 2002 M7.9 Denali EQ.

Figure 5-1 depicts historical earthquakes within close proximity (50 to 80 miles) of the Borough.



**Figure 5-1 Historical Earthquakes in Alaska**

Therefore the Planning Team determined that based on available recorded data, the Borough has a minor concern for earthquake damages as they have not experienced damaging impacts from their historical earthquake events and only need to be concerned with earthquakes with a magnitude > M5.0. This is substantiated in Table 5-4, which lists 89 of their historical earthquakes with the largest one (M5.8) occurring on January 24, 2009. All earthquakes that exceeded M4.0 are highlighted.

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**Table 5-4 LP & B's Historical Earthquakes**

Date	Time	Latitude	Longitude	Depth (Miles)	Magnitude
11/6/2014	3:46 PM	60.0137	-153.29	150.5	4
8/19/2014	10:11 AM	60.0283	-153.09	131.9	4.2
8/14/2014	6:04 AM	59.083	-154.03	130.4	4.5
4/6/2014	4:55 PM	60.1118	-153.37	157.4	4
3/12/2014	8:43 AM	59.2956	-153.18	86.1	4.6
1/27/2014	5:39 PM	59.9483	-153.36	142.9	4.1
12/28/2013	2:42 PM	59.3494	-153.52	117.1	4.1
11/22/2013	1:58 PM	59.9875	-153.61	167.5	4.3
11/17/2013	7:57 PM	60.1783	-153.85	203.7	4.3
11/11/2013	6:18 PM	60.013	-152.7	90.2	4
9/12/2013	4:41 AM	59.776	-152.84	10.8	4.1
8/25/2013	5:49 PM	60.0594	-152.87	103.5	4.3
8/1/2013	9:32 PM	60.1453	-152.92	126.4	4.7
7/12/2013	11:01 AM	60.2672	-153.06	147.5	4.1
5/14/2013	2:33 AM	58.7678	-153.89	12.4	4.4
5/12/2013	6:34 AM	58.7469	-153.88	11.4	4.4
4/11/2013	5:00 PM	58.8244	-153.26	14.9	4.1
3/31/2013	11:27 PM	58.988	-153.87	102.6	4.8
3/10/2013	5:11 PM	59.3147	-154.22	8.3	5.2
3/10/2013	9:17 PM	58.989	-153.87	103.5	4.3
1/13/2013	12:44 PM	60.528	-152.89	135	5
10/14/2012	9:58 AM	60.108	-152.56	88.5	4.4
9/13/2012	5:58 AM	59.622	-153.16	104.1	4
8/16/2012	12:50 AM	58.934	-154.48	134.9	4.3
7/19/2012	5:02 PM	59.368	-154.35	9.2	4.5
5/23/2012	9:35 AM	59.027	-152.93	69.7	4.4
5/13/2012	5:09 AM	60.053	-152.82	114.1	4
4/12/2012	7:14 AM	59.778	-152.25	67.6	4
4/1/2012	3:18 AM	59.978	-153.29	129	4
3/3/2012	1:35 PM	60.048	-152.86	114	4.3
1/6/2012	11:37 PM	59.852	-153.23	136.1	5
11/29/2011	8:34 PM	59.743	-152.67	90.7	4.5
11/8/2011	9:47 AM	60.373	-153.02	135.2	4.1
11/5/2011	12:57 AM	59.488	-153.4	110.2	4.4
9/17/2011	11:22 PM	60.156	-153.19	144.3	4.3
7/27/2011	7:41 PM	60.2	-152.52	98.6	4.6
7/21/2011	6:20 AM	60.031	-152.83	92.7	4.3
7/4/2011	3:57 AM	60.238	-152.8	111.9	4.4
6/26/2011	3:03 AM	59.894	-152.99	108.5	4.1

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**Table 5-4 LP & B's Historical Earthquakes**

Date	Time	Latitude	Longitude	Depth (Miles)	Magnitude
6/9/2011	7:40 AM	59.569	-152.49	83.3	4.3
5/20/2011	12:51 PM	59.892	-153.27	136.8	4.8
5/13/2011	8:30 PM	60.045	-152.61	101.4	4.5
5/11/2011	8:39 PM	59.977	-153.32	135.8	4
4/29/2011	1:35 PM	59.764	-153.61	131.4	4.3
4/4/2011	6:20 PM	58.922	-153.13	69.4	4.6
1/19/2011	2:03 PM	60.052	-152.82	103.7	4
1/18/2011	12:18 AM	58.875	-154.55	136.2	4.5
10/29/2010	12:05 AM	59.889	-152.35	77.7	4.3
10/21/2010	12:24 AM	59.233	-154.48	153.1	4.7
9/22/2010	11:32 AM	60.147	-153.2	136.2	4.2
9/15/2010	4:06 PM	59.861	-153.18	121	5
9/5/2010	1:44 AM	59.852	-152.79	87.7	4
8/14/2010	11:03 AM	59.965	-153.21	141	4.6
8/12/2010	1:39 PM	59.896	-153.25	131.7	4
8/11/2010	4:23 AM	60.054	-152.79	110.8	4.3
7/30/2010	12:14 PM	58.938	-154.36	123.1	4.5
7/27/2010	9:15 AM	60.053	-152.61	88.1	4.4
7/18/2010	5:40 PM	60.162	-153.24	137.8	4
5/24/2010	12:01 PM	59.982	-152.31	71.5	4.6
5/1/2010	1:12 AM	58.92	-153.84	92.2	4.3
4/18/2010	2:28 AM	59.315	-153.17	103.9	4
4/11/2010	6:17 PM	59.837	-153.31	121.8	4.2
2/8/2010	4:02 PM	58.664	-153.32	62	4.5
1/25/2010	5:04 PM	58.604	-153.47	89.7	5
12/18/2009	3:33 AM	59.044	-153.4	80.7	5.1
12/15/2009	12:55 PM	60.219	-152.88	117.5	4.3
11/17/2009	8:48 PM	59.465	-153.24	101.8	4.4
6/15/2009	8:37 PM	59.338	-153.06	81.7	4.3
6/9/2009	6:39 PM	59.016	-154.16	132	4.2
5/24/2009	9:40 AM	59.772	-153.25	125.8	4.7
5/4/2009	11:46 AM	59.778	-152.73	84.2	4.7
4/14/2009	5:14 PM	60.158	-153.06	117.8	4.5
3/12/2009	11:25 AM	60.301	-153.56	191.7	4.4
3/1/2009	4:03 PM	59.808	-152.77	84.8	4.3
2/23/2009	12:04 AM	58.916	-153.63	87.8	5
11/21/2008	6:04 AM	59.718	-153.78	151.2	4.2
11/9/2008	11:36 PM	59.997	-153.02	127.1	5
11/4/2008	1:22 PM	59.916	-152.55	79.7	4.6

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**Table 5-4 LP & B's Historical Earthquakes**

Date	Time	Latitude	Longitude	Depth (Miles)	Magnitude
10/8/2008	4:27 PM	60.115	-152.64	103.6	4.8
10/7/2008	12:57 AM	59.98	-153.25	139.6	4.5
10/5/2008	5:42 AM	60.089	-152.5	89.4	4.4
9/18/2008	7:43 PM	59.503	-152.79	90.2	4.5
8/13/2008	2:35 AM	59.332	-152.78	76.6	4
6/13/2008	4:01 PM	59.93	-153.52	155.7	4
5/27/2008	2:26 AM	60.109	-152.68	109.4	4
5/22/2008	10:19 PM	60.035	-152.89	120.4	4.4
4/8/2008	9:54 AM	59.994	-152.55	93.9	4.2
2/17/2008	11:54 PM	59.841	-153.28	129.1	4

(USGS 2012)

## 5.3.1.3 Location, Extent, Impact, and Future Event Recurrence Probability

### Location

The average distance of the 89-recorded earthquakes that exceeded M4.0 was 119 miles from the center point of the Borough (Latitude 59°54'69" Longitude -154°9'000") with a range from 0.3 to 238 miles.

The entire geographic area of Alaska is prone to earthquake effects. Figure 5-2 shows the locations of active and potentially active faults in Alaska. Large quakes have occurred near the Borough at regular intervals in the past, and it is likely that they will occur again. Even when earthquakes occur in other parts of the state, secondary effects such as transportation and supply interruptions may affect the Borough.



**Figure 5-2 Active & Potentially active faults in Alaska**

### Extent

Based on historic earthquake events and the criteria identified in Table 5-2, the magnitude and severity of earthquake impacts in the Borough are considered “Limited” with potential injuries

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and/or illnesses that do not result in permanent disability; critical facilities could expect to be shut-down for more than two weeks; and more than 10 percent of property severely damaged with limited long-term damage to transportation, infrastructure, or the economy.

### **Impact**

Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. Minor shaking may be seen or felt based on past events. Impacts to future populations, residences, critical facilities, and infrastructure are anticipated to remain the same.

### **Recurrence Probability**

This USGS 2009 Earthquake Probability Map 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).*

Earthquakes can occur at any time and do not provide any warning. The magnitude and severity of an earthquake will be dependent upon each particular event. Hundreds of “micro-quakes” occur every day throughout Alaska, and large, damaging earthquakes can occur at any time. Usually very large earthquakes occur at intervals of hundreds of years, but it is important to note that very large earthquakes can conceivably occur twice in the same year, or may not occur in several hundred years. All Alaska communities should be prepared for primary and secondary effects of earthquakes at all times. Where earthquake risk is indicated for Borough communities, it should be assumed that the entire community is vulnerable to earthquake damages. The Community Values sections indicate estimated values for all community infrastructures. Earthquakes can result in damages up to and including the total of those values. It is not possible to predict when an earthquake will occur.

Figure 5-3, derived from the United States Geological Survey (USGS) Earthquake Mapping Model shows the recurrence probability of a magnitude 5.0 or greater earthquake occurring in a future 100-year period. The highest probabilities “Likely” for lands in the L&PB were between 60 to 80 percent (darker brown color) for areas immediately adjacent to Cook Inlet and the Pacific Ocean. Probabilities decrease to “Unlikely” moving westward (red color 58’30” lower left corner and 61’00” -154’15” upper center) to near 0 percent west of Lake Iliamna. Most of the L&PB land is classified as “Likely” to have a recurrence probability of more than a 50 percent for M5.0 earthquakes in a 100-year period.



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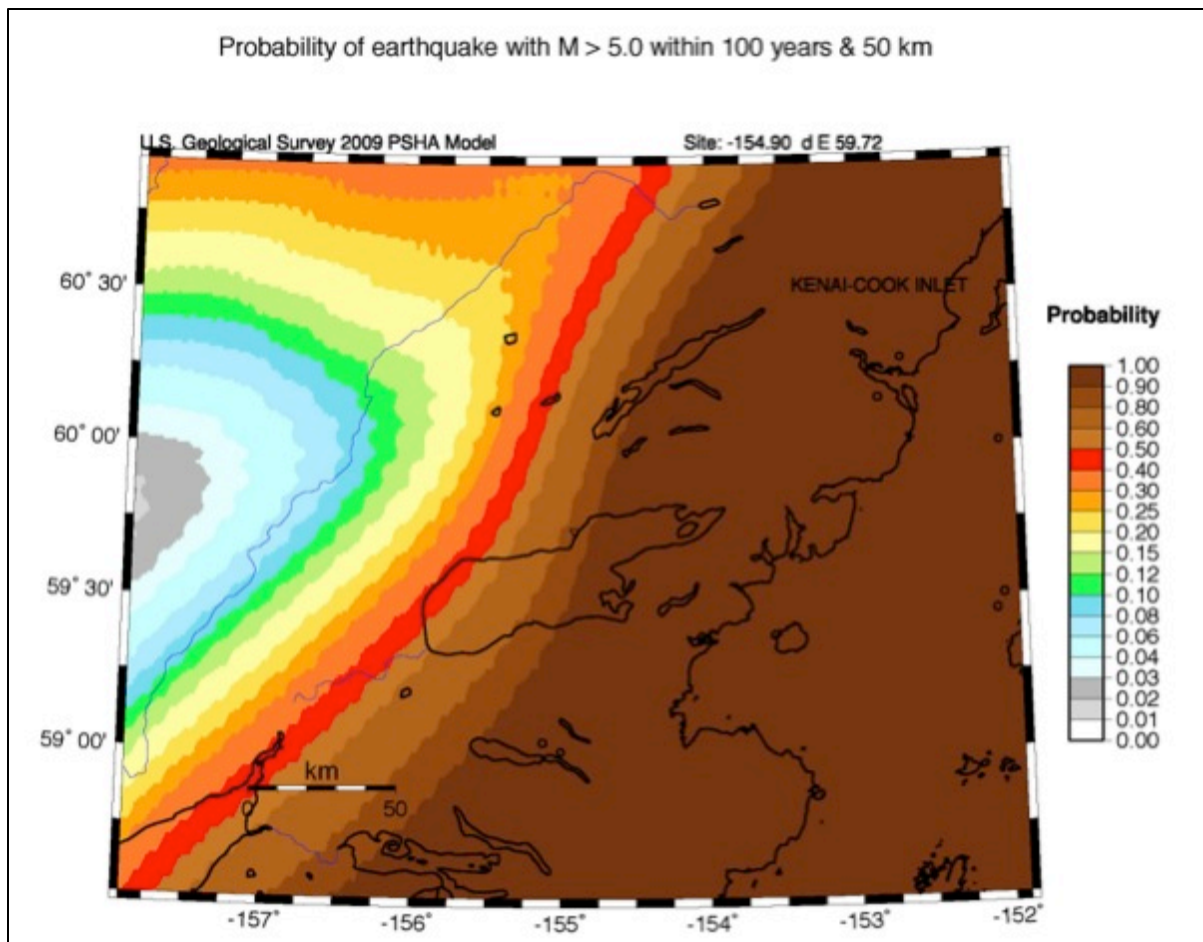


Figure 5-3 Earthquake Recurrence Probability Shake Map (USGS 2015).

### 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 impact communities with high water levels, or fast flowing waters, but sediment transport also impacts infrastructure and barge and other river vessel access limitations. Dredging may be the only option to maintain an infrastructure's viability and longevity.

Four primary types of flooding occur in the Borough: rainfall-runoff, snowmelt, ice jam, storm surge, and ice override floods.

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



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**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.

**Storm Surges**, or coastal floods, occur when the sea is driven inland above the high-tide level onto land that is normally dry. Often, heavy surf conditions driven by high winds accompany a storm surge adding to the destructive-flooding water's force. The conditions that cause coastal floods also can cause significant shoreline erosion as the floodwaters undercut roads and other structures. Storm surge is a leading cause of property damage in Alaska.

The meteorological parameters conducive to coastal flooding are low atmospheric pressure, strong winds (blowing directly onshore or along the shore with the shoreline to the right of the direction of the flow), and winds maintained from roughly the same direction over a long distance across the open ocean (fetch).

Communities that are situated on low-lying coastal lands with gradually sloping bathymetry near the shore and exposure to strong winds with a long fetch over the water are particularly susceptible to coastal flooding. Several communities and villages along the Bristol Bay coast, the Bering Sea coast, the Arctic coast, and the Beaufort Sea coast have experienced significant damage from coastal floods over the past several decades. Most coastal flooding occurs during the late summer or early fall season in these locations. As shore-fast ice forms along the coast before winter, the risk of coastal flooding abates, but later freeze-ups greatly increase the risk of erosion, storm surge flooding and ice override events.

**Ice Override** (also known as an Ivu) is a phenomenon that occurs when motion of the sheet ice is initiated by wind stress acting on the surface of ice that is not confined. Onshore wind, coupled with conditions such as a smooth gradual sloping beach and high tides can cause ice sheets to slide up or "override" the beach and move inland as much as several hundreds of feet. Ice override typically occurs in fall and early winter (though events have been reported at other times) and is usually associated with coastal storms and storm surge but may also happen in calm weather.

Override advances are slow enough to allow people to move out of its path, and therefore poses little immediate safety hazard. Intact sheets of ice up to several feet thick moving into buildings or across roads and airports can however cause structural damage and impede travel. Shoreline protection in the form of bulkheads or other structures to break-up the ice can limit the movement of ice. In at least one occasion, a bulldozer was able to break-up the ice and prevent damage.

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**Riverine or Coastal Erosion** rarely causes death or injury. However, erosion causes property destruction, prohibits development, and impacts community infrastructure. Erosion is typically gradual land loss through wind or water scour. However, erosion can occur rapidly as the result of floods, storms or other event or slowly as the result of long-term environmental changes such as melting permafrost. Erosion is a natural process, but its effects can be easily exacerbated by human activity.

Coastal erosion, sometimes referred to as tidal, bluff, or beach erosion, may other times encompass different categories altogether. For this profile, tidal, bluff and beach erosion will be nested within the term erosion.

Coastal erosion is the attrition of land resulting in loss of beach, shoreline, or dune material from natural activity or human influences. Coastal erosion occurs over the area roughly from the top of the bluff out into the near-shore region to about the 30 feet water depth. It is measured as the rate of change in the position or horizontal displacement of a shoreline over a period of time. Bluff recession is the most visible aspect of coastal erosion because of the dramatic change it causes to the landscape. As a result, this aspect of coastal erosion usually receives the most attention.

The forces of erosion are embodied in waves, currents, and winds. Surface and ground water flow, and freeze-thaw cycles may also play a role. Not all of these forces may be present at any particular location. Coastal erosion can occur from rapid, short-term daily, seasonal, or annual natural events such as waves, storm surge, wind, coastal storms, and flooding, or from human activities including boat wakes and dredging. The most dramatic erosion often occurs during storms, particularly because the highest energy waves are generated under storm conditions.

Coastal erosion may also be due to multi-year impacts and long-term climatic change such as sea-level rise, lack of sediment supply, subsidence, or long-term human factors such as aquifer depletion or the construction of shore protection structures and dams. Attempts to control erosion using shoreline protective measures such as groins, jetties, seawalls, or revetments can lead to increased erosion.

Riverine erosion is a major erosion threat to the Borough as it threatens the embankment, structures, and utilities of residents.

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

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

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

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### Event Occurrence Intervals

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

#### 5.3.2.2 History

Figure 5-4 is a picture of Timber Creek Bridge flooding in 2003.



**Figure 5-4 Timber Creek Bridge, October 2003** (Photo by Ray Williams)

The DHS&EM Disaster Cost Index delineates historical flood events affecting the Borough. The most current index (2013) lists the following events:

**00-191 Central Gulf Coast Storm declared February 4, 2000 by Governor Murkowski then FEMA declared (DR-1316) on February 17, 2000: 00-191 Central Gulf Coast Storm declared February 4, 2000 by Governor Murkowski then FEMA declared (DR-1316) on February 17, 2000:** On Feb 4 2000, the Governor declared a disaster due to high impact weather events throughout an extensive area of the state. The State began responding to the incident since the beginning of December 21, 1999.

On March 17, 2000, the Governor again expanded the disaster area and declared that a condition of disaster exists in Aleutians East, Bristol Bay, Denali, Fairbanks North Star, Kodiak Island, and **Lake and Peninsula Boroughs** and the census areas of Dillingham, Bethel, Wade Hampton, and Southeast Fairbanks, which is of sufficient severity and magnitude to warrant a disaster declaration. Effective on April 4, 2000, Amendment No. 2 to the Notice of a Major Disaster Declaration, the Director of FEMA included the expanded area in the presidential declaration. Public Assistance, for 64 applicants with 251 PW's, totaled \$12.8 million. Hazard Mitigation totaled \$2 million. The total for this disaster is \$15.66 million.

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**03-202 Kenai Peninsula Borough Flooding (AK-DR-1445) Declared November 6, 2002 by Governor Knowles then FEMA Declared December 4, 2002. FEMA amended the Declaration to extend the incident period to December 20<sup>th</sup>.** Starting October 23, 2002 through November 12, 2002, heavy rains (from three inches to fifteen inches) caused widespread damage, school closures, road washouts and stranded residents & hunters throughout the Kenai Peninsula Borough, the Kodiak Borough and the **Chignik Bay area, including Chignik Lake and Chignik Lagoon**. The driving rain continued for an extended time frame with multiple storm fronts.

Chignik Bay area, including Chignik Lake and Chignik Lagoon damage consisted of sea surge damage to docks and piers, damage oaf fuel of loading facility and dump truck, damage to a bridge in Chignik, and damage to the Department of Transportation-Chignik Lagoon Airport. The Kodiak Borough and Chignik Bay area also experienced private home damages. Federal Disaster Assistance for Individual Assistance, Debris Removal, Emergency Protective Measures and all categories of Permanent Work were provided under the Public Assistance Program. FEMA also authorized 404 Hazard Mitigation funding. Individual Assistance totaled \$142K. Public Assistance totaled \$16.6 million for 26 applicants with 118 PW's. Hazard Mitigation totaled \$582K. The total for this disaster is \$17.6 million.

**04-207 03 Fall Flood (AK-04-207) Declared November 3, 2003 by Governor Murkowski.** Unseasonable amount of rain during the period of September 26 through October 3, 2003 caused heavy flooding in the **Lake and Peninsula Borough**, the Kenai Borough and the Kodiak Island Borough. The Lake and Peninsula Borough declared a local disaster emergency. The Kenai Borough did not declare a disaster emergency but extended a letter of support for the Lake and Peninsula Borough declaration. The Department of Transportation experienced extensive damage on the Chiniak Hwy in Kodiak and to multiple locations on the Williamsport-Pile Bay road in the Lake and Peninsula Borough and the Kenai Borough.

The Tanalian Electric Cooperative in **Port Alsworth** experienced damage to overhead power lines resulting in power failures. Disaster Assistance for Emergency Protective Measures and Permanent Work category C were approved under the State Public Assistance Program. No Federal Disaster Assistance was requested. Total estimate for this disaster was \$342,136. Actual expenditure was \$235,407. This is only for Public Assistance for 2 applicants with 4 PW's.

(Disaster Cost Index, DHS&EM 2013).

The US Army Corp of Engineers reported one flood of record in 1948 with a magnitude of 14.1 feet has occurred in the Borough at Chignik. (USACE 2014)

Table 5-5 lists the historical floods in the L&PB.

**Table 5-5 L&PB Historical Floods**

Location	Date	Event Type	Magnitude
Chignik	Oct. 1948	Coastal Storm	14.1 feet
L&PB	February - March 2000	Coastal Storm	FEMA Declared Disaster
Chignik	October – November 2002	Heavy Rainfall	FEMA Declared Disaster
L&PB	September – October 2003	Heavy Rainfall	FEMA Declared Disaster

(USACE 2014, DHS&EM 2013)

### 5.3.2.3 Location, Extent, Impact, and Recurrence Probability

#### Location

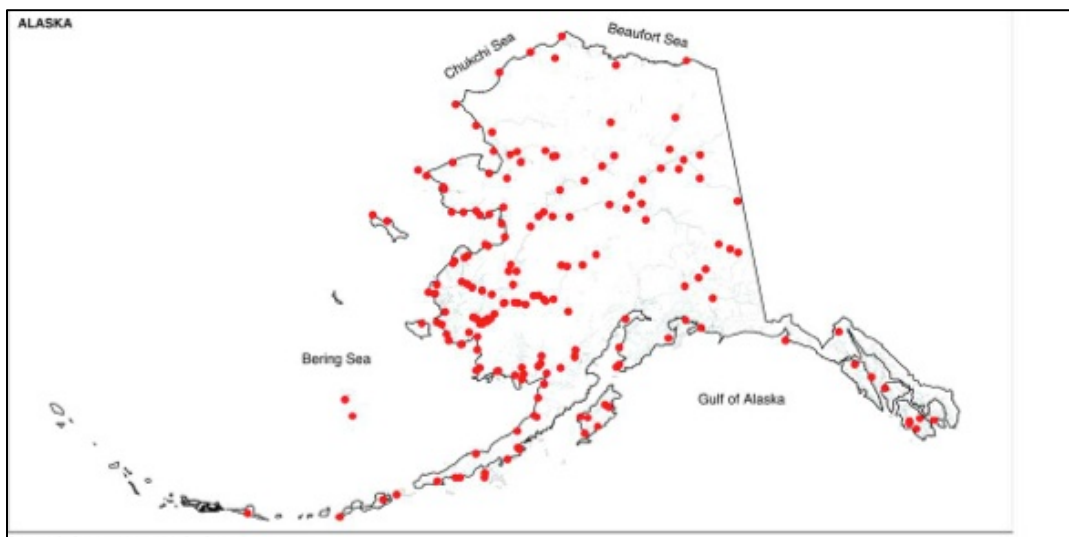
The Planning Team indicated that the Borough has minor flooding impacts; most of which occur

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from rainfall and snowmelt run-off. Water collects in low terrain depressions and may rise to just below a structures first step with no water intrusion on the first floor. The Borough's typical minor flood locations are primarily in the Chignik, Chignik Lagoon, and Port Alsworth areas. In addition, the following is an excerpt from the *USCOE Alaska Baseline Erosion Assessment, 2009*.

*“Port Heiden experiences coastline erosion along Bristol Bay caused by fall storms with high tides, storm surges, and wind and wave action. Annual erosion ranges from 15 to 40 feet, with erosion rates in the upper end of that range in recent years. Several buildings and the cemetery have been relocated, but multiple structures remain at risk, including homes, fuel tanks, the cemetery, and roads. Damage is expected within 10 years” (USCOE 2009).*

Figure 5-5 depicts the State of Alaska Erosion Locations defined within the US General Accounting Office's (GAO) December 2003 Report to Congressional Committees, titled *“Alaska Native Villages; Most are affected by Flooding and Erosion, but Few Qualify for Federal Assistance.”*



**Figure 5-5 Native Village Affected by Flooding and Erosion (GAO 2003)**

### Extent

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

The following factors contribute to riverine and/or lake 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



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- Flow velocity
- Availability of sediment for transport, and the bed and embankment watercourse erodibility
- Borough location related to identified-historical flood elevation

The Borough does not experience severe riverine flooding, but they experience lake flooding and moderate high water flow flood erosion impacts. Therefore, based on past high water flow event history and the criteria identified in Table 5-2, the extent of flooding and resultant damages to infrastructure and their protective embankments in the Borough are considered “Limited” where critical facilities could shut-down for more than one week with more than 10 percent of property being severely damaged.

### **Impact**

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

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

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

Impacts and problems also related to flooding are deposition as well as embankment, coastal erosion, 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 erosion involves material removal from the stream or riverbanks, coastal bluffs, and dune areas. When bank erosion is excessive, it becomes a concern because it results in loss of embankment vegetation, fish habitat, and land, property, and essential infrastructure (BKP 1988).

### **Recurrence Probability**

Based on previous occurrences, USACE Floodplain Manager’s report, and criteria in Table 5-3, validate it is “Possible” that a flood event would occur with a 1 in 5 year ( $1/5=20$  percent) chance of occurring. History of events is greater than 10 percent but less than or equal to 20 percent likely per year. There is no data identifying a 500-year (0.2 percent chance of occurring in a given year) flood threat in the Borough.

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### 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, and 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, refer 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.



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- **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 2010).

Indicators of a possible ground failure include:

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

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

### 5.3.3.2 *History*

There are few written records defining ground failure impacts. The latest (2013) DHS&EM Disaster Cost Index lists do not list any historical ground failure events affecting the Borough. Avalanches occur repeatedly on avalanche paths. Hundreds of avalanche paths exist in the borough but few intersect human development, and only impact human activity when humans travel into the avalanche paths. One avalanche path has caused repeated damages in Chignik

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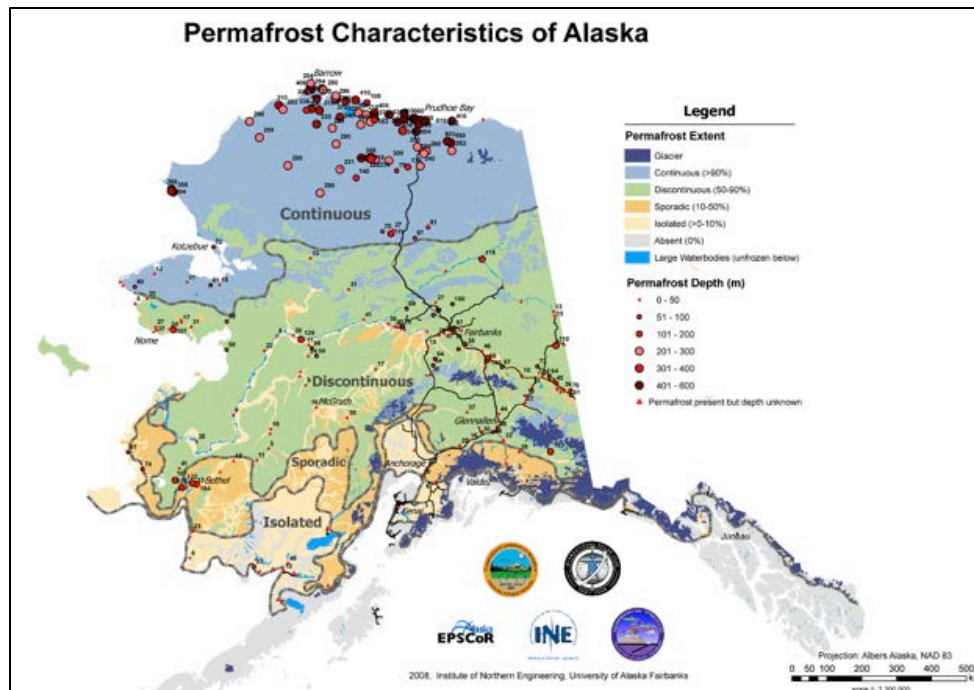
(please see community section for more detail). Other paths throughout the borough have not been monitored, but have likely slid at regular intervals. These paths are of no consequence to the Borough or its communities because they do not intersect infrastructure.

Landslides are not common in the Borough; but because soil stability studies have not been performed, it is possible that unstable hillsides are present in the Borough. The 2009 MJHMP states that the community of Chignik Lagoon has documented problems with and has sustained damages from unstable soils.

### 5.3.3.3 Location, Extent, Impact, and Recurrence Probability

#### Location

According to permafrost and ice conditions map (Figure 5-6) developed for the National Snow and Ice Data Center/World Data Center for Glaciology located in the most current State Hazard Mitigation Plan (SHMP), shows that portions of the Borough has areas of isolated and sporadic permafrost. (DHS&EM 2013)



**Figure 5-6 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 an airport) was 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 Borough are considered "Limited." Impacts would not occur quickly but over time with warning signs. This hazard would not likely cause injuries or death but could potentially shutdown critical facilities for more than one week and severely damage 10 percent of the property.

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### **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 occurs 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.

### **Recurrent Probability**

Even though there are few written records defining ground failure impacts for the Borough, there are areas that have annually recurring landslide, avalanche, and ground failure damages throughout their communities – to structures, roads, harbor areas, and the airport. The Planning Team stated the recurrence probability for ground failure follows the criteria in Table 5-3, classified as “Possible.” an event would occur within the next five years with a 1 in 5 year ( $1/5=20$  percent) chance of occurring with a the history of events greater than 10 percent but less than or equal to 20 percent likely per year.

### **5.3.4 Tsunami**

#### **5.3.4.1 Nature**

Tsunamis are ocean waves that are generally triggered by vertical motion of the sea floor during major earthquakes. Most seismically generated local tsunamis in Alaska have occurred along the Aleutian arc, which includes part of the Borough. The portion of Alaska bordering the North Pacific

Ocean can be hit by tsunamis generated by above and underwater landslides, crustal plate movement, or volcanic activity. The Aleutian Islands could receive a tsunami generated by remote source earthquakes while areas of the Gulf of Alaska could experience a tsunami from several possible sources. The Alaska coastline facing the Bering Sea has a very low tsunami threat. However, evidence exists of a volcanically induced tsunami in Bristol Bay about 3,500 years ago.

Near ocean or undersea landslides or volcanic eruptions can also generate tsunamis. They can be generated locally or a great distance from where they landfall. Warning time can be limited when the tsunami is triggered close to the impacted coastline. Many tsunamis are small and are only detected by instruments, but damaging tsunamis are of significant concern for the coastal areas of the Borough that is exposed to the Pacific Ocean.

The fact that tsunamis are rare does not reduce their potential for causing devastating damage to Borough communities. Actual tsunami damage is a direct result of three factors: inundation, wave impact, and coastal erosion. Even a relatively small damaging tsunami is likely to cause significant disruption to rural, isolated communities.

## **Tsunami Types**

### **Tele-tsunami**

Tele-tsunami is the term for a tsunami observed at places 1,000 kilometers from their source. In many cases, tele-tsunamis can allow for sufficient warning time and evacuation. There is a slight risk in the western Aleutians and some parts of Southeast Alaska.

Most tele-tsunamis that reached Alaska have not caused damage. In fact, Massacre Bay on Attu Island has historically received tele-tsunamis with less than one foot recorded amplitudes.

Only one tele-tsunami has caused damage in Alaska; the 1960 Chilean tsunami. Damage occurred to pilings at MacLeod Harbor, Montague Island and on Cape Pole, Kosciusko Island where a log boom broke free.

### **Volcanic tsunamis**

In 1883, a debris flow from the Saint Augustine volcano triggered a tsunami that inundated Port Graham with waves 30 feet high. Other volcanic events may have caused tsunamis but there is not enough evidence to report that conclusively. Many volcanoes have the potential to generate tsunami

### **Seismically generated local tsunamis**

Most seismically generated local tsunamis occurred along the Aleutian Arc. Other locations include the back arc area in the Bering Sea and the eastern boundary of the Aleutian Arc plate. They generally reach land within 20 to 45 minutes.

### **Landslide-generated tsunamis**

Submarine and subaerial landslides can generate large tsunamis. Subaerial landslides have more kinetic energy associated with them so they trigger larger tsunamis. An earthquake usually, but not always, triggers this type of landslide and they are usually confined to the originating bay or lake location.

### **Seiches**

A seiche is a wave that oscillates in partially or totally enclosed bodies of water. They are caused by earthquakes, underwater landslides, atmospheric disturbances or avalanches and can last from a few minutes to a few hours. The first wave can occur within a few minutes, giving virtually no time for warning. The resulting effect is similar to bathtub water sloshing repeatedly from side to side. The reverberating water continually causes damage until the activity subsides. The factors for effective warning are similar to a local tsunami. Communities near large lakes, such as Lake Iliamna, may be vulnerable to seiche activity following an earthquake.

#### **5.3.4.2 History**

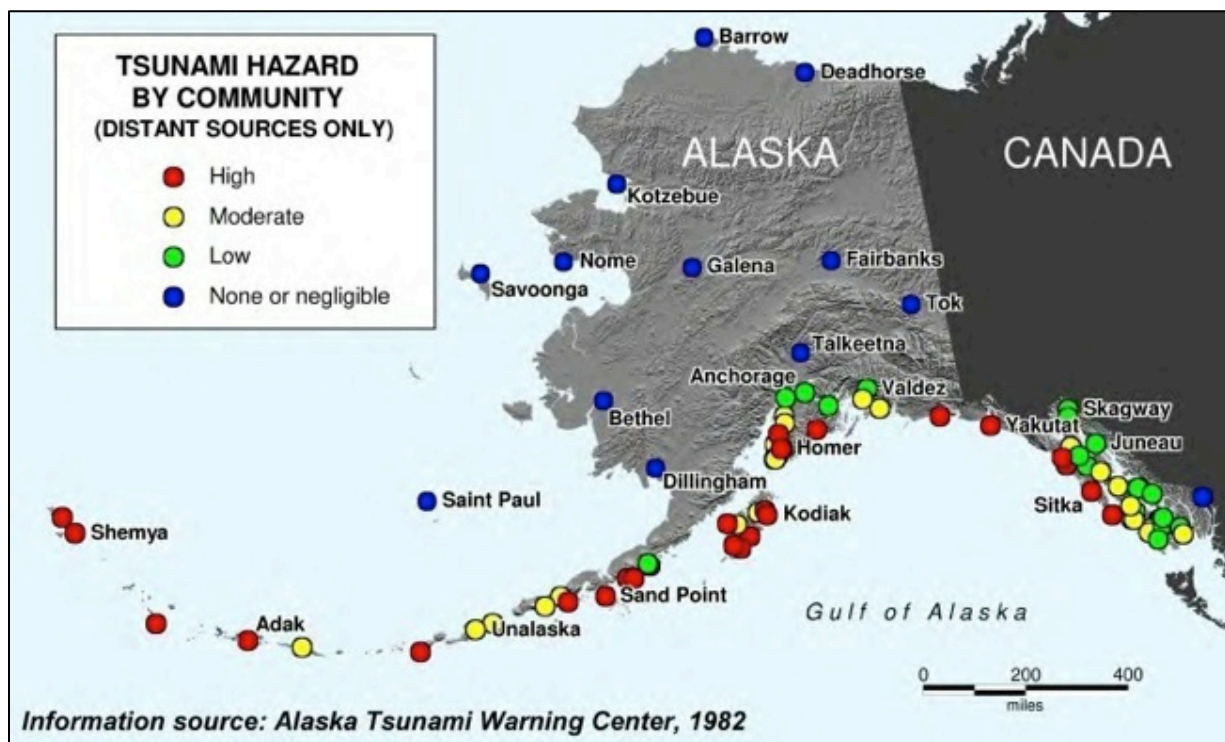
Notable tsunamis in Alaska include those resulting from the 1964 earthquake, a tsunami resulting from earthquake-induced ground failure in Lituya Bay in 1958, an earthquake-induced tsunami near Unimak Bay which destroyed the Scotch Cap lighthouse in 1946, and major Pacific-wide tsunami generated by an earthquake in the Aleutian trench, which, although significant, did not cause major damages to human settlements in Alaska. A landslide-induced tsunami in Skagway caused one fatality in 1994.

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There has been at least one confirmed volcanically triggered tsunami in Alaska. In 1883, a debris flow from the Saint Augustine volcano triggered a tsunami that inundated Port Graham with waves 30 feet high. Other volcanic events in Alaska may have caused tsunamis but there is not enough evidence to report that conclusively. Many volcanoes, including those in the Lake and Peninsula Borough, have the potential to generate tsunamis.

Activities that provide mitigation against tsunami damages are usually related to removal of vulnerable populations, provisions of shelter and/or safe areas for population, alert and warning activities, and public education.

Figure 5-7 depicts tsunami hazard by community developed by the Alaska Tsunami Warning Center.



**Figure 5-7 Tsunami Hazard by Community (ATWS 1982)**

The Borough has not been struck by a damaging tsunami in recent history, but this does not reduce the danger nor does this reduce the potential for a tsunami at any time. Tsunamis are unpredictable and can occur with little warning. All communities with a tsunami risk listed should be considered at risk whether or not they have a recorded instance of tsunami damages.

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

#### Location

The protected communities of the Borough are at low or no risk of tsunami damage, but several communities are exposed to the open Pacific Ocean and are located near the ocean shore, making them extremely vulnerable to tsunamis. Communities near large lakes, such as Lake Iliamna, may be vulnerable to seiche activity following an earthquake.



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Tsunamis generated by landslides in lakes occur more in Alaska than any other part of the U.S. They are associated with delta collapse in very deep glacial lakes and locations where delta deposits from rapidly flowing streams and rivers dump unconsolidated glacial debris.

Tsunamis are very unpredictable. Distant source tsunamis can only be predicted once they are generated, and then only have a warning time of an hour or less. Locally generated tsunamis, such as landslide or volcanically induced tsunamis, happen very suddenly and cannot be predicted at all.

However, geotechnical investigation can reveal unstable hillsides that may fail catastrophically and produce landslide-generated tsunamis. Still, the actual timing of such an event is unpredictable.

### **Extent**

Notable tsunamis in Alaska include those resulting from the 1964 earthquake, a tsunami resulting from earthquake-induced ground failure in Lituya Bay in 1958, an earthquake-induced tsunami near Unimak Bay which destroyed the Scotch Cap lighthouse in 1946, and major Pacific-wide tsunami generated by an earthquake in the Aleutian trench, which, although significant, did not cause major damages to human settlements in Alaska. A landslide-induced tsunami in Skagway caused one fatality in 1994.

The magnitude and severity of a tsunami will depend on each specific event. Communities that are actually struck by damaging tsunamis can usually count on experiencing an extremely damaging event. A distant-source tsunami that damages one community is very likely to also strike other communities on the same coast.

Based on the devastation of past tsunami events in the world and the criteria identified in Table 5-2, the magnitude and severity of impacts in the Borough are considered “Critical” in that more 25 percent of property could be severely damaged. Injuries and/or illnesses could result in permanent disability and complete shutdown of critical facilities for at least two weeks.

### **Impact**

Tsunami damages are usually related to vulnerable populations, shelter and/or safe areas for population, infrastructure damage and interruption of services. The Borough communities could be isolated from a large event.

Early warning could mitigate some of the impacts. However, the devastating Indonesian tsunami of 2004 illustrated how difficult it is to provide advance warning of even active tsunamis. Many communities could not be reached in time to warn them of the wave.

A similar situation exists in rural Alaska; demonstrated by the tsunami warning of 2007, which did not reach targeted communities in time to warn them of a potential tsunami. Luckily, that warning was unnecessary as a tsunami did not actually occur, but Alaskan communities should be aware that advance warning of tsunami waves may not reach them when necessary. Therefore it is important for all communities to be watchful for tsunami warning signs, especially when an earthquake or volcanic eruption occurs.

One earthquake can trigger multiple landslides and landslide-generated tsunamis. Low tide is a factor for submarine landslides because low tide leaves part of the water-saturated sediments exposed without the water’s support. “Loading” generally causes an area’s instability from added

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weight such as large structures, or added fill material used to reclaim land for future development.

### **Recurrence Probability**

Based on the history of tsunamis in the Borough area and applying the criteria identified in Table 5-3, it is “Possible” a tsunami event will occur within the next five years. An event has up to 1 in 5 years ( $1/5=20$  percent) chance of occurring and the history of events is equal to or greater than 10 percent but less than or equal to 20 percent likely each year.

### **5.3.5 Volcano**

#### **5.3.5.1 Nature**

A volcano is a vent at the Earth’s surface through which magma (molten rock) and associated gases erupt. Volcanoes are typically known by their mountainous landform built by effusive and explosive eruptions. Volcanoes are hazardous because of the primary effects of their eruptions, including volcanic ash fall and debris flows. Secondary effects are also a concern; landslides caused by volcanic activity can cause locally generated tsunamis, ash clouds can cause commerce and transportation interruptions, and lead to extended periods of isolation for remote communities. Residents can experience health problems from airborne ash.

The responsibility for hazard identification and assessment for the active volcanic centers of Alaska falls to the Alaska Volcano Observatory and its constituent organizations.

Alaska contains over 80 volcanic centers and is at continual risk for volcanic eruptions. The volcanoes of the Lake and Peninsula Borough are among the most active in the state. Most communities are far enough from the volcanoes that they are safe from lahars, pyroclastic flows, and lava flows; however, ash clouds and ash fall have historically caused significant impact on human populations. Effects can range from the inconvenient – a few days of no air traffic – to the disastrous – heavy, debilitating ash fall throughout the state including the borough, forcing communities to be completely self-sufficient.

Alaska is home to over 40 historically active volcanoes stretching across the entire southern portion of the State from the Wrangell Mountains to the far Western Aleutians. An average of 1-2 eruptions per year occurs in Alaska. 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.

### **Volcano Types**

Volcanoes display a wide variety of shapes, sizes, and behavior, however they are commonly classified among three main types: cinder cone, composite, and shield.

#### **Cinder cones**

A cinder cone is the simplest type of volcano. They are built from particles and blobs of congealed lava ejected from a single vent. As the lava is blown into the air, it breaks into small fragments that solidify and fall as cinders and bombs around the vent to form a circular or oval cone. Most cinder cones have a bowl-shaped crater or craters at the summit and are rarely more than a thousand feet above their surroundings. Cinder cones may form as flank vents on the sides of larger composite or shield volcanoes. They often occur in clusters and produce lava flows.

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Cinder cones are common in western North America as well as other volcanic terrain. Some Alaskan cinder cones are found in the following locations:

- St. Michael (in western Alaska along the southern Norton Sound shoreline)
- Ingakslugwat Hills (in western Alaska's Yukon Delta region near the village of St. Mary's)
- St. Paul Island (one of the Pribilof Islands in the Bering Sea)

### **Composite volcanoes**

Composite volcanoes, sometimes called stratovolcanoes volcanoes, are typically steep-sided, Redoubt Volcano is one of the active volcanoes of the Cook Inlet region. Steam and volcanic gas rise above the summit crater of the volcano following the 1989 to 1990 eruptions. Symmetrical cones of large dimension built of alternating layers of lava flows, volcanic ash, blocks, and bombs and may rise as much as 8,000 feet above their bases. Some of the most conspicuous and beautiful mountains in the world are composite volcanoes, including Mount Shasta in California, Mount Hood in Oregon, Mount St. Helens and Mount Rainier in Washington, Mt Fuji in Japan, Mt. Vesuvius in Italy, and Shishaldin in Alaska.

Composite volcanoes have a principal conduit system through which magma from a reservoir deep in the Earth's crust rises to the surface repeatedly to cause eruptions. The volcano is built up by accumulating erupted material and increases in size as lava, and fragmented deposits, are added to its slopes. Stratovolcanoes tend to erupt explosively because of the viscous nature of magmas associated with these volcanoes. Some stratovolcanoes produce enormous explosive eruptions that destroy a large part of the volcano itself, leaving a wide, roughly circular depression called a caldera. Eruptions that produce calderas are among the most explosive and largest eruptions known.

Most Alaskan volcanoes are stratovolcanoes, including:

- Redoubt;
- Spurr;
- Iliamna; and,
- Augustine.

### **Shield volcanoes**

Shield volcanoes are formed by lava flowing in all directions from a central summit vent, or group of vents, or rift zones building a broad, gently sloping cone with a dome shape. They are built up slowly by the accumulation of thousands of highly fluid lava flows that spread widely over great distances, and then cool in thin layers. Some of the largest volcanoes in the world are shield volcanoes including Mauna Loa in Hawaii. In Alaska, Wrangell, Yunaska, and Westdahl are examples of shield volcanoes.

### **Volcanic Hazards**

Volcanoes are also categorized according to the age of their eruptive activity. Active volcanoes are those that have recently erupted, are currently erupting, or show signs of unrest, such as unusual earthquake activity or significant new gas emissions. Dormant volcanoes are those that are not currently active, but could become restless or erupt again. Extinct volcanoes are those that are considered unlikely to erupt again. This can be difficult to determine as a volcano could go tens of thousands of years, or longer, between eruptions. There are over 80 volcanic centers in



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the State but only about half are considered active. Volcanic eruptions create the following hazards and associated impacts.

### Lava Flows

Lava flows are streams of molten rock that flow from a volcano. The distance traveled by a flow is dependent on several variables including viscosity, volume, slope steepness, and obstructions in the flow path. A typical flow may extend between 6 and 30 miles.

Lava flows cause damage by burning, crushing, or burying everything they contact. They can also melt ice and snow, causing flooding or move into a wooded area triggering wildland fires.

### Pyroclastic Flows

Pyroclastic flows are high-density mixtures of hot gases and dry rock that are usually released explosively from a volcano. They are hazardous because of their rapid movement and high temperatures. They travel at speeds of 30 to +90 miles per hour and can destroy or sweep away objects due to the impact of debris or associated high winds, or cause burns. Figure 5-87 is a picture of the pyroclastic flow on Mt. Augustine.

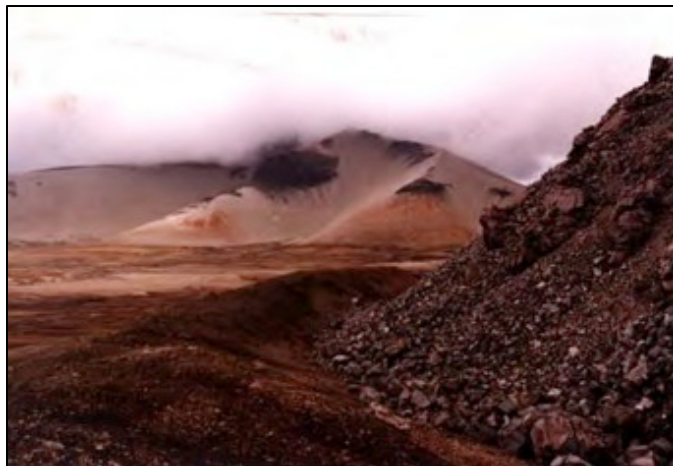


**Figure 5–8     Augustine  
Volcano – Pyroclastic Flow**  
(M.E. Yount, USGS)

### Lava Domes

Figure 5-9 is an example of a lava dome volcano.

Lava domes are formed when viscous lava erupts slowly from a vent. This causes it to solidify near the vent forming a steep-sided rubble dome instead of flowing away from the vent. A dome can also grow by expansion from within. As it grows its outer surface cools and hardens, then shatters, spilling loose fragments down its sides. Volcanic domes commonly occur within the craters or on the flanks of large composite volcanoes. Novarupta Dome, measures 800 feet across and 200 feet high, was formed at the end of the 1912 eruption of Katmai Volcano, Alaska.



**Figure 5-9     Novarupta Lava Dome** (Dennis Epperly)

### Volcanic Ash and Bombs

Volcanic ash, also called tephra, is a fine fragment of solidified lava ejected into the air by an explosion or rising hot air. The fragments range in size, with the larger falling nearer the source.

Ash is a problem near the source because of its high temperatures (may cause fires), burial (the weight can cause structural collapses), and impact of larger falling fragments called bombs. Further away, the primary hazards to humans are decreased visibility, respiratory and eye irritation, and effects on infrastructure. Chronic exposure to ash is a significant public health

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hazard. Ash will also interfere with mechanical equipment operation including aircraft that inadvertently enter airborne ash clouds. In Alaska, this is a major problem as many of the major flight routes are near historically active volcanoes.

#### **Volcanic Gases**

Volcanic gases consist mostly of steam, carbon dioxide, sulfur dioxide, hydrogen sulfide, and chlorine compounds, but may include other substances. The gases can damage eyes, respiratory systems and cause suffocation in high concentrations (usually near the vent). They can also be very corrosive.

#### **Lateral Blasts**

Lateral blasts are inflated mixtures of gases, ash, and hot rock debris. They may be hundreds of feet thick and travel at speeds up to 370 miles per hour. They cause damage through abrasion, impact, burial, and heat. They may also trigger pyroclastic flows or surges.

#### **Debris Avalanches**

Debris avalanches are sudden downward movement of unconsolidated material (mostly rock and soil). They occur without warning and travel quickly. Debris avalanches can extend for miles and cover up to 300 square miles, causing damage from impact or burial.

#### **Lahars and Debris Flows**

Debris flows, also known as lahars, are rapidly flowing mixtures of rock debris and water that originate on the slopes of a volcano. They form in a variety of ways, primarily by the rapid melting of snow and ice by pyroclastic flows, intense rainfall on loose volcanic rock deposits, breakout of a lake dammed by volcanic deposits, and as a consequence of debris avalanches. They generally have the consistency of wet cement and have the ability to destroy or bury anything in their path.

#### **Alaska Volcano Observation**

The responsibility for hazard identification and assessment for the active volcanic centers of Alaska falls to the Alaska Volcano Observatory and its constituent organizations (USGS, DNR/DGGS, and UAF/GI). AVO is in the process of publishing individual hazard assessments for each active volcano in the State. As of 2007, published or in-press hazard assessments cover the following volcanoes: Hayes, Spurr, Redoubt, Iliamna, Augustine, the Katmai Group, Aniakchak, Emmons Lake, Shishaldin, Akutan, and Makushin, Okmok, Great Sitkin, Tanaga, and Tanaga. Each report contains a description of the eruptive history of the volcano, the hazards they pose and the likely effects of future eruptions on populations, facilities, and ecosystems.

AVO has the primary responsibility to monitor all of Alaska's potentially active volcanoes and to issue timely warnings of activity to authorities and the public. During episodes of volcanic unrest or eruption, AVO is also the agency responsible for characterizing the immediate hazards and describing likely scenarios for an evolving volcanic crisis. AVO uses a two-part Alert-Notification System for Volcanic Activity to succinctly portray its interpretations of the state-of-activity and likely course of unrest at a given volcano.

A Color Code is aimed primarily at the aviation sector while Alert Levels are primarily intended to portray hazards to people and property on the ground.

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One of the most vulnerable sectors is the aviation industry. They have the highest risk from airborne volcanic ash effects as a major portion of air traffic fly directly over or near Alaska's potentially active volcanoes. This significant trans-Pacific and intrastate air traffic, necessitated developing a strong communication and warning link between AVO, other government agencies with responsibility in aviation management, and the airline and air cargo industries. Emergency coordination procedures and communication standards during eruptions are codified in an Interagency Plan that is updated every few years.

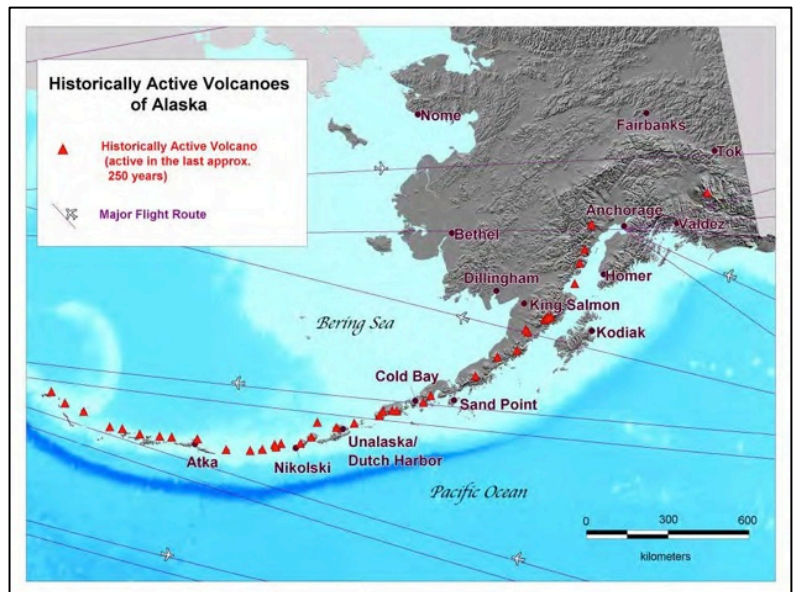
### 5.3.5.2 History

The largest volcanic eruption of the 20th century occurred at Novarupta Volcano in June 1912. It started by generating an ash cloud that eventually extended over thousands of miles wide during the three-day event. Within four hours of the eruption, ash started falling on Kodiak, darkening the city. It became hard to breathe because of the ash and sulfur dioxide gas. The water became undrinkable and unable to support aquatic life. Roofs collapsed under the weight of the ash.

Some buildings were destroyed by ash and similar conditions could be found all over the area.

Figure 5-10 is an example of a lava dome volcano.

Some villages ended up being abandoned, including Katmai and Savonoski villages. The ash and acid rain also negatively affected animals and plant life. Large animals were blinded and many starved because their food was eliminated. Figure 5-10 shows where the historically active volcanoes are located in Alaska (AVO)



**Figure 5-10 Historical Volcanoes in Alaska (AVO)**

More recent eruptions occurred on Augustine Volcano in 1986 and again in 2006. During both eruptions repeated ash plumes rose to 30,000 feet above sea level or higher, disrupting air traffic and dusting Cook Inlet communities with ash. A lava dome formed in the summit crater towards the end of each of these eruptions. A concern is the possibility of a partial cone collapse into Cook Inlet. Such an event could trigger a tsunami along lower Cook Inlet, as happened in 1883.

Novarupta ash fall compared to that from recent Alaskan eruptions.

Redoubt Volcano erupted in 1989-1990 and mudflows or lahars caused temporary closure of the Drift River Oil Terminal. A 747 jet aircraft, temporarily lost power in all four engines when it entered the Redoubt ash plume over the Talkeetna Mountains. Fortunately, the flight crew was able to restart their engines about 4,000 feet (1,219 meters) above ground and the plane landed safely in Anchorage.

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### 5.3.5.3 *Location, Extent, Impact, and Recurrence Probability*

#### **Location**

All of the communities in the Borough have some level of risk from volcano hazards. No communities are at risk from lahars or pyroclastic flows, but due to the large number of active volcanoes in the region, it is possible for any of the Borough's communities to potentially experience heavy ash fall in the event of an eruption of any one of the volcanoes in and near the Borough. Where volcano risk is indicated for Borough communities, it should be assumed that the entire community is vulnerable to volcano damages.

#### **Extent**

The magnitude and severity of each volcanic event depends upon the type of eruption, its secondary effects, and the amount of time, if any, that a community must go without transportation or outside supplies. Even a very large eruption has low severity if it does not affect human activity.

Based on the devastation of past volcanic events in the world and the criteria identified in Table 5-2, the magnitude and severity of impacts in the Borough are considered "Critical" in that more 25 percent of property could be severely damaged. Injuries and/or illnesses could result in permanent disability and complete shutdown of critical facilities for at least two weeks.

#### **Impact**

The Borough's communities could experience significant interruptions in transportation, supplies, and services due to ash fall in the Borough or in other areas of the state. When communities expressed concern about volcanic hazards, they were most concerned about ash fall and the resulting isolation. Ash fall can interrupt air transportation and delivery of supplies, leaving communities ill-equipped to deal with long periods of isolation.

#### **Recurrence Probability**

Volcanoes can erupt at any time, but the AVO monitors all active volcanoes sufficiently to allow enough warning time for communities to be prepared. Volcanic eruptions can occur at any time and, because of the existence of so many active volcanoes within the Borough, can be considered a certainty.

Based on the history of volcanoes in the Borough area and applying the criteria identified in Table 5-3, it is "Possible" a volcanic event could occur within in the next five years. An event has up to 1 in 5 years ( $1/5=20$  percent) chance of occurring with a history of events equal to or greater than 10 percent but less than or equal to 20 percent likely each year.

### 5.3.6 **Severe Weather**

#### 5.3.6.1 *Nature*

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

**Climate Change** influences the environment, particularly historical weather patterns. Climate change and El Niño/La Niña Southern Oscillation (ENSO) influences create increased weather



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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. Therefore 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 Rain** occurs rather frequently over the coastal areas along the Bering Sea and the Gulf of Alaska. Heavy rain is a severe threat to the Borough.

**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 -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.

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.

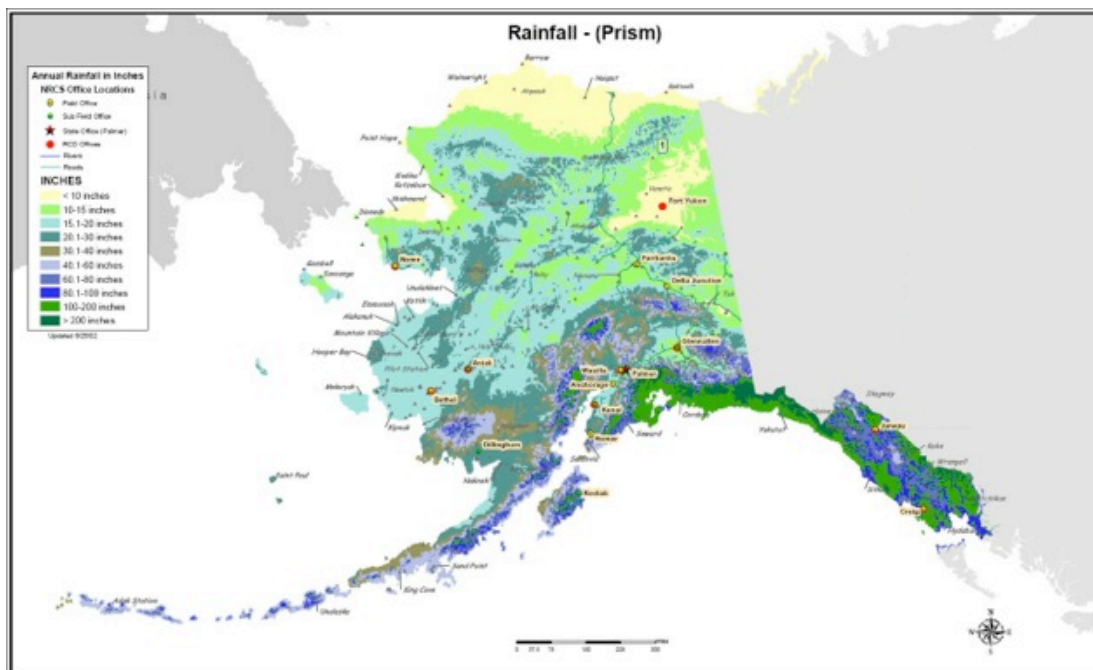
**Winter Storms** include a variety of phenomena described above and as previously stated may include several components; wind, snow, and ice storms. Ice storms, which include freezing rain, sleet, and hail, can be the most devastating of winter weather phenomena and are often the cause

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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 the 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 super cooled, 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 cloudbank 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.

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** (NRCS PRISM 2012)

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### 5.3.6.2 History

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

DHS&EM's latest (2013) Disaster Cost Index records listed the following statewide severe weather disaster event, 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.*

Figure 5-12 delineates the Western Regional Climate Center (WRCC) weather data for the King Salmon Weather Station (which is the nearest weather station to the L&PB). Actual communities temperatures and depths may vary due to their relative proximity to the King Salmon Weather Station.

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Monthly
Mean Max. Temperature (F)	22.8	23.8	32.0	41.3	52.1	59.5	63.8	62.2	54.9	40.5	30.5	25.1	42.4
Highest Mean Max. Temperature (F)	38.4	37.6	44.2	49.9	59.2	65.6	69.6	66.6	59.7	45.9	38.3	39.2	69.6
Year Highest Occurred	1977	1997	1984	1993	1993	1997	1997	1987	1995	1993	2000	2000	1997
Lowest Mean Max. Temperature (F)	4.2	5.7	11.3	29.9	43.5	53.7	58.4	58.8	49.7	34.1	21.2	12.5	4.2
Year Lowest Occurred	1971	1984	1972	1985	1971	1972	1982	1998	1992	1985	1975	1999	1971
Mean Temperature (F)	15.4	15.6	23.5	33.1	43.5	50.9	55.7	54.8	47.6	33.3	23.2	17.2	34.5
Highest Mean Temperature (F)	33.8	30.3	36.6	41.0	48.3	54.4	59.8	57.6	52.5	39.5	32.8	34.5	59.8
Year Highest Occurred	1977	2000	1984	1993	1993	1983	1997	1987	1995	1979	2000	1985	1997
Lowest Mean Temperature (F)	-3.2	-1.9	1.5	21.2	37.8	46.8	52.1	51.4	41.0	27.3	12.6	1.6	-3.2
Year Lowest Occurred	1971	1984	1972	1985	1971	1972	1982	1980	1992	1985	1975	1999	1971
Mean Min. Temperature (F)	8.0	7.4	15.1	24.9	34.8	42.2	47.5	47.4	40.3	26.0	15.9	9.3	26.6
Highest Mean Min. Temperature (F)	29.1	23.2	29.0	32.2	38.8	45.0	50.0	50.5	45.7	33.4	27.2	29.8	50.5
Year Highest Occurred	1977	2000	1984	1979	1990	1979	1997	1977	1989	1979	2000	1985	1977
Lowest Mean Min. Temperature (F)	-11.6	-14.1	-8.4	12.6	31.0	38.0	44.5	43.3	32.3	17.6	3.9	-9.4	-14.1
Year Lowest Occurred	1989	1990	1972	1985	1999	1976	1976	1980	1992	1997	1975	1999	1990
Mean Precipitation (in.)	1.03	0.72	0.79	0.94	1.35	1.70	2.15	2.89	2.81	2.10	1.54	1.39	19.41
Highest Precipitation (in.)	2.38	2.26	1.99	2.65	3.05	3.04	5.08	4.73	5.90	3.96	3.35	3.65	5.90
Year Highest Occurred	1987	1981	1977	1975	1998	1982	1990	1995	1989	1998	1985	1978	1989
Lowest Precipitation (in.)	0.25	0.11	0.13	0.19	0.46	0.50	0.74	1.05	0.89	0.03	0.13	0.14	0.03
Year Lowest Occurred	1997	1973	1997	1992	1979	1993	1975	1975	1984	1997	1995	1995	1997
Heating Degree Days (F)	1538.	1384.	1286.	957.	667.	425.	290.	317.	521.	984.	1254.	1481.	11104.
Cooling Degree Days (F)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

**Figure 5-12 L&PB 30 Year Historical Weather Summary (WRCS 2015)**

### 5.3.6.3 Location, Extent, Impact, and Recurrence Probability

#### Location

The entire Borough experiences periodic weather impacts. The most common to the area are high winds and winter storms. Table 5-7 depicts weather events that have impacted the area since 2009 and are provided as a representative sample.

#### Extent

The entire Borough is equally vulnerable to the severe weather effects. The Borough experiences severe storm conditions with moderate snow depths; wind speeds exceeding 90 mph; and extreme low temperatures that reach -2°F.



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Based on past severe weather events and the criteria identified in Table 5-2, the extent of severe weather in the Borough are considered “Limited” where injuries do not result in permanent disability, complete shutdown of critical facilities occurs for more than one week, and more than 10 percent of property is severely damaged.

### **Impact**

Climate change influences, weather intensity, community location and topography all shape the impact of severe weather on a community as well as influence future land use planning. Climate change impacts in the greater Portland Metropolitan area are mostly consistent with those expected in much of the Pacific Northwest. In the Pacific Northwest, temperature and precipitation increased over the 20th century at a rate greater than the global value (Mote 2003). A temperature increase of 1.5°F has been observed since 1920. Climate models project an average increase of about 6°F by 2080 in this region, a rate almost three times the observed 20th century warming. Precipitation is also projected to increase, though less substantially than temperature, at an average rate of 3.8 percent by 2080. The actual magnitude of these increases is dependent on future greenhouse gas emissions (Mote et al. 2005).

More frequent periods of drought due to climate change are of particular concern for the Pacific Northwest. This region relies on a robust winter snowpack for water storage for the summer months. Projected changes in temperature will likely reduce the winter snowpack and cause more snow to fall as rain, subsequently affecting April to September stream-flow. In the second half of the 20th century, April snow water equivalent (liquid water content of snowpack) declined more than 50 percent in the Portland area. Diminished summer water supply has consequences for drinking water supply, recreation, navigation, hydropower production and aquatic ecosystems among other uses (Mote 2003, Mote et al. 2005, USGCRP 2009).

Though streams in the summer months will be prone to low-flow situations, many of these systems are vulnerable to an increased flooding risk in the winter months. Flooding risk is greatest in systems where more wintertime precipitation will fall as rain rather than snow. Extreme precipitation (above the 95th percentile value) is projected to increase in the winter months and decrease in the summer months (Leung et al. 2004). Urban areas may be most at risk of wintertime flooding; small urban watersheds usually have large areas of impervious surfaces that are especially prone to flash flooding. Infrastructure in urban areas may also be designed using 20th century rainfall maps and may not be able to handle more extreme precipitation events (Leopold 1968, Rosenberg et al. 2009, Lowe et al. 2009).

Days with extreme heat are projected to increase in the 21st century. Heat waves (at least three continuous days) over 90 °F will occur more frequently in the 21st century. In particular, the elderly, urban-dwelling and those with chronic illness are most at risk to these extreme heat events (Jackson et al. 2009).

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 Borough.

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.

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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.

### **Recurrence Probability**

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

### **5.3.7 Wildland Fire**

#### **5.3.7.1 Nature**

A wildland fire is a 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 influence 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 slower or may even be unable to spread downhill.

**Fuel** and 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

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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. 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.

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

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

### 5.3.7.2 History

The Alaska Interagency Coordination Center (AICC) identified 238 tundra/wildland fires (Figures 5-13, 5-14) that occurred within 50 miles of the center-point of the Borough.

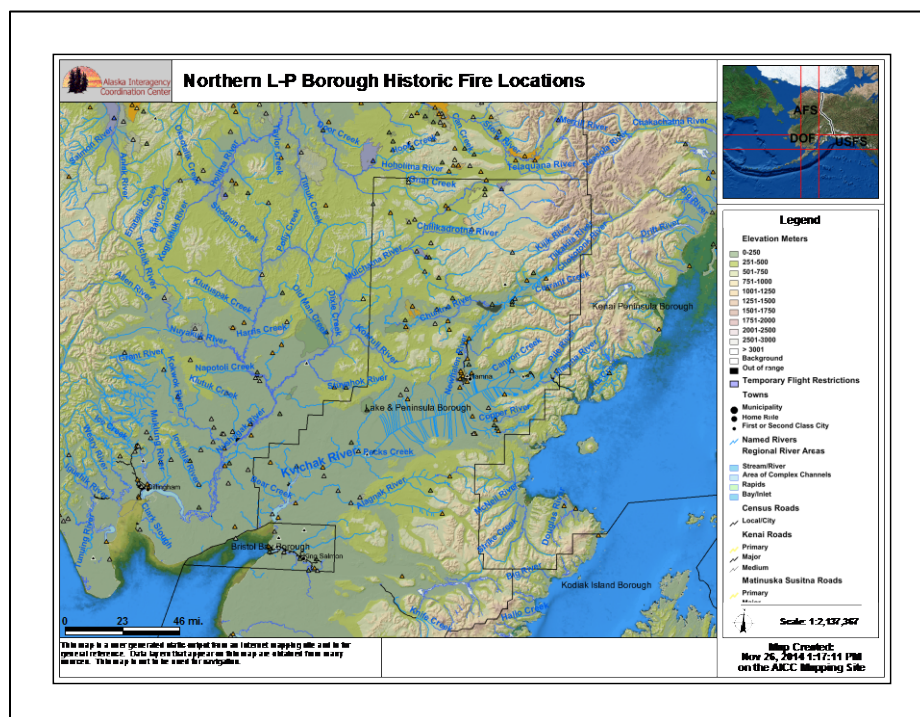
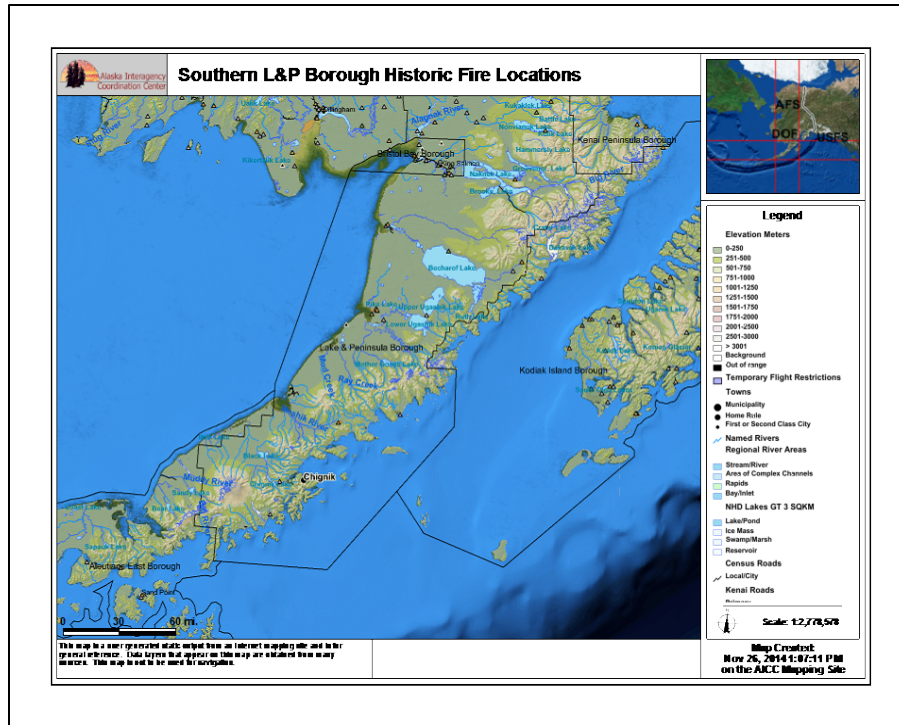


Figure 5-13 Northern L&PB historic fire locations (AICC 2015)

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**Figure 5-14 Southern L&PB historic fire locations (AICC 2015)**

Table 5-6 lists 52 of the fires, shown on Figures 5-7 and 5-8 that exceeded 500 acres with the largest one burning 201,808.2 acres in 2013, and another fire of 71,760 acres in 1997.

**Table 5-6 L&PB Historic Wildfires Since 1939**

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
Whitefish Lake	2013	4,310.2	60.9853333	-154.9891667	Lightning
Fish 2	2013	969.0	61.1585	-160.6432778	Lightning
Nikubuma Lake	2013	12,852.9	60.1643611	-155.5029722	Lightning
Nuyakuk River	2013	2,411.0	60.0015	-157.5938333	Lightning
Lime Hills	2013	201,808.2	61.4555	-155.6906667	Lightning
North Swift	2013	385.3	61.5441667	-155.0906667	Lightning
Doestock Creek	2013	29,099.1	61.24975	-158.9592222	Lightning
Chulitna	2013	2,446.9	60.0445	-155.5742778	Lightning
Kristin Creek	2013	16,746.8	61.0423333	-154.189	Lightning
Wilhelmina	2013	729.6	60.8062222	-159.6514166	Lightning
Hoholitna	2013	2,829.3	61.455	-156.8891667	Lightning
Can Creek	2013	6,590.1	61.2813333	-155.2345	Lightning
Currant Creek	2013	1,868.5	60.2761667	-153.9156666	Lightning
Snake River	2012	16,566.0	58.9922222	-158.5580556	Human
Kejulik River	2010	640.0	57.9861107	-155.4244385	Campfire
Hawk River	2010	10,766.0	60.4833336	-161.0833282	Lightning
Hoholitna	2009	8,619.0	61.4255562	-156.9416656	Lightning
Discovery South	2008	3,496.4	61.3061104	-159.7622223	Lightning
Takslekluk North	2006	4,016.7	61.16667	-162.7	Lightning
Meshik River	2006	1,309.6	56.73333	-157.9667	Campfire
Swift	2005	18,610.0	61.48333	-154.9667	Lightning
Stony	2005	2,879.0	61.01667	-154.0667	Lightning
Pikmiktalik	2005	649.0	61.08333	-162.1667	Lightning
Pilot Point	2005	4,827.0	57.58333	-157.5	Other



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**Table 5-6 L&PB Historic Wildfires Since 1939**

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Cause
Hamilton	2005	448.5	61.26667	-159.7667	Lightning
Otter Creek	2005	3,098.7	60.91667	-160.2833	Lightning
Iliamna	2003	5,460.4	59.79417	-154.9258	Human
Hoholitsna	2002	1,409.0	61.41667	-156.8667	Lightning
Klut Creek	1997	1,000.0	59.4000015	-157.5333405	Lightning
Timber Creek	1997	27,900.0	61.0499992	-158.9166718	Lightning
Titnuk Creek	1997	71,760.0	61.0333328	-156.8833313	Lightning
Tough	1997	3,060.0	61.4333344	-154.9666595	Lightning
Breast	1997	6,430.0	60.1833344	-160.1499939	Lightning
Tvativak	1997	2,450.0	58.8166656	-159.3833313	Lightning
Nuyakuk	1997	20,280.0	59.9333344	-157.9666595	Lightning
Tikchik	1997	5,079.0	60.1500015	-158.4166718	Lightning
Buck Mtn.	1997	5,130.0	61.4000015	-159	Lightning
Anchor	1993	2,410.0	61.3666649	-154.75	Lightning
Pole	1993	11,550.0	61.4333344	-159.9166718	Lightning
Discovery	1993	23,501.0	61.3166656	-159.4833374	Lightning
Timber	1993	25,920.0	61.1500015	-159.0500031	Lightning
Mulchatna	1993	960.0	60.6500015	-155.5666656	Lightning
Yantarni	1992	880.0	56.8166656	-157.1000061	Smoking
Twin	1991	12,400.0	59.1666679	-160.1999969	Lightning
Stoney	1991	8,150.0	61.2333336	-155.2166595	Lightning
Kulukbuk	1991	3,520.0	61.25	-157.3333282	Lightning
Rock Creek	1990	14,522.0	61.1833344	-154.5	Lightning
Alagnak	1990	1,193.0	59.0499992	-156.0500031	Cooking Fire
Shotgun Dr.	1989	6,900.0	60.7666664	-157.7666626	Lightning
Kogoyuk	1989	5,000.0	61.4166679	-158.5166626	Lightning
Lower Nushagak	1959	750.0	59.2166672	-157.5500031	Lightning
Tanalina Mt. Fire	1953	11,000.0	60.1833344	-154.3333282	Firecrackers

(AICC 2014)

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

#### Location

Under certain conditions wildland fires may occur within the Borough when weather, fuel availability, topography, and ignition sources combine. Since fuels data is not readily available, for the purposes of this plan, all areas within the Borough limits are considered to be vulnerable to tundra/wildland fire impacts. Since 1939, 59 wildland fire events over 500 acres have occurred within the Borough (Figures 5-7 and 5-8). The 2013 Lime Hills lightning cause fire was the largest event; damaging over 200,000 acres (Table 5-8). Due to poor records, the location was approximately 50 miles south of Lake Iliamna.

#### Extent

Generally, fire vulnerability dramatically increases in the late summer and early fall as vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. However, various other factors, including humidity, wind speed and direction, fuel load and fuel type, and topography can contribute to the intensity and spread of wildland fires. The common causes of wildland fires in Alaska include lightning strikes and human negligence. Fuel, weather, and topography influence wildland fire behavior. Fuel determines how much energy the fire releases, how quickly the fire spreads, and how much effort is needed to contain the fire. Weather is the most variable factor. High temperatures and low humidity encourage fire activity while low temperatures and high humidity retard fire spread. Wind affects the speed and

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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 and the magnitude and severity of impacts in the Borough are considered “Critical” with potential to shut-down critical facilities for more than one week threatening more 25 percent of property being severely damaged.

### **Impact**

Impacts of a wildland fire that interfaces with the population center of the Borough 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, within the Borough the natural fire regime is characterized by a return interval of approximately 150 due to their tundra vegetation, gently rolling topography.

### **Recurrence Probability**

Important issues related to the wildland or tundra fire probability are increased development along the community’s perimeter, 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 each community’s wildland interface areas, natural areas, and open spaces.

Based on the Borough’s wildland fire history and applying the criteria identified in Table 5-3, it is “Likely” a wildland or tundra fire event will occur within the next three years. The event has up to 1 in 3 years ( $1/3=33$  percent) chance of occurring with a history of events greater than 20 percent but less than or equal to 33 percent 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.

## 6. Vulnerability Analysis

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

### 6.1 Vulnerability Analysis Overview

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

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

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

DMA 2000 Recommendations
<b>Assessing Risk and Vulnerability, and Analyzing Development Trends</b> §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.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT B. Risk Assessment, Assessing Vulnerability, Analyzing Development Trends</b>
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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The requirements for a vulnerability analysis as stipulated in DMA 2000 and its implementing regulations are described here.

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

Table 6-1 lists the Borough infrastructures' hazard vulnerability.

**Table 6-1      L&PB Infrastructure Hazard Vulnerability**

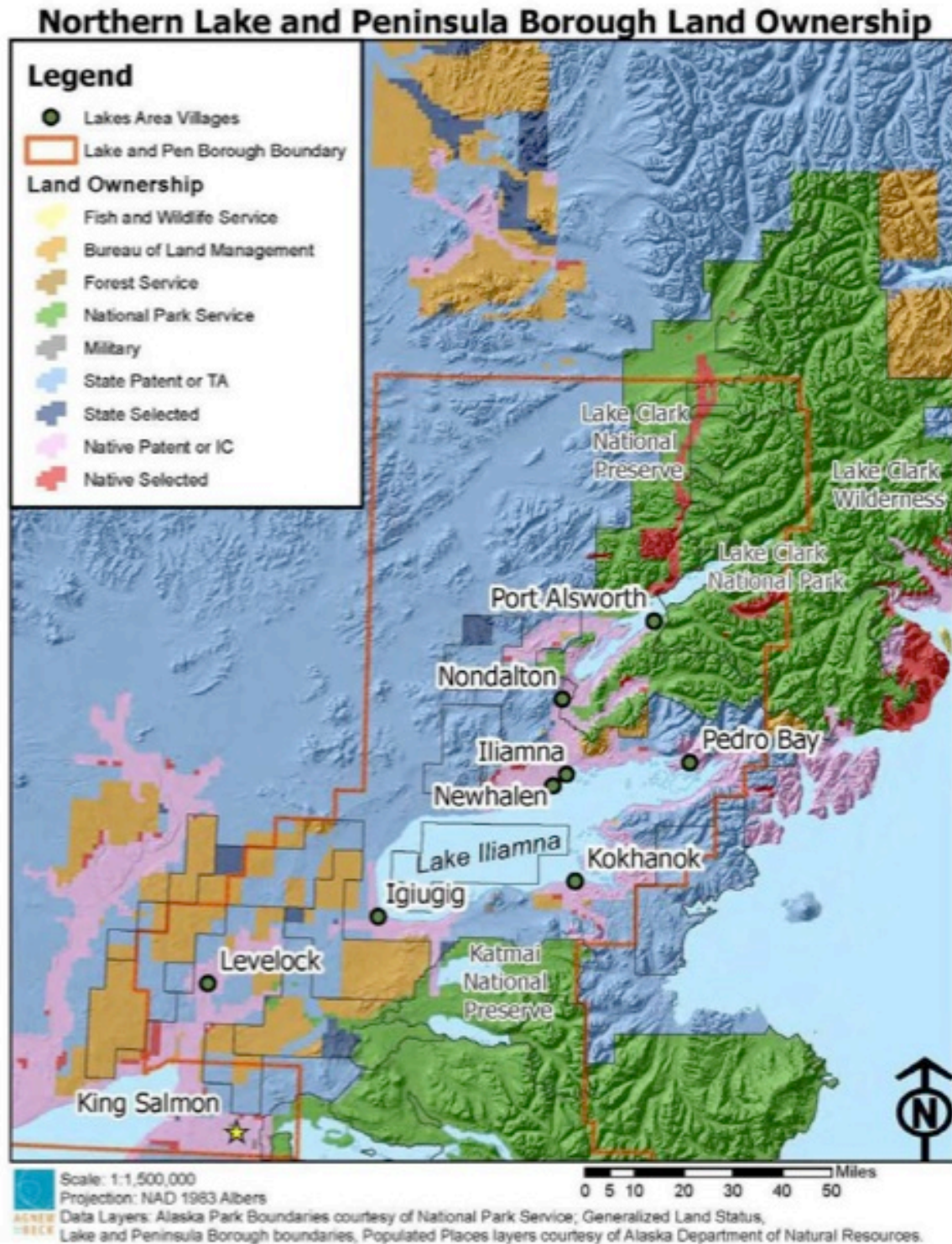
Hazard	Area's Hazard Vulnerability			
	Percent of Jurisdiction's Geographic Area	Percent of Population	Percent of Building Stock	Percent of Critical Facilities and Utilities
Earthquake	100	100	100	100
Flood	5.02	.010	.14	.006
Ground Failure	100	100	100	100
Tsunami	10	.0005	.0005	.0005
Volcano	100	100	100	100
Weather	100	100	100	100
Wildland Fire	100	100	100	100

## 6.2 Land Use and Development Trends

### 6.2.1 Land Use

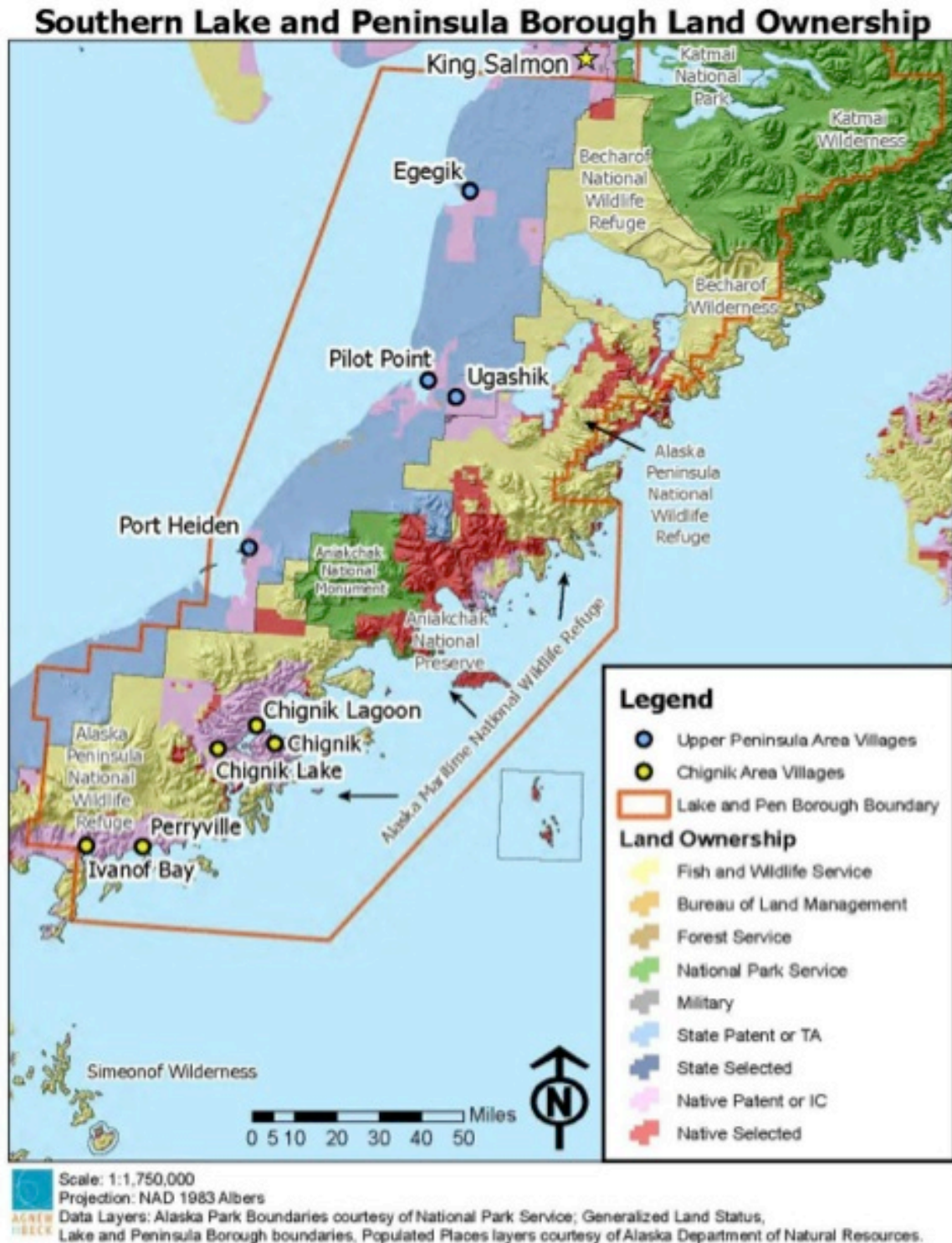
Land in the Borough is predominately publically or Native owned with limited area for commercial services and community (or institutional) facilities. The land and habitat characteristics and shipping costs make developing vacant land very difficult. The communities in the Borough are surrounded by wilderness and various hydrological bodies. Figures 6-1 and 6-2 from the 2012 L&PB Comprehensive Plan illustrate land ownership in the Borough.

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**Figure 6-1 Northern L&PB Ownership Map (L&PB Comprehensive Plan)**

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**Figure 6-2 Southern L&PB Ownership Map (LP&B Comprehensive Plan)**



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### 6.3 Exposure Analysis for Current Assets

#### 6.3.1 Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population (for community-wide hazards), residential buildings (where data is available), and critical facilities and infrastructure. The critical facility and infrastructure assets and associated values throughout the Borough are addressed in Section 6.3.1.3. and Appendices E and F.

##### 6.3.1.1 Population and Building Stock

Population data for the Borough was obtained from the 2010 U.S. Census and the DCRA. The US Census reports the Borough's total population for 2010 as 1,631 and DCRA 2014 data reported an estimated population of 1,672 (Table 6-2).

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

The Planning Team stated that residential replacement values are generally understated because replacement costs exceed Census structure estimates due to material purchasing, barge or airplane delivery, and construction in rural Alaska. The Planning Team estimates an average 30ft by 40 ft. (1,200 sq. ft.) residential structure costs \$350,000. A total of 1,502 residential buildings were considered in this analysis

**Table 6-2 Estimated Population and Housing Replacement Costs**

Population		Residential Buildings	
2010 Census	DCCED 2014 Data	Total Building Count	Total Value of Buildings <sup>1</sup>
1,631	1,672	1,502	Borough: \$525,700,000

##### 6.3.1.2 Infrastructure Improvements

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

**Table 6-3 Infrastructure Improvement Projects**

Grant Recipient	Award Year	Project Name	Grant Status	Award Amount	End Date
L&PB	2012	Replacement of two generators that provide power to the Village of Chignik Lake, Alaska	Pending	\$212,191	6/30/2014
L&PB	2011	Chignik Small Boat Harbor	Closed	\$1,400,000	12/31/2011
L&PB	2011	SFY11 Section 306 Required Tasks	Closed	\$17,000	5/31/2011
L&PB	2011	SFY11 Section 309 Enhancement Grant for Lake and Peninsula Borough CMP Final Phase	Closed	\$14,940	5/31/2011
L&PB	2010	FY10 Section 306 Required Tasks	Closed	\$17,000	6/30/2010

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**Table 6-3      Infrastructure Improvement Projects**

Grant Recipient	Award Year	Project Name	Grant Status	Award Amount	End Date
L&PB	2010	FY10 Sec 309 Enhancement Grant for Lake and Peninsula Mapping and Resource Inventory Amendments	Closed	\$31,049	9/30/2010
L&PB	2010	Purchase Insurance	Closed	\$27,197	3/31/2011
L&PB	2009	Areawide School Supplies & Equipment	Closed	\$60,000	9/30/2009
L&PB	2009	FY09 Section 309 Enhancement Grant	Closed	\$22,874	6/30/2009
L&PB	2008	Areawide School Supplies and Equipment	Closed	\$60,000	9/30/2008
L&PB	2008	Black Lake Research and Rehabilitation Project	Closed	\$76,444	6/30/2012
L&PB	2008	Illiamna Community Freezer and Laundromat Facility	Closed	\$75,000	9/30/2009
L&PB	2008	FY08 Section 306 Required Tasks	Closed	\$17,000	6/30/2008
L&PB	2008	Igiugig Skid Steer, Forklift, and Dozer Backhoe	Closed	\$50,000	3/31/2008
L&PB	2008	FY08 Section 309 for Mapping and Resource Inventory Amendments to the L&PB Coastal Management Plan	Closed	\$13,317	1/31/2010
L&PB	2007	Kokhanok Community Projects and Improvements	Closed	\$4,775	9/30/2009
L&PB	2007	Chignik Lake Fire Fighting Equipment/ Facilities Upgrade	Closed	\$45,000	6/30/2011
L&PB	2007	Newhalen Clinic Repairs	Closed	\$32,000	6/30/2011
L&PB	2007	Pedro Bay Firefighting Equipment Upgrade	Closed	\$35,000	6/30/2011
L&PB	2007	Perryville Barge Landing Dock Design and Construction	Active	\$100,000	6/30/2014
L&PB	2007	Nondalton Community Road Upgrades	Closed	\$30,000	3/31/2008
L&PB	2007	Port Alsworth Community Road Maintenance/ Equipment Upgrade	Closed	\$35,000	3/31/2008
L&PB	2007	07-Special Project/ Plan Finalization	Closed	\$4,000	8/1/2008
L&PB	2007	07-Required Tasks	Closed	\$18,160	6/30/2007

(DCRA 2015)

### 6.3.1.3      Existing Critical Facilities

A critical facility is defined as a facility that provides essential products and services to the general public, such as preserving the quality of life in the Borough and fulfilling important public safety, emergency response, and disaster recovery functions. The critical facilities profiled in this plan (Table 6-4) include the following:

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- Government facilities, such as Borough 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 wastewater treatment, sewage lagoons, landfills.

The Borough's government facilities are listed below and are located outside the Borough property boundary line at 101 Jensen Road, King Salmon, Alaska 99613. The value of the Borough's critical facilities are valued at \$4,650,000 and are vulnerable of all of the natural hazards of earthquake, flood, ground failure, tsunami, volcano, weather and wildland fire.

- Borough Offices
- School District Office
- Dorm Room 4
- Community Freezer

**Table 6-4 L&PB Potential Hazard Exposure Analysis -Critical Facilities**

Estimated No. of Occupants	Facilities	Address	Latitude	Longitude	Estimated Value	Building Type	Earthquake	Flood	Ground Failure	Severe Weather	Tsunami	Volcano	Wildland Fire
20	L&PB Office	101 Jensen Road, King Salmon, AK 99613	Undefined	Undefined	\$2,400,000	W2	X	X	X	X	X	X	X
3	School District Office	King Salmon, AK 99613	Undefined	Undefined	Undefined	W1	X	X	X	X	X	X	X
0	Warehouse/ Maintenance Building	King Salmon, AK 99613	Undefined	Undefined	\$750,000	W2	X		X	X	X	X	X
12	Dorm Room 4	King Salmon, AK, 99613	Undefined	Undefined	\$750,000	W2	X	X	X	X	X	X	X
0	Community Freezer	101 Jensen Road King Salmon, AK 99603	Undefined	Undefined	\$750,000	N/A	X	X	X	X	X	X	X

(L&PB 2014)

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### 6.4 REPETITIVE LOSS PROPERTIES

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

DMA 2000 Requirements
<p><b>Addressing Risk and Vulnerability to NFIP Insured Structures</b></p> <p><b>§201.6(c)(2)(ii):</b> 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><b>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:</b></i></p> <p><b>§201.6(c)(2)(ii)(A):</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;</p> <p><b>§201.6(c)(2)(ii)(B):</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;</p> <p><b>§201.6(c)(2)(ii)(C):</b> 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.</p> <p><b>§201.6(c)(3)(ii):</b> 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.</p>
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT B. NFIP Insured Structures</b>
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.

#### 6.4.1 NFIP Participation

The Borough has participated in the NFIP since an emergency entry date of March 4, 2004 and a regular entry date of February 3, 2010.

The L&PB has no repetitive loss properties and no claims for flood insurance. Table 6-5 illustrates the Borough's NFIP participation data.

**Table 6-5 NFIP Participation Data**  
(Lake and Peninsula Borough, #)

Category	Data	Category	Data
<b>Date joined NFIP</b>	03/04/2004	<b>Number of policies in force</b>	0
<b>CRS class / discount</b>	N/A	<b>Insurance in force</b>	0
<b>CAV date</b>	04/14/2009	<b>Number of paid losses</b>	0
<b>CAC date</b>	N/A	<b>Total losses paid</b>	0
<b>Date of current FIRM</b>	02/03/2010	<b>Substantial damage claims since 2004</b>	0

CAC = Community Assistance Contact  
CAV = Community Assistance Visit  
CRS = Community Rating System

FIRM = Flood Insurance Rate Map  
NFIP = National Flood Insurance Program



## **6.5 Vulnerability Analysis Methodology**

The methodology explained below was used for the Borough and the individual incorporated cities and Port Alsworth.

The methodology used a two-pronged effort. First, The Project Team used the State's Critical Facility Inventory and locally obtained information to identify critical facility locations in relation to potential hazard's threat exposure and vulnerability. Second this data was used to develop a vulnerability assessment for those hazards. GIS based hazard mapping information is not available for the majority of the Borough, so values were based on information from the Planning Teams in each of the cities.

Replacement structure and contents values were determined by the community for their physical assets. The community's aggregate exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced) for each physical asset located within a hazard area. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

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

## **6.6 Data Limitations**

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

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

## **6.7 Vulnerability Exposure Analysis**

There is limited GIS data available for the Borough. Table 6-5 lists the Borough's owned critical facilities. The L&PB offices and few owned critical facilities are located outside of the L&PB within the adjacent Bristol Bay Borough's, City of King Salmon, Alaska. Borough and community specific hazard narrative summaries are located in the respective communities' HMPs (Appendix G).

The Borough's government facilities are located outside the Borough property boundary line at 101 Jensen Road, King Salmon, Alaska 99613.

The entire Borough's critical facilities are vulnerable of all of their identified natural hazards: earthquake, flood, ground failure, tsunami, volcano, weather, and wildland fire. Any significant event would be catastrophic to the Borough.

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Damages would impact approximately 35 occupants in four facilities, valued at approximately \$4,650,000

### **6.8 Future Development**

Currently, the L&PB does not have any immediate future plans for development nor has there been any roads, bridges, or buildings developed since 2009.

Please see attached specific community sections for information on any planned future development within their jurisdictions.

## 7. Mitigation Strategy

**S**ection Seven outlines the six-step process for preparing a mitigation strategy including:

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

DMA requirements for developing a comprehensive mitigation strategy include:

DMA 2000 Requirements
<p><b>Identification and Analysis of Mitigation Actions</b></p> <p><b>§201.6(c)(3):</b> [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.</p> <p><b>§201.6(c)(3)(i):</b> [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.</p> <p><b>§201.6(c)(3)(ii):</b> [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.</p> <p><b>§201.6(c)(3)(iii):</b> [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.</p> <p><b>§201.6(c)(3)(iv):</b> [For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.</p> <p><b>Requirement §201.6(c)(4):</b> [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.</p>
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? <span style="float: right;">(Addressed in Section 6.4)</span>
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.

## 7.1 Lake and Peninsula Borough Capability Assessment

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

DMA 2000 Requirements
<b>Incorporation into Existing Planning Mechanisms</b> §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.
<b>ELEMENT C. Incorporate into Other Planning Mechanisms</b>
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.

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

**Table 7-1 L&PB Regulatory Tools**

Regulatory Tools (ordinances, codes, plans)	Existing Yes/No?	Comments (Year of most recent update; problems administering it, etc.)
Comprehensive Plan	Yes	Explains the Borough's land use initiatives and natural hazard impacts.
Land Use Plan	Yes	Explains the Borough's land use goals and initiatives.
Tribal Land Use Plan	Yes	Describes the Village's community development goals and initiatives.
Emergency Response Plan	Yes	Emergency Operation Plan, 2010
Wildland Fire Protection Plan	No	
Building code	Yes	The Borough can exercise this authority.
Zoning ordinances	No	The Borough can exercise this authority.
Subdivision ordinances or regulations	Yes	The Borough can exercise this authority.
Special purpose ordinances	No	The Borough can exercise this authority.

### Local Resources

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

**Table 7-2 Technical Specialists for Hazard Mitigation**

Staff/Personnel Resources	Yes / No	Department/Agency and Position
Development and land management practices	Yes	Community Development Planner
Planner or engineer with an understanding of	Yes	Community Development Planner

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**Table 7-2      Technical Specialists for Hazard Mitigation**

Staff/Personnel Resources	Yes / No	Department/Agency and Position
natural and/or human-caused hazards.		
Floodplain Manager	Yes	Community Development Planner
Surveyors	Yes	The Borough hires consultants when they need a surveyor.
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards.	Yes	Community Development Planner
Personnel skilled in Geospatial Information System (GIS) and/or Hazards Us-Multi Hazard (Hazus-MH) software	Yes	Community Development Planner
Scientists familiar with the hazards of the jurisdiction	No	The Borough works with U.S. Fish & Wildlife Service (USFWS) and Fish & Game (ADF&G), and the Alaska Department of Transportation and Public Facilities
Emergency Manager	Yes	Community Development Planner
Finance (Grant writers)	Yes	Community Development Planner and community representatives
Public Information Officer	Yes	The Borough Mayor, Borough Administrator, or Tribal President

**Table 7-3      L&PB Financial Resources**

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
General funds	Can exercise this authority with voter approval
Payment in Lieu of Taxes (PILT)	Provides operating support funding
Municipal Energy Assistance Program (MEAP)	Provides operating support funding
Community Development Block Grants (CDBG)	Can exercise this authority with voter approval
Capital Improvement Project Funding	Can exercise this authority with voter approval
Authority to levy taxes for specific purposes	Can exercise this authority with voter approval
Incur debt through general obligation bonds	Can exercise this authority with voter approval
Incur debt through special tax and revenue bonds	Can exercise this authority with voter approval
Incur debt through private activity bonds	Can exercise this authority with voter approval
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding 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.

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

## 7.2 Developing Mitigation Goals

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

DMA 2000 Requirements
<b>Local Hazard Mitigation Goals</b> §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.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT C. Mitigation Goals</b>
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?
Source: FEMA, March 2015.

The exposure analysis results were used as a basis for developing the mitigation goals and actions. Mitigation goals are defined as general guidelines that describe what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. As such, ten goals were developed to reduce or avoid long-term vulnerabilities to the identified hazards (Table 7-4).

**Table 7-4 Mitigation Goals**

No.	Goal Description
Multi-Hazards (MH)	
MH 1	Provide <b>outreach</b> activities to educate and promote recognizing and mitigating all natural and manmade hazards that affect the Borough, Cities, and Tribes
MH 2	<i><b>Cross-reference</b> mitigation goals and actions with other Borough, City, and Tribal planning mechanisms and projects</i>
MH 3	Develop <b>construction</b> activities that reduce possibility of losses from all natural hazards that affect the Borough, Cities, and Villages
Natural Hazards	
EQ 4	Reduce structural vulnerability to earthquake (ER) damage.
FL 5	Reduce flood and erosion (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.
TS 8	Reduce vulnerability, damage, or loss of structures from tsunami or seiche
VO 9	Reduce vulnerability, damage, or loss of structures from volcanic debris impacts
WF 10	Reduce structural vulnerability to Tundra/Wildland Fire (WF) damage.

## 7.3 Identifying Mitigation Actions

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



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DMA 2000 Requirements
<b>Identification and Analysis of Mitigation Actions</b> <b>§201.6(c)(3)(ii):</b> [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.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT C. Mitigation Actions</b>
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.

The Planning Team assessed the potential mitigation actions to carry forward into the mitigation strategy. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into three broad categories: property protection, public education and awareness, and structural projects.

The 2009 MJHMP organized mitigation actions into objectives and actions as listed below. Borough staff stated that all of objectives and actions are ongoing.

During the planning process November 2014 through April 2015 the Planning Team selected Borough natural hazard, mitigation actions for potential Mitigation Action Plan (MAP) implementation during the five-year life cycle of this MJHMP. The Planning Team placed particular emphasis on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure as well as facilities located in potential flood zones to comply with NFIP requirements.

The table breaks out Borough project criteria as considered, selected or ongoing. The Planning Team considered projects from a comprehensive list for each hazard type. They identified numerous “ongoing” mitigation actions currently in process or those that were listed in other Borough planning documents. The Planning Team did not delete any of the Legacy 2008 MJHMP actions, but reworded or clarified the actions, as deemed appropriate.

**\*Note:** Please see Appendix G for participating - jurisdiction specific mitigation actions.

**Table 7-5 Mitigation Plan and Potential Actions**

*(The following ongoing actions were identified for MAP implementation)*

Supports Goal No.	Description	Criteria <i>Considered Selected Ongoing Revised</i>	Action Description
MH 1	<i>Provide outreach activities to educate and promote recognizing and mitigating all natural and manmade hazards that</i>	SO	Train residents in installation of erosion monitoring devices to determine rate of eroding shorelines and riverbanks.
		SO	Train/advise residents in grant writing and project management.
		SO	Encourage communities to become more fire and flood ready and better prepared for fire and flood.

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**Table 7-5 Mitigation Plan and Potential Actions**

(The following ongoing actions were identified for MAP implementation)

Supports Goal No.	Description	Criteria <i>Considered Selected Ongoing Revised</i>	Action Description
	<i>affect the Borough, Cities, and Tribes</i>		
M 2	<b>Cross-reference</b> <i>mitigation goals and actions with other Borough, City, and Tribal planning mechanisms and projects</i>	SO	Identify Borough staff to take responsibility for maintaining situation reports.
		SO	Regularly correspond with community residents to identify best ways to assist mitigation efforts within the community.
M 3	<i>Develop <b>construction</b> activities that reduce possibility of losses from all natural and manmade hazards that affect the Borough, Cities, and Villages</i>	SO	With input from communities, develop standards as listed above.
		SO	Prioritize communities based on their abilities to meet the standards.
		SO	Obtain/provide funding for communities to meet fuel supply standards based on priority list.
		SO	Designate liaison between Borough and Communities to assist communities with mitigation planning; grant applications, and other mitigation-related tasks.
EQ 4	<i>Reduce vulnerability of structures to earthquake damage</i>	S	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current State Adopted Building Codes.
		S	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances to prevent toppling damage and resultant injuries to small children, elderly, and pets.
FL 5	<i>Reduce vulnerability, damage, or loss of structures from erosion</i>	SOR	Coordinate with the State of Alaska Department Transportation to improve Borough roads improving the drainage on the existing road and replacing many culverts where needed to prevent additional erosion.
		SOR	Coordinate with DOT to expend and utilize the Federal and State Highway dollars that are presently funded to improve roads.
		SOR	Explore the possibility of partnering with DOT on road maintenance.
		SOR	Identify beaches of concern where infrastructure could be damaged in future years.
		SOR	Coordinate with the communities and property owners to establish an erosion tracking system for each structure to determine how long before the structure will be required to be moved or replaced
		SO	Prohibit any new construction in identified erosion hazard zones
		SO	Increase use of simple, low cost monitoring and measuring activities.
		SO	In erosion-prone communities, install stakes at regular intervals perpendicular to eroding riverbanks and/or coastlines and provide long-term monitoring of the rate at which erosion occurs.
		SO	In flood areas, install marked stakes to measure water levels
		SO	Create detailed plan to address erosion damages.
		SO	Prioritize erosion projects throughout the Borough.

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**Table 7-5 Mitigation Plan and Potential Actions**

(The following ongoing actions were identified for MAP implementation)

Supports Goal No.	Description	Criteria <i>Considered Selected Ongoing Revised</i>	Action Description
		<b>SOR</b>	Ensure that first priority is given to monitoring and mitigation of existing erosion projects.
FL 5	<i>Reduce vulnerability, damage, or loss of structures from flood impacts</i>	<b>SOR</b>	Priority is also give to preventative measure for existing critical facilities.
		<b>SOR</b>	Continued participation in and compliance with the National Flood Insurance Program.
		<b>SO</b>	Ensure that community development occurs through the permitting process mandated by the NFIP. Ensure that new infrastructure is properly permitted before construction begins.
		<b>SO</b>	Continue to develop floodplain mapping in areas just outside communities with particular attention given to those areas that may be developed in the near future.
		<b>SO</b>	Work with State of Alaska NFIP coordinator to improve and further develop flood hazard mitigation strategies and capabilities.
		<b>SO</b>	Ensure that all personnel are adequately trained in NFIP procedure and regulations. Coordinate training with State NFIP coordinator.
GF 6	<i>Reduce ground failure (GF) damage and loss possibility.</i>	<b>S</b>	Promote permafrost sensitive construction practices in permafrost areas.
SW 7	<i>Reduce structural vulnerability to severe weather (SW) damage.</i>	<b>SO</b>	Develop Borough standards for fuel storage, emergency supply, and distribution during shortages.
		<b>SO</b>	Develop community standards as listed above.
		<b>SO</b>	Prioritize communities based on their abilities to meet the standards.
		<b>SO</b>	Obtain/provide funding for communities to meet fuel supply standards based on priority list.
TS 8	<i>Reduce vulnerability, damage, or loss of structures from tsunami or seiche</i>	<b>S</b>	Coordinate with the Alaska Tsunami Warning Center to ensure threaten L&PB communities receive adequate warning.
VO 9	<i>Reduce vulnerability, damage, or loss of structures from volcanic debris impacts</i>	<b>S</b>	Prepare Borough communities for significant interruptions in transportation, supplies, and services due to ash fall by early warning and encouraging stockpiles of items to last for several days.
WF 10	<i>Reduce structural vulnerability to Tundra/Wildland Fire (WF) damage.</i>	<b>S</b>	Support efforts to reduce flammable materials near residences and critical facilities.

## 7.4 Evaluating and Prioritizing Mitigation Actions

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

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

The Planning Commission, at a public meeting, evaluated and prioritized each of the mitigation actions on April 6, 2015 to determine which actions would be included in the Mitigation Action Plan. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities in the Borough. To complete this task, the Planning Team first prioritized the hazards that were regarded as the most significant within the community (earthquake, erosion, flood, ground failure, severe weather, and tundra/wildland fire). The Planning Team reviewed the simplified social, technical, administrative, political, legal, economic, and environmental (STAPLEE) evaluation criteria (Table 7-6) and the Benefit-Cost Analysis Fact Sheet (Appendix G) to consider the opportunities and constraints of implementing each particular mitigation action. For each action considered for implementation, a qualitative statement is provided regarding the benefits and costs and, where available, the technical feasibility. A detailed cost-benefit analysis is anticipated as part of the application process for those projects the Borough chooses to implement.

**Table 7-6 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> dministrative	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

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**Table 7-6      Evaluation Criteria for Mitigation Actions**

Evaluation Category	Discussion "It is important to consider..."	Considerations
<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

On April 6, 2015, the Planning Team prioritized the Borough natural hazard mitigation actions that were selected to carry forward into the Mitigation Action Plan (MAP).

The Planning Team considered each hazard's history, extent, and probability to determine each potential actions priority. A rating system based on high, medium, or low was used.

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

Prioritizing the mitigation actions within the MAP matrix (Table 7-8) was completed to provide the Borough with an implementation approach.

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## 7.5 Mitigation Action Plan

The Lake and Peninsula Borough and participation communities have flat management structures. Like most rural-remote Alaskan communities there is limited budget; therefore no funding is available for developing and maintaining departmental or other infrastructure responsibilities. The Borough, Cities, and Villages are managed by their jurisdiction led City or tribal Councils respectively. This process enables the each jurisdiction to maximize governance capacity, coordinate project prioritization, and closely monitor their limited budget constraints.

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

**Table 7-7 Potential Funding Source Acronym List**

*(See complete funding resource description in Appendix A)*

<p><b>L&amp;PB Community Development Coordinator</b></p> <p><b>Participating City's Mayor's Office</b></p> <p><b>Village Tribal Council Office</b></p> <p><b>US Department of Homeland Security (DHS)</b>  <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><b>Federal Management Agency (FEMA) /</b>  <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><b>US Department of Commerce (DOC) /</b>  <i>Remote Community Alert Systems Program (RCASP)</i></p> <p><b>National Oceanic and Atmospheric Administration (NOAA)</b>  <i>Economic Development Administration (EDP)</i>  <i>Public Works and Development Facilities Program (PWDFP)</i></p> <p><b>US Environmental Protection Agency (EPA) /</b>  <i>Indian Environmental General Assistance Program (IGAP)</i></p> <p><b>US Department of Agriculture (USDA) /</b>  <b>USDA, Farm Service Agency</b>  <i>Emergency Conservation Program (ECF)</i>  <i>Rural Development (RD)</i></p> <p><b>USDA, Natural Resources Conservation Service (NRCS)</b>  <i>Conservation Technical Assistance Program (CTA)</i>  <i>Conservation Innovation Grants (CIG)</i>  <i>Environmental Quality Incentives Program (EQIP)</i>  <i>Emergency Watershed Protection Program (EWPP)</i>  <i>Watershed Planning (WSP)</i></p> <p><b>US Geological Survey (USGS)</b>  <i>Alaska Volcano Observatory (AVO)</i></p> <p><b>Assistance to Native Americans (ANA)</b>  <i>Native American Housing Assistance and Self Determination Act (NAHASDA)</i></p> <p><b>US Army Corp of Engineers (USACE) /</b>  <i>Planning Assistance Program (PAP)</i>  <i>Capital Projects: Erosion, Flood, Ports &amp; Harbors</i></p> <p><b>Alaska Department of Military and Veterans Affairs (DMVA), Division of Homeland Security and Emergency Management (DHSEM)</b>  <i>Mitigation Section (for PDM &amp; HMGP projects and plan development)</i></p>
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## LAKE AND PENINSULA BOROUGH MULTI-JURISDICTIONAL Hazard Mitigation Plan Update

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

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

# LAKE AND PENINSULA BOROUGH

## MULTI-JURISDICTIONAL Hazard Mitigation Plan Update

**Table 7-8 Lake and Peninsula Borough Mitigation Action Plan (MAP)**

(See acronym and abbreviations list for complete titles)

Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
MH 1.1	Train residents in installation of erosion monitoring devises to determine rate of eroding shorelines and riverbanks.	High	L&PB Community Development Office or applicable funding agency	L&PB	1-3	B/C: This ongoing activity is essential for the Borough as there are limited funds available to accomplish effective mitigation actions. T/F: This activity is ongoing demonstrating its feasibility.
MH 1.2	Train/advise residents in grant writing and project management.	High	L&PB Community Development Office or applicable funding agency	L&PB	1-3	B/C: This ongoing activity is essential for the Borough as there are limited funds available to accomplish effective mitigation actions. T/F: This activity is ongoing demonstrating its feasibility.
MH 1.3	Encourage communities to become more fire and flood ready and better prepared for fire and flood.	High	L&PB Community Development Office or applicable funding agency	L&PB	1-3	B/C: This ongoing activity is essential for the Borough as there are limited funds available to accomplish effective mitigation actions. T/F: This activity is ongoing demonstrating its feasibility.
MH 2.1	Identify Borough staff to take responsibility for maintaining situation reports.	Medium	L&PB Community Development Coordinator's Office	L&PB	3-5	B/C: This ongoing activity is essential for the Borough as there are limited funds available to accomplish effective mitigation actions. T/F: This activity is ongoing demonstrating its feasibility.
MH 2.2	Regularly correspond with community residents to identify best ways to assist mitigation efforts within the community.	Medium	L&PB Community Development Office or applicable funding agency	L&PB	3-5	B/C: This ongoing activity is essential for the Borough as there are limited funds available to accomplish effective mitigation actions. T/F: This activity is ongoing demonstrating its feasibility.

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Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
<b>MH 3.1</b>	With input from communities, develop fuel supply standards and levels in case of isolation from a natural hazard.	Medium	L&PB Community Development Coordinator's Office	L&PB, FEMA HMA programs, AFG, FP&S, and SAFER	2-4 years	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. T/F: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
<b>MH 3.2</b>	Prioritize communities based on their abilities to meet the standards.	Medium	L&PB Community Development Coordinator's Office	L&PB, FEMA HMA programs, AFG, FP&S, and SAFER	2-4 years	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. T/F: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
<b>MH 3.3</b>	Obtain/provide funding for communities to meet fuel supply standards based on priority list.	Medium	L&PB Community Development Office or applicable funding agency	L&PB, FEMA HMA programs, AFG, FP&S, and SAFER	2-4 years	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. T/F: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.

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## MULTI-JURISDICTIONAL Hazard Mitigation Plan Update

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<b>MH 3.4</b>	Designate liaison between Borough and Communities to assist communities with mitigation planning, grant applications, and other mitigation-related tasks.	Medium	L&PB Community Development Office or applicable funding agency	L&PB, Tribes, FEMA HMA programs, AFG, FP&S, and SAFER	2-4 years	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. T/F: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
<b>EQ 4.1</b>	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current State Adopted Building Codes.	High	L&PB Community Development Office or applicable funding agency	L&PB, HMA, NRCS, ANA, USACE, US USDA, Lindbergh	1=3 years	B/C: This project would ensure threatened infrastructures are available for use – their loss would exacerbate potential damages and further threaten survivability. T/F: This project is feasible using existing staff skills, equipment, and materials.
<b>EQ 4.2</b>	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.	Medium	L&PB Community Development Office, Jurisdictional Office, or applicable funding agency	L&PB, HMA, NRCS, ANA, USACE, US USDA, Lindbergh	1-3 years	B/C: This project would ensure threatened infrastructures are available for use – their loss would exacerbate potential damages and further threaten survivability. T/F: This project is feasible using existing staff skills, equipment, and materials.
<b>FL 5.1</b>	Coordinate with the State of Alaska Department Transportation to improve Borough roads improving the drainage on the existing road and replacing many culverts where needed to prevent additional erosion.	High	L&PB Community Development Coordinator's Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECF, DCRA/ ACCIMP	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB has the skill to implement this action. Specialized skills may need to be contracted-out with materials and

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## MULTI-JURISDICTIONAL Hazard Mitigation Plan Update

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Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
						equipment barged in depending on the method selected.
<b>FL 5.2</b>	Coordinate with DOT to expend and utilize the Federal and State Highway dollars that are presently funded to improve roads.	High	L&PB Community Development Coordinator's Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.3</b>	Explore the possibility of partnering with DOT on road maintenance.	High	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.4</b>	Identify beaches of concern where infrastructure could be damaged in future years.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.

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Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
FL 5.5	Coordinate with the communities and property owners to establish an erosion tracking system for each structure to determine how long before the structure will be required to be moved or replaced.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected.
FL 5.6	Prohibit any new construction in identified erosion hazard zones.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected.
FL 5.7	Increase use of simple, low cost monitoring and measuring activities.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected.
FL 5.8	In erosion-prone communities, install stakes at regular intervals perpendicular to eroding	Medium	L&PB Community Development Office, or	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a



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	riverbanks and/or coastlines and provide long-term monitoring of the rate at which erosion occurs.		applicable Jurisdictional Office			high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.9</b>	In flood areas, install marked stakes to measure water levels	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.10</b>	Create detailed plan to address erosion damages.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.11</b>	Prioritize erosion projects throughout the Borough.	Medium	L&PB Community Development Coordinator's Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.

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Goal/ Action ID	Description	Priority (High, Medium, Low)	Responsible Department or Agency	Potential Funding Source(s)	Timeframe (1-3 Years 2-4 Years 3-5 Years)	Benefit-Costs (BC) / Technical Feasibility (T/F)
						T/F: The L&PB 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.
<b>FL 5.12</b>	Ensure that first priority is given to monitoring and mitigation of existing erosion projects.	Medium	L&PB Community Development Coordinator's Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.13</b>	Prioritize preventative measure for existing critical facilities.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.14</b>	Continued participation in and compliance with the National Flood Insurance Program.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB has the skill to implement this action. Specialized skills may need to be contracted-out with materials and

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						equipment barged in depending on the method selected.
<b>FL 5.15</b>	Ensure that community development occurs through the permitting process mandated by the NFIP. Ensure that new infrastructure is properly permitted before construction begins.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.16</b>	Continue to develop floodplain mapping in areas just outside communities with particular attention given to those areas that may be developed in the near future.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.
<b>FL 5.17</b>	Work with State of Alaska NFIP coordinator to improve and further develop flood hazard mitigation strategies and capabilities.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops.  T/F: The L&PB 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.

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<b>FL 5.18</b>	Ensure that all personnel are adequately trained in NFIP procedure and regulations. Coordinate training with State NFIP coordinator.	Medium	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	3-5 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB 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.
<b>GF 6.1</b>	Promote permafrost sensitive construction practices in permafrost areas.	High	L&PB Community Development Office, or applicable Jurisdictional Office	L&PB, HMA, ANA	1-3 years	B/C: This outreach project would decrease damage to facilities if they were sited and used the most appropriate construction practices. T/F: Technically feasible as the community is currently working with UAF and other entities to determine most viable permafrost construction practices.
<b>SW 7.1</b>	Develop Borough standards for fuel storage, emergency supply, and distribution during shortages.	High	L&PB Community Development Office with applicable Jurisdictional Office	L&PB, DCCED/CDBG, Denali Commission	1-3 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.
<b>SW 7.2</b>	Develop community standards as listed above.	Medium	L&PB Community Development Coordinator's Office	L&PB, DCCED/CDBG, 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.

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						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.
<b>TS 8.1</b>	Coordinate with the Alaska Tsunami Warning Center to ensure threaten L&PB communities receive adequate warning.	Medium	L&PB Community Development Coordinator's Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB 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.
<b>VO 9.1</b>	Prepare Borough communities for significant interruptions in transportation, supplies, and services due to ash fall by early warning and encouraging stockpiles of items to last for several days.	High	L&PB Community Development Coordinator's Office	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: Proactive mitigation activities have a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB 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.
<b>WF 10.1</b>	Support efforts to reduce flammable materials near residences and critical facilities.	High	L&PB	L&PB, ADOT, HMA, NRCS, USACE, USDA/EWP, USDA/ECP, DCRA/ ACCIMP	1-3 years	B/C: This action has a high/cost benefit ratio and result in less costly construction before a problem develops. T/F: The L&PB 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.

## 7.6 Implementing Mitigation Strategy into Existing Planning Mechanisms

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

DMA 2000 Requirements
<b>Incorporation into Existing Planning Mechanisms</b> §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.
<b>1. REGULATION CHECKLIST</b>
<b>ELEMENT C. Incorporate into Other Planning Mechanisms</b>
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.

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 mechanism.



## 8. References

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

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## **Appendices**

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## **9. Appendix A - Funding Resources**

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## 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 agencies pursue the goals of the program through collaboration with each other and numerous partners. In addition to other federal agencies, program partners include state and local governments, universities, research centers, professional societies, trade associations and businesses, as well as associated councils, commissions and consortia.

NEHRP's work encompasses research, development and implementation activities. Program research helps to advance our understanding of why and how earthquakes occur and impact the natural and built environments. The program develops strategies, tools, techniques and other measures that can reduce the adverse effects of earthquakes and facilitates and promotes implementation of these measures, thereby strengthening earthquake resilience among at-risk communities.

Detailed information about the program is available at [NEHRP.gov](http://NEHRP.gov), which is maintained by NIST, the lead agency for NEHRP. For additional agency-specific information, visit FEMA Earthquake, the USGS Earthquake Hazards Program, the NIST NEHRP Office and the National Science Foundation.
  - 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](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.
- 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/financial/cig/>)
      - The Emergency Watershed Protection Program (EWP). This funding source is designed is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.  
(<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>)
- 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://dec.alaska.gov/water/MuniGrantsLoans/index.htm>)
    - 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.  
([https://ofmpub.epa.gov/apex/watershedfunding/f?p=109:2:0::NO::P2\\_X\\_PROG\\_NUM,P2\\_X\\_YEAR:51,2015](https://ofmpub.epa.gov/apex/watershedfunding/f?p=109:2:0::NO::P2_X_PROG_NUM,P2_X_YEAR:51,2015))
    - Indian Environmental General Assistance Program (IGAP). In 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.  
(<http://www.epa.gov/tribal/gap/>)
  - 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](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/ih/grants/ihbg](http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/ihbg))

- HUD/CDBG provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income persons (<http://www.hud.gov/offices/cpd/communitydevelopment/programs/>)
- 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/ih/grants/icdbg](http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/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>)
- U.S. 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>).
- U.S. 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](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/dcra/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](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](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](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](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](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>)
- Rasmussen Foundation Grants. The Rasmussen foundation invests both in individuals and well-managed 501(c)(3) organizations dedicated to improving the quality of life for Alaskans.

Rasmussen 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>)

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## **10. Appendix B - FEMA Hazard Mitigation Plan (MJHMP) Review Tool**

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## **11. Appendix C - L&PB MJHMP Adoption Resolution and Community Resolutions**

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## **12. Appendix D - Public Outreach Activities**



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**Subject:** Hazard Mitigation Plan Development Project Initial Notice

**Date:** Thursday, November 20, 2014 at 12:18:13 PM Eastern Standard Time

**From:** Simmons, Scott

**To:** 'mewest@alaska.edu', 'hdenny@anthc.org', 'tneal@usgs.gov', 'swhite@avcp.org', 'steve.heppner.bia.ak@gmail.com', 'kato\_howard@ak.blm.gov', 'jneimeyer@denali.gov', 'leslie.pearson@alaska.gov', 'ryan.anderson@alaska.gov', 'Alice.Edwards@alaska.gov', 'taunnie.boothby@alaska.gov', 'scott.nelsen@alaska.gov', 'alan.wien@alaska.gov', 'terri.lomax@alaska.gov', 'Soderlund.Dianne@epamail.epa.gov', 'john.lingaas@noaa.gov', 'joel.curtis@noaa.gov', 'sam.albanese@noaa.gov', 'meg.mueller@ak.usda.gov', 'merlaine.kruse@ak.usda.gov', 'greg.magee@alaska.gov', 'Anna\_Plager@dnr.state.ak.us', 'kerry\_walsh@dnr.state.ak.us', 'John\_Dunker@dnr.state.ak.us', 'Steve\_Clautice@dnr.state.ak.us', 'patricia\_burns@dnr.state.ak.us', 'Steve\_McGroarty@dnr.state.ak.us', 'Mac\_McLean@dnr.state.ak.us', 'Margie\_Goatley@dnr.state.ak.us', 'Bruce.R.Sexauer@poa02.usace.army.mil', 'colleen.bickford@hud.gov', 'ak\_le@fws.gov'

**CC:** Eileen Bechtol (erbechtol@gmail.com), DHSEM Scott Nelsen, Evans, Jessica, Appleby, Elizabeth, Wasserman, Evan

Dear Potential HMP Development Participants,

URS Corporation has received a 2014 contract from the State Division of Homeland Security and Emergency Management (DHS&EM) to develop 21 Local/Tribal All-Hazard Mitigation Plans for the following communities:

#### **New HMP Development**

- Atmautlauk (Unorganized)
- Chitina (Unorganized)
- Copper Center (Unorganized)
- Grayling (Unorganized)
- Kongiganak (Unorganized)
- Kwigillingok (Unorganized)
- City of Merkoryuk (2nd Class City)
- City of Nightmute (2nd Class City)
- Tuntutuliak (Unorganized)
- Tununak (Unorganized)
- City of Wales (2nd Class city)

#### **HMP Update Required**

- Newtok (Unorganized)
- City of Aniak (2nd Class City)
- City of Dillingham (1st Class City)
- City of Golovin (2nd Class City)
- Lake and Peninsula Borough, MJHMP
- City of Hooper Bay (2nd Class City)
- City of Kivalina (2nd Class City)
- City of Saint Paul (2nd Class City)
- City of Unalakleet (2nd Class City)
- City and Borough of Yakutat

The Lake and Peninsula Borough (L&PB) Multi-Jurisdictional HMP (MJHMP) consists of six organized cities and 12 unorganized communities:

#### **The Lake and Peninsula Borough, MJHMP**

##### ***Organized Cities***

- City of Chignik (2nd Class City)
- City of Egegik (2nd Class City)
- City of Newhalen (2nd Class City)
- City of Nondalton (2nd Class City)
- City of Pilot Point (2nd Class City)
- City of Port Heiden (2nd Class City)

##### ***Unorganized Communities***

- Chignik Lagoon
- Chignik Lake
- Igiugig
- Iliamna
- Ivanof Bay
- Kokhanok

We invite you to participate in this important community planning effort during the development

process. Community newsletters will be located on the DHS&EM Local/Tribal All Hazard Mitigation Plan Development website at: <http://ready.alaska.gov/plans/localhazmitplans> 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**

**AECOM + URS**

700 G Street, Suite 500 | Anchorage, AK 99501

Ph: 907.261.9706 | 800.909.6787 | Personal Mobile: 841.1832 | Fax: 907.562.1297

eMail Address: [scott.simmons@urs.com](mailto:scott.simmons@urs.com)

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**From:** [Simmons, Scott](#)  
**To:** [cdc@lakeandpen.com](mailto:cdc@lakeandpen.com)  
**Cc:** [DHSEM Scott Nelsen](#); [DHSEM Ann Gravier](#)  
**Subject:** Mitigation Planning Guidance Materials  
**Date:** Thursday, November 06, 2014 9:30:00 AM  
**Attachments:** @

---

Good Morning Ted,

I am writing as a follow-up to our telephone conversation earlier this week.

I have attached three planning guidance documents for your review. You will note that I highlighted various items for specific emphasis as they pertain to changes for either tribal or organized city (local) government HMP requirements.

URS ( now known as AECOM+URS) was contracted by the Division of Homeland Security and Emergency Management (DHS&EM) to develop a Hazard Mitigation Plan for 21 communities. The Lake and Peninsula Borough (L&PB) is one of 10 jurisdictions' selected to assist with updating their HMP.

It is important to note that the L&PB does not have to pay anything for this project. This is an important project for your Borough funded by FEMA through the (DHS&EM. URS worked with rural communities to assist them with their hazard mitigation plan development needs. In fact, URS has been developing HMPs nationwide since 2000. Our Alaska office has completed approximately 90 State, Borough (County) and local community, State reviewed, and FEMA approved Hazard Mitigation Plans to-date.

HMP updates require reviewing current plans to identify how conditions have changed since the plan was last approved. For example, the current plan's plan development activities may change such as planning team membership; new plans, reports, and studies reviewed, new hazards identified and newly disaster impacts annotated. These changes have could directly change identified planning community vulnerabilities and risks. This requires that the current Mitigation Strategy be reviewed and updated to identify current project's status. Were any project completed or do they need to be modified, merged with similar initiatives for the same impact or location; deleted because they are no longer deemed the most appropriate mitigation initiative, or changed to reflect new jurisdictional needs?

AECOM+URS's role in this project is to ensure that the Updated HMP meets state and federal requirements -- part of this requirement is to describe the process in which the community was involved. We are at the beginning stages of this project. Your proactive initiative to have us meet with your Planning Commission is an awesome start.

Our task is to write the plan while guiding you through the HMP Update process; maximizing your Planning Commission's talent. URS will write the plan. The Planning Commission will assist the process by working with AECOM+URS to identify changes since 2009 implementation:

**Describe how the HMP has changed:**

- New Planning Commission membership and processes
- HMP update participation and plan reviewers,
- Identify new hazards not formerly addressed,
- Help us explain your hazard impacts since 2009,
- 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 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.

There will be opportunities for the entire community to review the team's work during various public involvement processes because FEMA requires at least two public involvement activities. We will provide planning team meeting minutes and two newsletters for distribution or posting to enable community wide knowledge, providing information during Borough Planning Commission Meetings or other public meetings, and working with us over the phone as we capture needed information.

AECOM+URS will provide two (2) newsletters. The first newsletter 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, will introduce the draft HMP and encourage the community to review and provide comments to make the plan better or more usable to mitigate your hazards. I have attached the draft Newsletter for your review. Please write me back with the names of the team leader and members so I can update the draft and return it to you for distribution throughout your community.

Your Planning Commission meeting scheduled for November 13, 2014 at the Atwood Building, in Anchorage will provide an outstanding introductory meeting venue with your HMP team leaders and members to introduce the project and the process letting you know what information we will need to allow us to proceed.

- Please provide us a list of names for your Planning Commission to include on the first newsletter and the name of the Planning Team Leader(s) as appropriate.

I will forward a few other items such as a draft agenda and documents designed to address the various HMP update criteria.

I look forward to working with you and your Team. Thank you for your time.

Kind Regards  
-Scott-

R. Scott Simmons, CFM, CPM

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Ph: 907.261.9706 | 800.909.6787 | Personal Mobile: 841.1832 | Fax: 907.562.1297  
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<<
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      Tribes - Updating your Hazard Mitigation Plan.pdf
(90.2KB)
      tribal_planning_guidance_may2010.pdf      (825.1KB)
      2011HMPReviewGuideFinal-UpdateHMPs-Highlighted.pdf
(501.6KB)
      image002.png      (2.5KB)
      (1.4MB)
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# LAKE AND PENINSULA BOROUGH HAZARD MITIGATION PLAN UPDATE

Newsletter #1

February 2015

*This newsletter describes the Lake and Peninsula Borough (LPB) Hazard Mitigation Planning project 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 2009 Hazard Mitigation Plan (HMP).

AECOM was contracted to assist the LPB with preparing a 2015 FEMA approvable HMP update.

The HMP will identify all natural hazards, such as earthquake, flood/erosion, severe weather, 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 this 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 LPB 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 2009,
- ❑ 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 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 a Local Planning Review Guide available at:

[http://emilms.fema.gov/is318/assets/local\\_mtgtn\\_plan\\_guidance\\_0708.pdf](http://emilms.fema.gov/is318/assets/local_mtgtn_plan_guidance_0708.pdf). It 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 will be conducting a Planning Team Meeting to introduce the project and planning team, to gather comments from community

residents update hazards lists, and collect data to refine the vulnerability assessment.

## We Need Your Help

Please use the following table to confirm the hazards AND identify new hazards not formerly addressed.

LPB Hazard Worksheet							
LPB Incorporated Cities	Earthquake	Flood/Erosion	Ground Failure	Severe Weather	Tsunami	Volcano	Wildland Fire
Chignik	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Egegik	Yes	Yes	No	Yes	No	Yes	Yes
Newhalen	Yes	Yes	No	Yes	No	Yes	Yes
Nondalton	Yes	Yes	No	Yes	No	Yes	Yes
Pilot Point	Yes	Yes	No	Yes	No	Yes	Yes
Port Heiden	Yes	Yes	No	Yes	No	Yes	Yes

The 2009 HMP identified critical facilities within LPB, but the list needs to be reviewed and updated and the estimated value and location (latitude/longitude) determined.

In addition, the number and value of structures, and the number of people living in each structure will need to be documented. A newsletter will be sent to each of the incorporated cities in the LPB with a table of their critical facilities to review. Once this information is collected we will determine which critical facilities, residences, and populations are vulnerable to specific hazards in the LPB.

## The Planning Team

### Public Participation

The purpose of this newsletter is to encourage public involvement as a continuous effort throughout the project. The goal is to receive comments, identify key issues or concerns, and improve mitigation ideas and to guide the community.

The LPB Planning Team will be led by LPB Community Development Planner, Ranya Aboras with assistance from AECOM (contracted by DHS&EM). Matters of the Hazard Mitigation Plan will be brought to the Borough Planning Commission Ms. Aboras.

AECOM will develop materials and lead the planning process with guidance Ms. Aboras and DHS&EM's Scott Nelsen.

LPB Hazard Update Planning Team		
Team Member	Title	Involvement
Ranya Aboras	LPB Community Development Planner	HMP Team Leader, data gathering and plan review
LPB Planning Commission	Planning Commissioners	HMP plan review
Chignik: Debbie Carlson	City Clerk	HMP data gathering and Chignik plan review
Egegik: Don Strand	City Manager	HMP data gathering and Egegik plan review
Newhalen: Wassie Balluta	City Clerk	HMP data gathering and Newhalen plan review
Nondalton: Robert Tracey,	Mayor	HMP data gathering and Nondalton plan review
Pilot Point: Barbara Higgins	City Manager	HMP data gathering and Pilot Point plan review
Port Heiden: Scott Anderson	Mayor	HMP data gathering and Port Heiden plan review
Port Alsworth	Kate Conley Borough Clerk	HMP data gathering and Port Alsworth plan review
Scott Simmons	AECOM, Lead Planner	HMP update manager, lead writer, HMP project coordination.
Eileen Bechtol	BP&D, Community Planner	HMP update, data gathering, HMP development

*We encourage you to take an active part in preparing the LPB 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 Borough Community Development Planner Ranya Aboras; Scott Simmons, AECOM; or Eileen Bechtol, BP&D directly if you have any questions, comments, or requests for more information:*

#### Lake and Peninsula Borough Community Development Planner

Ranya Aboras  
P.O. Box 485  
King Salmon, Alaska 99613  
907.246.3421  
cdc@lakeandpen.com

#### AECOM

Scott Simmons, HMP Lead Planner  
700 G Street, Suite 500  
Anchorage, Alaska 99501  
800.909.6787  
scott.simmons@aecom.com

#### BP&D

Eileen R. Bechtol, AICP, Planner  
P.O. Box 3426  
Homer, Alaska 99603  
907.399.1624  
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700 G Street, Suite 500  
Anchorage, AK 99501  
Phone: 907.261.9706  
Fax: 907.562.1297

## Lake and Peninsula Borough HMP Development Project Introduction

Introduce HMP Project and participant:

**Note:** *This is a very short duration planning project. All plans must be completed by October 2015. We propose to have a draft plan for Borough and each jurisdiction's review by the end of April 2015 to allow sufficient time for local, State, and FEMA review and subsequent completion by the October deadline.*

AECOM was contracted by the Division of Homeland Security and Emergency Management (DHS &EM) to update/develop the Lake & Peninsula Borough's (L&PB) Hazard Mitigation Plan (HMP) Update. It is important to note that the Borough does not have to pay anything for this project. This is an important project for your community funded by FEMA through DHS&EM.

*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 80 State, Borough (County) and Alaska, California, and Oregon local community, State reviewed, and FEMA approved HMPs to-date.

Hazard Mitigation plans identify hazards which routinely impact a community, defines those hazards so community members understand their nature, hazard impact location 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 the community's/borough's 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 Borough Identified Cities by contacting them directly they include the Cities of Chignik, Egegik, Newhalen, Nondalton, Pilot Point, Port Heiden, and the community of Port Alsworth.

Our task is to write the plan while teaching you the hazard mitigation plan development or update process. We have been very successful accomplishing this by using a community local Planning Teaming process. AECOM will write the plan. The community Planning Team, or contacts, will provide us essential 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 damages,



# Memorandum

700 G Street, Suite 500  
Anchorage, AK 99501  
Phone: 907.261.9706  
Fax: 907.562.1297

Our first goal is to encourage the Borough and each jurisdiction to select a Planning Team Leader and a few local team members.

- Team members should have knowledge of natural hazards that continually cause damage;
- Know what facilities are critical for protection from these hazards; as well as,
- Identify resources and capabilities are available within each community, or the borough, to mitigate those hazards.

We suggest asking for team members from the City, Village elders, the health clinics, schools, volunteer fire fighters, law enforcement, and others as they deem appropriate. We suggest no more than four or five members on each community's team.

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

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 HMP and encourage the community to review and provide comments to make the plan better or more usable to mitigate your hazards.

I have provided the draft Newsletter for Ted's and your review.

Are you available for a teleconference with Ms. Eileen Bechtol on Friday of this week (March 6, 2015 at 1 p.m.)?

She wrote the initial 2009 HMP and is well acquainted with L&PB's infrastructure and communities. She will introduce herself and seek to obtain some information throughout the HMP Update process:

- Hazards impacting the community, try to capture some historical dates and specific impact information
- Borough's few critical facilities:
  - Number of occupants at any point in time, facility addresses, GPS coordinates, estimated replacement value, "x" which hazard impact each facility
- Does the Borough have any potential projects they'd like to identify to "fix" the problem or "reduce" their impacts?

# Lake and Peninsula Borough HMP Update Workshop

## One Day Workshop

November 13, 2014	
<b>L&amp;P Borough Business</b>	<b>9:00 - 9:20</b>
<b>Unit 1</b> <b>Introduction:</b> Facilities, Breaks, Project Team, HMP Update Process, & L&PB Participation	<b>9:20 – 9:45</b>
<b>Unit 2</b> <b>Identify Update Needs</b> Explain Plan Tables (FEMA requirements and Update Info Needs)	<b>9:45 - 10:30</b>
<b>Break</b>	<b>10:30 - 11:00</b>
<b>Unit 3</b> <b>Hazard Assessment:</b> What has changed? New hazards, disaster events, etc.	<b>11:00 - 12:00</b>
<b>Lunch (On our own)</b>	<b>12:00 - 1:00</b>
<b>Unit 4</b> <b>Vulnerability Assessment</b> What infrastructure impacts have changed due to mitigation	<b>1:00 - 2:15</b>
<b>Break</b>	<b>2:15 - 2:30</b>
<b>Unit 4</b> <b>Vulnerability Assessment (<i>continued</i>)</b> What actions have worked or failed	<b>2:30 - 3:00</b>
<b>Break</b>	<b>3:00 - 3:15</b>
<b>Unit 5</b> <b>Mitigation Strategy</b> Determine mitigation Action Status (e.g. completed, deleted, deferred, ongoing, combined – Explain why status has or has not changed)	<b>3:15 – 4:30</b>
<b>Break</b>	<b>4:00 – 4:15</b>
<b>Unit 6</b> <b>HMP Maintenance</b> Did you do what you said you'd do?	<b>4:15 – 4:45</b>
<b>Unit 7</b> <b>Conclusion</b> Where do we go from here?	<b>4:45 - 5:00</b>

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**Lake and Peninsula Borough  
Regular Planning Commission Meeting  
November 13, 2014 – 9:00 am**

**A. CALL TO ORDER**

The regular meeting of the Lake and Peninsula Borough Planning Commission was called to order at 9:12 am by Chairman Scott Anderson on Thursday, November 13, 2014 in room 106 of the Atwood Building, 550 West 7<sup>th</sup> Avenue, Anchorage AK 99501.

**B. ROLL CALL**

A quorum was established with

- Commissioner Scott Anderson
- Commissioner Don Bumpus
- Commissioner Lary Hill
- Commissioner AlexAnna Salmon
- Commissioner Alexander “Skipper” Tallekpalek – absent, excused
- Commissioner Danica Wilson
- Commissioner Aurthur Woinowsky

Staff participating in the meeting included

- Kate Conley, Clerk
- Ted Meyer, Community Development Coordinator

Guests for all or part of the meeting

- Stephen Price, State of Alaska, Department of Environmental Conservation
- Eileen Bechtol, URS/BP&D
- Evan Wasserman, URS
- Elizabeth Appleby, URS
- Jessica Evans, URS
- Scott Simmons, URS
- Julianne Baltar, Bristol Bay Native Association
- Scott Nelson, State of Alaska, DHS&EM
- Michelle Torres, State of Alaska, DHS&EM
- Ann Gravier, DHS&EM

**C. APPROVAL OF AGENDA**

Motions was made by Commissioner Salmon and seconded by Commissioner Bumpus to approve the agenda for the November 13, 2014 regular meeting as presented. Motion passed unanimously by voice vote.

**D. SWEARING IN OF RE-APPOINTED MEMBERS** – Borough Clerk, Kate Conley, swore in Commissioner Woinowsky and Commissioner Salmon.

**E. APPROVAL OF MINUTES**

Motion was made by Commissioner Salmon to approve the minutes of September 15, 2014 as presented. Motion was seconded by Commissioner Wilson. Motion passed unanimously by voice vote.

**F. REPORTS**

- 1. Borough Manager** – Borough Manager, Nathan Hill was not present. There were no questions about his report.

- 2. Community Development Coordinator's Report** – Mr. Meyer gave an accounting of the scrap project. He explained that the project is now a hazardous waste project. He introduced Stephen Price from Department of Environmental Conservation. Mr. Price said that there are options for scrap metal. It is considered an inert waste and is not hazardous. It can be buried in a landfill or a village can get a one-time disposal or non-fill permit. Commissioner Bumps asked, once the fluids are drained, do the vehicles need to be cut up. Mr. Price said no, but it is wise to try to salvage things like alternators and catalytic converters. The hold to bury the cars needs to be 10 feet from a ground water source and covered with two feet of compacted soil and then the ground needs to be reseeded with a ground cover. Commissioner Hill asked if this would require a permit from the Borough. Mr. Meyer said yes, if the site is outside the landfill, and it would also require a permit from DEC. Mr. Meyer said the current challenge for the hazardous waste haul-out is to get pallets to each village to fill. He said Levelock needs twenty pallets. Commissioner Wilson suggested using fish totes. Commissioner Salmon said that most villages have scrap pallets. Commissioner Anderson said that he needs direction to package batteries and waste. Mr. Price said batteries can be shipped on pallets, no more than two layers high. For used oil, he suggested using oil burners.

Mr. Meyer reported he is officially leaving in January. The Levelock erosion study is coming along well. He is working to coordinate a meeting and presentation of the study to several agencies in January. The erosion rate for Levelock is a foot to two feet per year. Port Heiden's erosion rate is forty feet per year. Commissioner Bumpus asked if there are aerial photos available to establish the erosion patterns. Mr. Meyer explained that the studies are done using historical photos. Commissioner Bumpus asked if the hazardous waste project is still in the pilot project stages, or if it has expanded yet to all villages. Mr. Meyer said he is currently entertaining bids. Commissioner Salmon asked if a portion of the hazardous waste project money could be used to do some of the same work that the village has done for years to haul out the waste. Mr. Meyer acknowledged that some villages have been "scrappers" for years and other villages and the borough could learn from their experience. He suggested communities could work together to coordinate and figure out resources to get the work done. Mr. Price said that if the batteries are sent by air, they have to go through Interstate Batteries.

- 3. Clerk's Report** – Ms. Conley reported that she will be in Anchorage for the remainder of November, but will be available by internet or cell phone and will be working.
- 4. Superintendent's Report** – Mr. Mase was not in attendance and there were no questions about his report.
- 5. Capital Improvement Projects Update** Mr. Cotten was not in attendance and there were no questions about his report.

## **G. UNFINISHED BUSINESS – none**

## **H. NEW BUSINESS**

- 1. Scrap Project Financial Statuses** – Mr. Meyer said this was already discussed in his report. Commissioner Woinowsky asked if there are any other villages working on hydro projects. Commissioner Anderson said that Port Heiden had a hydro study done and AEA was confused by the village's wind studies. Commissioner Salmon said that the Tanalian site provides hydro power to Nondalton, Newhalen and Iliamna. Pedro Bay is considering a hydro project. She then described the Igiugig testing of an in-stream hydro turbine. She said it had to be monitored the entire time it is was in the water and so the project budget was



large. Commissioner Bumpus said that the Chignik Lagoon hydro project is moving quickly and the only problem has been with the access road. The ground is fine silt and the silt is sluffing off the slopes.

**I. PLANNING COMMISSION COMMENTS**

**AlexAnna Salmon** – Commissioner Salmon thanked Ted Meyer for his work with the Commission and for the Borough. She added that she hopes the Commission likes the replacement he trains.

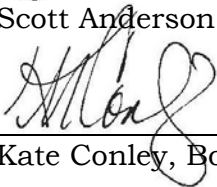
**J. CITIZEN COMMENTS - none**

**K. INFORMATIONAL ITEMS - none**

**L. ADJOURNMENT** – Motion was made by Commissioner Wilson to adjourn the meeting. Motion was seconded by Commissioner Woinowsky. Motion passed unanimously by voice vote. The meeting was adjourned at 10:10 am.



\_\_\_\_\_  
Scott Anderson, Chairman



\_\_\_\_\_  
Kate Conley, Borough Clerk

\_\_\_\_\_  
April 6, 2015

Date

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**Lake and Peninsula Borough  
Regular Planning Commission Meeting  
April 6, 2015 – 1:00 pm**

**A. CALL TO ORDER**

The regular meeting of the Lake and Peninsula Borough Planning Commission was called to order at 1:14 pm by Commissioner Lary Hill on Monday, April 6, 2015 in the Lake and Peninsula School District meeting room at 101 Jensen Rd, King Salmon AK 99613.

**B. ROLL CALL**

A quorum was established with

- Commissioner Don Bumpus
- Commissioner Adrienne Christensen – absent, excused
- Commissioner Lary Hill
- Commissioner Terry Mann
- Commissioner AlexAnna Salmon – absent, excused
- Commissioner Alexander “Skipper” Tallekpalek – absent, excused
- Commissioner Aurther Woinowsky

Staff participating in the meeting included

- Ranya Aboras, Community Development Coordinator
- Kate Conley, Clerk
- Nathan Hill, Borough Manager

Guests for all or part of the meeting

- Alvin Pedersen, Chignik Lagoon
- Myra Olsen, Egegik
- Verna Jean Kolyaha, Pedro Bay
- Victoria Briggs, Ugashik
- Roland Briggs, Ugashik
- Hattie Albecker, Ugashik – via teleconference
- Eileen Bechtol, URS/BP&D – via teleconference
- Scott Simmons, URS – via teleconference

**C. APPROVAL OF AGENDA**

Motions was made by Commissioner Woinowsky and seconded by Commissioner Bumpus to approve the agenda for the April 6, 2015 regular meeting as presented. Motion passed unanimously by voice vote.

**D. COMMISSION**

1. Swearing in of New and Reappointed members – Borough Clerk, Kate Conley, swore in Commissioner Mann
2. Elect New Chairperson – Commissioner Woinowsky made a motion to table the election of a new chairperson until the next commission meeting. Motion was seconded by Commissioner Mann. Commissioner Hill called for discussion. There was none. Motion passed unanimously by voice vote.

**E. PRESENTATION**

1. **Draft Hazard Mitigation Plan –AECOM** – Scott Simmons explained that the plan is nearly done and he introduced Eileen Bechtol who then led the commission in reviewing the plan. She explained that Ms. Aboras has already reviewed the draft and suggested revisions for the final draft. Ms. Bechtol requested the plan be reviewed by the planning commissioners over

the coming month. After the changes are made as per the commission, the plan will be sent to each city and Port Alsworth. Each will have to approve their version of the plan and the Borough will need to approve the overall plan in the fall.

The commission then discussed table 7-5 and edited task 8.1.2. (page 7-8) to read “Ensure that first priority is given to monitor and mitigate erosion.” The Commission also requested an additional item be added to address critical infrastructure that must be moved. There was discussion of provisions for temporary facilities.

Ms. Bechtol explained that the plan will have revisions and then go to the cities and Port Alsworth. She asked for the Planning Commission to make suggestions to Ranya who will pass them along to Ms. Bechtol.

Commissioner Hill asked if the funding for the Hazard Mitigation plan was secure, given the current legislature cuts. Mr. Simmons said that the funding is federal and stable. It is a lump sum amount; however, the federal government is seeking to slash the budget on mitigation grant funding in future years.

#### **F. APPROVAL OF MINUTES**

1. November 13, 2014 – Motion was made by Commissioner Woinowsky to approve the minutes of November 13, 2014 as presented. Motion was seconded by Commissioner Mann. Motion passed unanimously by voice vote.
2. March 16, 2015 - Motion was made by Commissioner Woinowsky to approve the minutes of March 16, 2015 as presented. Motion was seconded by Commissioner Mann. Motion passed unanimously by voice vote.

#### **G. REPORTS**

1. **Borough Manager** – Borough Manager, Nathan Hill said he met with SWAMC and discussed the future energy needs in developing an energy plan. Lake and Peninsula Borough has been proactive and will have to be working more with the federal government in the future as the state funding is shrinking. Iliamna dock project is moving forward. He hopes to have the dock out to bid by April 15, 2015. The School District is having a cash flow problem. The answer is one of three options: 1) cut services, 2) raise revenue, or 3) a combination of both. The Borough could cut community and school services to find new revenue streams. The Borough has been working hard to collect and identify land leases as well as guides and collect from lodges, but expenses will have to be decreased somewhere. For this year, there will be help from the reserves and contingency funds, but the current rate of spending and earning is not sustainable. The sooner a plan is formulated, the better. Roland Briggs, Ugashik said the only way to fund the schools will be to increase fish taxes. He said it should be on the table. Mr. Hill said there is also an option to increase bed and guide taxes. He said this will be discussed at the joint Assembly and School Board meeting on Tuesday at 1:30 pm. Mr. Hill said he is still planning to start the Chignik dock next calendar year. Commissioner Bumpus asked about the tank farm at Williamsport. Mr. Hill said he discussed the idea with Ray Williams and he intends to put in a tank farm. There was a discussion of fuel prices and flying versus barging fuel to the villages.
2. **Community Development Coordinator's Report** – Ranya Aboras said she worked on the hazard mitigation plan. A sample scrap budget and scope of work went out to the villages. Nine new land leases have been completed. She has yet to receive a second draft of the wall map. She attended a park service conference regarding energy efficiencies at Katmai National Park. The bridge at Katmai will be out to bid soon. Ms. Aboras has also be working on some permits. She has also been working on a survey and found grants for the

leadership project she has been working on. Ms. Aboras gave an update on the permit for Mr. Kronberger, which had been approved by the Planning Commission at the last meeting.

3. **Clerk's Report** – Ms. Conley reviewed the schedule for the April meetings. She reported that the new envelopes for the election have been ordered. The RFP for the website has been issued and staff is currently reviewing the proposals. Revenue sharing letters went out to the villages and are due April 30, 2015. The May meeting is proposed to be a week early, on May 11, 2015.
4. **Superintendent's Report** – Mr. Mase was not present, but Nathan Hill was able to give some school district updates. He said there are three schools in danger of not making the minimum student count this coming year: Egegik, Chignik Lake and Pilot Point. Commissioner Woinowsky asked what happens when a school closes. Mr. Hill said it is case by case. Some schools they keep heated, and some they are able to winterize and close completely. Commissioner Woinowsky asked how closing a school effects the funding. Mr. Hill said that also depends on the location because there are a lot of variable. The bottom line is each school cut costs money and the per-student expenses will go up as a result. Roland Briggs, Ugashik asked if there has been any new decisions made by the legislature about the proposed student minimum enrollment numbers. Mr. Hill said that is still in discussion.
5. **Capital Improvement Projects Update** Mr. Cotten was not in attendance and there were no questions about his report.

#### **H. UNFINISHED BUSINESS – none**

#### **I. NEW BUSINESS**

1. **Variance to Subdivide – Ugashik** – Ms. Aboras gave a staff report. She explained that this action should have a public hearing before a preliminary plat acceptance is considered by the Planning Commission. The schedule will be very tight, but May 7, 2015 in Ugashik seems the most ideal date as the minutes then could be prepared for the Planning Commission to consider on May 11, 2015. She added that she would like to take two commissioners with her and she would conduct the hearing.

Hattie Albecker, Ugashik, said that she agreed that would be the right way to go about the action. Commissioner Woinowsky said he thought if there is to be a meeting in Ugashik, he would like to have a member or two from other villages attend. Ms. Aboras recommended AlexAnna Salmon and Lary Hill to accompany her to Ugashik for the public hearing. Motion was made by Commissioner Mann to table the variance to subdivide for Preliminary Plat Briggs Field Subdivision to the next Planning Commission meeting. Motion was seconded by Commissioner Bumpus. There was no further discussion. Motion passed unanimously by voice vote.

2. **Variance for ROW – Ugashik** – Ms. Aboras gave a staff report. She said this is a variance to subdivide because it does not adhere to code. She recommended to the Commission to table the action until the next meeting to allow time for a public hearing. Commissioner Woinowsky asked if this would be split into three lots or two. Victoria Briggs, Ugashik said the proposal is to split one lot into two. Commissioner Bumpus asked if there is a local ordinance on the size of the lots. Ms. Aboras said that yes, the proposed lots will be too narrow. Ms. Briggs said that they wanted to split the lots vertically to give the lots access to both the water and the road. Motion was made by Commissioner Bumpus to table the variance for preliminary plat Briggs Point to the net Planning Commission meeting. Motion

was seconded by Commissioner Bumpus. There was no further discussion. Motion passed unanimously by voice vote.

**J. PLANNING COMMISSION COMMENTS**

**Terry Mann** – Commissioner Mann said he is excited to work with the commission and thanked all for the opportunity. Commissioner Hill thanked Commissioner Mann for taking on the responsibility.

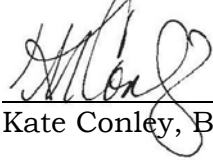
**K. CITIZEN COMMENTS - none**

**L. INFORMATIONAL ITEMS - none**

**M. ADJOURNMENT** – Motion was made by Commissioner Woinowsky to adjourn the meeting. Motion was seconded by Commissioner Mann. Motion passed unanimously by voice vote. The meeting was adjourned at 2:56 pm.



AlexAnna Salmon, Vice-Chairman



Kate Conley, Borough Clerk

August 17, 2015

Date

**Lake and Peninsula Borough  
Regular Planning Commission Meeting  
May 11, 2015 – 1:00 pm**

**A. CALL TO ORDER**

The regular meeting of the Lake and Peninsula Borough Planning Commission was called to order at 1:16 pm by Commissioner AlexAnna Salmon on Monday, May 11, 2015 in the Lake and Peninsula School District meeting room at 101 Jensen Rd, King Salmon AK 99613.

**B. ROLL CALL**

A quorum was established with

- Commissioner Don Bumpus
- Commissioner Adrienne Christensen
- Commissioner Lary Hill
- Commissioner Terry Mann
- Commissioner AlexAnna Salmon
- Commissioner Alexander “Skipper” Tallekpalek
- Commissioner Aurther Woinowsky

Staff participating in the meeting included

- Ranya Aboras, Community Development Coordinator
- Kate Conley, Clerk
- Nathan Hill, Borough Manager

Guests for all or part of the meeting

- Victoria Briggs, Ugashik
- Roland Briggs, Ugashik
- Christina Salmon, Igiugig
- Scott Anderson, Port Heiden
- Natalya Shellikoff, Port Heiden
- Ty Mase, LPSD Superintendent
- Stacy Hill, Igiugig
- Fawn Silas, Nondalton – via teleconference

**C. APPROVAL OF AGENDA**

Motions was made by Commissioner Mann and seconded by Commissioner Tallekpalek approve the agenda for the May 11, 2015 regular meeting as presented. Motion passed unanimously by voice vote.

**D. COMMISSION**

1. Elect New Chairperson – Commissioner Tallekpalek made a motion to nominate AlexAnna Salmon as the Chairperson. Motion was seconded by Commissioner Mann. Commissioner Salmon nominated Lary Hill as the Chairperson. Commissioner Hill declined the nomination. Commission Hill nominated Art Woinowsky. Commissioner Woinowsky declined the nomination. Motion was made by Commissioner Woinowsky to close the nominations for chairperson. Motion was seconded by Commissioner Hill. Nominations were closed. Commissioner Salmon was elected Chairperson by unanimous vote.
2. Elect New Vice Chairperson – Commissioner Woinowsky nominated Commissioner Hill as Vice Chairperson. Motion was made to nominate Hill was seconded by Commissioner Tallekpalek. Motion to close nomination was made by Commissioner Mann. Motion was seconded by Commissioner Tallekpalek. Nominations were closed. Commissioner Hill was elected vice-chairperson by unanimous vote.

## E. PRESENTATION

1. **Draft Hazard Mitigation Plan –AECOM** – Community Development Coordinator Ranya Aboras addressed the Commission and explained that the first draft of the plan was presented at the last meeting. The consultants will now present the plan to the State and to FEMA and then to the Assembly in October. She invited the Commissioners to edit the plan and give any edits to her. Commissioner Hill asked about community involvement and if there were any questions, when do they need to be submitted. Ms. Aboras said that the plan will be sent to each community to update their profile. The plan will be out for comment starting June first. Commissioner Woinowsky noted that the Ugashik information is lacking.

## F. APPROVAL OF MINUTES

1. April 6, 2015 – Commissioner Christensen noted the spelling of her name was spelled incorrectly. Motion was made by Commissioner Mann to approve the minutes of April 6, 2015 with the correction to Commissioner Christensen's name. Motion was seconded by Commissioner Hill. Motion passed unanimously by voice vote.

## G. REPORTS

1. **Borough Manager** – Borough Manager, Nathan Hill said he will combine his report with the Capital Improvement Project Update Report from Mr. Cotten. He began by explaining that there are several energy projects in progress. 1) Chignik Lagoon Hydro Project is awaiting dry weather to be finished. 2) The wind study in Egegik is looking good. 3) The Kokhanok wind project should be at medium penetration by the end of summer.

Mr. Nathan Hill said there are other issues of concern for the manager's office. The school budget is in deficit and they will ask for money today. The marine mammal study began today. The results of the study will allow the Chignik dock project to move forward. On June 8<sup>th</sup>, the Borough will be opening bids on the Iliamna dock.

Scott Anderson, Port Heiden, asked about \$250,000 set aside by AEA for a wind design for Port Heiden. He explained that the project was put on hold because of the distribution and generator systems being inadequate. Ms. Aboras said that she has been working with Chris Gobah from AEA and will attend a meeting with those in charge to work on this issue.

Commissioner Salmon said she received a phone call from Rich Stromberg from AEA asking about the status of the \$80,000 for wind design.

Commissioner Tallekpalek said the wind study tower in Levelock was put in near a GCI tower at the south end of the village toward the bottom of a hill with 20 foot trees around it, so it is likely the study results will be less than optimum.

Roland Briggs, Ugashik, said when Pilot Point redid their wind study, they put up three towers for less than for less than \$10,000. The results changed dramatically based on the location. An additional consideration needs to be given to the cost of running power lines to the site.

Commissioner Salmon asked if anyone from the Borough attended the energy conference presented by SWAMC in Dillingham. Nathan Hill said no one from the Borough attended. Ty Mase said that Tim McDermott, School District Maintenance Department Manager, attended the conference.

Commissioner Woinowsky asked why wind is the primary focus. He said solar energy has a lot of potential. Mr. Nathan Hill said that he has not looked at solar too extensively, but there



will be a presentation at an upcoming workshop. Mr. Hill said that the Borough has been successful with energy projects, but there has been a large funding cut by the state. Commissioner Salmon said that the multiple energy sources should be considered. Mr. Nathan Hill added that wind energy was studied and funded because that was the federal focus and money was available for those projects.

2. **Community Development Coordinator's Report** – Ranya Aboras said she has had some recent issues with both citizens and agencies because of the code and there will be new code changes at the next meeting.

The Half Cabin Lake cabin site are still in the staking phase of the offering. Two applications have been received. The state will issue lease contracts subject to the Borough's review of the applications.

Two land leases have been processed in the last month and are on the Assembly agenda for introduction.

At a previous meeting there was questions about contaminated municipal entitlement property owned by the Borough. Ms. Aboras said that she looked into the issue and the possible contamination should have been questioned at the time the property was transferred from the state. Mr. Nathan Hill said that the Borough will not sell municipal entitlement properties for a one-time payment, when there is an option to lease and receive money annually for the asset. Commissioner Woinowsky asked if the land in question is known to have hazards. Ms. Aboras said that no particular contamination is known, she was simply investigating the complicated process and implications. The Borough could potentially be responsible for cleanup. Scott Anderson, Port Heiden, offered a contact for additional information about Brownfield clean up advice.

Ms. Aboras said that she is working will all but six of the sixteen villages on the on the scrap project. The project, over all, is moving along well.

Commissioner Hill asked about available funding for ETT and EMT training. Ms. Aboras said there have also been some requests for AEDS and medical needs.

3. **Clerk's Report** – Ms. Conley reported on the website and the election.
4. **Superintendent's Report** – Mr. Mase was not present during this portion of the meeting. Commissioner Woinowsky asked how much the teachers are making. He said he wants a breakdown of the salaries and cost to travel. Mr. Nathan Hill said that the budget is public. It is the main topic for the Assembly meeting later in the day.
5. **Capital Improvement Projects Update** Mr. Cotten was not in attendance and Mr. Nathan Hill covered this report in his Manager's report.

## **H. UNFINISHED BUSINESS**

1. **Variance to subdivide – Ugashik** – Ms. Aboras explained that there is information in the packet, and a hand out has the new information. She explained that this is a consultation of a preliminary subdivision. She is seeking conditions, if any to adjust the design.

Ms. Aboras said that she and Commissioners Hill and Salmon held a public hearing in Ugashik about the proposed variance and right of way. The public hearing was very

successful. All the attendees had an opportunity to voice their concerns. Some of the concerns were:

- No benefit to the village – The improvements are private and are made for the benefit of the individual and not the entire village
- Rights taken away – The proposed subdivision does not affect the IRR inventory and therefore there are no native rights effected.
- Not farming or business – The Borough does not have zoning regulations and there are no restrictions about business in residential areas.

Ms. Aboras said that there are nine items to be considered by the Planning Commission, but the Borough does not have zoning or use regulations. Ms. Victoria Briggs, applicant, said that the property in question wasn't surveyed before because the survey will cost \$8,000 to \$10,000. Commissioner Christensen asked about access to the lots. Ms. Aboras explained that both lots will have a side of their property along Ptarmigan Trail and the opposite side along the Ugashik River. Commissioner Salmon clarified that this is a pre-preliminary plat. Ms. Aboras confirmed that this is presented to the Commissioner to establish recommendations prior to having the property surveyed. Commissioner Salmon asked if the neighbor has any issues with the proposed subdivision. Ms. Aboras said there is no significant objection by Ugashik.

Commissioner Lary Hill said he has questions about fuel storage on the airstrip. Ms. Aboras said that the airstrip is not part of this discussion. Mrs. Briggs noted that there is no fuel on the airstrip and there are no plans for fuel storage there.

Commissioner Woinowsky asked if each lot, after subdivision, would be over an acre. Mrs. Briggs said yes, each lot will actually be over an acre and a half. There will be several options to configure a structure, well and septic system. Commissioner Woinowsky asked about the water table. Mr. Briggs said there are two water tables, one at 30 to 35 feet and another table deeper.

Ms. Aboras said there is no motion to be made for this action, only conditions to be considered. Commissioner Salmon asked if there were any conditions. Commissioner Hill said he has none, as long as the survey shows the property to be as indicated on the presented map. Ms. Aboras said that this variance will come back to the Planning Commission in August as a formal plat, after the survey is completed. The Commission was in consensus that no additional conditions would be added to the variance request.

2. **Variance for ROW – Ugashik** – Commissioner Salmon said during the Public Hearing in Ugashik, there was much more discussion and objection to this proposed variance. Ms. Aboras agreed and said that the one primary complaint was that Ugashik would not get as much money from BIA by removing this road from the IRR inventory. Commissioner Salmon said the IRR inventory formula will change soon, she said she does not know exactly what the changes will be or how they will affect the villages, but she foresees funding to become really difficult for all rural communities. Commissioner Mann said that he understands the proposed IRR changes to be more based on populations. Ms. Briggs said Ugashik only receives a couple thousand dollars for roads now.

There was a discussion of utility easements and utility installation. It was noted that the utility easements is not reflected on the map.

Commissioner Salmon asked if the reason for the vacation is to be able to bring in larger planes. Mr. Briggs said they can already bring in DC-6 planes. He said that he did not

originally want to use this site as a runway. He wanted to extend the DOT runway, but DOT would not allow him to extend the runway.

Commissioner Woinowsky said that the lots between the river and the airstrip are residential. Ms. Aboras said that there is no strict dedication of usage or zoning. Commissioner Woinowsky asked about adding zoning and usage to the permit. Ms. Aboras said the Commission can add those conditions to the code, but not to the permit if it is not in code. She added that she is trying to eliminate options for interpretation in the code and zoning regulations would help.

Mr. Briggs noted that a trade manufacturing site was applied for in 1966 for this property before a town site was registered, but the trade manufacturing permit was not issued until 1989 and those lots were awarded as part of the trade manufacturing site.

Commissioner Hill asked if there are any artifacts on the site. Mr. Briggs said he has never found any on the lots, only along the rivers. He added that this was a significant town site with over 600 people before the epidemics. Ms. Aboras said that the utility corridor is the condition she will add to the variance for vacation of the right of way. The Commission was in consensus to add that utility corridor consideration to the variance.

## **I. NEW BUSINESS**

1. **Draft Hazard Mitigation Plan – Recommendation to Assembly – No action**
2. **Development Permit – Exploratory Mining – Millrock –** Ms. Aboras explained that this site is located fifteen (15) miles from Chignik Bay. There will be no more than eight (8) holes drilled. Commissioner Hill asked how deep the holes will be. Ms. Aboras said the holes will be 800 to 1000 feet deep. Commissioner Salmon said this is on BBNC land. It is too small to justify a DNR permit. Commissioner Hill asked about the footprint. Ms. Aboras said the footprint is one acre. Commissioner Hill said they should have two to three tailings ponds and he is concerned about reclamation. Mr. Aboras said they have a plan. The permittee submitted a 68 page application. Millrock will need a permit from the Borough, as well as from the State for water. Commissioner Hill asked about archeology work. Commissioner Salmon pointed out a cultural review. Commissioner Christensen asked when the work will begin. Ms. Aboras said that the work is to start mid-June and end in August. Motion was made by Commissioner Hill to approve the development permit form Millrock for exploratory mining. Commissioner Woinowsky noted that 72,000 gallons of water per day is a lot. Ms. Aboras said they plan to average 500 gallons a day or less. Motion was seconded by Commissioner Woinowsky. Commissioner Christensen asked about the remediation plan. Ms. Aboras said that the water will be discharged into pools. Motion passed unanimously by voice vote.

## **J. PLANNING COMMISSION COMMENTS**

**Art Woinowsky** – Commissioner Woinowsky said he appreciated Commissioners Hill and Salmon attending the public hearing in Ugashik.

**AlexAnna Salmon** – Commissioner Salmon welcomed Commissioners Christensen and Mann to the Planning Commission.

## **K. CITIZEN COMMENTS - none**

## **L. INFORMATIONAL ITEMS - none**

**M. ADJOURNMENT** – Motion was made by Commissioner Hill to adjourn the meeting. Motion was seconded by Commissioner Woinowsky. Motion passed unanimously by voice vote. The meeting was adjourned at 3:10 pm.



AlexAnna Salmon, Chairman



Kate Conley, Borough Clerk

8-17-2015

Date

**Subject:** Comments and Edits to MJHMP

**Date:** Monday, April 6, 2015 at 10:28:19 AM Eastern Daylight Time

**From:** Ranya Aboras

**To:** Eileen Bechtol

**CC:** Simmons, Scott

Good Morning Eileen,

It is correct that the Borough has not built any roads, buildings or bridges since 2009 however I would prefer if it reads that:

Currently, the Lake and Peninsula Borough does not have any immediate future plans for development at the time of this plan nor has there been any roads, bridges or buildings developed since 2009.

I think writing it this way provides more clarity.

Thank you,

Ranya

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**From:** Eileen Bechtol [<mailto:erbechtol@gmail.com>]

**Sent:** Monday, April 06, 2015 9:25 AM

**To:** Ranya Aboras

**Cc:** Simmons, Scott

**Subject:** FW: Comments and Edits to MJHMP

Hi Ranya:

Thank you for your comprehensive and great comments and edits. I will revise the draft plan with your edits, Scott's and the PC in the final draft for the 5/11 meeting.

I only have a couple of questions.

1. Page 94, your comment: *"am confused by this statement. Is it relating to the Comprehensive Plan or referring to development in general? There are many developments underway such as the Chignik Hydroelectric Project among others. I would request this statement to be removed"*

I put that sentence in the document because we have to address any future development and when I asked you that question you responded as follows:

\*\*\*\*\*

\*

"There were no new buildings, roads or bridges built by the Borough since the 2009 HMP was done."

Thanks,

Ranya"

---

**From:** Eileen Bechtol [<mailto:erbechtol@gmail.com>]

**Sent:** Sunday, March 15, 2015 10:13 PM

**To:** Ranya Aboras; Kate Conley

**Subject:** Development

One of the requirements from FEMA is to list any changes in development from 2009 to present. Has the Borough

built any new buildings, roads, bridges since the 2009 HMP was done?

Or, can you point me to who I should ask?

Thank you,

E

\*\*\*\*\*  
\*\*\*

I apologize if my question was confusing. Sometimes my emails are not clear enough.

Table 6-3 on Page 6-5 addresses the development trend in the LPB for replacing aging infrastructure. We need to address ***future planned or ongoing development***. If you could send me a list of the developments underway I can make it into a table and we will have met that specific FEMA requirement.

2. Table 7-3, Page 7-3: Your comment: *"Overall, how are tribal entities mentioned here if BBNA are drafting the plans for native communities? I am curious as to whether the mention of tribal entities are applicable to this portion of the plan."*

Good question. I struggled with that too. The MJHMP for the LPB is an overarching plan encompassing the entire Borough. Each of the jurisdictions within the borough will have their own portion that only include a) planning process, b) hazard identification and risk assessment, c) mitigation strategy, d) plan review, evaluation and implementation. Each jurisdiction will need to approve just their section of the plan. In other words the jurisdictional portions will not include Table 7-3 (or most of the tables).

The final draft for the 5/11 meeting will have the incorporated cities and PA. I do not know the timeline for the native communities.

Thank you very much for taking the time to read the plan so carefully. Please do not hesitate to contact me if you have any questions or concerns.

Scott and I will call into the PC meeting today at 1 p.m.

E

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**From:** Ranya Aboras <[cdc@lakeandpen.com](mailto:cdc@lakeandpen.com)>

**Date:** Friday, April 3, 2015 at 3:16 PM

**To:** Eileen Bechtol <[erbechtol@gmail.com](mailto:erbechtol@gmail.com)>

**Subject:** Comments and Edits to MJHMP

Hi Eileen,

Attached are my edits and comments for the MJHMP.

Let me know if you have any questions.

Thanks and have a good weekend,

Ranya Aboras

# LAKE AND PENINSULA BOROUGH MULT-JURISDICTIONAL HAZARD MITIGATION PLAN (MJHMP)

April 2015

Newsletter 2

*This newsletter discusses the preparation of the Lake and Peninsula Borough (LPB) 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 LPB 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, erosion, flood, ground failure, severe weather, and tundra/wildland fire. The HMP also identifies the people and facilities potentially at risk and potential actions to mitigate community hazards. The public participation and planning process is documented as part of the project.

## What is Hazard Mitigation?

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

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

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

## Why Do We Need A Hazard Mitigation Plan?

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

## The Planning Process

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

The DMA2000 requires the plan to document the following topics:

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

FEMA has prepared a Local Planning Review Guide) and (available at:

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

The planning process kicked-off on **November 13, 2014** by establishing a local planning team and holding a public meeting. The planning team examined the full spectrum of hazards listed in the State Hazard Mitigation Plan and identified natural hazards the HMP would address.

Borough staff, AECOM and the public 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 natural hazards in the LPB.

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 team 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.

At the **April 6, 2015** meeting the LPB Planning Commission reviewed 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 Borough Offices; please call the number below for a copy. The plan will be provided to DHS&EM and FEMA for their preliminary approval and returned to the Borough Assembly for formal adoption.

**Next Plan Review: May 11, 2015 LPB Planning Commission Meeting. Please call the LPB at 907.246.3421 for more information**

**Sample of the LPB Mitigation Actions. Review the draft HMP for a complete list.**

Train residents in installation of erosion monitoring devices to determine rate of eroding shorelines and riverbanks.	With input from communities, develop fuel supply standards and levels in case of isolation from a natural hazard	Coordinate with the State of Alaska Department Transportation to improve Borough roads improving the drainage on the existing road and replacing many culverts where needed to prevent additional erosion.
Train/advise residents in grant writing and project management.	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.	Promote permafrost sensitive construction practices in permafrost areas.
Encourage communities to become more fire and flood ready and better prepared for fire and flood.	Prepare Borough communities for significant interruptions in transportation, supplies, and services due to ash fall by early warning and encouraging stockpiles of items to last for several days.	Develop Borough standards for fuel storage, emergency supply, and distribution during shortages.

*We encourage you to take an active part in the LPB 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 Borough Community Development Planner Ranya Aboras; Scott Simmons, AECOM; or Eileen Bechtol, BP&D directly if you have any questions, comments, or requests for information.*

**Lake and Peninsula Borough  
Community Development  
Planner**

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**AECOM**

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**BP&D**

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## **13. Appendix E - Benefit–Cost Analysis Fact Sheet**

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# Benefit Cost Analysis

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.

## Benefit Cost Analysis

- 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 percent of pre-damage structure value).
- Include the site location (i.e., miles inland) for the Hurricane module.

### **Use Correct Occupancy Data**

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

### **Questions to Be Answered**

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

### **Common Shortcomings**

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

## **14. Appendix F - Plan Maintenance Documents**

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Annual Review Questionnaire				
PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action			
	Are there procedures (e.g. meeting announcements, plan updates) that can be done more efficiently?			
	Has the 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 City of 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?			

## MITIGATION ACTION PROGRESS REPORT

1 of 2

Progress Report Period: \_\_\_\_\_ To \_\_\_\_\_  
(date) (date)

Project Title: \_\_\_\_\_ Project ID#: \_\_\_\_\_

Responsible Agency: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

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



## MITIGATION ACTION PROGRESS REPORT

2 of 2

Plan Goal(s) Addressed: \_\_\_\_\_

Goal: \_\_\_\_\_

Success Indicators: \_\_\_\_\_

### Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed\*

\* explain: \_\_\_\_\_

### Project Cost Status

☐ Cost unchanged

☐ Cost overrun\*\*

\*\* explain: \_\_\_\_\_

Cost underrun\*\*\*

☐ Project canceled

\*\*\* 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: \_\_\_\_\_

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## **15. Appendix G – Participating Communities' HMPs**

1. Chignik
2. Egegik
3. Newhalen
4. Nondalton
6. Pilot Point
7. Port Alsworth
8. Port Heiden

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