City of Unalakleet, Alaska

Local Hazards Mitigation Plan

Cover Photo: Anonymous

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Acronyms

AEIS	Alaska Earthquake Information System
AWCG	Alaska Wildfire Coordinating Group
BCA	Benefit- Cost Analysis
BCR	Benefit-Cost Review
BFE	Base Flood Elevation (100 year flood)
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
CMP	Coastal Management Plan
DCRA	(Alaska) Department of Commerce, Community and Economic Development
DHS&EM	(Alaska) Division of Homeland Security and Emergency Management
FBFM	Flood Boundary and Floodway Maps
FDIC	Federal Deposit Insurance Corporation
FEMA	Federal Emergency Management Agency
FHLBB	Federal Home Loan Bank Board
FIRM	Flood Insurance Rate Maps
FLD	Flood Projects
fps	feet per second
FLD	Flood Projects
HMP	Hazard Mitigation Plan
HMPG	Hazard Mitigation Planning Grant
IAW	Immediate Action Workgroup
LHMP	Local Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NOAA	National Oceanographic and Atmospheric Administration
PDMG	Pre Disaster Mitigation Grant
SBA	Small Business Administration
STIP	Statewide Transportation Improvement Program
T/S	Tsunami/Seiche Projects
USCOE	United States Army Corps of Engineers
USGS	United States Geological Survey
UTM	Universal Transverse Mercator

Sample Resolution

City of Unalakleet, Alaska
Local Hazards Mitigation Plan Adoption Resolution
Resolution # _____

Adoption of the City of Unalakleet Local Hazards Mitigation Plan

Whereas, the City of Unalakleet recognizes the threat that local natural hazards pose to people and property; and

Whereas, undertaking hazard mitigation projects before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

Whereas, an adopted Local Hazards Mitigation Plan is required as a condition of future grant funding for mitigation projects; and

Whereas, the Unalakleet Local Hazards Mitigation Plan has been sent to the Alaska Division of Homeland Security and Emergency Management and the Federal Emergency Management Agency for their approval.

Now, therefore, be it resolved, that the Unalakleet City Council**,** hereby adopts the City of Unalakleet Local Hazards Mitigation Plan as an official plan; and

Be it further resolved, that the City of Unalakleet will submit the adopted Local Hazards Mitigation Plan to the Alaska Division of Homeland Security and Emergency Management and the Federal Emergency Management Agency officials for final review and approval.

Passed: _____
Date

_____
Certifying Official

Chapter 1. Planning Process and Methodology

Introduction

The scope of this plan is natural hazards: flooding, erosion, severe weather, wildland fire, avalanche, tsunami and earthquake hazards. However, some of the mitigation projects for the natural hazards would also mitigate impacts from other hazards.

The City of Unalakleet Local Hazards Mitigation Plan (LHMP) includes information to assist the city government and residents with planning to avoid potential future disaster losses. The plan provides information on natural hazards that affect Unalakleet, descriptions of past disasters, and lists projects that may help the community prevent disaster losses. The plan was developed to help the City make decisions regarding natural hazards that affect Unalakleet.

Plan Development

Location

Unalakleet is located at the eastern end of Norton Sound of the Bering Sea. The city is on a sandy spit at the mouth of the Unalakleet River and west of the Nulato Hills. It lies 148 air miles south of Nome and 295 miles northwest of Anchorage. The community lies at approximately 63.87306° North Latitude and -160.78806° (West) Longitude. (Sec. 3, T019S, R011W, Kateel River Meridian.) Unalakleet is located in the Cape Nome Recording District. The area encompasses 2.9 sq. miles of land and 2.3 sq. miles of water.

Project Staff

The Unalakleet LHMP City staff included City Administrator Herbert Ivanoff, and City Clerk Sonya Agienik.

WHPacific, Inc. and Eileen R. Bechtol, AICP, of Bechtol Planning & Development were hired to write the plan with the City.

Ervin Petty and Andrew Jones of the Division of Homeland Security & Emergency Management (DHS&EM) provided technical assistance and reviewed the drafts of this plan.

Plan Research

The plan was developed utilizing existing Unalakleet plans and studies as well as outside information and research. The following list contains the most significant of the plans, studies and websites that were used in preparing this document. Please see the bibliography for additional sources.

1. *Alaska All-Hazard Risk Mitigation Plan*. Prepared by and for DHS&EM. October 2007

2. *DCRA Community Information*: http://www.dced.state.ak.us/dca/commdb/CF_BLOCK.htm.

3. *FEMA Benefit-Cost Analysis Website:* http://www.fema.gov/government/grant/bca.

4. FEMA How to Guides

   Getting Started: Building Support For Mitigation Planning (FEMA 386-1)

   Understanding Your Risks: Identifying Hazards And Estimating Losses (FEMA 386-2)

   Developing The Mitigation Plan: Identifying Mitigation Actions And Implementing Strategies (FEMA 386-3)

   Bringing the Plan to Life: Implementing the Hazard Mitigation Plan (FEMA 386-4)

   Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)

5. Flood Plain Management Study for the City & Native Village of Unalakleet, Alaska. Prepared by USDA NRCS. 2002.

6. Unalakleet Comprehensive Plan. Prepared by the City of Unalakleet. November 2002. http://www.commerce.state.ak.us/dca/plans/UnalakleetCompPlan.pdf

7. Native Village of Unalakleet website: http://www.unalakleet.org

Web Sites of General Mitigation Planning Information

American Planning Association: http://www.planning.org
Association of State Floodplain Managers: http://www.floods.org

Developing the Implementation Strategy:	www.pro.gov.uk
Federal Emergency Management Agency:	http://www.fema.gov/fima/planning.shtm
Community Rating System:	http://www.fema.gov/nfip/crs.htm
Flood Mitigation Assistance Program:	http://www.fema.gov/fima/planfma.shtm
Hazard Mitigation Grant Program:	http://www.fema.gov/fima/hmgp
Immediate Action Workgroup:	http://www.climatechange.alaska.gov/iaw.htm
Individual Assistance Programs:	http://www.fema.gov/rrr/inassist.shtm
Interim Final Rule:	http://www.access.gpo.govl
National Flood Insurance Program:	http://www.fema.gov/nfip
Native Village of Unalakleet website	http://www.unalakleet.org
Public Assistance Program:	http://www.fema.gov/rrr/pa

Public Involvement

The contractors met with the community at a luncheon at the community building on June 7, 2006. Village elders provided historical information on flooding and erosion issues in the community. The contractors also met with the City Administrator and toured the community with Chuck Degnan.

The City Administrator reviewed the draft of the plan and a public meeting on the plan was held on April 21, 2008. The City Council and the Native Village of Unalakleet, School District members and other members of the community were invited to the meeting.

The following newsletter was distributed within the community.

The Unalakleet City Council will review and approve the plan after pre-approval by DHS&EM and FEMA.

Figure 1. Community newsletter

The Planning Process

The Disaster Mitigation Act of 2000 requires the plan to follow and record the following elements:

1. Planning process
2. Hazard Identification
3. Risk Assessment
4. Mitigation Strategy with Goals, Objectives and Actions
5. Plan Maintenance
6. Adoption by local government
7. Approval from FEMA, and the State Department of Homeland Security and Emergency Management

For more information on mitigation planning you can visit FEMA's website at http://www.fema.gov/plan/mitplanning/index.shtm

Local Hazards Mitigation Planning

Disasters, such as avalanches, coastal erosion, earthquakes, floods, high winds, landslides, tsunamis, wildfires, and severe weather, are events beyond human control. However, reducing the risks and damage from these events through mitigation efforts is possible.

The Federal Emergency Management Agency (FEMA) wants to ensure that each community's critical facilities and services will continue to function after a natural disaster. FEMA has funds available for projects that help to do this.

Preparing a Local Hazards Mitigation Plan (LHMP) is the first step in this process. Through the planning process risks from each type of hazard are assessed, critical facilities are identified within the community and their vulnerability to hazard is determined, potential losses are estimated, and community land use is considered.

With this information, a mitigation strategy will be developed, including mitigation goals, objectives and actions to reduce or avoid long-term risk or damage from disaster events. Projects will be identified, evaluated and prioritized, and an implementation strategy developed.

The plan must be approved by the local government, FEMA, and the state Department of Homeland Security and Emergency Management (DHS&EM) before it is official.

Once the plan is finalized, the community is eligible to apply to FEMA and DHS&EM for funds for the community's identified mitigation projects.

State DHS&EM sponsors planning effort in Unalakleet

The Alaska Division of Homeland Security and Emergency Services has funded a local hazards mitigation plan for the City of Unalakleet. WHPacific, Inc. and Bechtol Planning and Development (BP&D) have been hired to help the community to prepare the plan.

The LHMP will include information specific to the Unalakleet and , including critical facilities, potential threats from natural hazards, and strategies to minimize the risk to people and property.

Strategies may be for immediate implementation or long term activities, and can range from educating residents about what to do in the event of a natural disaster to relocating structures away from high-risk areas.

To Get Involved

The most practical plans are ones that have local public input. Your ideas are valuable to the planning team and to the usefulness of the plan. A meeting about the LHMP process is planned for the community on April 21, 2008, 3 p.m. at the City Office. At this meeting the contractor will present a draft plan to solicit input into its content. Copies of the plan are available at Unalakleet City Hall.

Your comments are welcome!

The planning team hopes that you will take an active role in the Unalakleet LHMP development. If you would like more information or have questions or comments, you can reach the planning team by phone or email:

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Further information may also be found on the DHS&EM website at:

http://www.ak-prepared.com/plans/mitigation/mitplanresourcesa.htm

Public Meeting

Date: April 21, 2008

Time: 3 p.m.

Location: City Office

Mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

WHPacific

Plan Implementation

The City Council of Unalakleet will be responsible for adopting the Unalakleet LHMP and all future updates or changes. This governing body has the authority to promote sound public policy regarding hazards. The Hazards Mitigation Plan will be assimilated into other Unalakleet plans and documents as they come up for review according to each plans' review schedule.

Please see the following table for plan review schedules.

Table 1. Unalakleet Plans

Document	Completed	Next Review
Unalakleet Comprehensive Plan	2002	As needed
Emergency Operations Plan	2001	As Needed
Comprehensive Economic Development Strategy Plan	Regional Plan	As needed
Bering Straits Alaska Coastal Management Plan	Amendment 2007	As needed

Continuing Review and Monitoring Strategy

The City Administrator will evaluate the Unalakleet LHMP on an annual basis to determine the effectiveness of programs and to reflect changes in land development, status, or other situations that make changes to the plan necessary. This annual review will include determining if the mitigation project items are still relevant to the changing situations in the village, as well as changes in state or federal policy and to ensure that mitigation continues to address current and expected conditions. The City will also review the hazard analysis information to determine if this information should be updated and/or modified, given any new available data or changes in status.

The community will review the plan during their annual break up meetings in the spring.

Continued Plan Development

The Unalakleet LHMP will be further developed as funding and time allow. Additional hazards not currently covered in the plan, including technological and manmade hazards, will be added, if funding becomes available during the next five-year update cycle.

The plan will be updated every 5 years or as required by DHS&EM.

The City Administrator will be responsible for updating and maintaining the plan by adding additional hazards and completing vulnerability assessments for existing hazard chapters.

The following table lists the schedule for completion of these tasks, provided that funds are available to do so:

Table 2. Continued Plan Development

Hazard	Status	Hazard Identification Completion Date	Vulnerability Assessment Completion Date
Floods	Completed	2008	2008
Erosion	Completed	2008	2008
Severe Weather	Completed	2008	2008
Wildland Fire	Completed	2008	2008
Earthquake	Completed	2008	2008
Tsunami/Seiche	Completed	2008	2008
Avalanche	Completed	2008	2008
Economic	Future Addition	2013	2014
Technological	Future Addition	2013	2014
Public Health Crisis	Future Addition	2013	2014

Continued Public Involvement

The following methods will be used for continued public involvement.

Native Village of Unalakleet website: http://www.unalakleet.org

Places where the hazard plan will be kept:

City Hall
Unalakleet Native Corporation Office Building
Unalakleet Tikasuk Library

On an annual basis the City Council will review the plan at an annual basis, which will be advertised to the public using the same method established under the public involvement section of this plan. Also the plan will be presented an annual break up gathering.

Risk Assessment Methodology

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, and disruption to local and regional economies, environmental

damage and disruption, and the amount of public and private funds spent to assist with recovery.

Mitigation efforts begin with a comprehensive risk assessment. A risk assessment measures the potential loss from a disaster event caused by an existing hazard by evaluating the vulnerability of people, buildings, and infrastructure. It identifies the characteristics and potential consequences of hazards and their impact on community assets.

A risk assessment typically consists of three components; hazards identification, vulnerability assessment and risk analysis.

1. *Hazards Identification* - The first step in conducting a risk assessment is to identify and profile hazards and their possible effects on the jurisdiction. This information can be found in Chapter 3: Hazards.

2. *Vulnerability Assessment* – Step two is to identify the jurisdiction's vulnerability; the people, infrastructure and property that are likely to be affected. It includes everyone who enters the jurisdiction including employees, commuters, shoppers, tourists, and others.

Populations with special needs such as children, the elderly, and the disabled should be considered; as should facilities such as the hospital, health clinic, senior housing and schools because of their additional vulnerability to hazards.

Inventorying the jurisdiction's assets to determine the number of buildings, their value, and population in hazard areas can also help determine vulnerability. A jurisdiction with many high-value buildings in a high-hazard zone will be extremely vulnerable to financial devastation brought on by a disaster event.

Identifying hazard prone critical facilities is vital because they are necessary during response and recovery phases. Critical facilities include:

- Essential facilities, which are necessary for the health and welfare of an area and are essential during response to a disaster, including hospitals, fire stations, police stations, and other emergency facilities;

- Transportation systems such as highways, airways and waterways;

- Utilities, water treatment plants, communications systems, power facilities;

- High potential loss facilities such as bulk fuel storage facilities; and

- Hazardous materials sites.

Other items to identify include economic elements, areas that require special considerations, historic, cultural and natural resource areas and other jurisdiction-determined important facilities.

3. *Risk Analysis* – The next step is to calculate the potential losses to determine which hazard will have the greatest impact on the jurisdiction. Hazards should be considered in terms of their frequency of occurrence and potential impact on the jurisdiction. For instance, a possible hazard may pose a devastating impact on a community but have an extremely low likelihood of occurrence. Such a hazard must take lower priority than a hazard with only moderate impact but a very high likelihood of occurrence.

For example, there might be several schools exposed to one hazard but one school may be exposed to four different hazards. A multi-hazard approach will identify such high-risk areas and indicate where mitigation efforts should be concentrated.

Currently there are insufficient funds and data with which to conduct an accurate risk analysis for all the hazards affecting Unalakleet. However, risk analysis information will be added as it is completed.

Vulnerability Assessment Methodology

The purpose of a vulnerability assessment is to identify the assets of a community that are susceptible to damage should a hazard incident occur.

Critical facilities are described in the Community Profiles Section of this hazard plan. A vulnerability matrix table of critical facilities as affected by each hazard is provided in Chapter 3 of this document.

Facilities were designated as critical if they are: (1) vulnerable due to the type of occupant (children, disabled or elderly for example); (2) critical to the community's ability to function (roads, power generation facilities, water treatment facilities, etc.); (3) have a historic value to the community (museum, cemetery); or (4) critical to the community in the event of a hazard occurring (emergency shelter, etc.).

This hazard plan includes an inventory of critical facilities from the records and land use map.

Federal Requirement for Risk Assessment

Recent federal regulations for hazard mitigation plans outlined in 44 CFR Part 201.6 (c)(2) include a requirement for a risk assessment. This risk assessment requirement is intended to provide information that will help the community identify and prioritize mitigation activities that will prevent or reduce losses from the identified hazards. The federal criteria for risk assessments and information on how the Unalakleet LHMP meets those criteria are outlined below:

Table 3. Federal Requirements

Section 322 Requirement	How is this addressed?
Identifying Hazards	Unalakleet city staff and community members identified natural hazards at community meetings, which were used in developing the Plan.
Profiling Hazard Events	The hazard-specific sections of the Unalakleet LHMP provide documentation for all natural hazards that may affect the City. Where information was available, the Plan lists relevant historical hazard events.
Assessing Vulnerability: Identifying Assets and Estimating Potential Losses of Critical Facilities	Vulnerability assessments for floods/erosion, severe weather, wildland fire, earthquakes, avalanches and tsunamis have been completed and are contained within the hazard chapter. Additional vulnerability assessments will be added as they are funded and completed.
Assessing Vulnerability: Analyzing Development Trends	The Community Profile Section and Chapter 3 include a description of development in Unalakleet.

Chapter 2: Community Profile

Community Overview

Current Population:	727 (2006 DCRA Certified Population)
Pronunciation:	YOO-nuh-luh-kleet
Incorporation Type:	2nd Class City
Borough Located In:	Unorganized
Census Area:	Nome

Figure 2. Native Village of Unalakleet

Source: Native Village of Unalakleet website: http://www.unalakleet.org/index.php/Newsletters

Location and Transportation

The name Unalakleet means "the most southerly point" in the Inupiaq language. It is 148 air miles southeast of Nome and 295 miles northwest of Anchorage at 63.87306° (North) Latitude and -160.78806° (West) Longitude. (Sec. 3, T019S, R011W, Kateel River Meridian.) It is in the Cape Nome Recording District. Unalakleet lies on Alaska's west coast at the eastern end of Norton Sound. The community was built west of the Nulato Hills at the mouth of the Unalakleet River. The area encompasses 2.9 sq. miles of land and 2.3 sq. miles of water.

Unalakleet is usually accessed by plane. During winter people from neighboring villages travel there by ATVs, snowmachines and dogsleds. Cargo is shipped in flat-bottomed boats from Nome. The State-owned airport includes a gravel runway 6,004' long by 150' wide and a gravel airstrip 2,000' long and 80' wide. Flights to local villages and Anchorage depart regularly.

The city lies between three different ethnic groups: the Inupiaq Eskimos to the north, the Athabaskans to the east and the Yupik Eskimos to the south. It is also the terminus of the Kaltag Portage, a winter travel route that connects Norton Sound to the Yukon River. For much of its history Unalakleet has been an important trading center, attracting the Russian-American company in the 1830s. Lapland reindeer herders visited Unalakleet in 1898 to teach herding to the local residents. In 1901 a telegraph line was built between Unalakleet and St. Michael, a smaller city to the southwest. In

1973 the city was designated the first checkpoint along the Norton Sound for the Iditarod Trail Sled Dog Race.

Climate

Winter temperatures average from -4 to 11 degrees Fahrenheit. Summer temperatures average from 47 to 62 degrees Fahrenheit. Annual precipitation is 14 inches, and average snowfall is 41 inches. Please see the section on severe weather for more detailed information on the climate.

Population

Unalakleet's population in the 2000 Census was 747, consisting of 87.7% Alaska Native or part Native, 11.9% White and 0.2% Black. Total housing units numbered 242 and vacant housing units numbered 18, six of which were vacant due to seasonal use. The unemployment rate at that time was 14.6 percent, although 48.6 percent of all adults were not in the work force; only 258 residents were employed. According to the Unalakleet Comprehensive Plan, however, no one listed forestry/fishing/farming as his or her occupation, although commercial fishing and subsistence are central to the community's economy. The median household income was $42,083, per capita income was $15,845, and 11.0 percent of residents were living below the poverty level.

History and Culture

The history and culture section was reproduced, in part, from the *2002 Unalakleet Comprehensive Plan* and the Unalakleet Wiki Encyclopedia.

Ethno History

Ten archeological sites have been established in Unalakleet, including a cluster of over 100 house pits. The Yupik-speaking Unalit appear to have used them from approximately 200 B.C. to 300 A.D. They still inhabited the city in the 1800s when westerners arrived and were nearly wiped out by epidemics.

In 1833 Russian traders founded the village of St Michael, 60 miles southeast of Unalakleet. Three years later an unknown disease literally decimated Unalakleet; its population shrank from an estimated 120 people to 13. The remaining family migrated from the south end of the river's mouth to the north end. In 1839 the Russians built a Russian-American fur trading hut in the new town site, attracting Yupik-speaking native traders.

Some Unalakleet landmarks still have Yupik names: Kwiyuk Creek (Powers Creek), Ququahuq Creek, Okfi auktoolik, and Nuveulnuq (the village to the south known as Golsovia). The late Thora Katchatag, daughter of Mullak Nagchuk, was a descendant of the sole surviving Unalit family from the 1836 epidemic. Many of her descendants live in Unalakleet.

Few people in Unalakleet speak the Yupik dialect, since after the epidemics other Inupiaq-speaking Eskimo groups migrated to the area: the Malimiut, Qawiaraqmiut, and the Kuvunmutes. The Kuvunmutes came from the Kobuk valley to the north. Alluyagnak II was an ethnic Athabaskan adopted by a Kuvunmute woman, Masu. She found him at the age of seven when an inter-tribal war left him orphaned and abandoned. He moved south after he and his sister had a falling-out and other Kuvunmute later settled with him on the coast in the Unalakleet valley.

One day a group of Athabascan Indians came to the coastal Kuvunmute tribe on a seemingly peaceful visit. Alluygnak II, who spoke the Athabascan language as a child, overheard the visitors planning to attack the Kuvunmute. He stood on a sod house and loudly told them that they needed to deal with him first before attacking his own people. Surprised to see that he spoke their dialect, the Athabascans decided instead to leave peacefully. They imitated honking geese as they departed to show they had no intention of attacking, to say goodbye, and to leave safely. Eventually the two tribes became trading partners and would hold potlucks and ceremonial dances together.

Unalakleet in the Twentieth Century

In 1898 Lapland reindeer herders came to teach herding to the residents of Unalakleet. The Nome gold rush, however, brought miners through Unalakleet and led to a measles epidemic. Many people and reindeer died. The herd was reestablished in 1911 but gradually shrank until finally disappearing in 1966.

The 1918 influenza epidemic had the net effect of raising the city's population. Many smaller villages nearby experienced a higher mortality rate, prompting some survivors to move to Unalakleet. By that time the city had a school, a mission church, and better job opportunities.

During World War II the Army and Air Force built temporary bases near the city, stimulating the next period of migration. New technology such as snowmachines, outboard motors, and guns began to replace traditional hunting and fishing methods.

After a brief dip in the population in the 1960s, many people returned to Unalakleet after the Alaska Native Claims Settlement Act of 1971. New homes, public buildings, and utility improvements raised the residents' standard of living. The Bering Straits School District relocated to Unalakleet in 1983 and it now employs the most people in the city. The regional Annikan Clinic was built in more recent years to serve the Norton Sound area.

Economy

Subsistence activities and commercial fishing are two major components of the local economy. Unalakleet was hard hit by the decline of the salmon industry in the late 90's and the more recent drop in herring roe prices. Residents would like to diversify the

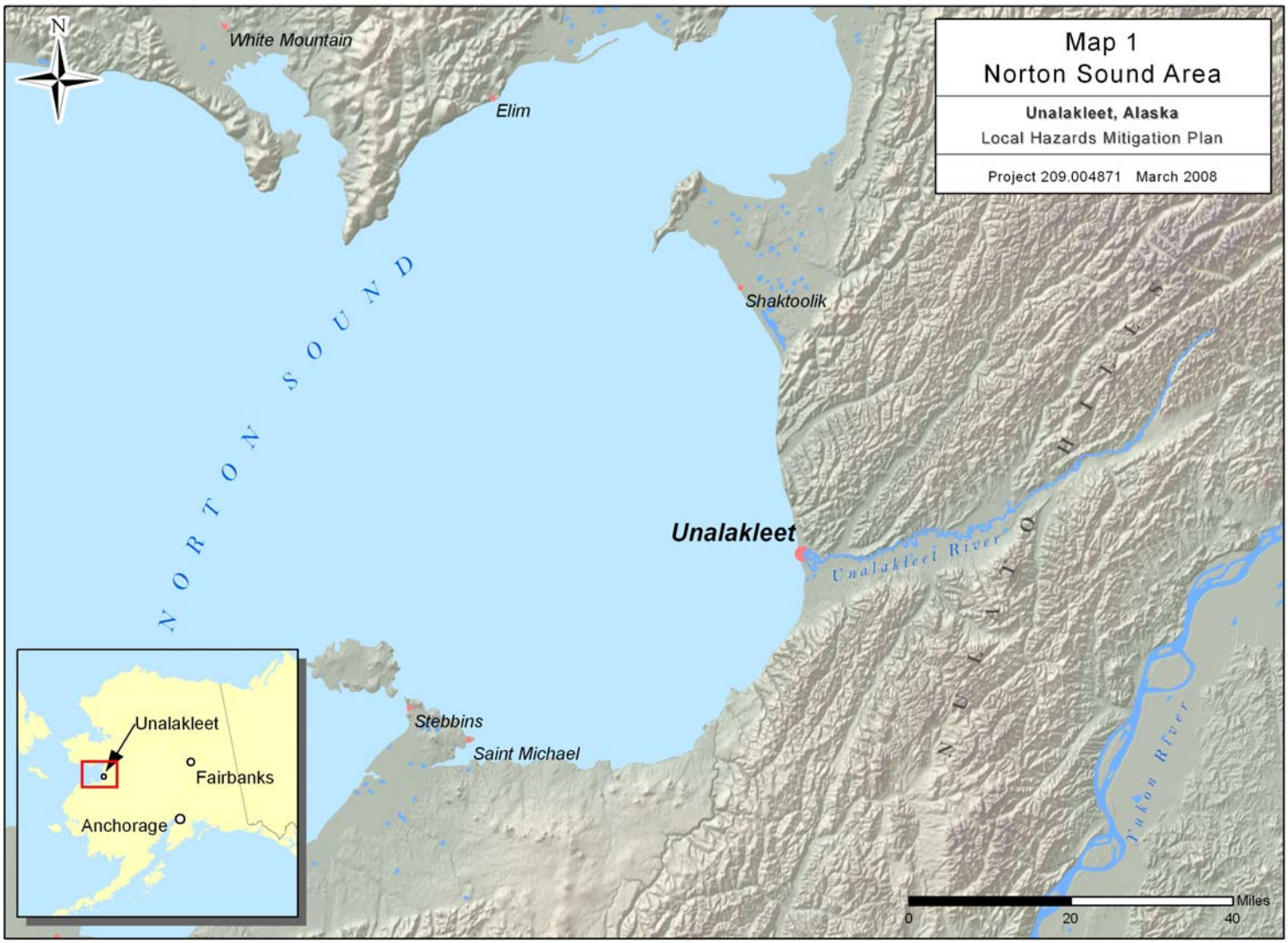
city's commercial fishing industry. A proposed renovation of the fish processing plant would allow it to process other species such as crab and halibut. Other potential sources of economic growth include education, tourism, medicine, and construction.

Located on a spit that is eroding with rising sea levels, Unalakleet's already narrow city limits will soon be insufficient to sustain its growth. Infill of the existing community is almost impossible and rent is prohibitively expensive. Although the median value of a home is only $70,000, the median rent is $531. Most young adults live with their parents because they cannot afford to move out. The community plans to gradually relocate to higher ground for flood protection and to allow the city to expand. Although this would generate many new construction jobs, the community would need a local building trades program to train local residents.

Another major proposed construction project is a new sub-regional minimum security prison. Currently the only prison in the Norton Sound is in Nome. The long distance prohibits many people from visiting incarcerated relatives, which is believed to help with prisoner rehabilitation. A prison in Unalakleet would allow more frequent visits and would generate jobs within the city.

Cargo is brought to the city either by plane or by flat-bottomed boats from Nome when the sea is clear of ice. Unalakleet's only access to the nearby Yukon River is a winter snowmachine trail to Kaltag. Building a permanent road would give Unalakleet access to the Yukon during the summer months and allow shipment of goods from Nenena at a much lower cost.

Map 1. Regional Map



Community Information

Table 4. Community Information

Community Information	Contact Information
City of Unalakleet	City of Unalakleet P.O. Box 28 Unalakleet, AK 99684 Phone: (907) 624-3531 Fax: (907) 624-3130 Email: counk@alaska.com City Website: http://www.Unalakleet.org
Borough Located In:	Unorganized
Electric Utility	Unalakleet Valley Electric Cooperative P.O. Box 186 Unalakleet, AK 99684-0186 Phone (907) 624-3474 Fax (907) 624-3009
Regional Native Corporation	Bering Straits Native Corp. P.O. Box 1008 Nome, AK 99762 Phone 907-443-5252 Fax 907-443-2985 E-mail tim@beringstraits.com Web http://www.beringstraits.com
School District	Bering Strait School District P.O. Box 225 Unalakleet, AK 99684-0225 Phone 907-624-3611 Fax 907-624-3099 E-mail jhickerson@bssd.org Web http://www.bssd.org
Village Corporation	Unalakleet Native Corporation P.O. Box 100 Unalakleet, AK 99684 Phone: (907) 624-3411 Fax: (907) 624-3833 E-mail unkadmin@alaska.net
Village Council	Native Village of Unalakleet (IRA) P.O. Box 270 Unalakleet, AK 99684 Phone: (907) 624-3621 Fax: (907) 624-3402/3621 E-mail unkira@kawerak.org

Community Information	Contact Information
Regional Native Health Corporation	Norton Sound Health Corporation P.O. Box 966 Nome, AK 99762 Phone: (907) 443-3311 Web: http://www.nortonsoundhealth.org
Regional Native Non-Profit	Kawerak, Incorporated P.O. Box 948 Nome, AK 99762 Phone: (907) 443-5231 Fax: (907) 443-4452 E-mail exec.sec@kawerak.org Web http://www.kawerak.org
Regional Development District	CDQ Group - Norton Sound Econ. Dev. Corp. 420 L St., Suite 310 Anchorage, AK 99501-1971 Phone: (907) 274-2248 Fax: (907) 274-2249 E-mail eugene@nsedc.com Web http://www.nsedc.com

Facilities

Powers Creek is Unalakleet's new main water supply after the previous source froze during the winter of 1999-2000. The water is filtered and chlorinated. The City operates a piped water and sewer system. There are no individual or community septic tanks. Over 9% of homes lack complete plumbing. In 2002 a design for a new wastewater treatment facility was created. The plan included sludge drying beds at the landfill, a new lift station, and a settling tank.

The City operates a Class 3, 0132-BA005 landfill. Refuse collection is available for commercial customers. Unalakleet Valley Electric Cooperative, associated with the Matanuska Electric Association, provides diesel-powered generators as well as wind-generated electricity. Almost 90% of all households heat their homes with fuel oil.

The Unalakleet K-12 school employs 19 teachers and is attended by 179 students. The Bering Straits School District offices are located in Unalakleet. The district's 15 schools have an 87% graduation rate. The clinic is staffed by a physician's assistant, four health aides, a mental health worker, and a Unalakleet based dentist who also serves surrounding communities. Residents requiring specialists or emergencies requiring special services are medevaced to Nome or Anchorage.

Vegetation and Wildlife

Cotton grass, lichen, and shrubs grow in the soil surrounding the city at lower elevations. Willow, dwarf birch, alpine spruce, shrubs, and grasses line the banks of the Unalakleet River. Dense mixed spruce and hardwood grow along the upper reaches of the river, giving way to alpine tundra at the higher areas of the Nulato Hills.

Caribou, first introduced to the area over a hundred years ago by Lapland herders, still live in the high tundra. The lower wet tundra is occupied by moose, showshoe and arctic hares. Furbearers are plentiful in the area, including beaver, marten, mink, muskrat, wolverine, lynx, fox, ermine and otter. Birds are especially important for subsistence and include ptarmigan, geese, ducks, cranes and swans. On the other side of the Nulato Hills the Innoko National Wildlife Refuge is home to at least 124 bird species. Brown and black bears live off fish and berries.

Summer fish in the Unalakleet River include Pink, King, Chum, and Silver Salmon. Silver fishing in particular has attracted a small seasonal tourist industry. Other fish such as Arctic Char, Dolly Varden, grayling, whitefish, lingcod, tomcod, and smelt live in the river at other times of the year. The Norton Sound is home to other forms of sea life important for subsistence, including clams, crab, mussels, shrimp, salmon, herring. Walrus and beluga whales also inhabit coastal areas in the vicinity of Unalakleet.

Community Assets

This section outlines the resources, facilities and infrastructure that, if damaged, could significantly impact public safety, economic conditions, and environmental integrity of Unalakleet.

Community Resources

This section outlines the resources available to Unalakleet for mitigation and mitigation related funding and training.

The federal government requires local governments to have a hazard mitigation plan in place to be eligible for funding opportunities through FEMA, such as through the Pre-Disaster Mitigation Assistance Program and the Hazard Mitigation Grant Program. 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 the FEMA Publication Warehouse (1-800-480-2520) and are briefly described below:

- **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 mirror the four major phases of hazard mitigation planning used in the development of the Newtok Hazard Mitigation Plan. 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 Disaster Mitigation Act (DMA) 2000 requirements (http://www.fema.gov/fima/planhowto.shtm).

- **Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments.** FEMA DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation and shows state and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.

- **Mitigation Resources for Success CD.** FEMA 372, September 2001. This CD contains a wealth of information about mitigation and is useful for state and local government planners and other stakeholders in the mitigation process. It provides mitigation case studies, success stories, information about Federal mitigation programs, suggestions for mitigation measures to homes and businesses, appropriate relevant mitigation publications, and contact information.

- **A Guide to Federal Aid in Disasters.** FEMA 262, April 1995. When disasters exceed the capabilities of state and local governments, the President's disaster assistance program (administered by FEMA) is the primary source of federal assistance. This handbook discusses the procedures and processes for obtaining this assistance, and provides a brief overview of each program.

- **The Emergency Management Guide for Business and Industry.** FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to Newtok businesses.

- **Department of Agriculture.** Assistance provided includes: Emergency Conservation Program, Non-Insured Assistance, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service.

- **Department of Energy, Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program.** This program minimizes the adverse effects of high energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services such as an all-around safety check of major energy systems, including heating system modifications and insulation checks.

- **Department of Housing and Urban Development, Office of Homes and Communities, Section 108 Loan Guarantee Programs.** This program provides loan guarantees as security for federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing.

- **Department of Housing and Urban Development, Community Development Block Grants.** Administered by the Alaska DCRA, Division of Community Advocacy. Provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income persons.

- **Department of Labor, Employment and Training Administration, Disaster Unemployment Assistance.** Provides weekly unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible.

- **Federal Financial Institutions.** Member banks of the Federal Deposit Insurance Corporation (FDIC) or Federal Home Loan Bank Board (FHLBB) may be permitted to waive early withdrawal penalties for Certificates of Deposit and Individual Retirement Accounts.

- **Internal Revenue Service, Tax Relief.** Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous tax returns to reflect loss back to three years.

- **United States Small Business Administration (SBA).** May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. Requests for SBA loan assistance should be submitted to the Alaska DHS&EM.

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

- **Federal Emergency Management Agency,** http://www.fema.gov – includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.
- **American Planning Association,** http://www.planning.org – is 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,** http://ibhs.org – an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters. Online resources provide information on natural hazards, community land use, and ways citizens can protect their property from damage.

State Resources

Alaska DHS&EM is responsible for coordinating all aspects of emergency management for the State of Alaska. Public education is one of its identified main categories for mitigation efforts.

Improving hazard mitigation technical assistance for local governments is high priority item for the State of Alaska. Providing hazard mitigation training, current hazard information, and the facilitation of communication with other agencies would encourage local hazard mitigation efforts. DHS&EM provides resources for mitigation planning on their website at http://www.ak-prepared.com.

- **DCRA, Division of Community Advocacy:** Provides training and technical assistance on all aspects of the National Flood Insurance Program (NFIP) and flood mitigation.

- **Division of Senior Services:** Provides special outreach services for seniors, including food, shelter, and clothing.

- **Division of Insurance:** Provides assistance in obtaining copies of policies and provides information regarding filing claims.

- **Department of Military and Veteran's Affairs:** Provides damage appraisals and settlements for Veterans Administration (VA)-insured homes, and assists with filing for survivor benefits.

Other Funding Sources and Resources

- **Real Estate Business.** Real estate disclosure is required by state law for properties within flood plains.

- **American Red Cross.** Provides for the critical needs of individuals such as food, clothing, shelter, and supplemental medical needs. Provides recovery needs such as furniture, home repair, home purchasing, essential tools, and some bill payment may be provided.

- **Crisis Counseling Program.** Provides grants to State and Borough mental health departments, which in turn provide training for screening, diagnosing and counseling techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster.

Local Resources

Unalakleet 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 City, and are summarized in the following tables.

Community Maps

List of Maps from this plan:
Map 1. Unalakleet Regional Map
Map 2. Unalakleet Flood Contour Map
Map 3. Unalakleet Critical Infrastructure, Georeferenced aerial photo
Map 4. Unalakleet Regional Critical Infrastructure

Critical Facilities: Those facilities and infrastructure necessary for emergency response efforts.

Roads and Bridges
Communications
Utilities
Clinic
Unalakleet Airport
City Hall
Public Works

Essential Facilities: Those facilities and infrastructure that supplement response efforts.

Designated Shelters
City Hall
Bulk Fuel Storage Tank Farm
Unalakleet School

Critical Infrastructure: Infrastructure that provides services to Unalakleet.

Unalakleet Telephone lines
Unalakleet Electric Power Network
Air transportation networks

Wastewater collection
Water Supply Facilities including storage and delivery systems
Power Generators

Vulnerable Populations: Locations serving population that have special needs or require special consideration.

Schools
Clinic
Elderly residents

Cultural and Historical Assets: Those facilities that augment or help define community character, and, if lost, would represent a significant loss for the community.

City Hall
Native Village of Unalakleet Buildings
    Archaeological sites
Assembly of God Church
Catholic Church
Covenant Church

The following Map lists the critical infrastructure in the community.

Map 2. Critical Infrastructure

Map 3. Regional Infrastructure

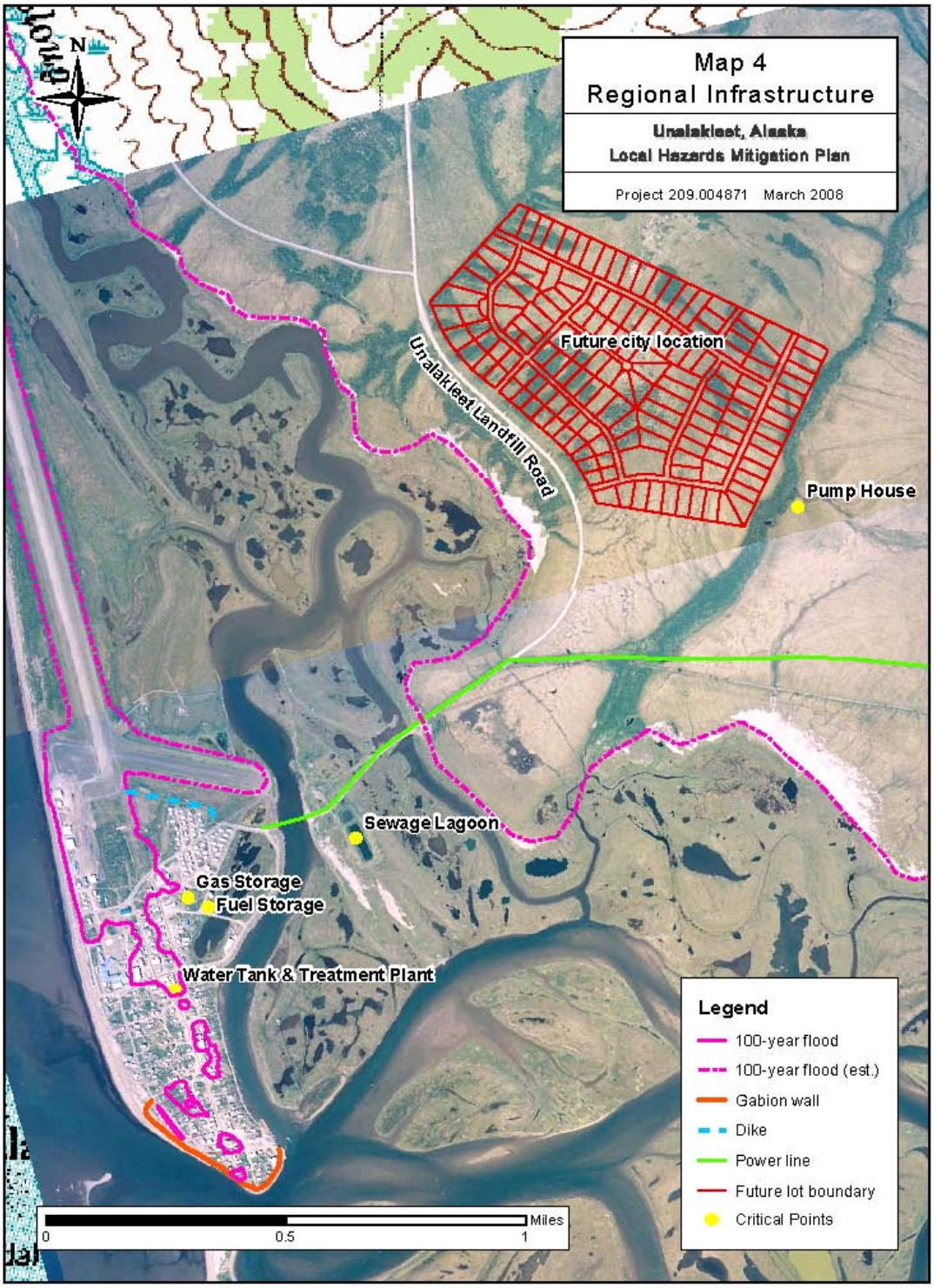


Table 5. Legal and Technical Capability

Regulatory Tools (ordinances, codes, plans)	Local Authority (Y/N)	Comments (Year of most recent update; problems administering it, etc)
Building code	Yes	
Zoning ordinance	No	
Subdivision ordinance or regulations	Yes	
Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	No	Does not participate in the National Flood Insurance Program
Growth management ordinances (also called "smart growth" or anti-sprawl programs)	No	
Site plan review requirements	No	
Comprehensive plan	Yes	Adopted 2002, ongoing update as necessary.
A capital improvements plan	Yes	
An economic development plan	No	
An emergency response plan	Yes	
A post-disaster recovery plan	No	
Real estate disclosure requirements	No	

Table 6. Fiscal Capability

Financial Resources	Accessible or Eligible to Use (Yes or No)
Community Development Block Grants (CDBG)	Yes
Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	No
Fees for sewer	No
Impact fees for homebuyers or developers for new developments/homes	No
Incur debt through general obligation bonds	Yes, with a vote
Incur debt through special tax and revenue bonds	No
Incur debt through private activity bonds	No
Withhold spending in hazard-prone areas	No

Table 7. Administrative and Technical Capability

Staff/Personnel Resources	Y/N	Department/Agency and Position
City Administrator, Herbert Ivanhoff	Yes	City Administration Manager
City Planner	No	City Planning Department Planning Director
Fire Chief, Jay Freytag	Yes	City Fire Department
City Clerk, Sonya Agienik	Yes	City Clerk Department Head
Public Works Director, Jay Freytag	Yes	City Public Works Department Head
Police Chief	Yes	
Regional Public Safety Officer	Yes	
Librarian, Doris Ivanoff	Yes	City Library Department Head
Village Environmental Coordinator, Art Ivanhoff	Yes	
Grant writer. LaVerne Anagick	Yes	
Fire Department	Yes	Volunteer
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	No	
Planners or Engineer(s) with an understanding of natural and/or human-caused hazards	No	
Floodplain manager	No	
Surveyors	No	
Staff with education or expertise to assess the community's vulnerability to hazards	No	
Personnel skilled in GIS and/or HAZUS	No	
Scientists familiar with the hazards of the community	No	
Emergency manager	No	
Environmental Advisory Council	No	

Chapter 3: Hazards

DHS&EM Matrices

Table 8. Hazard Matrix

Nome Census Area					
Flood	**Wildland Fire**	**Earthquake**	**Volcano**	**Avalanche**	**Tsunami & Seiche**
Y	Y-U	Y-M	N	Y-M	N
Severe Weather	**Landslides**	**Erosion**	**Drought**	**Technological**	**Economic**
Y-H	Y	Y	U	Y	Y

Y = Hazard is present in jurisdiction but probability unknown
Y – L = Hazard is present with a low probability of occurrence within the next ten years. Event has up to 1 in 10 years chance of occurring.
Y – M = Hazard is present with a moderate probability of occurrence with the next three years. Event has up to 1 in 3 years chance of occurring.
Y – H = Hazard is present with a high probability of occurrence within the calendar year. Event has up to 1 in 1 year chance of occurring.
N = Hazard is not present
U = Unknown if the hazard occurs in the jurisdiction

Extent:
Z = Zero
L = Limited
T = Total

Previous Occurrence
Y = Yes
N = No

Table 9. Previous Occurrences of Hazards 1978 – Present

Nome Census Area					
Flood/ Erosion	**Wildland Fire**	**Earthquake**	**Volcano**	**Avalanche**	**Tsunami & Seiche**
1-L	3-L	0	0	0	0
Severe Weather	**Ground Failure**	**Erosion**	**Drought**	**Technological**	**Economic**
17- L	0	1-L	0	3-L	2-L

Extent **Z** - Zero - Used for historical information. An event occurred but may not have caused damage or loss.
L - Limited – Minimal through maximum impact to part of community.
Falls short of the definition for total extent.
T - Total – Impact encompasses the entire community.
Number: Number of occurrences

Source: Alaska All-Hazard Risk Mitigation Plan, 2007

Hazard Vulnerability Assessment Matrices

Identification of Assets and Vulnerability

The Hazard Vulnerability Matrices below lists the City of Unalakleet facilities, utilities and transportation systems, including the school district and clinic. Most dollar values were valued based on an estimated replacement cost of $120 per square foot, as in the 2002 USDA NRCS floodplain management study. The list is provided to identify city assets and provide an indication of each asset's vulnerability to natural hazards.

Table 10. Unalakleet Asset and Vulnerability Matrix - Structures and Infrastructure

Facility	Flood/ Erosion	Severe Weather	Wildland Fire	Earthquake
City Hall	X	X		X
Clinic	X	X		X
BSSD-Unalakleet School		X		X
Teacher Housing		X		X
Library Building		X		X
Native Village Offices		X		X
United Utilities Building	X	X		X
Head Start		X		X
City Shop and Warehouse	X	X		X
Water Treatment and Pump	X	X		X
UNC Office Building		X		X
Post Office		X		X
Fish Cannery	X	X		X
BSSD Power Plant		X		X
Native Village of Unalakleet Buildings		X		X
Trash Compactor		X		X
Gonangnan-Paneok Memorial Hall		X		X
Seawall	X	X		X

Unalakleet's Vulnerability to Identified Hazards:

Most identified hazards are area wide. The principal hazards of flood, erosion, and severe weather could potentially impact any part of Unalakleet. Only the few structures built on the city's relocation site are safe from flood and erosion.

Flooding events, even for those properties unaffected directly, will suffer due to road closures, impacts to public safety (access and response capabilities), limited availability of perishable commodities, and isolation. (See Map 2, Unalakleet Flood Contour Map.)

A severe weather event would create an area wide impact and could damage structures and potentially isolate Unalakleet from the rest of the state.

Wildland Fire, although a low risk could impact Unalakleet on an area wide basis.

Norton Sound is sheltered from tsunamis and is also not as risk from volcanoes, avalanches and drought.

Further information on Unalakleet's vulnerability to identified hazards was researched and delineated by the agencies described below as part of the Alaska Climate Change Strategy.

Alaska Climate Change Strategy and Unalakleet Hazards

Administrative Order 238 by Governor Sarah Palin established the Alaska Climate Change Sub-Cabinet to advise the Office of the Governor on the preparation and implementation of an Alaska climate change strategy.

The Alaska Climate Change Strategy website states in part the following:

> *Alaska's Perspective*
>
> *The impacts of climate warming in Alaska are already occurring. These impacts include coastal erosion, increased storm effects, sea ice retreat and permafrost melt. The villages of Shishmaref, Kivalina and Newtok have begun relocation plans. The U.S. Army Corps of Engineers has identified over 160 additional rural communities threatened by erosion.*
>
> *The unique task of the Climate Change Sub-Cabinet is to appropriately attend to these immediate needs.*

An Immediate Action Workgroup (IAW) was formed to deal with the early assessment and development of an action plan addressing climate change impacts on coastal and other vulnerable communities in Alaska.

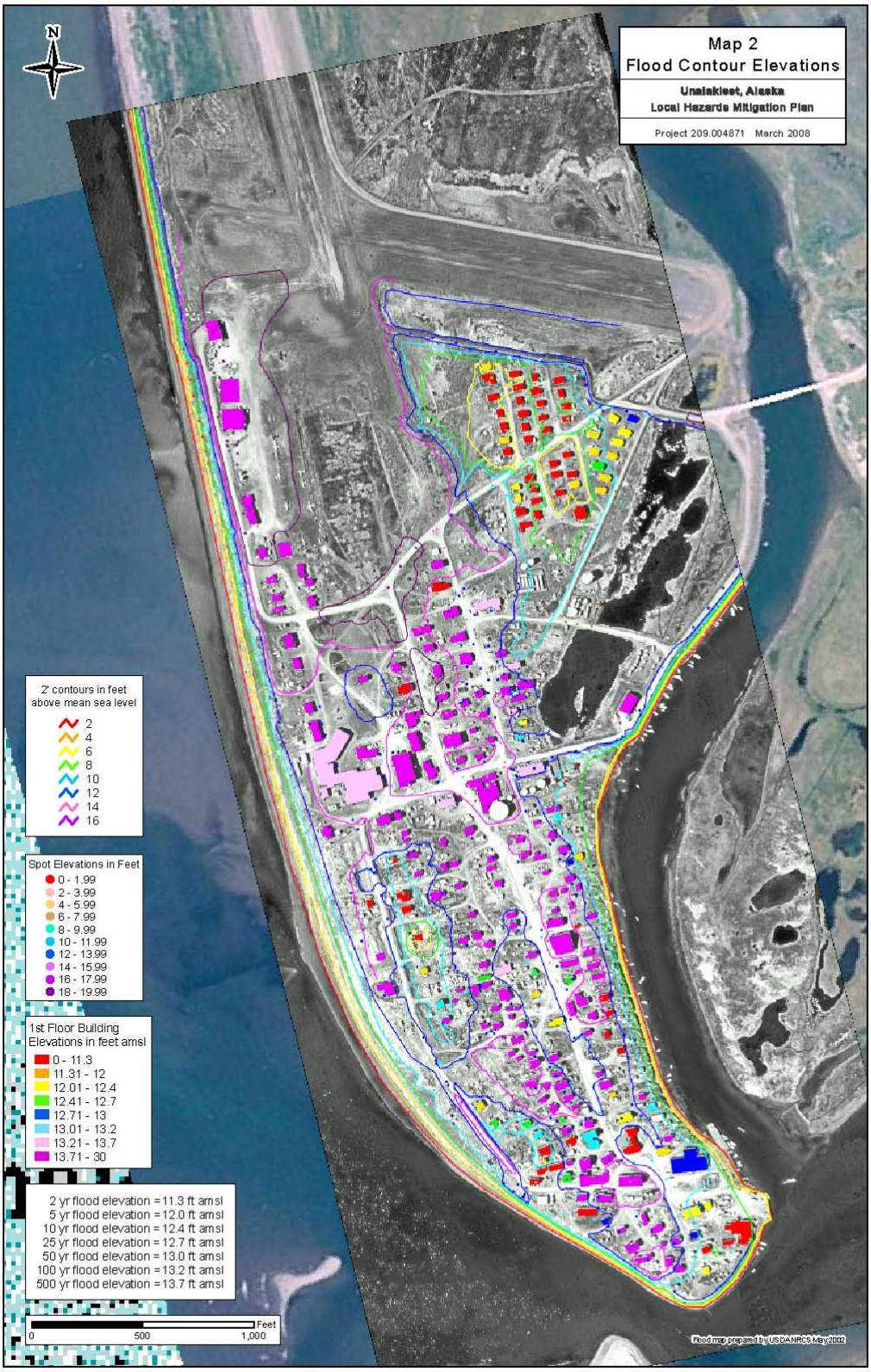
IAW Members include:

- United States Army Corps of Engineers - Patricia Opheen, Co-Chair
- Department of Commerce, Community/Eco Development - Mike Black, Co-Chair
- Department of Natural Resources, Division of Forestry - Chris Maisch
- Department of Transportation and Public Facilities - Frank Richards
- Denali Commission - George Cannelos
- Alaska Municipal League - Luke Hopkins
- Alaska Climate Impact Assessment Commission - Bob Pawlowski
- Alaska Division of Homeland Security / Emergency Management - John Madden

The IAW completed its "Draft Recommendations Report to the Governor's Subcabinet on Climate Change" on March 20, 2008. Six communities were designated as facing imminent threats of loss of life, loss of infrastructure, loss of public and private property, or health epidemics as caused by coastal erosion, thawing permafrost and flooding. The communities identified were Newtok, Shishmaref, Kivalina, Koyukuk, Unalakleet and Shaktoolik.

The IAW developed matrices regarding immediate actions that should be taken for each community. Unalakleet was designated as being in imminent danger from flooding and erosion. The IAW report to the Governor's Subcabinet are included under the Flood and Erosion and Wildfire Sections of this document.

Map 4. Flood Contour Elevations



Section 1. Floods and Erosion

Hazard Description and Characterization

Types of Flooding in Unalakleet

Flood hazards in Unalakleet include storm surges, rainfall, snowmelt and early melting and late formation of sea ice.

Storm Surge Flooding

Storm surges are relatively long-term, local increases in water level resulting from offshore storms. Maximum hazard results when such a surge coincides with a maximum tide.

The effects of climate change are expected to add to natural hazards including flooding in coastal areas. As sea level rises and the offshore ice pack retreats, more coastal flooding can be expected.

Ralnfall/Snowmelt/Glacler Melt Flooding

Flooding is also caused by ice jams, snowmelt, and rainfall. The highest flood level recorded in Alaska is 46 feet. In areas of low elevation, such as deltas and flat tundra, a 6-inch rise in the water level can flood a vast area.

The rising sea level associated with global warming is expected to increase flooding and storm damage.

Factors that affect the level of coastal flooding include wind conditions, exposure of the site and ice conditions. Due to climate change, some coastal areas of Alaska are freezing later in the season. With the delayed formation of protective shore ice, shorelines will become increasingly vulnerable to fall storms and associated storm surges.

Flood and Erosion Hazards

Deposition

Deposition is the accumulation of soil, silt, and other particles on a river bottom or delta. Deposition leads to the destruction of fish habitat and presents a challenge for navigational purposes. Deposition also reduces channel capacity, resulting in increased flooding or bank erosion.

Erosion

Erosion is a process that involves the wearing away, transportation, and movement of

land. Erosion rates can vary significantly as erosion can occur quite quickly as the result of a flash flood, coastal storm or other event. It can also occur slowly as the result of long-term environmental changes. Erosion is a natural process but its effects can be exacerbated by human activity.

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

Contaminated water

Floodwaters pose a health hazard by picking up contaminants and disease as they travel. Outhouses, sewers, septic tanks, and dog yards are all potential sources of disease transported by floodwaters. Individual wells in Unalakleet could be contaminated during flood events. The private well systems must be tested and disinfected after a flood. Lack of a water source is a significant concern for flood victims, especially if the flood has been extensive enough to contaminate the public water supply. In such a case, outside bottled water is at times the only source of clean water.

Local Flood and Erosion Hazard Identification

The following section regarding hazard identification was taken from the *Flood Plain Management Study*. Prepared by USDA NRCS for the City & Native Village of Unalakleet, Alaska, 2002.

The principal flood problem in Unalakleet is caused by high water in Norton Sound. During the fall storm season westerly and southwesterly winds buffet the coast. Low pressure storm systems augment high tides and raise flood levels.

The city is situated on a four-mile long sand and gravel spit. Erosion is of particular concern to residents in the south end of town, where the sea is eroding the spit most rapidly. A gabion retaining wall was constructed around the southern end of the spit in 2000 and has provided some protection, although it is currently in need of repair.

The Happy Valley residential subdivision is below 12 feet amsl with most of the land between 6 and 10 feet amsl. Protected from 2 but not 5 year event by the surrounding dike and Beach Road East, it is the most vulnerable area to flooding. All new structures on the spit are likely to be built here, since there is no other room for new construction elsewhere.

Ice forms around the spit during the winter and protects it from erosion. In recent years global warming has contributed to the early breakup and late formation of the ice, leaving the city vulnerable to storms.

The highest flood on record is the 1965 flood which reached a height of 18 feet amsl.

Flooding from the Unalakleet River is not considered to be the most hazardous threat to the city. Flooding is most likely to occur in August, when precipitation levels are highest. The tables in the NRCS Floodplain Management Study's Appendix show maximum water elevations for selected locations along the Unalakleet River.

Economic Considerations. The NRCS Floodplain Management Study concluded that 109 out of 263 structures would be affected by a 100-year flood. The value of the property alone, using an estimation of $120 per square foot, is $4,981,000. The electrical utility UVEC and the school buildings would be affected by a 500-year flood.

Previous Occurrences of Flood and Erosion

The following information is from the DHS&EM Disaster Cost Index, 2007 and the Army Corps of Engineers Floodplain Management Services.

West Coast Storm September 22-26, 2005 A powerful fall sea storm produced high winds combined with wind-driven tidal surges resulting in severe and widespread coastal flooding and a threat to life and property in the Northwest Arctic Borough, and numerous communities within the Bering Strait, the Kashunamiut, the Lower Yukon, and the Lower Kuskokwin. The following conditions existed as a result of this disaster; severe damage to personal residences requiring evacuation and sheltering of the residents; to businesses; to drinking water systems, electrical distribution systems, local road systems, airports, seawalls, and other public infrastructure; and to individual personal and real property; necessitating emergency protective measures and temporary and permanent repairs. On October 25, 2005, a request for a federal time extension was submitted. On December 9, 205 a presidential disaster was declared (DR-1618) for Public Assistance for the Northwest Arctic Borough, Bering Strait REAA, Kashunamiut REAA and the Lower Kuskokwim REAA.

Bering Strait Sea Storm, October 18-24, 2004 The Governor issued a Disaster Declaration on October 29, 2004 after a severe winter storm with extreme tidal surges resulted in severe damage throughout the area.

Fall Sea Storm (AK 04-209), November 1-24, 2004 A series of sea storms with high winds and tidal surge during the period of November 1 to November 24, 2003 caused damages in the communities of Unalakleet, Diomede, and Port Heiden. Damage was also reported by the Department of transportation. The City of Unalakleet and Port Heiden declared local emergencies and Diomede requested assistance in a letter to the Division of Emergency Services. The Department of Transportation reported damages in Nome on the Nom-Counsel Road (MP 22 and 23.8) and at the Unalakleet airport. The City of Unalakleet had a large quantity of debris deposited throughout the road system. Damages to a gabion protection wall, roads and exposure of a water line were also experienced. Disaster Assistance for Emergency Protective Measure and Permanent Work category C and debris removal for Unalakleet were approved under the State Public Assistance Program.

Coastal Storm, 1974 A coastal storm caused flooding up to 15 feet above sea level.

Coastal Storm, 1965 A coastal storm caused flooding up to 18 feet above sea level, the highest flood recorded in Unalakleet.

Flood and Erosion Hazard Vulnerability

Please see matrices at the beginning of Chapter 3.

The following table displays output from the NRCS Floodplain Management Study and demonstrates the calculation of average annual flood damages, which are estimated to equal $1,178,000 as noted in the lower right cell of the table and $2,103,000 if no improvements are made to the surrounding roads or airport dike to protect the Happy Valley subdivision.

Table 11. Estimated Flood Damages (A)

Storm Event	Event Probability	Flood Elevation	No. of Structures	Structural Damage	Content Damage	Vehicle Damage	Total Damage
100 Year	0.01	13.2	109	$4,981,000	$1,380,000	$701,000	$7,062,000
50 Year	0.02	13.0	103	$4,628,000	$1,283,000	$673,000	$6,583,000
25 Year	0.04	12.7	98	$4,114,000	$1,140,000	$633,000	$5,887,000
10 Year	0.10	12.4	90	$3,716,000	$1,032,000	$590,000	$5,338,000
2 Year	0.50	11.3	58	$2,411,000	$674,000	$423,000	$3,508,000
Average Annual Damages (6.375% for 50 Years)[1]							$2,103,000

Table 12. Estimated Flood Damages (B)

Storm Event	Event Probability	Flood Elevation	No. of Structures	Structural Damage	Content Damage	Vehicle Damage	Total Damage
100 Year	0.01	13.2	62	$3,010,000	$838,000	$291,000	$4,139,000
50 Year	0.02	13.0	56	$2,732,000	$760,000	$268,000	$3,760,000
25 Year	0.04	12.7	52	$2,346,000	$652,000	$238,000	$3,236,000
10 Year	0.10	12.4	45	$2,076,000	$578,000	$208,000	$2,862,000
2 Year	0.50	11.3	26	$1,320,000	$369,000	$117,000	$1,806,000
Average Annual Damages (6.375% for 50 Years)[1]							$1,178,000

[1] Water Resources Development Act of 1974, Section 80, current notice at: http://www.usace.army.mil/inet/functions/cw/cecwp/egm01-02.pdf

Tables at the beginning of Chapter illustrate the facilities located with flood/erosion areas. Unalakleet is located on the water and therefore the dock facilities and areas near the shore are always vulnerable to flooding/erosion.

According to the National Resources Conservation Service, 40% of Unalakleet's buildings would be impacted by a 100-year flood. UVEC and the Unalakleet school buildings would be at least minimally impacted from a 500-year flood.

Community Participation in the NFIP

The City of Unalakleet does not participate in the NFIP.

The function of the National Flood Insurance Program (NFIP) is to provide flood insurance to homes and businesses located in floodplains at a reasonable cost. In trade, the City of Unalakleet would agree to regulate new development and substantial improvement to existing structures in the floodplain, or to build safely above flood heights to reduce future damage to new construction. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce flood damage primarily through requiring the elevation of structures above the base (100-year) flood elevations.
The table below describes the FIRM zones.

Firm Zone	***Explanation***
A	Areas of 100-year flood; base flood elevations and flood hazard not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet, average depths of inundation are shown but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.
C	Areas of minimal flooding.
D	Areas of undetermined, but possible, flood hazards.

Development permits for all new building construction, or substantial improvements, are required by the City in all A, AO, AH, A-numbered Zones. Flood insurance purchase may be required in flood zones A, AO, AH, A-numbered zones as a condition of loan or grant assistance. An Elevation Certificate is required as part of the development permit. The Elevation Certificate is a form published by the Federal Emergency Management Agency required to be maintained by communities participating in the NFIP. According to the NFIP, local governments maintain records of elevations for all new construction, or substantial improvements, in floodplains and to keep the certificates on file.

Flood and Erosion Mitigation Goals and Projects

Goals

Goal 1. Reduce flood damage.

Support elevation, flood proofing, buyout or relocation of structures that are in danger of flooding or are located on eroding banks.

Goal 2. Prevent future flood damage.

Consider the benefits and costs of joining the National Flood Insurance Program. Consider the long-term benefits and costs of relocation to higher ground.

Goal 3: Increase public readiness.

Plan and practice community evacuation drills, establish official, well-supplied evacuation shelters, move resources such as fuel tanks to secure locations. Increase public knowledge about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards.

Projects

General Mitigation Techniques

Nonstructural Measures. Nonstructural measures include flood warning, flood proofing, and floodplain evacuation. Flood warning is used primarily to provide residents of flood-prone areas an opportunity to prepare for an impending flood. It is useful to alert such residents of approaching storms that may generate flooding or who live on large watersheds to warn of floodwaters that are moving toward a particular area.

Flood proofing can be used to modify existing floodplain development to make it more compatible with the flood hazard. Generally, this is accomplished by elevating structures above flood levels, providing ring levees, or dikes, or waterproofing a structure. Floodplain evacuation involves the removal of damageable property from the flood prone area. This can be done by moving the house or structure to another location or by demolishing the structure and rebuilding elsewhere. Evacuation thus restores the floodplain to its original condition, allowing it to function as an overflow storage area.

Structural Measures. These include levees, floodwalls, retention/detention reservoirs, channel modifications, and streamflow diversion. All such measures reduce the frequency of damaging overflows.

Levees generally involve either earthen or concrete walls, which constrict water movement into certain areas. They reduce the extent of the area subject to flooding and

the amount of property subject to danger. In this manner, the floodplain is altered to be more compatible with existing or planned development. Occasionally, training levees may be used along either or both sides of the stream to confine floodwater to the stream area or floodway. In reducing the extent of flooding and the floodplain, levees also reduce available storage and can cause an increase in flow rate and flood level. Therefore, the usefulness of levees depends a great deal on the topography and other physical characteristics of the area.

Floodwalls can be used to confine floodwaters to the stream and a selected portion of the floodplain. Floodwalls, like levees, also reduce available storage and can cause an increase in flow rate and flood level. Floodwalls also require some form of anchoring device below the surface.

Flood retention/detention reservoirs can be used to temporarily store floodwaters above flood-prone areas, thus reducing the downstream flow volumes and flood levels. Later, the floodwaters can be released at a controlled rate to minimize the downstream effect. The usefulness of such reservoirs depends on the physical characteristics of the upper watershed and the status of development within that area.

Channel modification can be used to alter the existing stream channel and increase its carrying capacity. This is usually accomplished by excavating to make the stream channel either wider, deeper, or both. This increases the velocity and flow rate of the floodwaters thereby reducing flood levels and the extent of flooding. The magnitude and extent of the effect of channel modification on flooding is directly dependent on the extent of excavation; the larger the channel, the greater the reduction in flood levels. However, since floodplain storage in the channeled area is reduced and flow velocities are increased, downstream flooding may actually be greater due to greater flow rates and hydrologic regime alteration. Thus, the usefulness of this measure may depend on downstream conditions as well.

Stream flow diversion can be used to redirect floodwaters around a particular area. This precludes their entry into the problem area thereby greatly reducing the flood problems of that area. This is often accomplished by constructing a secondary channel bypass around the problem area to connect at some downstream point or to another drainage course.

The effectiveness of this measure is thus depends on the physical setting and characteristics of the area.

Specific Mitigation Projects

After receiving public input, it is the recommendation of this plan that the City of Unalakleet, along with other local, State and Federal entities look at the following projects for flood/erosion mitigation. Please see Chapter 4 Mitigation Strategy for additional detail on the following specific projects.

- Adopt the IAW project recommendations (please see Chapter 4, Mitigation Strategy).

  The IAW describes the following flooding and erosion mitigation project in Unalakleet in the following paragraphs.

  Situation Description: Unalakleet is susceptible to erosion damages along various locations in the community. Particularly along an NRCS gabion revetment that has been damaged by storms. The recommended project is a 1,500 foot long rock revetment which would be constructed along the alignment of the existing NRCS gabion basket revetment. The NRCS project would be removed or covered by the Corps project. $12.8 million is the most current estimate available. Another threat are the logs that float down the Yukon change from being protective to becoming destructive during storms surges.

  Overarching Problem: No definite timeline or authorities for erosion control and/or relocation makes it difficult to plan for needed erosion control projects. It's difficult to coordinate and focus resources without funding sources and timeline.

  Elders have reported that west and southwest winds have been increasing in recent years. The spit where the city is currently located is vulnerable to erosion from fall storms. A breakwater would protect the townsite from tidal storms.

- Rip rap wall along the beach adjacent to DOT property and the airport

The rip rap wall would protect the west side of the spit, the east-west runway and the airport facilities in particular. DOT&PF has completed the design for the wall and the target construction time is summer 2008.

- Building codes for all new structures

All new buildings should be above the 100-year flood level and meet structural standards. Raising existing structures above this level should also be considered.

- Protection of the Happy Valley subdivision

Raising the houses in Happy Valley would be effective but costly. The other option is to raise the existing dike on the north side and extend it to surround the subdivision. Surrounding the area in this way would necessitate construction of a gated culvert to allow for drainage into Kouwegok Slough.

- Protection of utilities

Currently the AT&T Alascom building is at 11 feet amsl, an elevation subject to a two year flood. It could be protected by a three foot enclosure surrounding the building. The power plant is built at 12-14 feet amsl and could be protected from flooding by dikes.

The sewage lagoon is relatively safe from storm surges since it lies far from shore but raising the surrounding berm 10 feet would protect it from a 500-year flood.

- Relocation of the city and extending utilities to the new city site, including the North River water source

The new city location should be to the northeast in an area that is free from danger of erosion, sheltered from strong winds, and not in an airport clear zone. A few houses have already been constructed on the new site and there are plans for others in the coming years. Although the present location will be habitable for approximately 100 more years, the need for a new city site is immediate. There is no room to safely expand the city on the spit. The only land that has potential for more infill is in the low-lying Happy Valley area. Residents have also expressed the desire for cheaper housing and to live in less crowded conditions.

Wells and water hauled from town are the only two sources of water for the new site. Eventually water must be piped in from the North River, both to the new and old city locations. The present water source, Powers Creek, has frozen several times in the past. The entire community needs a water source that is more reliable in winter weather.

- Community Readiness

The community should increase public knowledge about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards. This would include advising residents about securing household fuel tanks and moving vehicles to safe locations. In addition, dissemination of a brochure or flyer on local flood hazards could be developed and distributed to all households.

Develop an evacuation procedure and conducting evacuation drills. Establish official shelters with food and water, heating, medical supplies, sanitation, and an independent power source. The school or airport facilities are two potential locations within the city; other shelters could be established off the spit.

- Grants/funds to implement flood and erosion protection methods

In order to prevent financial disaster in the event of a severe flood, the community should consider joining the NFIP. Participation in the program requires that all new structures be constructed according to NFIP requirements and set back from the shoreline to lessen future erosion concerns and costs. The city should also try to obtain a CRS rating to lower flood insurance rates.

- Trees and shrubs

Planting vegetation along the shoreline would mitigate the effects of erosion.

Section 2. Severe Weather

Hazard Description and Characterization

Weather is the result of four main features: the sun, the planet's atmosphere, moisture, and the structure of the planet. Certain combinations can result in severe weather events that have the potential to become a disaster.

In Alaska, there is great potential for weather disasters. High winds can combine with loose snow to produce a blinding blizzard and wind chill temperatures to 75°F below zero. Extreme cold (-40°F to -60°F) and ice fog may last a week at a time Heavy snow can impact the interior and is common along the southern coast. A quick thaw means certain flooding.

Winter Storms

Winter storms originate as mid-latitude depressions or cyclonic weather systems. High winds, heavy snow, and cold temperatures usually accompany them.

Extreme cold

What is considered an excessively cold temperature varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold". In Alaska, extreme cold usually involves temperatures below –40 degrees Fahrenheit. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity.

Extreme cold can bring transportation to a halt across interior Alaska for days or sometimes weeks at a time. Aircraft may be grounded due to extreme cold and ice fog conditions, cutting off access as well as the flow of supplies northern villages.

Extreme cold also interferes with a community's infrastructure. It causes fuel to congeal in storage tanks and supply lines, stopping electric generation. Without electricity, heaters 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.

Ice Storms

The term ice storm is used to describe occasions when damaging accumulations of ice

are expected during freezing rain situations. They can be the most devastating of winter weather phenomena and are often the cause of automobile accidents, power outages and personal injury. Ice storms result from the accumulation of freezing rain, which is rain that becomes super cooled and freezes upon impact with cold surfaces. Freezing rain most commonly occurs in a narrow band within a winter storm that is also producing heavy amounts of snow and sleet in other locations.

Freezing rain develops as falling snow encounters a layer of warm air in the atmosphere deep enough for the snow to completely melt and become rain. As the rain continues to fall, it passes through a thin layer of cold air just above the earth's surface and cools to a temperature below freezing. The drops themselves do not freeze, but rather they become super cooled. When these super cooled drops strike the frozen ground, power lines, tree branches, etc., they instantly freeze.

Local Severe Weather Hazard Identification

The Unalakleet area has a maritime-continental climate, characterized by mild summers, cold winters and moderate levels of precipitation. This type of climate is typical of the western, coastal areas of Alaska where the ocean exerts a modifying influence in the summer but not in the winter, when the presence of sea ice causes a more continental, cold winter.

Unalakleet's winters are as cold as interior Alaska. The coldest month (December) has an average daily temperature of about 2 degrees F. Summer temperatures in the community also tend to be on the cool side, averaging between 50 and 55 degrees F., with daily maximums reaching into the low 60's in July. The record high temperature in Unalakleet is 87 degrees F., a mark set back in 1972.

Table 13. Unalakleet Weather Summary

	Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
	High	Date	Low	Date	Highest Mean	Year	Lowest Mean	Year	>= 90 F	<= 32 F	<= 32 F	<= 0 F
	F	dd/yyyy or yyyymmdd	F	dd/yyyy or yyyymmdd	F	-	F	-	# Days	# Days	# Days	# Days
January	47	21/1961	-59	28/1989	20.8	1977	-10.1	1971	0.0	28.5	30.7	17.2
February	46	12/1980	-50	28/1956	17.3	1977	-11.4	1954	0.0	26.3	28.0	15.8
March	47	29/1954	-50	11/1971	24.9	1965	-7.3	1972	0.0	26.5	30.8	15.4
April	62	30/1960	-30	12/1977	31.6	1957	9.8	1977	0.0	16.8	28.7	6.4
May	78	24/1969	-6	07/1952	44.5	1951	30.8	1952	0.0	2.6	18.3	0.1
June	86	26/1951	25	06/1952	54.9	1957	43.2	1955	0.0	0.0	1.8	0.0
July	87	07/1972	32	16/1953	59.4	1972	50.2	1959	0.0	0.0	0.1	0.0

	Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
August	85	06/1968	28	16/1953	58.5	1977	46.4	1969	0.0	0.0	0.7	0.0
September	75	01/1981	6	30/1957	50.6	1974	38.4	1970	0.0	0.1	7.9	0.0
October	57	01/1950	-20	30/1953	34.3	1969	19.5	1956	0.0	14.2	26.7	1.7
November	48	01/1995	-36	23/1994	22.0	1949	-3.5	1956	0.0	26.3	29.8	8.4
December	43	08/1983	-52	31/1974	18.4	1960	-12.7	1959	0.0	29.0	30.9	18.0
Annual	87	19720707	-59	19890128	29.6	1957	21.1	1956	0.0	170.4	234.2	83.0
Winter	47	19610121	-59	19890128	15.1	1977	-5.6	1971	0.0	83.8	89.5	51.0
Spring	78	19690524	-50	19710311	29.8	1957	13.5	1971	0.0	45.9	77.8	21.9
Summer	87	19720707	25	19520606	55.0	1977	49.2	1955	0.0	0.0	2.6	0.0
Fall	75	19810901	-36	19941123	34.2	1949	19.6	1956	0.0	40.6	64.3	10.1

Source: Western Regional Climate Center, http://www.wrcc.dri.edu

High Winds

Another major weather factor in the community is high winds. The wind chill factor can bring temperatures down to -59°F, which can lead to frozen pipes and dangerous conditions for outdoor activities. While most home and business owners are prepared for the heavy winds and low temperatures, construction practices must be followed to protect against the high winds.

Previous Occurrences of Severe Weather

the following events were taken from the 2007 DHS&EM Disaster Cost Index and the 2002 Unalakleet Comprehensive Plan.

Severe Weather Event, 1999 Extreme cold caused a drastic reduction in the city water supply and eventual freezing of a major loop on the city water system.

Severe Weather Event, 1996 Extreme cold froze the transmission main of the city water system from Powers Creek to the airport. Public assistance was granted to replace a major portion of this line.

Severe Weather Event, 1992 Extreme cold caused a drastic reduction in the city water supply and eventual freezing of a major loop on the city water system.

Hazard Mitigation Cold Weather, March 5, 1984. Extreme cold for a period of six to seven weeks caused a drastic reduction in the city water supply and eventual freezing of the southeast loop of the city water system. Residents were left without water for two months. Public assistance was granted to repair/replace portions of the water system.

Severe Weather Previous Occurrences of Hazard Vulnerability

The entire community is clearly vulnerable to severe weather. The citizens of Unalakleet are vulnerable to bitter cold weather, heavy snowfall and high winds. Alaskans are known for self-efficiency and hardy behavior in the face of often inclement weather. Citizens who do not live on the road system must be able to survive without outside assistance several times throughout most winters.

Please see the tables at the beginning of this chapter, which illustrate the city structures, infrastructure, and transportation systems, which are vulnerable.

Severe Weather Mitigation Goals and Projects

Severe Weather Goals and Projects

Goal 1: Mitigate the effects of extreme weather by instituting programs that provide early warning and preparation.

Goal 2: Educate people about the dangers of extreme weather and how to prepare.

Goal 3: Develop practical measures to warn in the event of a severe weather event.

Projects

- Research and consider instituting the National Weather Service program of *"Storm Ready"*.

Storm Ready is a nationwide community preparedness program that uses a grassroots approach to help communities develop plans to handle all types of severe weather—from tornadoes to tsunamis. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations.

To be officially Storm Ready, a community must:

1. Establish a 24-hour warning point and emergency operations center.
2. Have more than one way to receive severe weather forecasts and warnings and to alert the public.
3. Create a system that monitors local weather conditions.
4. Promote the importance of public readiness through community seminars.
5. Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

6. Demonstrate a capability to disseminate warnings.

Specific Storm Ready guidelines, examples, and applications also may be found on the Internet at: www.nws.noaa.gov/stormready

- Conduct special awareness activities, such as Winter Weather Awareness Week, Flood Awareness Week, etc.

- Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability.

- Encourage weather resistant building construction materials and practices.

Section 3. Wildland Fire

Hazard Description and Characterization

Wildland fires occur in every state in the country and Alaska is no exception. Each year, between 600 and 800 wildland fires, mostly between March and October, burn across Alaska causing extensive damage.

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. In Alaska, the natural fire regime is characterized by a return interval of 50 to 200 years, depending on the vegetation type, topography and location. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process and the full range of fire management activities is exercised in Alaska to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighter and public safety and welfare, natural and cultural resources threatened, and the other values to be protected dictate the appropriate management response to the fire. Firefighter and public safety is always the first and overriding priority for all fire management activities.

Fires can be divided into the following categories:

Structure fires – originate in and burn a building, shelter or other structure.

Prescribed fires - ignited under predetermined conditions to meet specific objectives, to mitigate risks to people and their communities, and/or to restore and maintain healthy, diverse ecological systems.

Wildland fire - any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Use - a wildland fire functioning in its natural ecological role and fulfilling land management objectives.

Wildland-Urban Interface Fires - fires that burn within the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The potential exists in areas of wildland-urban interface for extremely dangerous and complex fire burning conditions, which pose a tremendous threat to public and firefighter safety.

Fuel, weather, and topography influence wildland fire behavior. Wildland fire behavior can be erratic and extreme causing fire whirls and firestorms that can endanger the lives of the firefighters trying to suppress the blaze. 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. Temperature and humidity also affect fire behavior. High temperatures and low humidity encourage fire activity while low temperatures and high humidity help retard fire behavior. Wind affects the speed and direction of a fire. Topography directs the movement of air, which can also affect fire behavior. When the terrain funnels air, like what happens in a canyon, it can lead to faster spreading. Fire can also travel up slope quicker than it goes down.

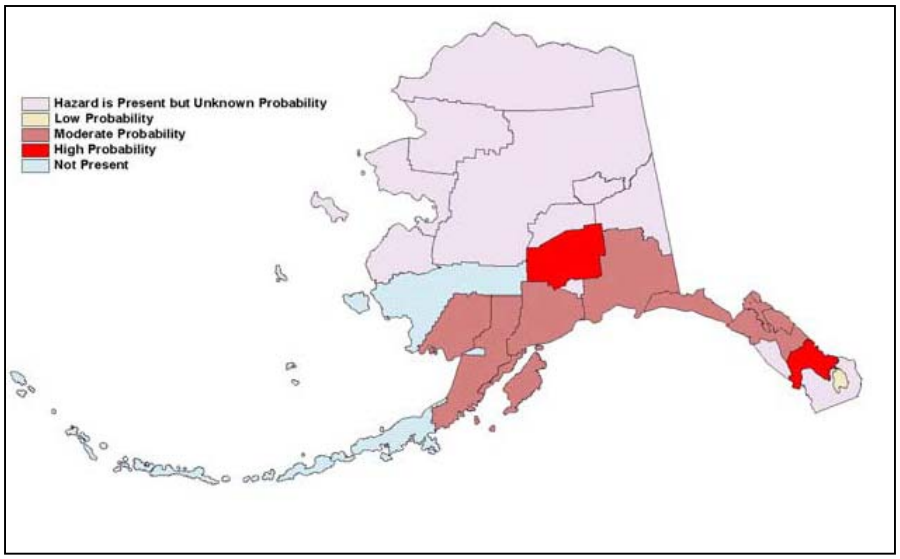
Wildland fire risk is increasing in Alaska due to the spruce bark beetle infestation. The beetles lay eggs under the bark of a tree. When the larvae emerge, they eat the tree's phloem, which is what the tree uses to transport nutrients from its roots to its needles. If enough phloem is lost, the tree will die. The dead trees dry out and become highly flammable.

Local Wildland Fire Hazard Identification

Though Unalakleet has an unknown probability of occurrence, it is listed as a full protection area by the Alaska Interagency Fire Management Plan. Please see map and explanation on the following pages.

The following map from the Alaska State Hazard Plan depicts Unalakleet as being in an unknown probability area of the state.

Figure 3. Alaska Hazard Plan - Fire Risk Map



Unalakleet is located in a full protection area of the state protection option areas. Full protection is suppression action provided on a wildland fire that threatens uninhabited private property, high-valued natural resource areas, and other high-valued areas such as identified cultural and historical sites. The suppression objective is to control the fire at the smallest acreage reasonably possible. The allocation of suppression resources to fires receiving the full protection option is second in priority only to fires threatening a critical protection area.

Previous Occurrences of Wildland Fire

There are no previous occurrences of serious wildland fire in Unalakleet.

Wildland Fire Hazard Vulnerability

Please see Hazard Vulnerability Assessment Matrix and description at the beginning of this chapter.

Wildland Fire Mitigation Goals and Projects

<u>Wildland Fire Goals and Projects</u>

Goal 1: Establish building regulations to mitigate against fire damage.

Goal 2: Conduct outreach activities to encourage the use of Fire Wise development techniques.

Goal 3: Encourage the evaluation of emergency plans with respect to wildland fire assessment.

Goal 4: Acquire information on the danger of wildland fires and how best to prepare.

Projects

- Construct a public safety building to store fire equipment.
- Support the fire department with adequate firefighting equipment and training.
- Promote Fire Wise building design, siting, and materials for construction.
- The Alaska Fire Wise Program is designed to educate people about wildland fire risks and mitigation opportunities. It is part of a national program that is operated in the State by the Alaska Wildfire Coordinating Group (AWCG).
- Continue to enforce building codes and requirements for new construction.
- Enhance public awareness of potential risk to life and personal property. Encourage mitigation measures in the immediate vicinity of their property.

Section 4. Description of Hazards Not Present in Unalakleet

Avalanche and Landslides

Unalakleet is located on a flat spit with a gentle topographic relief in the city estimated to be 6 – 16 feet. There is no danger from avalanches, landslides or volcanoes because there are no mountains or steep slopes in the city.

Earthquakes

Unalakleet is located near the western edge of the Kaltag fault, a strike-slip fault associated with several small earthquake epicenters. These seismic events are infrequent, small, and shallow enough to pose no significant threat to the community.

The following figures were obtained from the University of Alaska, Fairbanks, and Alaska Earthquake Information Center website at: http://www.giseis.alaska.edu/Seis/

Figure 4. AEIS Earthquake Active Faults

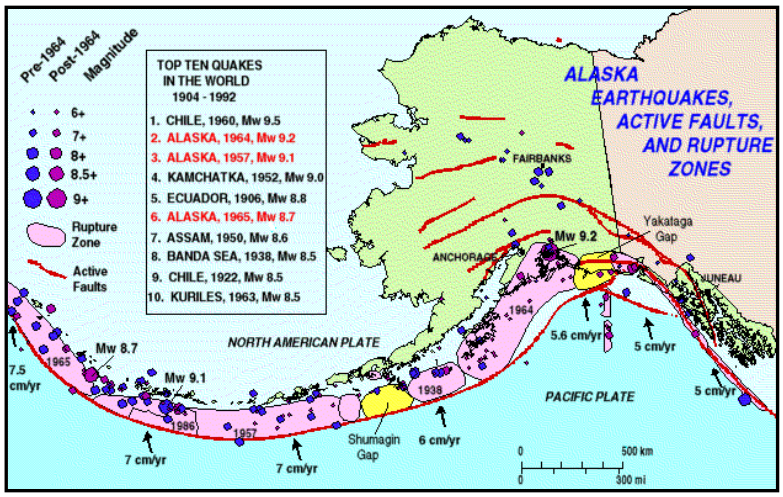
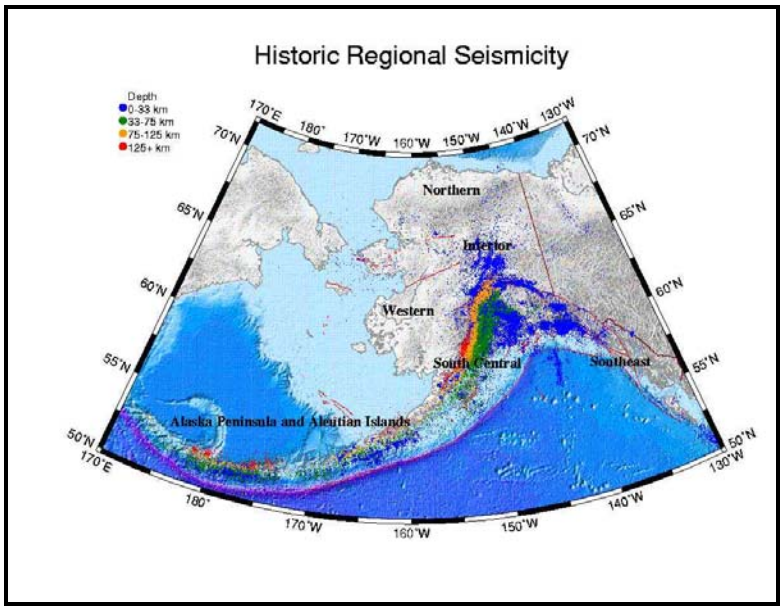


Figure 5. AEIS Historic Regional Seismicity

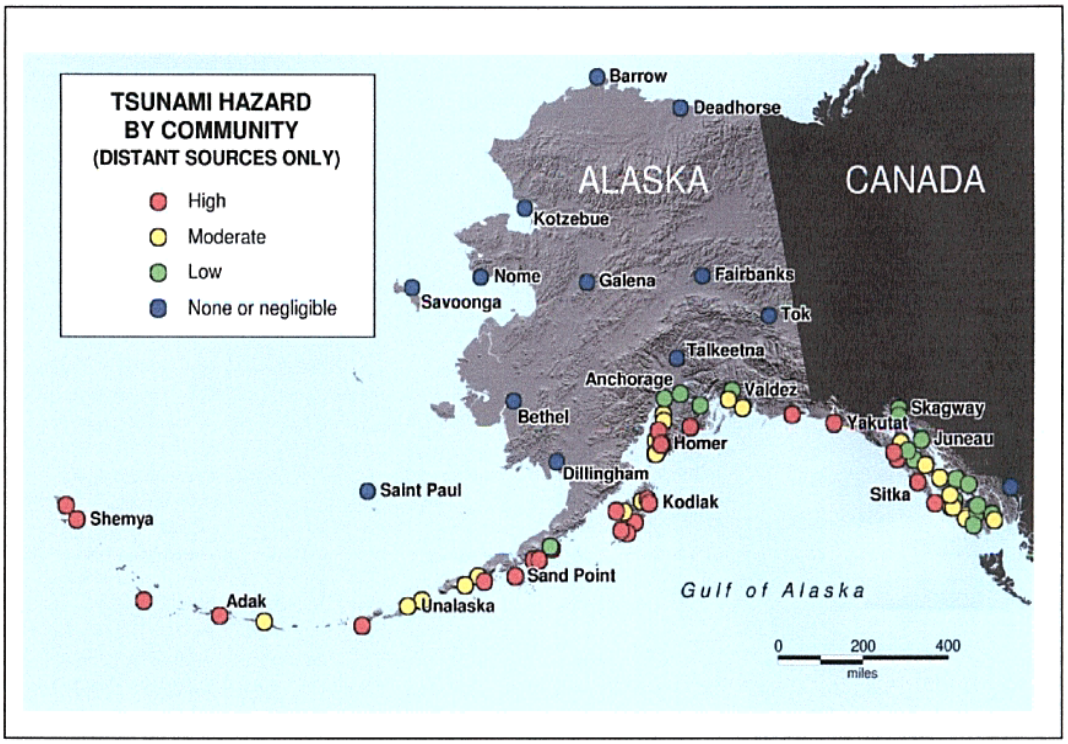


Tsunamis and Seiches

There is no danger of tsunamis and seiches since the topography of the Bering Sea and the Norton Sound does not allow for a tsunami to form and travel far enough to threaten the community.

Fault rupture on the seafloor can produce tsunamis, a hazard in coastal areas. There were no reported tsunamis associated with the 1928 submarine earthquakes in the Chukchi Sea. The closest recorded submarine earthquake that produced a tsunami occurred in 1991 in the Bering Sea southwest of St. Matthew Island, (West Coast & Alaska Tsunami Warning databases). This M6.1 earthquake occurred near the edge of the continental shelf.

Figure 6. Tsunami Hazard by Community



Source: Alaska State Hazard Mitigation Plan, 2004

Chapter 4: Mitigation Strategy

Benefit - Cost Review

This chapter of the plan outlines Unalakleet's overall strategy to reduce its vulnerability to the effects of the hazards studied. Currently the planning effort is limited to the hazards determined to be of the most concern; flooding, erosion, and severe weather; however the mitigation strategy will be regularly updated as additional hazard information is added and new information becomes available.

The projects listed on Table 15, Benefit and Costs Listing, were prioritized using a listing of benefits and costs review method as described in the FEMA *How-To-Guide Benefit-Cost Review in Mitigation Planning* (FEMA 386-5).

Due to monetary as well as other limitations, it is often impossible to implement all mitigation actions. Therefore, the most cost-effective actions for implementation will be pursued for funding first, not only to use resources efficiently, but also to make a realistic start toward mitigating risks.

The City of Unalakleet considered the following factors in prioritizing the mitigation projects. Due to the dollar value associated with both life-safety and critical facilities, the prioritization strategy represents a special emphasis on benefit-cost review because the factors of life-safety and critical facilities steered the prioritization towards projects with likely good benefit-cost ratios.

1. Extent to which benefits are maximized when compared to the costs of the projects, the Benefit Cost Ratio must be 1.0 or greater.

2. Extent the project reduces risk to life-safety.

3. Project protects critical facilities or critical city functionality.

    A. Hazard probability.

    B. Hazard severity.

Other criteria that was used to developing the benefits – costs listing depicted in Table 15:

1. Vulnerability before and after Mitigation

Number of people affected by the hazard, areawide, or specific properties.
Areas affected (acreage) by the hazard
Number of properties affected by the hazard
Loss of use
Loss of life (number of people)

Injury (number of people)

List of Benefits

Risk reduction (immediate or medium time frame)
Other community goals or objectives achieved
Easy to implement
Funding available
Politically or socially acceptable

Costs

Construction cost
Programming cost
Long time frame to implement
Public or political opposition
Adverse environmental effects

This method supports the principle of benefit-cost review by using a process that demonstrates a special emphasis on maximization of benefits over costs. Projects that demonstrate benefits over costs and that can start immediately were given the highest priority. Projects that the costs somewhat exceed immediate benefit and that can start within five years (or before the next update) were given a description of medium priority, with a timeframe of one to five years. Projects that are very costly without known benefits, probably cannot be pursued during this plan cycle, but are important to keep as an action were given the lowest priority and designated as long term.

The Unalakleet Planning Commission will hold another round of public meetings on the LHMP Update. The plan is subject to final Unalakleet City Council approval after pre-approval is obtained by DHS&EM.

After the LHMP Update has been approved, the projects must be evaluated using a Benefit-Cost Analysis (BCA) during the funding cycle for disaster mitigation funds from DHS&EM and FEMA.

A description of the BCA process follows, briefly, BCA is the method by which the future benefits of a mitigation project are determined and compared to its cost. The result is a Benefit-Cost Ratio, which is derived from a project's total net benefits divided by its total cost. The BCR is a numerical expression of the cost-effectiveness of a project. Composite BCRs of 1.0 or greater have more benefits than costs, and are therefore cost-effective.

Benefit-Cost Review vs. Benefit-Cost Analysis (FEMA 386-5) states in part:
Benefit-Cost Review for mitigation planning differs from the benefit cost analysis (BCA) used for specific projects. BCA is a method for determining the potential positive effects of a mitigation action and comparing them to the cost of the action. To assess and demonstrate the cost-effectiveness of mitigation actions, FEMA has developed a suite of BCA software, including hazard-specific modules. The analysis determines whether a mitigation project is technically cost-effective. The principle behind the BCA is that the benefit of an action is a reduction in future damages.

DMA 2000 does not require hazard mitigation plans to include BCA's for specific projects, but does require that a BCR be conducted in prioritizing projects.

Benefit-Cost Analysis

The following section is reproduced from a document prepared by FEMA, which demonstrates on how to perform a Benefit –Cost Analysis. The complete guidelines document, a benefit-cost analysis document and benefit-cost analysis technical assistance is available online http://www.fema.gov/government/grant/bca.

Facilitating BCA

Although the preparation of a BCA is a technical process, FEMA has developed software, written materials, and training that simplifies the process of preparing BCAs. FEMA has a suite of BCA software for a range of major natural hazards: earthquake, fire (wildland/urban interface fires), flood (riverine, coastal A-Zone, Coastal V-Zone), Hurricane Wind (and Typhoon), and Tornado.

Sometimes there is not enough technical data available to use the BCA software mentioned above. When this happens, or for other common, smaller-scale hazards or more localized hazards, BCAs can be done with the Frequency Damage Method (i.e., the Riverine Limited Data module), which is applicable to any natural hazard as long as a relationship can be established between how often natural hazard events occur and how much damage and losses occur as a result of the event. This approach can be used for coastal storms, windstorms, freezing, mud/landslides, severe ice storms, snow, tsunami, and volcano hazards.

Applicants and Sub-Applicants must use FEMA-approved methodologies and software to demonstrate the cost-effectiveness of their projects. This will ensure that the calculations and methods are standardized, facilitating the evaluation process. Alternative BCA software may also be used, but only if the FEMA Regional Office and FEMA Headquarters approve the software.

To assist Applicants and Sub-applicants, FEMA has prepared the *FEMA Mitigation BCA Toolkit* CD. This CD includes all of the FEMA BCA software, technical manuals, BC training courses, Data-Documentation Templates, and other supporting documentation and guidance.

The *Mitigation BCA Toolkit* CD is available free from FEMA Regional Offices or via the BC Helpline (at bchelpline@dhs.gov or toll free number at (866) 222-3580.

HAZARD EVENT (Frequency & Severity)	X	PROPERTY EXPOSED TO THE HAZARD	=	HAZARD RISK Dollars ($$)
Probability of Damaging Hazard Events		Value & Vulnerability of Property Exposed to the Hazard		Severity of the Hazard Threat to the Built Environment

The BC Helpline is also available to provide BCA software, technical manuals, and other BCA reference materials as well as to provide technical support for BCA.

For further technical assistance, Applicants or Sub-Applicants may contact their State Mitigation Office, the FEMA Regional Office, or the BC Helpline. FEMA and the BC Helpline provide technical assistance regarding the preparation of a BCA.

Benefit – Costs Review Listing Table

Table 14. Benefit Cost Review Listing

* Priorities: High = Clearly a life/safety project, or benefits clearly exceed the cost or can be implemented
0 – 1 year.
Medium = More study required to designate as a life/safety project, or benefits may exceed the cost, or can be implemented in 1 – 5 years.
Low = More study required to designate as a life/safety project, or not known if benefits exceed the costs, or long-term project, implementation will not occur for over 5 years.

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority Level
Flood/Erosion (FLD)			
FLD 1: (IAW 2008) Suite of Emergency Plans and Training/Drills Emergency Operations, Community Evacuation, Hazard Mitigation	The Suite of Emergency Plans is the most immediate, most near term and cost effective mechanism to reduce the risk of loss to lives and property.	Community will need technical assistance to complete this project. The State needs the federal agencies to provide the weather, tidal and horizontal and vertical control data mandated so the State can meet its FEMA, CZMA and other mandates.	High
FLD 2. IAW. Unalakleet Revetment	Benefit to entire community Reduction in property damage 2008 funding is critical if to take advantage of heavy equipment in 2009 season that will already be in place for DOT – Airport projects	Need funding strategy to ensure erosion/revetment project is done in 2008 or 2009.	High
FLD 3. Rip rap wall along the beach adjacent to DOT property and the airport	Damage Reduction Life/Safety Issue	Cost unknown at this time.	Medium
FLD 4. Protection of the Happy Valley subdivision	Reduction in property damage	Expense, design and engineering studies needed.	Medium
FLD 5. Protection of utilities	Life/Safety Issue Benefit to entire community	Expense, design and engineering studies needed.	Medium

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority Level
FLD 6. Relocation of the city and extending utilities to the new city site, including the North River water source	Life/safety issue Benefit to entire community Reduction in property damage Process has already started	Expense, design and engineering studies needed.	Medium
FLD 7. Community Readiness	Life/safety issue Benefit to entire community	Staff time	Medium
FLD 8. Consider joining NFIP	Benefit to entire community Property damage reduction	Staff time, insurance cost	Medium
FLD 9. Planting trees and shrubs along shoreline	Property damage reduction Can be started immediately.	Cost and staff time	Medium
Severe Weather (SW)			
SW-1. Research and consider instituting the National Weather Service program of *"Storm Ready"*.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be implemented annually	Staff time	High
SW-2. Conduct special awareness activities, such as Winter Weather Awareness Week, Flood Awareness Week, etc.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	Staff time	High
SW-3. Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	Staff time	High
SW-4. Encourage weather resistant building construction materials and practices.	Risk and damage reduction. Benefit to entire community.	Staff time	High
Wildland Fire (WF)			
WF-1. Continue to support the local fire department with adequate firefighting equipment and training.	Life/Safety issue Risk reduction Benefit to entire community State assistance available Annual project.	Dollar cost not determined. Staff time to research grants	Medium

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority Level
Project WF-2. Promote Fire Wise building design, siting, and materials for construction.	Life/Safety issue Risk reduction Benefit to entire community, Annual project. State assistance available	Dollar cost not determined. Staff time to research grants	Medium
WF-3: Continue to enforce development of building codes and requirements for new construction.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be implemented annually	Staff time	Medium
WF-4: Enhance public awareness of potential risk to life and personal property. Encourage mitigation measures in the immediate vicinity of their property.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be implemented annually	Staff time	Medium
W-5. Construct a public safety building to store fire equipment.	Life/Safety issue Risk reduction Benefit to entire community		Medium

Mitigation Project Plan Table

Table 15. Mitigation Projects Plan

** PDMG Pre-Disaster Mitigation Grant
*** HMGP Hazard Mitigation Grant Program
****FMA Flood Mitigation Assistance (Program)

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe
Flood/Erosion (FLD)				
FLD 1: (IAW 2008) Suite of Emergency Plans and Training/Drills Emergency Operations, Community Evacuation, Hazard Mitigation	DHS&EM City	$75,000	State FY08 and FY09 Capital Budgets PDMG*, FMA**	IAW Recommends Completion Date: ASAP – no later than 12/31/08. Work has already been started.
FLD 2. IAW. Unalakleet Revetment	USACE City	$5 million	PDMG	2008
FLD 3. Rip rap wall along the beach adjacent to DOT property and the airport	USACE DOT/PF	TBD	State/federal budgets	2008
FLD 4. Protection of the Happy Valley subdivision	City DHS&EM	TBD	PDMG	1 – 5 years
FLD 5. Protection of utilities	City DHS&EM	TBD	PDMG	1 – 5 years
FLD 6. Relocation of the city and extending utilities to the new city site, including the North River water source	City USACE DCRA DHS&EM	TBD	PDMG	5 – 10 years
FLD 7. Community Readiness	City DCRA	$10,000	Local/state budgets	1 – 5 years
FLD 8. Consider joining NFIP	City DCRA/FEMA	Staff time	Local/state budgets	1 – 5 years
FLD 9. Planting trees and shrubs along shoreline	City	TBD	City	1 – 5 years
Severe Weather (SW)				
SW 1. Research and consider instituting the National Weather Service program of *"Storm Ready"*.	City	Staff Time	City	<1 year

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe
SW 2. Conduct special awareness activities, such as Winter Weather Awareness Week, Flood Awareness Week, etc.	City DCRA DHS&EM	Staff Time	City DCRA DHS&EM	<1 year
SW 3. Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability	City	Staff Time	NOAA	Ongoing
SW 4. Encourage weather resistant building construction materials and practices for new and existing infrastructure.	City	Staff Time	City	<1 year
Wildland Fire (WF)				
WF 1. Continue to support the local fire department with adequate firefighting equipment and training.	City/State	TBD	State capital budget	Ongoing
Project WF 2. Promote Fire Wise building design, siting, and materials for construction new and existing.	City	Staff Time	City Budget	Ongoing
WF 3: Consider development of building codes and requirements for new construction.	City	Staff Time	City Budget	Ongoing
WF 4: Enhance public awareness of potential risk to life and personal property. Encourage mitigation measures in the immediate vicinity of their property.	City	Staff Time	City Budget	Ongoing

Glossary of Terms

A-Zones

Type of zone found on all Flood Hazard Boundary Maps (FHBMs), Flood Insurance Rate Maps (FIRMs), and Flood Boundary and Floodway Maps (FBFMs).

Acquisition

Local governments can acquire lands in high hazard areas through conservation easements, purchase of development rights, or outright purchase of property.

Asset

Any manmade or natural feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Base Flood

A term used in the National Flood Insurance Program to indicate the minimum size of a flood. This information is used by a community as a basis for its floodplain management regulations. It is the level of a flood, which has a one-percent chance of occurring in any given year. Also known as a 100-year flood elevation or one-percent chance flood.

Base Flood Elevation (BFE)

The elevation for which there is a one-percent chance in any given year that flood water levels will equal or exceed it. The BFE is determined by statistical analysis for each local area and designated on the Flood Insurance Rate Maps. It is also known as 100-year flood elevation.

Base Floodplain

The area that has a one percent chance of flooding (being inundated by flood waters) in any given year.

Building

A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Building Code

The regulations adopted by a local governing body setting forth standards for the construction, addition, modification, and repair of buildings and

other structures for the purpose of protecting the health, safety, and general welfare of the public.

Community

Any state, area or political subdivision thereof, or any Indian tribe or tribal entity that has the authority to adopt and enforce statutes for areas within its jurisdiction.

Community Rating System (CRS)

The Community Rating System is a voluntary program that each municipality or county government can choose to participate in. The activities that are undertaken through CRS are awarded points. A community's points can earn people in their community a discount on their flood insurance premiums.

Critical Facility

Facilities that are critical to the health and welfare of the population and that are especially important during and after a hazard event. Critical facilities include, but are not limited to, shelters, hospitals, and fire stations.

Designated Floodway

The channel of a stream and that portion of the adjoining floodplain designated by a regulatory agency to be kept free of further development to provide for unobstructed passage of flood flows.

Development

Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or of equipment or materials.

Digitize

To convert electronically points, lines, and area boundaries shown on maps into x, y coordinates (e.g., latitude and longitude, universal transverse mercator (UTM), or table coordinates) for use in computer

Disaster Mitigation Act (DMA)

DMA 2000 (public Law 106-390) is the latest legislation of 2000 (DMA 2000) to improve the planning process. It was signed into law on October 10, 2000. This new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur.

Earthquake

A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the earth's tectonic plates.

Elevation

The raising of a structure to place it above flood waters on an extended support structure.

Emergency Operations Plan

A document that: describes how people and property will be protected in disaster and disaster threat situations; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies, and other resources available for use in the disaster; and outlines how all actions will be coordinated.

Erosion

The wearing away of the land surface by running water, wind, ice, or other geological agents.

Federal Disaster Declaration

The formal action by the President to make a State eligible for major disaster or emergency assistance under the Robert T. Stafford Relief and Emergency Assistance Act, Public Law 93-288, as amended. Same meaning as a Presidential Disaster Declaration

Federal Emergency Management Agency (FEMA)

A federal agency created in 1979 to provide a single point of accountability for all federal activities related to hazard mitigation, preparedness, response, and recovery.

Flood

A general and temporary condition of partial or complete inundation of water over normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.

Flood Disaster Assistance

Flood disaster assistance includes development of comprehensive preparedness and recovery plans, program capabilities, and organization of Federal agencies and of State and local governments to mitigate the adverse effects of disastrous floods. It may include maximum hazard reduction, avoidance, and mitigation measures, as well policies, procedures, and eligibility criteria for Federal grant or loan assistance to State and local governments, private organizations, or individuals as the result of the major disaster.

Flood Elevation

Elevation of the water surface above an establish datum (reference mark), e.g. National Geodetic Vertical Datum of 1929, North American Datum of 1988, or Mean Sea Level.

Flood Hazard

Flood Hazard is the potential for inundation and involves the risk of life, health, property, and natural value. Two reference base are commonly used: (1) For most situations, the Base Flood is that flood which has a one-percent chance of being exceeded in any given year (also known as the 100-year flood); (2) for critical actions, an activity for which a one-percent chance of flooding would be too great, at a minimum the base flood is that flood which has a 0.2 percent chance of being exceeded in any given year (also known as the 500-year flood).

Flood Insurance Rate Map

Flood Insurance Rate Map (FIRM) means an official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study

Flood Insurance Study or Flood Elevation Study means an examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluations and determination of mudslide (i.e., mudflow) and/or flood-related' erosion hazards.

Floodplain

A "floodplain" is the lowland adjacent to a river, lake, or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 10-year flood. The 100-year floodplain by the 100-year flood.

Floodplain Management

The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and floodplain management regulations.

Floodplain Management Regulations

Floodplain Management Regulations means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as floodplain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations, in any combination thereof,

which provide standards for the purpose of flood damage prevention and reduction.

Flood Zones

Zones on the Flood Insurance Rate Map (FIRM) in which a Flood Insurance Study has established the risk premium insurance rates.

Flood Zone Symbols

A - Area of special flood hazard without water surface elevations determined.
A1-30 - AE Area of special flood hazard with water surface elevations determined.
AO - Area of special flood hazard having shallow water depths and/or unpredictable flow paths between one and three feet.
A-99 - Area of special flood hazard where enough progress has been made on a protective system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes.
AH - Area of special flood hazard having shallow water depths and/or unpredictable flow paths between one and three feet and with water surface elevations determined.
B - X Area of moderate flood hazard.
C - X Area of minimal hazard.
D - Area of undetermined but possible flood hazard.

Geographic Information System

A computer software application that relates physical features of the earth to a database that can be used for mapping and analysis.

Governing Body

The legislative body of a municipality that is the assembly of a borough or the council of a city.

Hazard

A source of potential danger or adverse condition. Hazards in the context of this plan will include naturally occurring events such as floods, earthquakes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.

Hazard Event

A specific occurrence of a particular type of hazard.

Hazard Identification

The process of identifying hazards that threaten an area.

Hazard Mitigation

Any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards. (44 CFR Subpart M 206.401)

Hazard Mitigation Grant Program

The program authorized under section 404 of the Stafford Act, which may provide funding for mitigation measures identified through the evaluation of natural hazards conducted under §322 of the Disaster Mitigation Act 2000.

Hazard Profile

A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.

Hazard and Vulnerability Analysis

The identification and evaluation of all the hazards that potentially threaten a jurisdiction and analyzing them in the context of the jurisdiction to determine the degree of threat that is posed by each.

Mitigate

To cause something to become less harsh or hostile, to make less severe or painful.

Mitigation Plan

A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the State and includes a description of actions to minimize future vulnerability to hazards.

National Flood Insurance

The Federal program, created by an act of Congress in Program (NFIP) 1968 that makes flood insurance available in communities that enact satisfactory floodplain management regulations.

One Hundred (100)-Year

The flood elevation that has a one-percent chance of occurring in any given year. It is also known as the Base Flood.

Planning

The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit.

Repetitive Loss Property

A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least $1000 each have been paid within any 10-year period since 1978.

Risk

The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It can also be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Riverine

Relating to, formed by, or resembling rivers (including tributaries), streams, creeks, brooks, etc.

Riverine Flooding

Flooding related to or caused by a river, stream, or tributary overflowing its banks due to excessive rainfall, snowmelt or ice.

Runoff

That portion of precipitation that is not intercepted by vegetation, absorbed by land surface, or evaporated, and thus flows overland into a depression, stream, lake, or ocean (runoff, called immediate subsurface runoff, also takes place in the upper layers of soil).

Seiche

An oscillating wave (also referred to as a seismic sea wave) in a partially or fully enclosed body of water. May be initiated by landslides, undersea landslides, long period seismic waves, wind and water waves, or a tsunami.

Seismicity

Describes the likelihood of an area being subject to earthquakes.

State Disaster Declaration

A disaster emergency shall be declared by executive order or proclamation of the Governor upon finding that a disaster has occurred or that the occurrence or the threat of a disaster is imminent. The state of disaster emergency shall continue until the governor finds that the threat or danger has passed or that the disaster has been dealt with to the extent that emergency conditions no longer exist and terminates the state of disaster emergency by executive order or proclamation.

Along with other provisions, this declaration allows the governor to utilize all available resources of the State as reasonably necessary, direct and compel the evacuation of all or part of the population from any stricken or threatened area if necessary, prescribe routes, modes of transportation and destinations in connection with evacuation and control ingress and egress to and from disaster areas. It is required before a Presidential Disaster Declaration can be requested.

Topography

The contour of the land surface. The technique of graphically representing the exact physical features of a place or region on a map.

Tribal Government

A Federally recognized governing body of an Indian or Alaska native Tribe, band, nation, pueblo, village or community that the Secretary of the Interior acknowledges to exist as an Indian tribe under the Federally Recognized Tribe List Act of 1994, 25 U.S.C. 479a. This does not include Alaska Native corporations, the ownership of which is vested in private individuals.

Tsunami

A sea wave produced by submarine earth movement or volcanic eruption with a sudden rise or fall of a section of the earth's crust under or near the ocean. A seismic disturbance or landslide can displace the water column, creating a rise or fall in the level of the ocean above. This rise or fall in sea level is the initial formation of a tsunami wave.

Vulnerability

Describes how exposed or susceptible to damage an asset it. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. The vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electrical substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Other, indirect effects can be much more widespread and damaging than direct ones.

Vulnerability Assessment

The extent of injury and damage that may result from hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future built environment.

Watercourse

A natural or artificial channel in which a flow of water occurs either continually or intermittently.

Watershed

An area that drains to a single point. In a natural basin, this is the area contributing flow to a given place or stream.

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4. FEMA How to Guides

   Getting Started: Building Support For Mitigation Planning (FEMA 386-1)

   Understanding Your Risks: Identifying Hazards And Estimating Losses (FEMA 386-2)

   Developing The Mitigation Plan: Identifying Mitigation Actions And Implementing Strategies (FEMA 386-3)

   Bringing the Plan to Life: Implementing the Hazard Mitigation Plan (FEMA 386-4)

   Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)

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6. Unalakleet Comprehensive Plan. Prepared by the City of Unalakleet. November 2002. http://www.commerce.state.ak.us/dca/plans/UnalakleetCompPlan.pdf

7. Native Village of Unalakleet website: http://www.unalakleet.org

Web Sites

American Planning Association:	http://www.planning.org
Association of State Floodplain Managers:	http://www.floods.org
Developing the Implementation Strategy:	www.pro.gov.uk
Federal Emergency Management Agency:	http://www.fema.gov/fima/planning.shtm
Community Rating System:	http://www.fema.gov/nfip/crs.htm
Flood Mitigation Assistance Program:	http://www.fema.gov/fima/planfma.shtm
Hazard Mitigation Grant Program:	http://www.fema.gov/fima/hmgp
Immediate Action Workgroup:	http://www.climatechange.alaska.gov/iaw.htm

Individual Assistance Programs:	http://www.fema.gov/rrr/inassist.shtm
Interim Final Rule:	http://www.access.gpo.govl
National Flood Insurance Program:	http://www.fema.gov/nfip
Native Village of Unalakleet website	http://www.unalakleet.org
Public Assistance Program:	http://www.fema.gov/rrr/pa