

City of Togiak, Alaska

Multi-Hazard Mitigation Plan



October 2009

Prepared by:

City of Togiak

WHPacific

and

Bechtol Planning & Development

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



FEMA

February 16, 2010

Honorable James Forbes
Mayor, City of Togiak
P.O. Box 190
Togiak, Alaska 99678

Dear Mayor Forbes:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the *City of Togiak, Alaska Multi-Hazard Mitigation Plan* as a local plan as outlined in 44 CFR Part 201. With approval of this plan, the City of Togiak is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through February 16, 2015.

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

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

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

Sincerely,

A handwritten signature in cursive script that reads "Mark Carey".

Mark Carey, Director
Mitigation Division

cc: Mark Roberts, Alaska Division of Homeland Security and Emergency Management

Enclosure

BH:bb

www.fema.gov

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Acronyms

AEIS	Alaska Earthquake Information System
ATV	All Terrain Vehicle
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
DCCED	(Alaska) Department of Commerce, Community and Economic Development
DCRA	(DCCED) Division of Community and Regional Affairs
DEC	(Alaska) Department of Environmental Conservation
DHS&EM	(Alaska) Division of Homeland Security and Emergency Management
F	Fahrenheit
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
HMP	Hazard Mitigation Plan
HMGP	Hazard Mitigation Grant Program
HWE	High Water Elevation
IAW	Immediate Action Workgroup
MHMP	Multi-Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NOAA	National Oceanographic and Atmospheric Administration
PDMG	Pre Disaster Mitigation Grant
REAA	Regional Education Attendance Area
SBA	Small Business Administration
STIP	Statewide Transportation Improvement Program
T/S	Tsunami/Seiche Projects
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VA	Veterans Administration

Adoption Resolution

City of Togiak, Alaska

Multi-Hazard Mitigation Plan Adoption Resolution

Resolution # 09-04

Adoption of the City of Togiak Multi-Hazard Mitigation Plan

Whereas, the City of Togiak 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 Multi-Hazard Mitigation Plan is required as a condition of future grant funding for mitigation projects; and

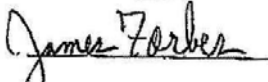
Whereas, the Togiak Multi-Hazard Mitigation Plan has been sent to the Alaska Division of Homeland Security and Emergency Management and the Federal Emergency Management Agency for their approval;

Now, therefore, be it resolved, that the Togiak City Council, hereby adopts the City of Togiak Multi-Hazard Mitigation Plan as an official plan; and

Be it further resolved, that the City of Togiak will submit the adopted Multi-Hazard 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: 11/09/09

Date


Mayor



City Administrator

Chapter 1. Planning Process and Methodology

Introduction

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Mitigation activities may be implemented prior to, during, or after an incident. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs (FEMA 386-8).

Local Mitigation Plan regulations are found in the Code of Federal Regulations at 44 CFR Part 201. This plan has been developed using the regulations to ensure compliance with federal criteria.

Federal regulations specify that local mitigation plans be designed to help jurisdictions identify specific actions to reduce loss of life and property from natural hazards. It is not intended to help jurisdictions establish procedures to respond to disasters or write an emergency operations plan. The goal of mitigation is to decrease the need for response as opposed to increasing response capability (FEMA 386-8).

The scope of this plan is natural hazards: flooding, erosion, severe weather, earthquakes and volcanoes hazards. However, some of the mitigation projects for natural hazards would also mitigate impacts from man-made hazards.

The City of Togiak Multi-Hazard Mitigation Plan (MHMP) 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 Togiak, gives 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 Togiak.

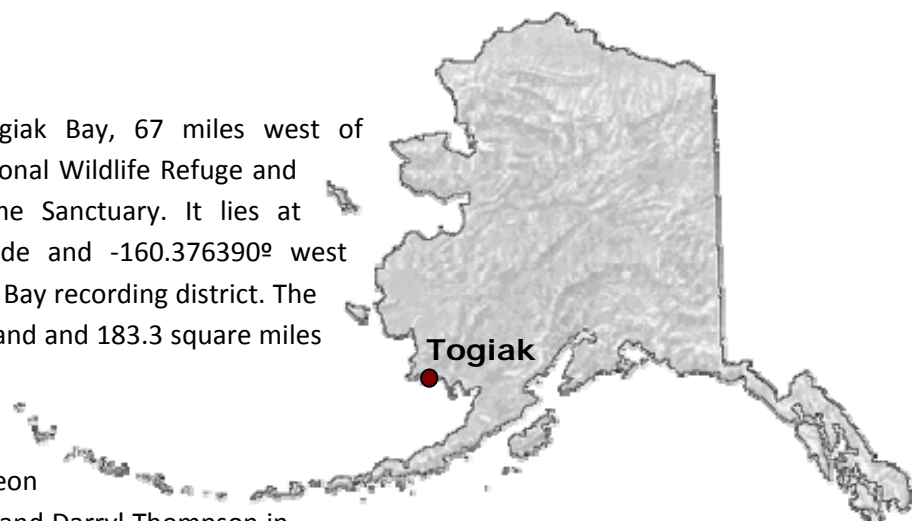
Plan Development

Location

Togiak is located at the head of Togiak Bay, 67 miles west of Dillingham. It lies within the Togiak National Wildlife Refuge and is the gateway to Walrus Island Game Sanctuary. It lies at approximately 59.061940° north latitude and -160.376390° west longitude. Togiak is located in the Bristol Bay recording district. The area encompasses 45.2 square miles of land and 183.3 square miles of water.

Project Staff

The Togiak MHMP City staff included Leon Kiana, Togiak City Administrator in 2008 and Darryl Thompson in 2009.



WHPacific and Bechtol Planning & Development were hired to write the plan with the City. Ervin Petty and Mark Roberts of the Division of Homeland Security and Emergency Management (DHS&EM) provided technical assistance and reviewed the drafts of this plan.

Plan Research

The plan was developed using existing Togiak 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. See the bibliography for a complete list of sources.

1. *Alaska All-Hazard Risk Mitigation Plan*. Prepared by and for DHS&EM. October 2007
2. *DCRA Community Information*: http://www.commerce.state.ak.us/dca/commdb/CF_BOCK.htm.
3. *It's a Disaster! And what are you gonna do about it?* Prepared by the Immediate Action Workgroup, March 4, 2008
4. FEMA How to Guides:
 - a. *Getting Started: Building Support For Mitigation Planning* (FEMA 386-1)
 - b. *Local Multi-Hazard Mitigation Planning Guidance*, July 1, 2008 (FEMA 386-8)
 - c. *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA 386-2)
 - d. *Developing The Mitigation Plan: Identifying Mitigation Actions And Implementing Strategies* (FEMA 386-3)
 - e. *Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 386-4)
 - f. *Using Benefit-Cost Review in Mitigation Planning* (FEMA 386-5)
5. University of Alaska, Fairbanks, and Alaska Earthquake Information Center website at: <http://www.giseis.alaska.edu/Seis/>
6. USGS Earthquake Probability Mapping: [www//eqint.cr.usgs.gov/eqprob/2002/index.php](http://www/eqint.cr.usgs.gov/eqprob/2002/index.php)
7. West Coast and Alaska Tsunami Warning Center, NOAA, <http://wcatwc.arh.noaa.gov/>

General Hazard Planning Web Sites

American Planning Association:	http://www.planning.org
Association of State Floodplain Managers:	http://www.floods.org
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
Individual Assistance Programs:	http://www.fema.gov/rrr/inassist.shtm
Interim Final Rule:	http://www.access.gpo.gov/
National Flood Insurance Program:	http://www.fema.gov/nfip

Public Assistance Program:

<http://www.fema.gov/rrr/pa>

Public Involvement

A public meeting was held on August 26, 2008 in collaboration with the regularly scheduled and advertised Togiak City Council meeting. Prior to the meeting, a newsletter was distributed and posted at local stores and businesses as well as City and Tribal offices. The meeting presentation, newsletter, and list of attendees are contained in the public involvement appendix. All interested parties were encouraged to attend the meeting or contact the planning team via contact information in the newsletter.

The WHPacific planner met with Jonathan Forsling of the Traditional Council of Togiak during the site visit and provided him information on the plan to share with the rest of the Traditional Council, requesting their input as well.

The draft MHMP was submitted to the City and Tribe for review in October 2009. Comments were incorporated into the document. Copies of the draft MHMP are available for public perusal at the City and Tribal Government Offices.



The Togiak City Council will review and approve the plan after pre-approval by DHS&EM and the Federal Emergency Management Agency (FEMA).

Plan Implementation

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

Table 1. Togiak Plans

Document	Completed	Next Review
Togiak Comprehensive Plan	2006	Unscheduled
Togiak Emergency Plan		Unscheduled
Togiak Healthy Community Plan		Unscheduled

Monitoring, Evaluating and Updating the Plan

Section §201.6(c)(4)(i) of the mitigation planning regulation requires that the plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Monitoring the Plan

The Togiak City Administrator, Public Safety Director or their designees are responsible for monitoring the plan. On an annual basis, the Administration will seek a report from the agencies and departments responsible for implementing the mitigation projects in Chapter 4 of the plan. The compiled report will be provided to the City Council as information and noticed to the public. Public comments will be sought. A report outlining all five years of the plan monitoring will be included in the plan update.

Evaluating the Plan

The Togiak City Administrator or designee will evaluate the plan during the five-year cycle of the plan. On an annual basis, concurrent with the report above, the evaluation should assess, among other things, whether:

- The goals and objectives address current and expected conditions.
- The nature, magnitude and/or types of risks have changed.
- The current resources are appropriate for implementing the mitigation projects in Chapter 4.
- There are implementation problems, such as technical, political, legal or coordination issues with other agencies.
- The outcomes have occurred as expected (a demonstration of progress).
- The agencies and other partners participated as originally proposed.

A column in Table 19 Mitigation Strategy is reserved for annual review comments on the projects listed.

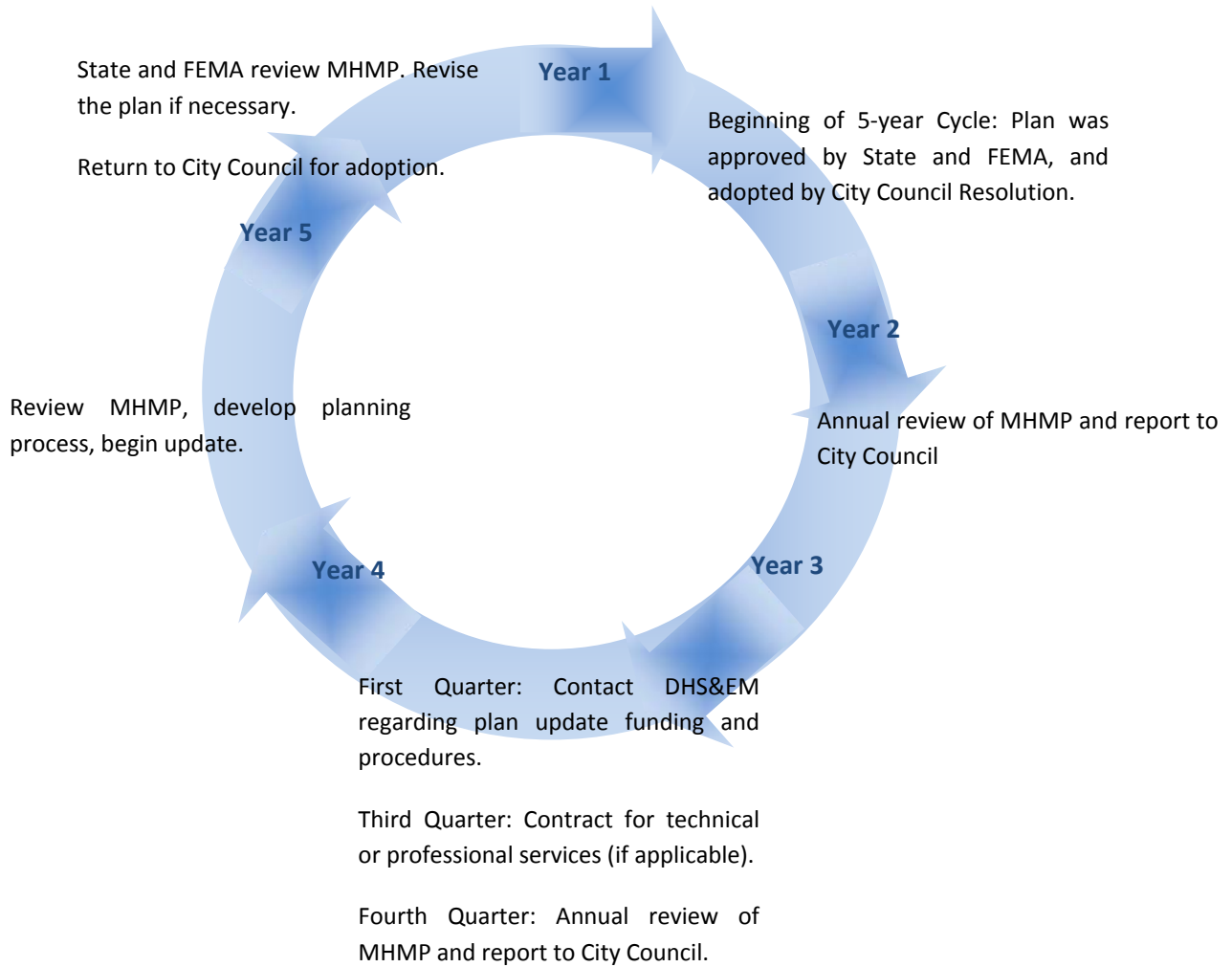
Updating the Plan

The mitigation planning regulations at §201.6(d)(3) direct the update of Mitigation Plans.

Plans must be updated and resubmitted to FEMA for approval every five years in order to continue eligibility for FEMA hazard mitigation assistance programs. Plan updates must demonstrate that progress has been made in the past five years to fulfill commitments outlined in the previously approved plan. This involves a comprehensive review and update of each section of the plan and a discussion of the results of evaluation and monitoring activities described above. Plan updates may validate the information in the previously approved plan or may involve a major plan rewrite. A plan update may not be an annex to this plan; it must stand on its own as a complete and current plan.

The tasks required to monitor, evaluate and update the MHMP are illustrated in Figure 1.

Figure 1. Hazard Mitigation Planning Cycle



Continued Public Involvement

A copy of the MHMP will be kept at City and Tribal offices and will be available for public review. On an annual basis the City Council will review the plan and solicit public input. Review meetings will be advertised to the public using the same methods established in the public involvement section of this plan.

Chapter 2. Community Profile

Community Overview

Current Population: 802 (2008 DCCED certified population)
 Pronunciation: TOAG-ee-ack
 Incorporation Type: 2ND Class City
 Borough: Unorganized
 Census Area: Dillingham

Table 2 provides local and regional contact information for Togiak

Table 2. Community Information

Community Information	Contact Information
City of Togiak	City of Togiak P.O. Box 190 Togiak, AK 99678 Phone: (907) 493-5820 Fax: (907) 493-5932 E-mail: Ctyoftog@unicom-alaska.com
Borough Located In:	Unorganized
Village Council	Togiak Traditional Council Moses Kritz, President P.O. Box 310 Togiak, AK 99678 Phone: (907) 493-5004 Fax: (907) 493-5005 Email: Tradcounciltogiak@starband.net
Electric Utility	Alaska Village Electric Co-Operation
Regional Native Corporation	Bristol Bay Native Corporation 111 West 16 th Ave. Suite 400 Anchorage, AK 99501 Phone: 800-426-3602 Fax: (907) 276-3925 Web: http://www.bbnc.net

Community Information	Contact Information
Regional Native Non-Profit	Bristol Bay Native Association P.O. Box 310 Dillingham, AK 99576 Phone: (907) 842-5257 Fax: (907) 8425932 Web : http://www.bbna.com
School District	Southwest Region Schools 574 Kenny Wren Rd. P.O. Box 90 Dillingham, AK 99576 Phone: (907) 842-5287 Fax: (907) 842-5428 Web: http://www.swrsd.org

History

Togiak is a Yup'ik Eskimo village on Togiak Bay. In 1880, "Old Togiak," or "Togiagamute," was located across the Bay on the south shore. Heavy winter snowfalls made wood-gathering difficult at Old Togiak, so gradually people settled at a new site on the opposite shore to the north. After a devastating influenza epidemic in 1918, residents of the Yukon-Kuskokwim Delta region migrated to the Togiak area. In 1950, a school was established in an old church. In 1959, a school building and a National Guard Armory were constructed. A flood in 1964 destroyed fish racks and oil storage tanks. After the flood three or four households left Togiak and developed the village of Twin Hills. The City of Togiak was incorporated in 1969.

Culture

Togiak is a traditional Yup'ik Eskimo village with a fishing and subsistence lifestyle. The sale and importation of alcohol are prohibited.

Population

According to the 2008 Department of Commerce, Community and Economic Development (DCCED) Certified Population, Togiak has a population of 802; nearly 93 percent of residents are Alaska Native. Togiak has a total of 221 housing units, 202 units are occupied household. Seven housing units are vacant due to seasonal use and 19 housing units are vacant in total.

Economy

Togiak's potential work force is 519, a total of 173 residents are employed; 284 adult residents are not in the labor force (not seeking work). The unemployment rate is 26.8 percent. Nearly 30 percent of Togiak residents live below the poverty line. The per capita income is \$9,676 and the median household income is \$23,977.

Facilities

Water is pumped from a well, treated, stored and piped to 88 percent of community households. Approximately, 58 percent of households are connected to the City sewage system. The water and

sewer system was installed in 1976 and is in need of repair. Refuse is taken to a landfill operated by the City and North Pacific Processors. The class-three landfill has an expired Department of Environmental Conservation permit. The electric utility, Alaska Village Electric Cooperative (AVEC), operates a 1,673-kilowatt diesel generator.

Togiak is located within the Southwest Region School District. The district is home to 8 schools with 65 teachers and 676 students. Togiak received a new Kindergarten through 12th grade school in 2004.

Togiak is classified as an isolated town and emergency services have coastal and air access. The community has a recently-constructed clinic, the Togiak Sub-Regional Health Clinic.

Transportation

Scheduled and chartered flights provide passenger and freight service from Dillingham to Togiak. The community has a state-owned 4,400-foot-long by 98-foot-wide lighted gravel airstrip and a 1,200-foot-long by 49-foot-wide crosswind airstrip. There are no docking facilities; freight arriving by barge is lightered to shore. Skiffs, automobiles, all-terrain vehicles (ATVs), and snowmobiles are used for local transportation.

Climate

Togiak is located in a climatic transition zone. Average summer temperatures range from 37° Fahrenheit (F) to 66°F. Winter temperatures average from 4°F to 30°F. Winters are characterized by fog and high winds. The community has an average of 20 to 26 inches of precipitation annually. The Bay is ice-free from June through mid-November.

Vegetation and Soils

Area geology is composed of a low-lying coastal plain characterized by unconsolidated alluvial and marine sediments with localized glacial drift deposits. The deposits are silt, sand and gravel overlain with volcanic ash (Selkregg, 1976). Togiak is underlain by a series of beach ridge deposits, inland the terrain is flat and muskeg covered, with irregularly-shaped morainal deposits (Bristol Environmental & Engineering Services Corporation, 2003).

The regional vegetation consists of moist tundra; characterized by a variety of grasses, sedges, mosses, berries and low-shrub mires.

Wildlife

According to the U.S. Fish and Wildlife Service, sockeye, chum, pink and coho salmon and 27 other fish species can be found in Togiak's rivers and streams. An estimated 201 staging, migrating, or breeding bird species are also commonly found in the area. Terrestrial mammals including brown bear, moose, caribou, wolves and many smaller mammals are also common to the area. 17 species of marine mammals are found along the coastline; including stellar sea lions, fur seals and walrus.

Togiak Capability Assessment

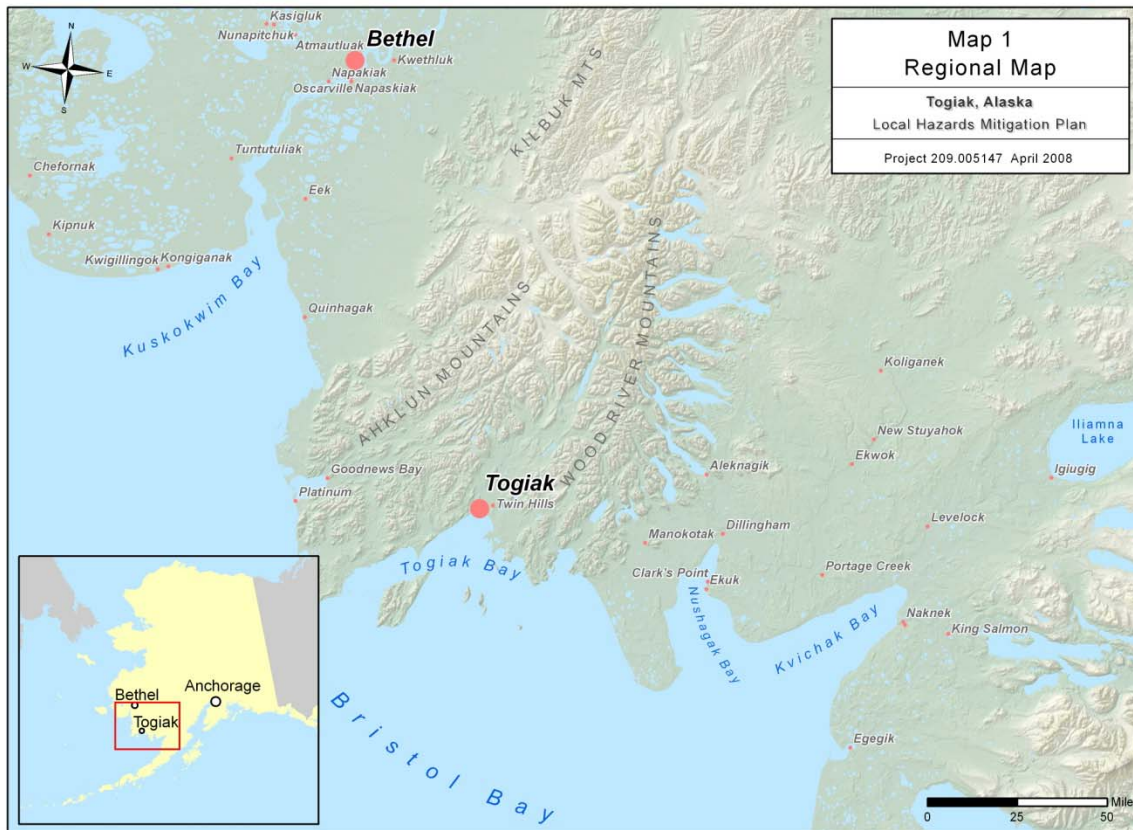
Government

The City of Togiak was incorporated in 1969. The municipal government is composed of six council members and a “strong mayor.” Regular elections are held on the first Tuesday in October. The City Council meets on the first Tuesday of each month.

Community Maps

Community maps were developed using data from the DCCED website and input from residents. Togiak does participate in the National Flood Insurance Program (NFIP), however no Flood Insurance Rate Maps (FIRM) were available. Togiak’s location in the Bristol Bay area and its relation to the state as a whole are shown on Map 1.

Map 1. Regional Map



Infrastructure

Every jurisdiction is unique. The list of assets that are most important to protect, as well as the criticality of any given facility, can vary widely from community to community. For planning purposes, a jurisdiction should determine criticality based on the relative importance of its various assets for the delivery of vital services, the protection of special populations, and other important functions. Infrastructure may be considered critical for a variety of reasons. The following are examples of facilities important to Togiak.

Critical Facilities

Critical facilities are those facilities and infrastructure necessary for emergency response efforts and whose loss of function would present an immediate threat to life, public health, and safety. In Togiak, they include:

- Airport
- Clinic/Senior Center
- City Office
- Police/Fire Station
- Water Tank

Essential Facilities

Essential facilities are those facilities and infrastructure that supplement response efforts and whose loss of function would present an immediate threat to life, public health, and safety, including:

- Bulk Fuel Storage Tank Farms
- Public Works Complex
- AVEC Electric Plant
- AC Store

Critical Infrastructure

Critical infrastructure consists of the various service networks in Togiak, including:

- Telephone Lines
- Satellite Communication Tower
- Power Lines
- Transportation Networks
- Water Storage and Distribution Network
- Wastewater Collection and Distribution Facilities

Vulnerable Populations

Locations within Togiak that serve populations with special needs or requiring special consideration include:

- Schools
- Clinic/Senior Housing
- UAF BB & Youth Center
- Traditional Council Senior Center

Cultural and Historical Assets

Cultural and historical assets include those facilities that augment or help define community character that, if lost, would represent a significant loss to the community. These include:

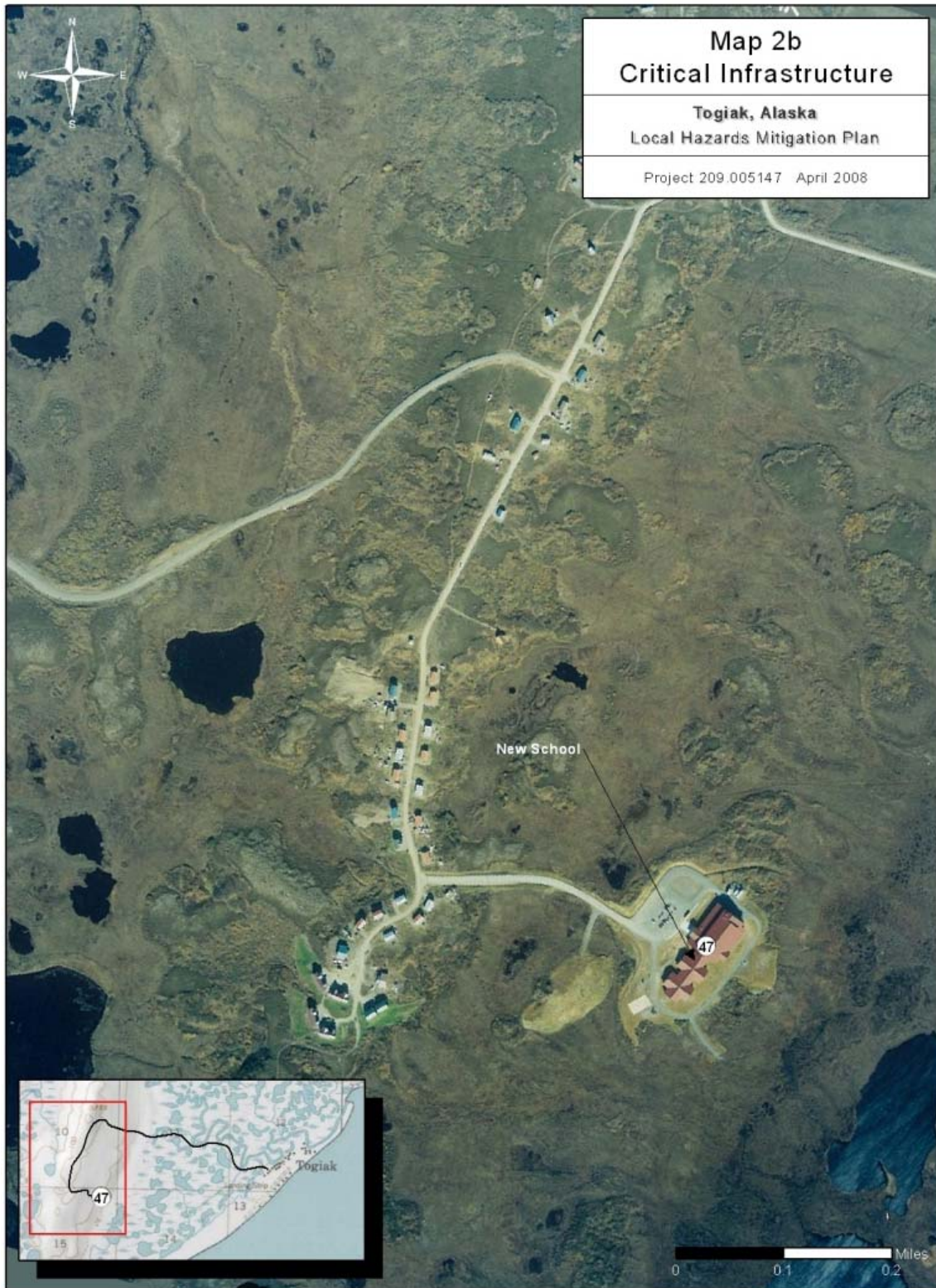
- Nangucuilnguq Arts and Crafts Center

- Togiak Church
- Cemetery

Togiak's critical infrastructure is shown on Map 2a and b.

Map 2. Critical Facilities





Federal Resources

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 (PDM)

Assistance Program and the Hazard Mitigation Grant Program (HMGP). The Mitigation Technical Assistance Programs available to local governments are also a valuable resource. FEMA may also provide temporary housing assistance through rental assistance, mobile homes, furniture rental, mortgage assistance, and emergency home repairs. The Disaster Preparedness Improvement Grant also promotes educational opportunities with respect to hazard awareness and mitigation.

FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from 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 Togiak 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/plan/mitplanning/resources.shtm>).
- **Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments.** FEMA Disaster Assistance Policy-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 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 Togiak businesses.

Other Federal Resources include:

- **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 DCCED Division of Community and Regional Affairs (DCRA). 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 a 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>.
- **DCCED DCRA:** 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

Togiak is a small community with a limited number of planning and land management tools. The resources available in these areas have been assessed by the City, and are summarized in Table 3, Table 4, and Table 5.

Table 3. Regulatory Tools

Regulatory Tools (ordinances, codes, plans)	Local Authority (Yes/No)	Comments (Year of most recent update; problems administering it, etc)
Building code	No	Except for NFIP requirements
Zoning ordinance	No	
Subdivision ordinance or regulations	No	May have covenants through Tribal government
Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Yes	Related to NFIP
Growth management ordinances (also called “smart growth” or anti-sprawl programs)	No	
Site plan review requirements	No	Except for those required by specific grant funding, etc.
Comprehensive plan	Yes	2006
A capital improvements plan	Yes	1985 (Comprehensive Plan serves as update)
An economic development plan	Yes	Needs update.
An emergency response plan	Yes	
A post-disaster recovery plan	No	
Real estate disclosure requirements	No	

Table 4. Administrative and Technical Capability

Staff/Personnel Resources	Y/N	Department/Agency and Position
City Administrator	Yes	
City Clerk	Yes	
Fire Chief		Department of Public Safety
City Planner	No	
Public Works Director	Yes	Water/Sewer Director
Public Safety Director	Yes	Police Chief
Librarian		School
Fire Department	Yes	Department of Public Safety
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	Vacant
Surveyors	No	

Staff/Personnel Resources	Y/N	Department/Agency and Position
Staff with education or expertise to assess the community's vulnerability to hazards	No	
Personnel skilled in GIS and/or HAZUS	No	

Table 5. 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	Yes
Fees for sewer	Yes
Impact fees for homebuyers or developers for new developments/homes	No
Incur debt through general obligation bonds	No
Incur debt through special tax and revenue bonds	No
Incur debt through private activity bonds	No
Withhold spending in hazard-prone areas	Yes

Chapter 3. Risk Assessment

Requirements

Section 201.6(c)(2) of the mitigation planning regulation requires local jurisdictions to provide sufficient hazard and risk information from which to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. (FEMA 386-8)

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 buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards and their impact on community assets.

Federal Requirements for Risk Assessment

Federal regulations for hazard mitigation plans outlined in 44 CFR Section §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 Togiak MHMP meets those criteria are outlined below:

Table 6. Risk Assessment - Federal Requirements

Section §201.6(c)(2) Requirement	Where requirement is addressed in Togiak Multi-Hazard Mitigation Plan
Identifying Hazards §201.6(c)(2)(i) The risk assessment <i>shall</i> include a description of the type . . . of all natural hazards that can affect the jurisdiction . . .	Chapter 3, Section 1 identifies flood/erosion, severe weather, earthquakes, and volcanoes as natural hazards affecting Togiak.
Profiling Hazards §201.6(c)(2)(i) The risk assessment <i>shall</i> include a description of the . . . location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.	Chapter 3, Sections 3-6 includes hazard-specific sections of the Togiak MHMP profile the natural hazards that may affect the community. The Plan includes location, extent, impact and probability for each natural hazard identified. The MHMP also provides hazard specific information on previous occurrences of hazards events.

Section §201.6(c)(2) Requirement	Where requirement is addressed in Togiak Multi-Hazard Mitigation Plan
<p>Assessing Vulnerability: Overview §201.6(c)(2)(i) The risk assessment <i>shall</i> include a description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.</p>	<p>Chapter 3, Sections 3-6 contain overall summaries of each hazard and its impact on the community. Summaries are contained in hazard-specific section in Chapter 3.</p>
<p>Assessing Vulnerability: Addressing Repetitive Loss Properties §201.6(c)(2)(ii) The risk assessment in all plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.</p>	<p>There are no repetitively damaged structures in the City of Togiak. Section 3 Flood/Erosion explains this requirement in further detail.</p>
<p>Assessing Vulnerability: Identifying Structures §201.6(c)(2)(ii)(A) The plan <i>should</i> describe vulnerability in terms of the types and number of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.</p>	<p>Chapter 3, Section 1, Table 12 lists structures, infrastructure and critical facilities located in the identified hazard areas.</p>
<p>Assessing Vulnerability: Estimating Potential Losses §201.6(c)(2)(ii)(B) The plan <i>should</i> describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.</p>	<p>Chapter 3, Section 2, Table 13 estimates potential dollar losses to municipal-owned facilities. This information was derived from insurance values provided by the City.</p>

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 Profile Section of this hazard plan. A vulnerability table of critical facilities as affected by each hazard is provided in Section 2 of this chapter.

Facilities were designated as critical if they are: (1) vulnerable due to the type of occupant (children 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 (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 Togiak records and land use map.

The following assessment includes the following seven sections:

Section 1. Identifying Hazards

- Section 2. Assessing Vulnerability: Overview and Potential Losses
- Section 3. Flood/Erosion
- Section 4. Severe Weather
- Section 5. Earthquake
- Section 6. Volcanoes
- Section 7. Hazards Not Profiled in the 2009 Togiak MHMP

The description of each of the identified hazards includes a narrative and in some cases a map of the following information:

- The **location** or geographical areas in the community that would be affected.
The location of identified hazards is described by a map wherever appropriate or in some cases with a narrative statement.
- The **extent** (i.e. magnitude or severity) of potential hazard events is determined.
Table 7 is used to rank the extent of each hazard. Sources of information to determine the extent include the *Alaska All-Hazard Risk Mitigation Plan*, historical or previous occurrences and information from local residents and experts.

Table 7. Extent of Hazard Ranking

Magnitude/Severity	Criteria to Determine Extent
Catastrophic	Multiple deaths Complete shutdown of facilities for 30 or more days More than 50% of property severely damaged
Critical	Injuries and/or illnesses result in permanent disability Complete shutdown of critical facilities for at least 2 week More than 25% of property is severely damaged
Limited	Injuries and/or illnesses do not result in permanent disability Complete shutdown of critical facilities for more than one week More than 10% of property is severely damaged
Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life lost Shutdown of critical facilities and services for 24 hours or more Less than 10% of property is severely damaged

- The **impact** of the hazard or its potential effects on the community is described.
- The **probability** that the hazard event would occur in an area.
Table 8, taken from the *Alaska All-Hazard Risk Mitigation Plan* categorizes the probability of a hazard occurring. Sources of information to determine the probability include the *Alaska All-Hazard Risk Mitigation Plan*, historical or previous occurrences and information from experts, as well as local residents.

Table 8. Probability Criteria Table

Probability	Criteria Used to Determine Probability
Low	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.
Medium	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.
High	Hazard is present with a high probability of occurrence within the calendar year. Event has up to 1 in 1 year chance of occurring.

- Previous occurrences** of hazard events.

The previous occurrences of natural events are described for identified natural hazards. The information was obtained from the *Alaska All-Hazard Risk Mitigation Plan*, State Disaster Cost Index, City records, other state and federal agency reports, newspaper articles, web searches, etc.

Section 1. Identifying Hazards

This section identifies and describes the hazards likely to affect Togiak. The community used the following sources to identify the hazards present in community: the *Alaska All-Hazard Risk Mitigation Plan*, interviews with experts and long-time residents, and previous occurrences of events.

Alaska All-Hazard Risk Mitigation Plan, 2007 Matrices – Bristol Bay Borough

Table 9 is taken from the *Alaska All-Hazard Risk Mitigation Plan* of October 2007. The identification of hazards is for the whole Bristol Bay Borough and is not specific to Togiak; some hazards, such as erosion are documented as present in Togiak that are not identified on this matrix.

Table 9. Hazard Matrix

Hazard Matrix – Bristol Bay Borough				
Flood	Wildland Fire	Earthquake	Volcano	Avalanche
Y	N	Y	Y	Y
Tsunami & Seiche	Severe Weather	Ground Failure	Erosion	
N	Y	N	N	

Hazard Identification:

- 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 within 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 next one 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

Source: Alaska All-Hazards Mitigation Plan, 2007

Data for the Previous Occurrences Matrix, Table 10, comes from the *Alaska All-Hazard Risk Mitigation Plan*, Disaster Cost Index including data from 1978 to the 2007 and major events such as the 1964 earthquake. It may not include events known to the community or from other sources discussed in the sections describing specific hazards.

Table 10. Previous Occurrences from 1978 to Present

Previous Occurrences - Bristol Bay Borough				
Flood	Wildland Fire	Earthquake	Volcano	Avalanche
2 – L	None	None	None	1 – L
Tsunami & Seiche	Severe Weather	Ground Failure	Erosion	
None	3 – L	None	None	

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-Hazards Mitigation Plan, 2007

Identification of Natural Hazards Present in Togiak

Based on consultation with the Alaska DHS&EM, Table 9 and Table 10 from the *Alaska All-Hazard Risk Mitigation Plan*, Togiak plans and reports, and interviews Togiak identified the following hazards to be profiled.

Table 11. Hazards Identification and Decision to Profile

Table 9	Yes/No	Decision to Profile Hazard
Earthquake	Yes	Designated as a hazard in the <i>Alaska All-Hazard Risk Mitigation Plan</i> . The Alaska Earthquake Information Center indicated that Togiak lies near active earthquake faults.
Flood/Erosion	Yes	Flood/Erosion is designated as a hazard in the <i>Alaska All-Hazard Risk Mitigation Plan</i> ; erosion is documented in USACE studies, and residents report previous occurrences.
Severe Weather	Yes	Designated as a hazard in <i>Alaska All-Hazard Risk Mitigation Plan</i> . Previous occurrences have caused damage in the community.
Volcano	Yes	The Alaska Volcano Observatory identifies the closest active volcano to Togiak as being Mount Redoubt, approximately 200 miles away; however, closer inactive volcanoes exist and Redoubt activity could cut off access to other parts of the state.
Avalanche	No	Togiak’s topography is not one likely to produce avalanches.
Ground Failure	No	Designated as not a hazard in <i>Alaska All-Hazard Risk Mitigation Plan</i> .
Tsunami	No	The bathymetry and shallow depth of Togiak Bay protect the village from a tsunami hazard.
Wildland Fire	No	Designated as not a hazard in <i>Alaska All-Hazard Risk Mitigation Plan</i> .

See Section 7, Hazards not Profiled in the 2009 Togiak MHMP, for more information on the hazards not profiled in this plan. Each hazard that affects the community is profiled in hazard-specific sections.



Photo courtesy of the City of Togiak

Standing water in roadway, spring 2008.

Section 2. Assessing Vulnerability

Overview

The vulnerability overview section is a summary of Togiak’s vulnerability to the hazards identified in Table 11. The summary includes, type of hazard, the types of structures, infrastructures and critical facilities affected by the hazards. Some hazards are area wide in scope while others impact certain areas of the community to a greater or lesser extent.

Identification of Assets

Because Togiak is a small community of 802 residents, every structure is essential to the sustainability and survivability of Togiak residents. The Hazard Vulnerability Matrix in Table 12 includes a list of facilities, utilities and businesses and whether, based on its location, each has a low (L), medium (M) or high (H) vulnerability to specific natural hazards.

Table 12. City of Togiak Asset Matrix – Structures and Infrastructure

Structure	Flood/Erosion	Severe Weather	Volcano	Earthquake
Airport	L	H	L	L
City Office	H	H	L	L
Water Tank	L	H	L	L
Police/Fire Station	H	H	L	L
Clinic/Senior Center	L	H	L	L
School Complex	H	H	L	L
UUI Station	L	H	L	L
Fuel Storage Tanks (500+ gallons)	L	H	L	L
AVEC Electric Plant	H	H	L	L
AVEC Tank Farm	H	H	L	L
Landfill	L	H	L	L
AC Store	H	H	L	L
Beacon Tower	L	H	L	L
UAF BB & Youth Center	L	H	L	L
Nanguciunguk Center	L	H	L	L
Coupchiak Building	L	H	L	L

Planned future construction in Togiak includes additional housing in the Togiak Heights subdivision. This area is above the floodplain and is not vulnerable to flooding and erosion hazards. Other potential projects include construction of a sub-regional healthcare facility, relocation and consolidation of utility

generators and tankfarms, and new Public Safety facilities. These are all planned for areas above the 100-year floodplain.

Table 13 lists the critical facilities owned by the City and the replacement value of buildings and contents. Both of these values were provided by the City and were based on insurance assessments. Additional information will be added as it becomes available.

Table 13. City-owned Critical Facilities with Replacement Value

Structure	Building Value (\$)	Contents Value (\$)
City Offices (Community Center)	\$563,985	\$45,324
City Shop	\$235,438	\$33,993
Water Tank		
New Pump House	\$47,557	
Police/Fire Station	\$835,385	\$29,460
Clinic/Senior Center	\$1,985,095	
School Complex		
UUI Station		
Fuel Storage Tanks (500+ gallons)		
AVEC Electric Plant		
AVEC Tank Farm		
Landfill Storage Building	\$106,651	\$21,345
AC Store		
Beacon Tower		
Old Water Treatment Plan	\$256,864	\$5,666
Family Resource Center	\$1,400,000	\$80,000
Manifold Building	\$31,995	\$12,807
Gray House	\$92,552	\$1,133
Craft Center	\$829,668	

Section 3. Floods and Erosion

The flood/erosion hazard profile includes a description of the hazard, the location, extent, impact and probability of the hazard and previous occurrences of flooding/erosion (not due to tsunami, which is covered in Section 7) in Togiak.

Hazard Description

The primary flooding and erosion hazard in the Togiak is storm surge flooding. Togiak is located on the coast and therefore susceptible to significant storm surge flooding. 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. Storm-driven wind and waves, high tides, heavy rains and attendant flooding contribute to coastal erosion in Togiak. Additionally, Togiak is subject to riverine bank erosion along Nasaurluq Creek in the northern part of the community. Finally, heavy rains and spring snowmelt cause flooding in Togiak that damages infrastructure and hampers movement throughout the community.

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

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

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

Coastal erosion: Coastal erosion is the wearing away of coastal land. It is commonly used to describe the horizontal retreat of the shoreline along the ocean, or the vertical down cutting along the shores of the Great Lakes. Erosion is considered a function of larger processes of shoreline change, which includes erosion and accretion. Erosion results when more sediment is lost along a particular shoreline than is redeposited by the water body. Accretion results when more sediment is deposited along a particular shoreline than is lost. When these two processes are balanced, the shoreline is said to be stable. In assessing the erosion hazard, it is important to realize that there is a temporal, or time aspect associated with the average rate at which a shoreline is either eroding or accreting. Over a long-term period (years), a shoreline is considered to be eroding, accreting or stable. A hazard evaluation should focus on

the long-term erosion situation. However, in the short-term, it is important to understand that storms can erode a shoreline that is, over the long-term, classified as accreting, and vice versa.

Riverine erosion: Riverine erosion is the long-term process whereby river banks and riverbeds are worn away. This erosion is often initiated by river bank failure or heavy rainfall; increasing the sediment loads. As the sediment load increases, fast-flowing rivers will erode their banks downstream. Eventually, the river becomes overloaded or velocity is reduced, leading to sediment deposition further downstream or in dams and reservoirs. The deposition may eventually lead to the river developing a new channel.

Erosion is measured as a rate, with respect to either a linear retreat (i.e., feet of shoreline recession per year) or volumetric loss (i.e., cubic yards of eroded sediment per linear foot of shoreline frontage per year). Erosion rates are not uniform, and vary over time at any single location. Annual variations are the result of seasonal changes in wave action and water levels.

Erosion is caused by coastal storms and flood events; changes in the geometry of tidal inlets, river outlets, and bay entrances; man-made structures and human activities such as shore protection structures and dredging; long-term erosion; and local scour around buildings and other structures. Further information on coastal erosion can be found in FEMA-55, Coastal Construction Manual, FEMA's Multi-hazard Identification and Risk Assessment, Evaluation of Erosion Hazards published by The Heinz Center, and Coastal Erosion Mapping and Management, a special edition of the Journal of Coastal Research. (FEMA, 386-2)

Location

During high tides, water rises as much as 22 feet in the fall and winter. High winds are also prevalent, with winds up to 80 knots that raise water levels another five feet, inundating substantial portions of the community. Residents stated that storm surges, resulting from high winds and high water levels, cause flooding in the Togiak Spit and the old townsite. Low, flat terrain areas along the coast are most at risk of storm surge flooding. Flooding also occurs when seawater enters the slough and inundates the community from the river side.

The community is affected by coastal erosion along Togiak Bay and riverine bank erosion along Nasaurluq Creek, which is in the northern part of the community.

Snowmelt during spring break-up, as well as heavy rains, cause flooding throughout the community, leaving roads impassable and hampering movement between critical facilities and residences. This is shown in the photo on the right. A snowblower was secured from the State to assist in removal of snow from city streets. This reduces the amount of snow that is amassed and reduces standing water during breakup.



Photo courtesy of the City of Togiak

Map 3 was taken from *Alaska Baseline Erosion Assessment* (U.S. Army Corps of Engineers, 2009) and depicts the linear extent of erosion in Togiak.

Map 3. Linear Extent of Erosion in Togiak, Alaska



Source: Alaska Baseline Erosion Assessment, 2009

Extent

The extent (i.e. magnitude or severity) of the flood/erosion hazard is measured in this plan by using historical past events and the *Alaska All-Hazard Risk Mitigation Plan*. Based on these factors and using the criteria established in Table 7, the City of Togiak has a **critical** flooding and erosion extent. Erosion and flooding along the shoreline have been a persistent problem with major flood/erosion events in 1964, 1979, 1980, and 1982.

No community floodplain mapping has been developed. A flood gauge was installed on the front of the city office. A High Water Elevation sign was placed on the gauge with the water symbol at the 1964 flood level of 18.8 feet.

The unprotected coastal areas and the expanding community area south of the seawall are being eroded (U.S. Army Corps of Engineers, 2009). The rate of erosion was estimated at about one foot per year (Tetra Tech, 1983). That same report estimated that erosion could increase to seven to eight feet per year if major storms occur regularly. The City more recently estimated the rate of coastal erosion to be four feet per year and the rate of erosion along Nasaurluq Creek to be four to six feet per year.

Impact

Most of the community's public and private buildings are located near the coastline. Flooding in the coastal portions of Togiak could cut off access to critical facilities and services. Ninety percent of the village was flooded under water as deep as 3 to 4 feet during the 1964 flood event.

Erosion along Nasaurluq Creek reportedly threatens residences, outbuildings, sheds, water lines, sewer lines, and a church. Some of these structures are less than 100 feet from the eroding bank. Locally installed erosion protection measures include a line of 55-gallon drums filled with rocks approximately 30 feet inland from the bank. The city dumps rock and gravel on the creek side of the 55-gallon drums when needed (U.S. Army Corps of Engineers, 2009).

Even properties unaffected directly by flood events, will suffer due to road closures, impacts to public safety (access and response capabilities), and isolation.

Probability

Based on the *Alaska All-Hazard Risk Mitigation Plan*, City records and past historical events Togiak has a **medium** probability of flooding. Table 8 defines criteria used for determining medium probability, as the hazard is present with a probability of occurrence within the next three years. Event has up to 1 in 3 years chance of occurring. The *Alaska All-Hazard Risk Mitigation Plan* lists Togiak as having flood hazard present but with a low probability.

However, heavy winter snowfall and rapid spring thaws that have occurred recently create conditions for flooding in the community on a more regular basis.

Previous Occurrences

The community of Togiak flooded in 1964. The flood waters reached levels of 18.8 feet.

06-214 2005 Bristol Bay Storm (AK-06-214) declared October 03, 2005 by Governor Murkowski: On August 23, 2005, a strong storm with high winds combined with high tides produced storm surges of 2 to 3 feet above the high tide levels and caused **widespread coastal flooding in the upper Bristol Bay** area. Public infrastructure, commercial property, and personal property damages were reported in the City of Clark's Point, the nearby unincorporated community of Ekuk, and the **City of Togiak**. Damages were also reported in Lake and Peninsula Borough, Bristol Bay Borough and the City of Dillingham. Lake and Peninsula Borough, Bristol Bay Borough and the City of Dillingham elected not to declare local disasters and are not seeking assistance. Clark's Point and **Togiak** have each signed local disaster declarations and asked for state Individual Assistance and Public Assistance in response and recovery from this storm. Individual Assistance totaled \$131,890 for 39 applicants. Public Assistance totaled \$157,000. The total for this disaster is \$326,000 (RBS, Nov 7, 008).

Community Participation in the NFIP

The City of Togiak is participating in NFIP. Togiak is an emergency phase community; this is the initial phase of a community's participation, only limited amounts of insurance are available.

The function of the NFIP is to provide flood insurance at a reasonable cost to homes and businesses located in floodplains. In trade, the City of Togiak agrees 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 on 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. Table 14 describes the flood insurance rate map (FIRM) zones.

Table 14. FIRM Zones

<i>Firm Zone</i>	<i>Explanation</i>
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 FEMA 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.

Elevation Certificates are used to:

- Record the elevation of the lowest floor of all newly constructed buildings, or substantial improvement, located in the floodplain.
- Determine the proper flood insurance rate for floodplain structures

Local governments must insure that elevation certificates are filled out correctly for structures built in floodplains. Certificates must include:

- The location of the structure (tax parcel number, legal description and latitude and longitude) and use of the building.
- The Flood Insurance Rate Map panel number and date, community name and source of base flood elevation date.
- Information on the building’s elevation.
- Signature of a licensed surveyor or engineer.

Currently, no floodplain mapping is available for Togiak; FEMA has released preliminary maps, but official maps are not available yet for use as a reference in this document.

Table 15. Housing Use Types in Togiak

Housing Types	Number of Structures
Total Housing Units	221
Occupied Housing (Households)	202
Vacant Housing	19
Vacant Due to Seasonal Use	7
Households located in the flood plain	

Table 16. Local and State Floodplain Coordinator Contact Information

Togiak Floodplain Coordinator	City Contact Person – Vacant Position Contact Person Address Phone: Email:
State of AK Floodplain Coordinators	Floodplain Management Programs Coordinator Division of Community Advocacy Department of Commerce, Community & Economic Development Taunnie Boothby, State Floodplain Coordinator 550 W. 7th Avenue, Suite 1640 Anchorage, AK 99501 (907) 269-4567 (907) 269-4563 (fax) Email: taunnie_boothby@commerce.state.ak.us Web: http://www.commerce.state.ak.us/dca/nfip/nfip.htm

Repetitive Loss Properties

The risk assessment in all plans approved after October 1, 2008 must also address NFIP-insured structures that have been repetitively damaged by floods. Under NFIP guidelines, repetitive loss

structures include any currently insured building with two or more flood losses (occurring more than ten days apart) greater than \$1,000 in any 10-year period since 1978.

States should provide communities with information on historic floods throughout the state so communities will know what type of damage has occurred (even if it didn't occur within that particular community). States should ensure that lists of repetitive loss properties are kept up to date and that communities have the most current list. States should contact their FEMA Regional Office for this information.

FEMA also maintains a national list of properties that comprise the "Repetitive Loss Target Group". These are repetitive loss properties that have either experienced four or more losses with the characteristics above, or have had losses that cumulatively exceed the property value of the building.

Repetitive loss properties are those with at least two losses in a rolling ten-year period and two losses that are at least ten days apart. Specific property information is confidential, but the State DCRA Floodplain Coordinator related that within the City of Togiak there have been **zero** properties that meet the FEMA definition of repetitive loss.

Flood and Erosion Mitigation Goals and Projects

Flood and Erosion Goals

Goal 1. Reduce or prevent future flood damage.

Perform mitigation actions that will reduce floodwater incursion into the community and perform actions that will make structures less vulnerable to damage.

Goal 2. Reduce loss of life or injuries from flood disasters

Provide safe access to emergency shelter during all weather conditions.

Goal 3. Increase public awareness

Increase public knowledgeable about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards.

Flood and Erosion Projects

After receiving public input, it is the recommendation of this plan that the City of Togiak, along with other local, State and Federal entities look at the following projects for flood and erosion control.

See Table 19, page 56, for further analysis of specific projects to mitigate flooding and erosion.

FLD-1. Bulkhead Rehabilitation (Goal 1)

The community reported that the creek by the bulkhead has eroded away nearly two feet of material and the bulkhead has started to lean toward the water. Consider lengthening the seawall to the southwest. Coordination with the USACE is needed on this project.

FLD-2. Elevation and/or reinforcement of roads (Goal 1)

Elevate and reinforce roads that serve as barriers to rising waters or storm surges. Main roads throughout town have been identified as performing this function. A flood/dust abatement grant was secured to begin this process.

FLD-3. Relocate existing and new Public Safety Facilities to areas above the 100-year floodplain. (Goals 1, 2)

Areas have been set aside in the ridge area (near school and Togiak Heights subdivision) for public safety facilities where they will not be impacted by flood hazards.

FLD-4. Emergency shelter access route (Goal 2)

A second route for access and egress to the school, which is the community's designated shelter, and the Togiak Heights subdivision is needed. It is important that all areas of the community have access to the shelter. A direct route past the pump house is envisioned.

FLD-5. Improve drainage in Togiak (Goals 1, 2)

Storms and snowmelt both cause flooding in the community. Improved drainage could keep standing water off streets, reducing damage to infrastructure and facilitating movement of residents and emergency services throughout the community.

FLD-6. Suite of emergency plans (Goals 2, 3)

To facilitate preparedness, the community's Emergency Operations Plan should be updated and tailored to the community's specific needs. Other emergency plans could include emergency evacuation and continuity of operations planning.

FLD-7. Public education (Goal 3)

Increase public knowledge about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards. This would include advising property owners, potential property owners, and visitors about the hazards. In addition, dissemination of a brochure or flyer on flood hazards in Togiak could be developed and distributed to all households.

Hands on educational activities and presentations on flood and erosion at the school can greatly influence families throughout the community.

FLD-8. Togiak Flood Plain Maps (Goal 1, 2)

Accurate flood maps that delineate areas of flooding and upland areas should be prepared.

FLD-5: Flood Insurance (Goals 1, 2)

Continue to obtain flood insurance for all City structures, and continue compliance with NFIP

Section 4. Severe Weather

Hazard Description

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 for weeks at a time. Heavy snow can impact the interior and is common along the southern coast. A quick thaw means certain flooding.

In many Alaskan communities, severe weather can disrupt the delivery of fuel by barge or aircraft. Since residents are generally dependent on diesel electric power for heat as well as energy needs, this can be disastrous to the community as a whole.

Weather issues in Togiak include severe high winds, winter storms with blizzard conditions, heavy snow, and wind-driven tides.

Winter Storms

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

- Cold air - Subfreezing temperatures (below 32°F, 0°C) in the clouds and/or near the ground to make snow and/or ice.
- Moisture - The air must contain moisture in order to form clouds and precipitation.
- Lift - A mechanism to raise the moist air to form the clouds and cause precipitation. Any or all of the following may provide lift:
 - The flow of air up a mountainside.
 - Fronts, where warm air collides with cold air and rises over the dome of cold air.
 - Upper-level low-pressure troughs.

Heavy Snow

Heavy snow, generally more than 12 inches of accumulation in less than 24 hours, can immobilize a community by bringing transportation to a halt. Until the snow can be removed, airports and major roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns. Injuries and deaths related to heavy snow usually occur as a result of vehicle accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

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°F . 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 to 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.

Location

The hazards of severe weather impact Togiak on an area-wide basis. A severe weather event would create an area-wide impact, could damage structures, and potentially isolate Togiak from the rest of the state.

Winter blizzards close roads throughout the community as public works staff struggle to keep up with clearing efforts.

Severe weather affecting regional transportation hubs (i.e. Dillingham or Anchorage) also impacts Togiak. Severe weather can ground flights preventing the transportation of critical goods into the community.

Extent

Severe Weather could result in a **critical** situation in Togiak. Injuries and/or illness could result from blizzard conditions and high winds causing shutdown of critical facilities, damage to property and isolating Togiak from the rest of the state.

The *Alaska All-Hazard Risk Mitigation Plan, 2007* lists severe weather as creating one limited-damage event in Togiak.

Impact

Severe weather can cut off air access limiting medevac availability and access to goods and services, including groceries and medical supplies. Severe wind may result in extensive damage to critical structures including residences and public facilities. Recent blowing snow in high wind conditions entered attic/roof space and damaged insulation in several structures.

A severe weather event would create an area wide impact and could damage structures and critical infrastructure potentially isolating Togiak from the rest of the State.

Probability

The City Administrator and residents describe severe weather as a serious natural hazard risk in Togiak, due to snow, ice, and high winds. Togiak has a **high** probability of severe weather, which is defined, as the hazard is present with a high probability of occurrence within the calendar year. Event has up to a 1 in 1 chance of occurring.

Previous Occurrences

Wind event, October 2009. City staff reported that in October 2009 wind gusts up to 80 miles per hour occurred in Togiak. Construction crews witnessed a 22-foot by 28-foot house lifted off its support pilings approximately ten feet into the air before settling back down. The pilings were damaged but the house was alright. Another structure under construction had a portion of the roof blown off.

West Coast Storm, November 23, 1979: A major sea storm on the west coast of Alaska caused extensive damage in 14 villages in the area. The Governor proclaimed a Disaster Emergency effective from Sheldon Point to **Togiak**. At the request of the Governor, the SBA authorized disaster loans to affected individuals and businesses, and the State provided grants to individuals and families as well as some public assistance related to a fuel spill at Togiak.

Togiak, February 8, 1991: An electrical failure lasting four days, combined with extreme cold temperatures, caused damage to the Municipal water system and the plumbing and heating systems of public buildings. Disaster assistance supported emergency work and permanent repair work.

2005 Bristol Bay Storm (AK-06-214): declared October 03, 2005 by Governor Murkowski: On August 23, 2005, a strong storm with high winds combined with high tides produced storm surges of 2 to 3 feet above the high tide levels and caused widespread coastal flooding in the upper Bristol Bay area. Public infrastructure, commercial property, and personal property damages were reported in the City of Clark's Point, the nearby unincorporated community of Ekuk, and the **City of Togiak**. Damages were also

reported in Lake and Peninsula Borough, Bristol Bay Borough and the City of Dillingham. Lake and Peninsula Borough, Bristol Bay Borough and the City of Dillingham elected not to declare local disasters and are not seeking assistance. Clark’s Point and **Togiak** have each signed local disaster declarations and are asking for state Individual Assistance and Public Assistance in response and recovery from this storm. Individual Assistance totaled \$135,000 for 39 applicants. Public Assistance totaled \$157,000 for three applicants. The total for this disaster is \$326,000.

Table 17 from the Western Regional Climate Center provides a weather summary for nearby Cape Newenham since data is not available for Togiak. This shows the average range of temperatures, precipitation and snowfall in a similar area.

Table 17. Cape Newenham, Alaska, Weather Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	23.4	21.6	26.8	31.3	41.2	49	53.4	53.3	49.4	38.5	32.3	24.5	37.1
Average Min. Temperature (F)	14	11.9	17.3	22.7	33.5	41	45.8	47.1	43.4	32.4	25	14.8	29.1
Average Total Precipitation (in.)	1.78	1.09	1.58	1.7	2.02	2.81	3.75	5.88	5.39	4.76	3.7	2.13	36.59
Average Total SnowFall (in.)	12.3	9	10.4	10	4.3	0	0	0	0.1	5.5	12.4	12.9	76.9
Average Snow Depth (in.)	7	8	9	10	4	0	0	0	0	0	2	5	4

Table Updated 11/30/1984, Source: Western Regional Climate Center, <http://wrcc.dri.edu>

Severe Weather Mitigation Goals and Projects

Severe Weather Goals

Goal 1: Mitigate the effects of Severe Weather.

Encourage weather appropriate construction and citizen preparedness.

Goal 2: Education and Preparedness.

Provide information about the dangers of Severe Weather and how to prepare.

Goal 3: Develop an early warning system.

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

Severe Weather Projects

SW-1. Storm Ready (Goals 2, 3)

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: <http://www.nws.noaa.gov/stormready>.

SW-2. Education and Preparedness Activities (Goal 2)

Conduct special awareness activities, such as Winter Weather Awareness Week, Flood Awareness Week, etc., in the school and with the general public.

SW-3. NOAA Weather Radio (Goal 2)

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

SW-4. Encourage weather resistant building construction materials and practices. (Goal 1)

Homes, businesses, and public buildings that are built to be weather resistant have lower maintenance and utility costs, suffer less weather-related damage, and are more comfortable in Alaska's harsh weather.

Section 5. Earthquake

Hazard Description

Approximately 11 percent of the world's earthquakes occur in Alaska, making it one of the most seismically active regions in the world. Three of the ten largest quakes in the world since 1900 have occurred here. Earthquakes of magnitude 7 or greater occur in Alaska on average of about once a year; magnitude 8 earthquakes average about 14 years between events.

Most large earthquakes are caused by a sudden release of accumulated stresses between crustal plates that move against each other on the earth's surface. Some earthquakes occur along faults that lie within these plates. The dangers associated with earthquakes include ground shaking; surface faulting, ground failures, snow avalanches, seiches and tsunamis. The extent of damage is dependent on the magnitude of the quake, the geology of the area, distance from the epicenter and structure design and construction. A main goal of an earthquake hazard reduction program is to preserve lives through economical rehabilitation of existing structures and constructing safe new structures.

Ground shaking is due to the three main classes of seismic waves generated by an earthquake. Primary waves are the first ones felt, often as a sharp jolt. Shear or secondary waves are slower and usually have a side to side movement. They can be very damaging because structures are more vulnerable to horizontal than vertical motion.

Surface waves are the slowest, although they can carry the bulk of the energy in a large earthquake. The damage to buildings depends on how the specific characteristics of each incoming wave interact with the buildings' height, shape, and construction materials.

Earthquakes are usually measured in terms of their magnitude and intensity. Magnitude is related to the amount of energy released during an event while intensity refers to the effects on people and structures at a particular place. Earthquake magnitude is usually reported according to the standard Richter scale for small to moderate earthquakes.

Large earthquakes, like those that commonly occur in Alaska are reported according to the moment-magnitude scale because the standard Richter scale does not adequately represent the energy released by these large events.

Intensity is usually reported using the Modified Mercalli Intensity Scale. This scale has 12 categories ranging from not felt to total destruction. Different values can be recorded at different locations for the same event depending on local circumstances such as distance from the epicenter or building construction practices. Soil conditions are a major factor in determining an earthquake's intensity, as unconsolidated fill areas will have more damage than an area with shallow bedrock. Surface faulting is the differential movement of the two sides of a fault. There are three general types of faulting.

Strike-slip faults are where each side of the fault moves horizontally. Normal faults have one side dropping down relative to the other side. Thrust (reverse) faults have one side moving up and over the fault relative to the other side.

Earthquake-induced ground failure is often the result of liquefaction, which occurs when soil (usually sand and coarse silt with high water content) loses strength as a result of the shaking and acts like a viscous fluid.

Liquefaction causes three types of ground failures: lateral spreads, flow failures, and loss of bearing strength. In the 1964 earthquake, over 200 bridges were destroyed or damaged due to lateral spreads. Flow failures damaged the port facilities in Seward, Valdez and Whittier.

Similar ground failures can result from loss of strength in saturated clay soils, as occurred in several major landslides that were responsible for most of the earthquake damage in Anchorage in 1964. Other types of earthquake-induced ground failures include slumps and debris slides on steep slopes.

Location

An earthquake hazard event could potentially impact any part of Togiak. Since Togiak is dependent on air transportation for delivery of medical supplies and groceries, damage to regional airports would have serious impacts as well.

Extent

The extent of an earthquake in Togiak could be **limited**. Table 7 uses the following criteria to determine the extent of possible damage: Injuries and/or illnesses result in permanent disability, complete shutdown of critical facilities for at least two weeks, more than 25 percent of property is severely damaged.

Intensity is a subjective measure of the strength of the shaking experienced in an earthquake. Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. It varies from place to place within the disturbed region depending on the location of the observer with respect to the earthquake epicenter.

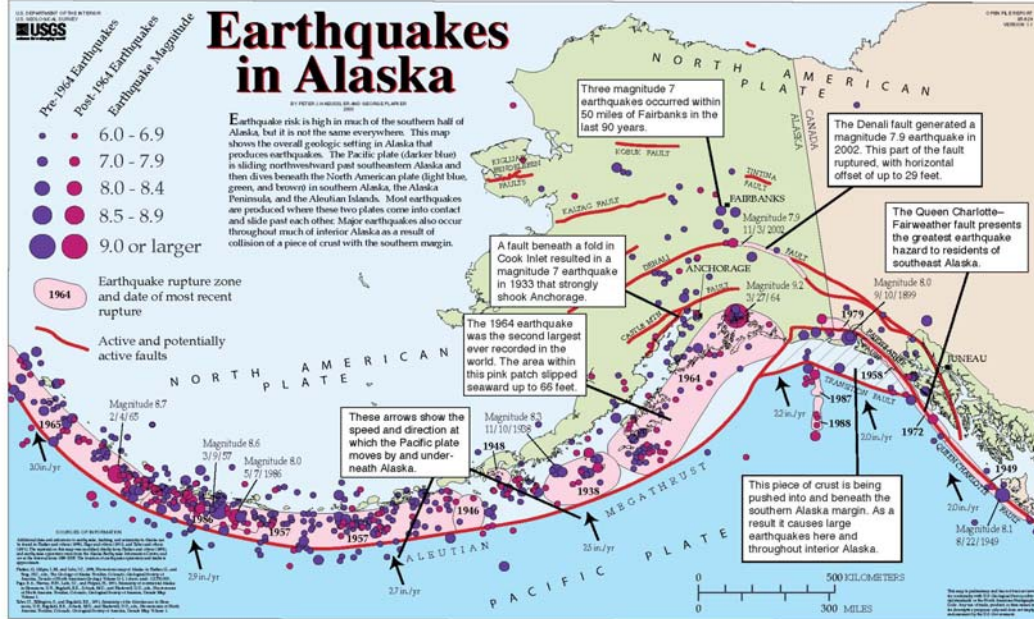
The "intensity" reported at different points generally decreases away from the earthquake epicenter. Local geologic conditions strongly influence the intensity of an earthquake; commonly, sites on soft ground or alluvium have intensities two to three units higher than sites on bedrock.

The Richter scale expresses magnitude as a decimal number. A 5.0 earthquake is a moderate event, 6.0 characterize a strong event, 7.0 is a major earthquake and a great earthquake exceeds 8.0. The scale is logarithmic and open-ended (*Alaska All-Hazard Risk Mitigation Plan 2007*).

A magnitude of 2 or less is called a microearthquake, they cannot even be felt by people and are recorded only on local seismographs. Events with magnitudes of about 4.5 or greater are strong enough to be recorded by seismographs all over the world. But the magnitude would have to be higher than 5 to be considered a moderate earthquake, and a large earthquake might be rated as magnitude 6 and major as 7. Great earthquakes (which occur once a year on average) have magnitudes of 8.0 or higher (British Columbia 1700, Chile 1960, Alaska 1964). The Richter Scale has no upper limit, but for the study of massive earthquakes the moment magnitude scale is used. The modified Mercalli Intensity Scale is used to describe earthquake effects on structures.

Map 4 shows historic earthquakes in the state of Alaska. The Togiak area has a low probability of earthquake. However, since all of Alaska is at risk for an earthquake event, Togiak could be at risk for an earthquake or have secondary impacts from an earthquake in the region.

Map 4. AEIS Historic Earthquakes in Alaska



Impact

The impact on the community of Togiak of a severe earthquake event occurring near the town site would be **limited**.

Earthquake damage would be area-wide with potential damage to critical infrastructure and key facilities. Limited building damage assessors are available in Togiak to determine structures integrity following earthquake damage. Priority would have to be given critical infrastructure to include: public safety facilities, health care facilities, shelters and potential shelters, and finally public utilities.

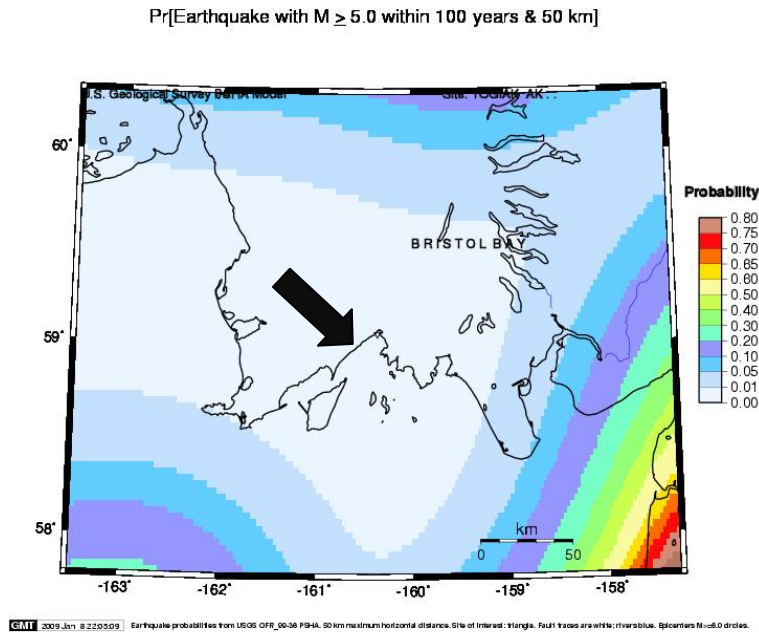
Probability

Togiak has a **low** probability of earthquake hazard. Table 8 lists the following criteria for a low probability: hazard is present with a low probability of occurrence with the next ten years. Event has up to 1 in 10 years chance of occurring.

While it is not possible to predict an earthquake, the U.S. Geological Survey (USGS) has developed Earthquake Probability Maps that use the most recent earthquake rate and probability models. These models are derived from earthquake rate, location and magnitude data from the USGS National Seismic Hazard Mapping Project.

Map 5 indicates that the USGS earthquake probability model places the probability of an earthquake with an intensity of 5.0 or greater occurring within the next ten years within 50 kilometers (31 miles) or Togiak is 0 to 1 percent

Map 5. USGS Togiak Earthquake Probability Map



Previous Occurrences

There have been no reports of earthquake damage in Togiak.

Earthquake Mitigation Goal and Projects

Earthquake Goals

Goal 1: Mitigate against earthquake damage.

Obtain funding to protect existing critical infrastructure from earthquake damage.

Earthquake Projects

E-1. Identify critical facilities

Identify buildings and facilities that must be able to remain operable during and following an earthquake event.

E-2: Assess the structural integrity of critical facilities and infrastructure.

If funding is available, perform an engineering assessment of the earthquake vulnerability of each identified critical infrastructure owned by the City of Togiak.

E-3. Nonstructural Mitigation Projects

Assess facilities and improve earthquake preparedness through such measures as installing bookshelf tie-downs, improving computer servers' resistance to earthquakes, moving heavy objects to lower shelves, etc.

Section 5. Volcanoes

Hazard Description

Alaska is home to an average of one to two eruptions per year. Forty historically active volcanoes dot the southern portion of the State from the Wrangell Mountains to the far Western Aleutians.

A volcano is a vent at the Earth's surface through which magma and associated gases erupt, and also the landform built by effusive and explosive eruptions. Volcanoes display a wide variety of shapes, sizes and behavior, however they are commonly classified among three main types: cinder cone, composite, and shield.

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

Composite Volcanoes: Composite volcanoes, sometimes called stratovolcanoes, are typically steep-sided, symmetrical cones of large dimension built of alternating layers of lava flows, volcanic ash, blocks, and bombs. These volcanoes are built up by accumulated erupted material and increase in size as lava, and fragmented deposits, are added. Composite volcanoes may rise as much as 8,000 feet above their bases and have a principal conduit system through which magma from a reservoir deep in the Earth's crust rises to the surface repeatedly to cause eruptions. The eruptions tend to be explosive because of the viscous magmas common to composite volcanoes; some produce enormous explosive eruptions destroying a large part of the volcano itself, resulting in a wide, roughly circular depression called a caldera. These eruptions are the largest eruptions known.

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

Volcanic eruptions create the following hazards:

- **Lava Flow**: streams of molten rock that flow from a volcano; a typical lava flow may extend between 6 and 30 miles depending on viscosity, volume, slope steepness and obstructions in the flow path
- **Pyroclastic Flow**: high-density mixtures of hot gases and dry rock that are usually released explosively from a volcano. They travel at speeds of 30 to 90+ miles per hour.
- **Pyroclastic Surges**: turbulent low-density clouds of rock debris, air, and other gases that move over the ground at high speeds. There are two types: hot surges of dry materials over 212°F and cold surges consisting of cooler rock debris and water or steam.

- Lava Domes: formed when viscous lava erupts slowly from a vent causing it to solidify near the vent forming a steep-sided rubble dome instead of flowing away from the vent.
- Volcanic Ash and Bombs: also called tephra, are fine fragments of solidified lava ejected into the air by an explosion or rising hot air. Chronic exposure to ash can be a significant public health hazard. Ash also interferes with mechanical equipment including aircraft and generators.
- Volcanic Gases: consist mostly of steam, carbon dioxide, sulfur dioxide, hydrogen sulfide, and chlorine compounds, but may include other substances. These gases can damage eyes, respiratory systems and cause suffocation in high concentrations and may be very corrosive.
- Lateral Blasts: inflated mixtures of gases, ash and hot rock debris that may be hundreds of feet thick and travel up to 370 miles per hour.
- Debris Avalanches: are sudden downward movements of unconsolidated material (mostly rock and soil).
- Lahars and Debris Flows: are rapidly flowing mixtures of rock debris and water that originate on the slopes of a volcano. Primarily formed by the rapid melting of snow and ice by pyroclastic flows, intense rainfall on loose volcanic rock deposits, breakout of lake dammed by volcanic depositions, and as a consequence of debris avalanches.

The community of Togiak is located near the Togiak Volcanics and 40 miles south of Flat Top Mountain volcano. The Togiak volcanics are a set of thin lava flows underlying the Togiak River valley (AVO, 2009). The Togiak Volcanics and Flat Top Mountain volcano are inactive.

Ingakslugwat Hills volcanic field consists of small cinder cones and eight larger craters and is the closest active volcano, approximately 200 miles north of Togiak (AVO, 2009). Ingakslugwat Hills is ranked as a “low threat” by the National Volcano Early Warning System.

Redoubt Volcano is an active, steep-sided cone stratovolcano; the most recently active vent is located on the north side of the crater (AVO, 2009). Redoubt Volcano is ranked as a “very high threat” by the National Volcano Early Warning System. Mt. Redoubt may not pose a direct threat to Togiak but it is in the flight path from Togiak to Anchorage; which is a regional transportation hub.

Regional airport facilities are of particular concern since the community is dependent on air transportation for delivery of medical supplies and groceries.



Mount Redoubt during a 2009 eruption

Photo by Suzanne Taylor

Location

Volcanic eruption hazards could potentially impact any part of Togiak. It is possible for Togiak to be impacted by ashfall from active volcanoes in the southcentral portion of the state which could pose a threat to public health.

Extent

The extent of volcanic eruption hazards in Togiak could be **limited**. Table 7 uses the following criteria to determine the extent of possible damage: Injuries and/or illnesses would not result in permanent disability, complete shutdown of critical facilities for more than one week; more than 10 percent of property is severely damaged.

If there was an eruption in the area near Togiak, ash would be a main hazard; other possible hazards could include volcanic gases (Cameron, 2009).

Impact

The impact on the community of Togiak resulting from volcanic eruption event occurring near the town site would be **limited**.

Volcanic ash falls are a regional hazard. Ash is gritty, abrasive, and acidic. Heavy ash fall reduces visibility and may create sudden electrical power demands resulting in brownouts. Ash may cause machine failure and contaminate or clog water supplies. Accumulation of ash may cause structural collapse and fine ash is slippery, making both walking and driving hazardous. Ash can cause respiratory irritation, and in extreme cases respiratory failure, especially among infants, the aged, and those with respiratory ailments (Mason, et al., 1997).

Probability

Togiak has a **low** probability of volcanic eruption hazards. Table 8 lists the following criteria for a low probability: hazard is present with a low probability of occurrence with the next ten years. Event has up to 1 in 10 years chance of occurring.

Previous Occurrences

There have been no reports of volcano eruption related damage in Togiak.

Volcano Mitigation Goal and Projects

Volcano Goals

Goal 1: Mitigate against volcano damage.

Volcano Projects

V-1. Public Education and Preparedness

Cooperate with local governmental and aviation entities to share information and advanced warning of volcanic eruption hazards. Publish and distribute guide to volcano preparedness.

Section 6. Hazards Not Profiled in the 2009 Togiak MHMP

Avalanche

Alaska experiences many snow avalanches every year. The exact number is undeterminable as most occur in isolated areas and go unreported. Avalanches tend to occur repeatedly in localized areas and can shear trees, cover communities and transportation routes, destroy buildings, and cause death. Alaska leads the nation in avalanche accidents per capita.

Avalanche Vulnerability Assessment

The terrain surrounding Togiak does not provide the necessary conditions for avalanche. No threat from avalanche is present in Togiak.

Tsunami

A tsunami is a series of ocean waves generated by any rapid large-scale disturbance of the seawater. These waves can travel at speeds of up to 600 miles per hour in the open ocean. Most tsunamis are generated by earthquakes, but they may also be caused by volcanic eruptions, landslides (above or under sea in origin), undersea slumps, or meteor impacts.

Tsunami damage is a direct result of three factors:

1. Inundation (the extent to which the water covers the land)
2. Wave action that will impact structures and moving objects that become projectiles.
3. Coastal erosion

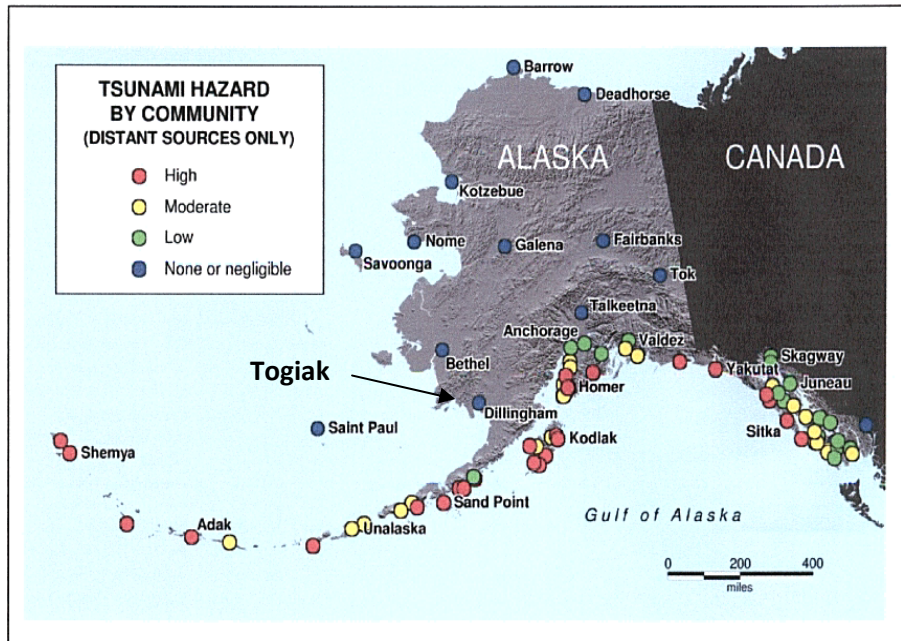
A seiche is a wave that oscillates in partially or totally enclosed bodies of water. They can last from a few minutes to a few hours as a result of an earthquake, underwater landslide, atmospheric disturbance or avalanche. The resulting effect is similar to bathtub water sloshing repeatedly from side to side. The reverberating water continually causes damage until the activity subsides. The factors for effective warning are similar to a local tsunami, in that the onset of the first wave can be a few minutes, giving virtually no time for warning.

Tsunami Vulnerability Assessment

As shown in Map 6, Togiak is in a region ranked as having negligible to no threat of tsunami. However, high tides are not uncommon and it is possible that a tsunami that occurred during a very high tide could cause flooding in the community. It is recommended that this threat be further examined in future updates of this plan.

There is no threat of a seiche in the community of Togiak.

Map 6. Tsunami Hazard by Community



Source: Alaska All-Hazard Mitigation Plan, 2007

Wildland Fire

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.

Wildland Fire Hazard Vulnerability

According to the *State of Alaska All-Hazards Risk Mitigation Plan*, community residents and historical information Togiak is in an area where the wildland fire hazard is not present.

Chapter 4. Mitigation Strategy

Benefit - Cost Review

The methods for conducting a Benefit Cost Review are outlined in the FEMA How-To-Guide Benefit-Cost Review in Mitigation Planning (FEMA 386-5). All the guidebooks for developing a MHMP may be accessed online at: http://www.fema.gov/hazard/hurricane/2005katrina/hmp/mitigation_planning.sht

The projects listed on the Cost Benefit Listing Table 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.

Due to the dollar value associated, with both life-safety and critical facilities, the prioritization strategy represents a special emphasis on benefit-cost review. The factors of life-safety and critical facilities steered the prioritization towards projects with likely good benefit-cost ratios. The following factors were used in assigning the priority on the benefit cost listing table.

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 Borough functionality.
4. Hazard probability.
5. Hazard severity.

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 (FEMA 386-5).

Benefit-Cost Analysis

The following section, written by FEMA, explains how to perform a Benefit-Cost Analysis. The complete guidelines document, a benefit-cost analysis document and benefit-cost analysis technical assistance are 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 simplify 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. The latest software for preparing Benefit-Cost Analysis is available from FEMA Regional via the BC Helpline, (at bchelpine@dhs.gov or toll free number at (866) 222-3580).

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.

Eligible Projects for PDM Funding

The PDM (Grant Program) is federally funded through FEMA at 75% of the plan or project and requires a 25% local fund match. The program is annual, nationally competitive and is intended to reduce overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.

A Hazard Mitigation Planning grant is only available for communities that do not have a FEMA/State approved and community adopted All-Hazard Mitigation Plan. A Hazard Mitigation Project grant is only available for communities that do have a FEMA/State approved and community adopted Hazard Mitigation Plan. Hazard Mitigation Projects are intended to reduce risk to life and property and examples include:

- Elevation of flood prone structures
- Structural and non-structural seismic retrofits of public facilities
- Voluntary acquisition or relocation of structures out of the floodplain
- Natural hazard protective measures for utilities, water and sanitary sewer systems

- Localized storm water management and flood control projects

Eligible Projects for HMGP Funding

To be eligible for funding under the HMGP, proposed measures must meet the minimum project criteria under 44 CFR 206.434(b).

These criteria are designed to ensure that the most appropriate projects are selected for funding. Projects may be of any nature that will result in protection of public or private property from natural hazards. Some types of projects that may be eligible include:

- Acquisition of hazard prone property and conversion to open space;
- Retrofitting existing buildings and facilities;
- Elevation of flood prone structures;
- Vegetative management/soil stabilization;
- Infrastructure protection measures;
- Stormwater management;
- Minor structural flood control projects; and
- Post-disaster code enforcement activities.

The following types of projects are not eligible under the HMGP:

- Retrofitting places of worship (or other projects that solely benefit religious organizations); and
- Projects in progress.

There are five minimum criteria that all projects must meet in order to be considered for funding:

- Conforms with the State Hazard Mitigation Plan;
- Provides beneficial impact upon the designated disaster area;
- Conforms with environmental laws and regulations;
- Solves a problem independently or constitutes a functional portion of a solution; and,
- Is cost-effective.

Benefit – Costs Review of Projects

Table 18 lists mitigation projects and their benefits, costs and prioritization.

Table 18. Benefit - Costs Review Listing

Mitigation Projects	Benefits (pros)	Costs or Issues (cons)	Priority
Flood/Erosion (FLD)			
FLD-1. Bulkhead Rehabilitation	Life/Safety issue Risk reduction Benefit to entire community Reduced maintenance costs – currently costs >\$5,000 annually for replacement rock backfill.	Dollar cost high, but not determined. Three-mile seawall project cost \$3 million in 1988. Coordination with USACE necessary.	High
FLD-2. Elevation and/or reinforcement of roads	Life/Safety issue Risk reduction Benefit to entire community City has crushed gravel resources	Dollar cost high. Can exceed \$75,000/mile. Coordination with State and BIA needed.	High
FLD-3. Relocate existing and new Public Safety Facilities to areas above the 100-year floodplain.	Life/Safety issue Risk reduction Benefit to entire community	Dollar cost high, but not yet determined.	Medium
FLD-4. Emergency shelter access route.	Life/Safety issue Risk reduction Benefit to entire community City has crushed gravel resources	Dollar cost high. Can exceed \$1 million/mile. Coordination with State and BIA needed.	Medium
FLD-5. Improve Drainage in Togiak	Life/Safety issue Risk reduction Benefit to entire community City has crushed gravel resources	Engineering required Costs not determined.	High

Mitigation Projects	Benefits (pros)	Costs or Issues (cons)	Priority
FLD-6. Suite of Emergency Plans and Training/Drills: <ul style="list-style-type: none"> • Emergency Operations • Community Evacuation 	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.	Medium
FLD-7. Public Education	Life/Safety issue Risk reduction Benefit to entire community Inexpensive Could be implemented annually	Staff time	High
FLD-8. Togiak Flood Plain Maps	FEMA, PDM, HMGP and State DCRA funding available. USCOE facilitated project. Can be started immediately.	Not yet on priority list for FIRM mapping Implementation dependent on agency prioritization	High
FLD-9: Continue to obtain flood insurance for all City structures, and continue compliance with NFIP	Life/Safety project Could be done annually Benefit to entire community to have NFIP insurance on public buildings Inexpensive	Staff time	High

Mitigation Projects	Benefits (pros)	Costs or Issues (cons)	Priority
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	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.	Would require ordinance change. Potential for increased staff time. Research into feasibility necessary. Political and public support not determined.	Medium
Earthquake			
E-1. Identify buildings and facilities that must be able to remain operable during and following an earthquake event.	Life/Safety issue/Risk reduction Benefit to entire community	Staff time	High

Mitigation Projects	Benefits (pros)	Costs or Issues (cons)	Priority
E-2. If funding is available, perform an engineering assessment of the earthquake vulnerability of each identified critical infrastructure.	Life/Safety issue/Risk reduction Benefit to entire community	Staff time Professional engineering services required.	High
E-3. Nonstructural Mitigation Projects (such as bookshelf tie-downs, water heater strapping, computer servers being made earthquake resistant, etc.)	Inexpensive, reduces risk of property damage and injury from falling objects.	Volunteer time	Medium
Volcano			
V-1. Public Education and Preparedness Provide information about volcanic hazards in the region	Life/Safety issue/Risk reduction Benefit to entire community	Staff time	Medium

Priorities Levels:

- High 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

Table 19 presents Togiak’s strategy for mitigation of the natural hazards faced by the community and includes a brief description of the projects, lead agencies, costs, potential funding sources and an estimated timeframe for each project. The final column allows the community to make note of specific progress on projects during the 5-year life of the plan.

Table 19. Mitigation Strategy

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Project Status (for local review)
Flood/Erosion (FLD)					
FLD-1. Bulkhead Rehabilitation	USACE City	Cost not determined.	PDM/HMGP	1 year	

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Project Status (for local review)
FLD-2. Elevation and/or reinforcement of roads	City/Tribe State BIA	Estimated >\$75,000/mile	PDM/HMGP	1 year	
FLD-3. Relocate existing and new Public Safety Facilities to areas above the 100-year floodplain.	City State	Estimated \$75,000+	City PDM	1-5 years	
FLD-4. Emergency shelter access route.	City State BIA	>\$1 million/mile	PDM	1-5 years	
FLD-5. Improve Drainage in Togiak	City/Tribe State BIA	Estimated >\$75,000/mile	PDM/HMGP	1 year	
FLD-6. Suite of Emergency Plans and Training/Drills: <ul style="list-style-type: none"> Emergency Operations Community Evacuation 	DHS&EM City/Tribe	\$75,000	State FY09 and FY10 Capital Budgets PDM, FMA	1-5 years	
FLD-7. Public Education	City DHS&EM	Staff Time	City PDM	Ongoing	
FLD-8. Togiak Flood Plain Maps	FEMA NOAA USCOE DHS&EM	>\$75,000	FEMA, DCRA	>1 year Not yet on federal priority list	
FLD-5. Continue to obtain flood insurance for all City structures, and continue compliance with NFIP	City	<\$1,500	City	Ongoing	
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	Project Status (for local review)
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.	City	Staff Time	City	1 year	
Earthquake (E)					
E-1. Identify buildings and facilities that must be able to remain operable during and following an earthquake event.	City/Tribe DHS&EM DCRA	Staff Time	State Grants	1 year	
E-2. If funding is available, perform an engineering assessment of the earthquake vulnerability of each identified critical infrastructure owned by the City of Cordova.	City/Tribe DHS&EM	To be determined	State Grants	1 year	
E-3. Nonstructural Mitigation Projects (such as bookshelf tie-downs, computer servers being made earthquake resistant, etc.)	Community DHS&EM	>\$5,000	PDM	1-5 years	
Volcano (V)					
V -1. Public Education and Preparedness. Provide information about volcanic hazards in the region	DHS&EM City	Inexpensive	PDM	1-5 years	

PDM Pre-Disaster Mitigation Grant Program

HMGP Hazard Mitigation Grant Program

FMA Flood Mitigation Assistance (Program)

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 floodwater 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 (GIS)

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, tsunamis, 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 is. 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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Web Sites with General Hazard Planning Information

American Planning Association:	http://www.planning.org
Association of State Floodplain Managers:	http://www.floods.org
Developing the Implementation Strategy:	http://www.pro.gov.uk
FEMA: Mitigation Planning	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
Individual Assistance Programs:	http://www.fema.gov/rrr/inassist.shtm
Interim Final Rule:	http://www.access.gpo.gov/
National Flood Insurance Program:	http://www.fema.gov/nfip
Public Assistance Program:	http://www.fema.gov/rrr/pa

Appendix A: Public Involvement



August 2008

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.shtml>

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 Division 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 Togiak

The Alaska Division of Homeland Security and Emergency Services has funded a local hazards mitigation plan for the Community of Togiak. 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 Togiak, including critical facilities, poten-

tial 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 presentation about the LHMP process will be made to the **Togiak City Council at 7 pm, Tuesday, August 26**. At this meeting planning team members will share

information about the plan and its value to Togiak.

The team will also be meeting with people in the community to gather information about which facilities are critical to the community's well being and about previous occurrences of natural disasters in Togiak.



Your comments are welcome!

The planning team hopes that you will take an active role in the Togiak 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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Planning Goals and Objectives

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

Primary goals of hazard mitigation are to:

- Minimize loss of life and injuries
- Minimize damages
- Restore public services
- Promote economic development

To attain these goals the Local Hazards Mitigation Plan will include measures to:

- Save lives and reduce injuries

- Prevent or reduce property damage
- Reduce economic losses
- Minimize social dislocation and stress
- Maintain critical facilities in functional order
- Protect infrastructure from damage
- Protect legal liability of government and public officials.

Awareness, education and preparedness, together with prediction and warning systems can reduce the disruptive impacts of natural disasters on communities.



Further information may also be found on the DHS&EM website at:
<http://www.ak-prepared.com/plans/mitigation/mitplanresourcesa.htm>



Togiak
Local Hazards Mitigation Plan

Togiak Local Hazards Mitigation Plan

August 26, 2008
Suzanne Taylor, planner

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

WHPacific

Togiak
Local Hazards Mitigation Plan

Which of these hazards are present in Togiak?

- Severe Weather
- Wildfire
- Avalanches/Landslides
- Earthquake
- Tsunami
- Flooding/Erosion

Togiak
Local Hazards Mitigation Plan

What is a Local Hazards Mitigation Plan?

A plan, adopted by the local governing body, that identifies hazards, risks, and vulnerabilities and includes prioritized mitigation projects.

Togiak
Local Hazards Mitigation Plan

Why does the community need a hazards mitigation plan?

Disaster Mitigation Act of 2000 (DMA 2000) requires local governments, as a condition of receiving federal disaster mitigation funds, to have a mitigation plan.

Togiak
Local Hazards Mitigation Plan

What are the steps in developing a local hazards mitigation plan?

Local Hazard Mitigation Plan Requirements (FEMA 44 CFR § 201.6).

Public involvement in planning process; contributors comment prior to drafting stage and after FEMA pre-approval.

Togiak
Local Hazards Mitigation Plan

Planning Steps, continued

- Coordination with other agencies, organizations, plans
- Review and incorporation of existing plans, studies, reports and technical information
- Identify the hazards
- Profile the location
- Determine probability of occurrence
- Previous occurrences of hazard events
- Identification of critical facilities
- Vulnerability assessment

A public meeting was held in conjunction with the regularly scheduled and advertised City Council meeting on August 26, 2008.

Attendees included:

- City Council Members: Stanley Active Jr, Leroy Fox, Sean Carlos, Evelyn Yanez via teleconference, Anna May Ferguson, Kevin Ramey
- City Staff: Leon Kiana, Blanche Blue
- Community Members: Bill Ferris, Olia Sutton, Jim Forbes Sr, Alandra Upton, Ted Sutton, Francesca Kamkapak, Dr. Craig, Phill Loring

Suzanne Taylor presented information on the Hazard Mitigation Planning process, distributed newsletters and presentation handouts, and solicited input on natural hazards facing the community of Togiak and potential projects to address the identified hazards.