CBS Hazard Mitigation Plan

Draft

2018 UPDATE

JUNE 18, 2018

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

RECORD OF PLAN UPDATE AND APPROVAL

The City and Borough of Sitka All-Hazards Mitigation Plan is required to be updated once every five years and submitted to the Assembly for adoption, and to the Federal Emergency Management Agency for approval. The City may update the plan on a more frequent basis as needed.

More detailed information about plan updates and requirements is found throughout the document.

Date of Update	Date of City Adoption	Date of FEMA Approval
INITIAL PLAN DATES		INITIAL PLAN DATES
[INSERT DATE]	[INSERT DATE]	[INSERT DATE]

ACRONYMS

AEIC	Alaska Earthquake Information Center
AEIS	Alaska Economic Information System
AOR	Area of Responsibility
CFR	Code of Federal Regulations
DART	Deep Ocean Assessment and Reporting Tsunamis
DCCED	(Alaska) Department of Commerce, Community and Economic Development
DCRA	(DCCED) Division of Community and Regional Affairs
DGGS	(Alaska) Division of Geological and Geophysical Surveys
DHS&EM	(Alaska) Division of Homeland Security and Emergency Management
DNR	(Alaska) Department of Natural Resources
DOT&PF	(Alaska) Department of Transportation & Public Facilities
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
FEMA	Federal Emergency Management Agency
HMP	Hazard Mitigation Plan
HMPG	Hazard Mitigation Planning Grant
LEPC	Local Emergency Planning Committee
MHMP	Multi-Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NOAA	National Oceanographic and Atmospheric Administration
NTHMP	National Tsunami Hazard Mitigation Program
NWS	National Weather Service
PDM	Pre Disaster Mitigation
SBA	Small Business Administration
SERC	State Emergency Response Commission
SMHMP	Sitka Multi-Mitigation Hazard Plan
UAF	University of Alaska, Fairbanks
USGS	U.S. Geological Survey
WCATWC	West Coast and Alaska Tsunami Warning Center

1 INTRODUCTION

Chapter 1 describes the authorities and principles that provide the basis for the City and Borough of Sitka's mitigation program as well as a description of the program's organization and how the plan is organized to support it.

1.1 Purpose

Hazard mitigation is any sustained action taken to reduce or eliminate the 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).

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 procedure 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 Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act), as amended by the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390, and its implementing Code of Federal Regulations (CFR) provisions, 44 CFR § 201, provide the legal authority for local hazard mitigation planning. The DMA 2000 requires state, local, and tribal governments to develop a hazard mitigation plan that identifies the jurisdiction's natural hazards, risks, vulnerabilities, and mitigation strategies. The planning process requirements mandated by the Federal Emergency Management Agency (FEMA) (outlined in 44 CFR §201.6) include the following activities:

- Document the planning process.
- Provide stakeholders with an opportunity to participate.
- Conduct and document public involvement.
- Incorporate existing plans and reports.
- Discuss continued public participation and plan maintenance.
- Provide a method for monitoring, evaluating, and updating the hazard mitigation plan.

Once complete, the hazard mitigation plan must be submitted to FEMA for approval. FEMA's approval of a hazard mitigation plan is a prerequisite for federal Hazard Mitigation Assistance grant program eligibility (outlined in 42 CFR §5165(a)).

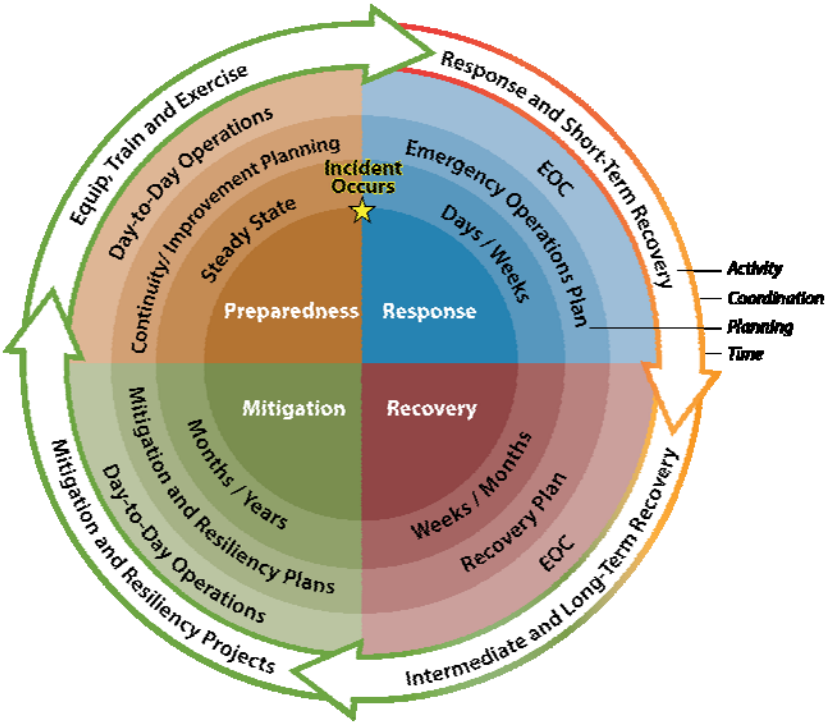
1.2 What is Hazard Mitigation?

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property posed by hazards (44 CFR §201.2). Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.

Additionally, hazard mitigation planning is one of the five mission areas presented in the National Preparedness Goal: Mitigation, Prevention, Protection, Response, and Recovery. The City and Borough

of Sitka HMP is an integral piece of the City's comprehensive approach to emergency management and is designed to align and integrate with other existing plans and emergency management activities.

Figure 1-1 Emergency Management Cycle



Mitigation planning is important because it not only encourages communities to become more flexible and adapt to change more easily, but it also:

- Guides mitigation activities in a coordinated and efficient manner.
- Integrates mitigation into existing City plans/programs.
- Considers future growth and development trends.
- Makes the community more disaster resilient.
- Ensures eligibility for grant funding.

1.3 Scope

The City & Borough of Sitka is a unified city and borough, organized under a home rule charter. It was first adopted in October 1960 and has been amended eight times since that date, most recently in 2002. Any amendments to the Charter must be approved by a public vote. The Sitka Charter may be viewed on the City & Borough website at http://www.cityofsitka.com/clerk/clerk.html.

The boundaries of the municipality are the same as the boundaries of the Greater Sitka Borough. This plan is a multi-hazard single jurisdiction plan.

The scope of Sitka Multi-Hazard Mitigation Plan (SMHMP) is natural hazards: ***flooding/erosion, earthquake, snow avalanche, tsunami, severe weather, and ground failure*** hazards. However, some of

the mitigation projects for natural hazards would also mitigate impacts from manmade hazards, such as technological and economic hazards.

The City & Borough of Sitka Local Multi-Hazard Mitigation Plan (MHMP) includes information to assist the borough government and residents with planning to avoid potential future disaster losses. The plan provides information on natural hazards that affect Sitka, descriptions of previous disasters, and lists projects that may help the community prevent disaster losses. The plan was developed to help the community of Sitka make decisions regarding natural hazards that affect City & Borough.

1.4 Roles and Responsibilities

This section details the specific organization of plan maintenance tasks and assigns responsibilities and roles to City and Borough of Sitka departments.

FEMA	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.

1.4.1 Plan Implementation

The City & Borough of Sitka Assembly will be responsible for adopting the Sitka MHMP and all future updates. This governing body has the authority to promote sound public policy regarding hazards. The Hazard Mitigation Plan will be assimilated into other Sitka plans and documents as they come up for review according to each plans' review schedule.

1.4.2 Monitoring the Plan

The City & Borough of Sitka Manager or designee is responsible for monitoring the plan. On an annual basis, the Borough Manager will request 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 Planning Commission and Assembly as information and noticed to the public. A report outlining all five years of the plan monitoring will be included in the plan update.

1.4.3 Evaluating the Plan

The Borough Manager 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.

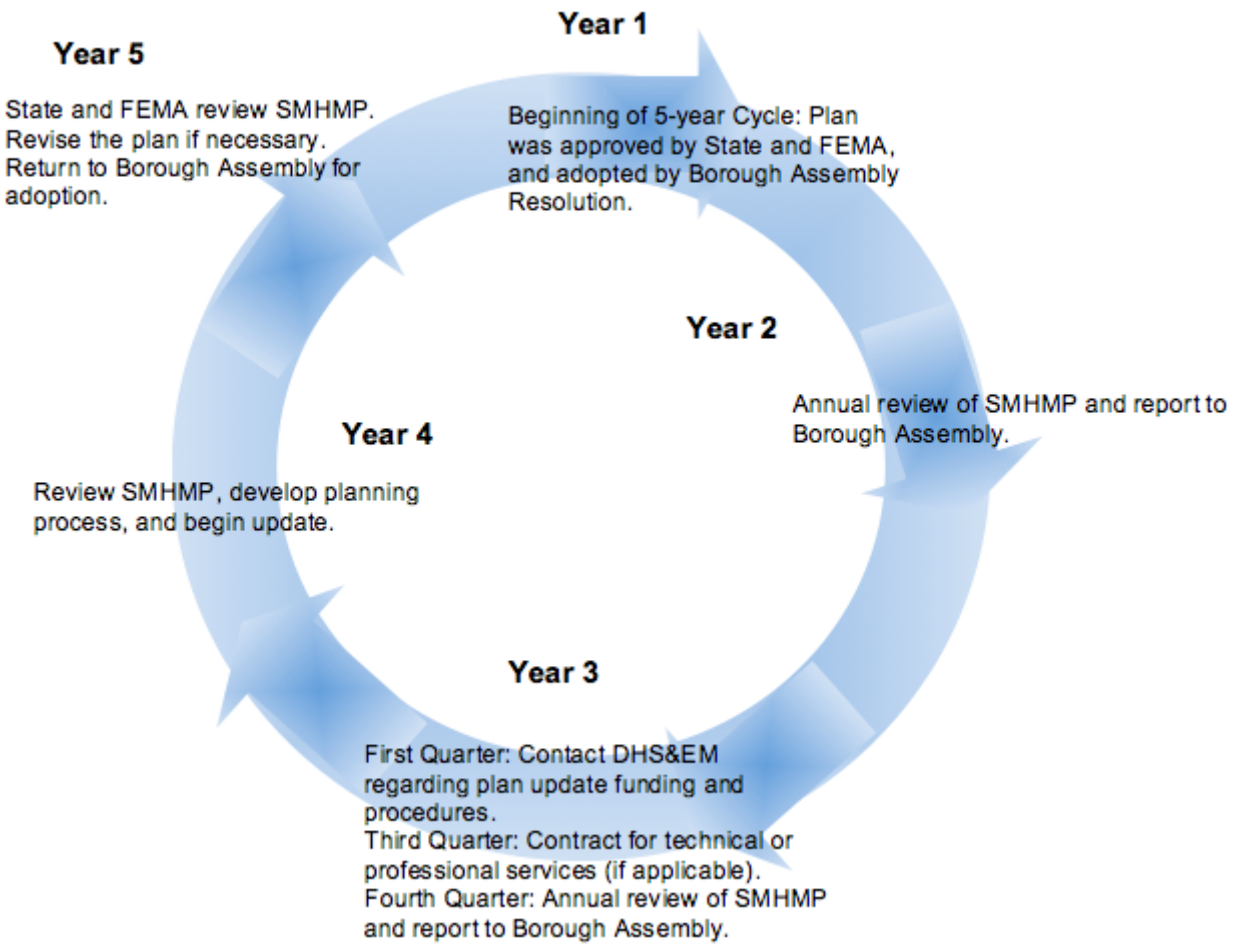
- The current resources are appropriate for implementing the mitigation projects in Chapter 4.
- There are implementation problems, such as technical, political, legal or coordination issues with other agencies.
- The outcomes have occurred as expected (a demonstration of progress).
- The agencies and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

1.4.4 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.

Figure 1 Plan Review Schedule



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

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

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

1.5 Plan Organization

- **Chapter 1: Introduction**
  This chapter identifies the authorities on which the plan is based, describes the plan's purpose and scope, describes the organization of the plan, and identifies changes to the plan in the newest update.

- **Chapter 2: Planning Process**
  This chapter provides a narrative description of the planning process used to update the plan while utilizing input from key community members, stakeholders, Tribal members, agencies, community partners, and other sources.

- **Chapter 3: Community and Tribal Profile**
  Provides key information and a community profile including the geographic, demographic, and economic characteristics that affect the community's capabilities and vulnerabilities.

- **Chapter 4: Hazard Profiles and Vulnerability Assessment**
  Contains information about the hazards that affect the community, including their characteristics and a detailed description of the effects the community might experience. This chapter includes economic information about potential hazard damages.

- **Chapter 5: Capability Assessment**
  Identifies the mitigation capabilities of the community's government agencies, and highlights mitigation accomplishments over the last planning cycle.

- **Chapter 6: Mitigation Goals and Strategy**
  Provides updated goals and objectives for new mitigation actions, and mitigation actions identified in past efforts that have not yet been completed.

- **Chapter 7: Program Implementation**
  Describes the community's plan for monitoring, evaluating, and updating the HMP over the next five-year period.

1.6 What's New in the 2018 Update?

In the years since the original release of the plan, Sitka has experienced a major disaster, made progress on its original mitigation strategies, and experienced some changes in its community. The update has documented these incidents and changes, and has incorporated both existing and new mitigation strategies.

Major revisions are:

- More accurate risk analysis in regards to individual hazards; removal of irrelevant hazard profiles
- Introduction of risk modeling that compares hazards to each other to assist with prioritization
- Comprehensive and focused mitigation strategy with highly prioritized mitigation actions
- Integration of hazard mitigation planning into existing mechanisms
- Update on progress on mitigation goals from original plan
- Format update to modernize the plan, make updates easier and more straightforward
- Addition of callouts of FEMA-required planning elements in text boxes throughout the plan, to make plan reviews and updates more straightforward.

- Addition of mitigation actions that build on past efforts and the 2010 mitigation plan
- Addition and inclusion of data that was not available for the 2010 original plan

2 PLANNING PROCESS

Chapter 2 provides a narrative description of the planning process the City conducted to ensure that the City's mitigation strategy was informed by key City departments, community residents and partners, and stakeholders. The process was based on strategies for inclusive engagement and integration with existing planning efforts.

FEMA	A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for [the City and Borough of Sitka]? (Requirement §201.6(c)(1))

The City hazard mitigation plan's organization is driven by the needs of the community. The following priorities were used to steer development of the HMP:

- Communicate City priorities and values through mitigation strategies.
- Build community through a comprehensive and inclusive planning process.
- Focus as much as possible on cost effective and feasible mitigation actions, including actions that are notably cross-beneficial between hazards, departments, agencies, and benefits.

FEMA recommends nine tasks for developing or updating hazard mitigation plans (see Figure 2-1). Tasks 1 through 3 involve the people and process involved in the all-hazards mitigation plan development or update; Tasks 4 through 8 focus on the analytical and decision steps that need to be taken; and Task 9 includes suggestions for plan implementation.

Figure 2 FEMA Recommended Mitigation Planning Tasks

Source: FEMA Local Mitigation Planning Handbook, March 2013

2.1 Planning Area

The City & Borough of Sitka is located off the mainland on Baranof Island, in Sitka Sound facing the Pacific Ocean. Located approximately 95 miles southwest of Juneau, and 185 miles northwest of Ketchikan; it lies approximately 57.053060° North Latitude and -135.330° West Longitude. Sitka is located in the Sitka Recording District. The area encompasses 2,874 square miles of land and 1,937.5 square miles of water. The Borough of Sitka is located on the west side of the Alexander Archipelago. The Borough encompasses Baranof Island and the southern half of Chichagof Island; an area of approximately 4,710 square miles. The Borough is completely within the Tongass National Forest.

2.2 Data Collection and Incorporation of Existing Plans

The primary source documents for this plan update were:

Table 1 Related Plans and Documents

Document	Completed	Updated
Sitka Comprehensive Plan	1999	2007, 2018
Sitka Legislative Priorities	FY2009	Annually
Sitka Emergency Operations Plan	2003	2012
Southeast Alaska Transportation Plan	2004	2012
Revised Sitka Coastal Management Plan	2007	2012
Sitka Non-Motorized Transportation Plan	2002	As needed
Sitka Trail Plan	2003	As needed
City and Borough of Sitka Land Management Program	1996	As needed
City and Borough of Sitka Debris Management Plan	2015	
Sitka Historic Preservation Plan	2017	
Sitka Debris Management Plan	June 2015	
Sitka Stormwater Plan	2013	

2.3 Coordination with Other Planning Efforts

The 2018 update was developed concurrently with the Comprehensive Plan Update and Landslide Hazard Mapping. While each effort was an individual one and not all stages aligned with those of other plans in update or development, the planning team considered issues and changes to each plan when making changes to one. It is hoped that all related plans will work together and continue to evolve and expand concurrently (when a change is made to one, reviews will be conducted of other plans to be sure all information is in concert).

2.4 Mitigation Planning Team

Table 2 Mitigation Planning Team

Name	Title	Department
Jill Missal	Consultant	Missal LLC
Samantha Pierson	Planner I	City and Borough of Sitka
Maegan Bosak	Community Affairs Director	City and Borough of Sitka
Dave Miller	Fire Chief and Emergency Manager	City and Borough of Sitka
Michael Scarcelli	Planning Director	City and Borough of Sitka
Keith Brady	Municipal Administrator	City and Borough of Sitka

2.5 Local Emergency Planning Committee

The Sitka Local Emergency Planning Committee (LEPC) reviewed the plan and provided revisions that were incorporated into the plan. The LEPC is a community wide group with the following composition:

Table 3 LEPC Roster

Name	Title	Department
Dave Miller (chair)	Fire Chief	Sitka Fire Department
George Bennett, JR		SEARHC
Shannon Freitas		SEARHC
Michael Sanders		SEARHC
Alan Stevens	Assistant Fire Chief	Sitka Fire Department (Retired)
Pat Hughes		Sitka Community Hospital
Donna Callistini	Public Education Liaison	
Gayle Hammons	Print Media	
Annabel Lund		American Red Cross
Carol Berge		Sitka Counseling and Prevention
Trish White		Harry Race Pharmacy
Scott Wagner		NSRAA
Mary Ann Hall	N/A	Public
Aubrey Vaughn	N/A	Public
Rose Miller	N/A	Public
Jeff Ankerfelt	Chief of Police	Sitka Police Department
Lance Ewers	Police Officer	Sitka Police Department
Craig Warren	LEPC Coordinator	
Bob Potrzuski	Assembly Liaison	City and Borough of Sitka
Gail Johansen	Secretary	

2.6 Outreach and Public Involvement

Public involvement on the 2018 update was conducted via public meetings, surveys, and mailings.

Two surveys were issued to the community and were open for comment and input for four weeks each. Two public meetings on the HMP were held on December 14, 2017 (LEPC and Planning Commission), and two on April 12, 2018 (LEPC and Planning Commission.

The planning team – the consultant, staff core team, and other interested city staff - met January 19, February 14, and March 15, 2018 to develop the mitigation strategy. Plan draft was presented to the Planning Commission on May 24, 2018. Public notice for the meetings were advertised in accordance with Sitka General Code requirements. Meeting agendas and minutes are in the Appendix, as is a comprehensive matrix detailing all public comments received, their disposition, and how they were

resolved or considered. All meetings were advertised and open to the public, using normal public notice procedures of the Borough.

Copies of the HMP draft were available for public perusal at the Fire Department and at the City Planning Department. The final plan will be available for public information on the Borough web site at http://www.cityofsitka.com.

3 COMMUNITY PROFILE

3.1 Community History

Originally called "Shee Atika," Sitka was inhabited by a Tlingit tribe. Russian explorer Vitus Bering "discovered" Sitka in 1741. The site became known as "New Archangel" in 1799. During the 1802 Battle of Sitka, local Tlingits burned and looted St. Michael Redoubt fort and trading post built by Russian Alexander Baranof, manager of the Russian-American Company. In retaliation, the Russians destroyed the Tlingit Fort in 1804. The Battle of Sitka was the Tlingit's last stand against the Russians, after which, Tlingits evacuated the area until about 1822. In 1808, Sitka was the capital of Russian Alaska and home to a major fur trade port on the north Pacific coast. Salmon, lumber and ice were also exported to Hawaii, Mexico and California.

In 1867, the U.S. purchased Alaska from Russia. Sitka remained the Territory's capital until 1906, when the capital was moved to Juneau. The first canneries in Alaska were built in Sitka in 1878. That same year Presbyterian missionary, Sheldon Jackson, opened Sitka's first school. In the early 1900s, gold mines spurred Sitka's growth and in 1913 the City was incorporated.

World War II brought a naval air base and 30,000 military personnel to Japonski Island across the harbor from Sitka. The Bureau of Indian Affairs (BIA) converted some of the base's buildings into Mt. Edgecumbe High School, an Alaska Native boarding school, after the war. The U.S. Coast Guard now maintains the rest of the air station.

3.2 Culture and Demographics

Nearly a quarter of Sitka's residents are Alaska Native. Tlingit and Russian culture still influence modern day Sitka.

The population of Sitka consists primarily of Caucasians. Approximately 25 percent of the residents are Alaska Native or partially Native. During the 2000 U.S. Census, total-housing units numbered 3,650, with 372 vacant housing units. Housing units vacant due to seasonal use totaled 169.

3.3 Economy

Fishing, tourism, government, transportation, retail and health care services drive Sitka's economy. There are 586 residents who hold commercial fishing permits. Seasonal employees process fish. Over 200,000 tourists arrive in Sitka via cruise ships annually, helping to drive the economy. Regional health and government services employ a significant number of residents. Sitka's potential work force is 6,700 of which 4,567 are employed, resulting in a 7.8 percent unemployment rate. The median household income is $51,901; per capita income is $23,622 and 7.8 percent of Sitka's residents live below the poverty line.

3.4 Infrastructure

Water is drawn from a reservoir on Blue Lake.The water is treated, stored and piped to 95 percent of Sitka's homes. The system has a maximum capacity of 8.6 million gallons per day, with a storage capacity of 197 million gallons. Refuse is collected by a city-contracted private firm and disposed of in a class 2, lined landfill. Sitka has an aggressive recycling program that covers common items such as tin,

aluminum, glass, and paper, as well as batteries, used oil, packing materials, film and printer cartridges. A public sewer system serves 89.5 percent of Sitka's residents. Electricity is generated by borough-owned hydroelectric facilities at Blue and Green Lakes.

3.5 Critical Facilities

A critical facility is defined as a facility that provides essential services to the general public, such as improving/preserving the quality of life and/or fulfilling important public safety functions including:

- Government facilities, such as city and tribal administration offices, departments, or agencies
- Emergency response facilities, including police, Village Public Safety Officer (VPSO) offices, fire departments, and emergency management facilities

- Educational facilities
- Care facilities such as medical clinics and residential care facilities
- Community gathering places
- Utilities, such as electric generation, communications, water and waste water treatment plants, sewage lagoons, landfills, etc.

The following maps and figures illustrate existing critical facilities, businesses, and infrastructure, and the FEMA flood overlay zone for Sitka (A tsunami inundation map is found in the Tsunami Inundation Study in the appendices):

Figure 3 NFIP Flood Insurance Rates

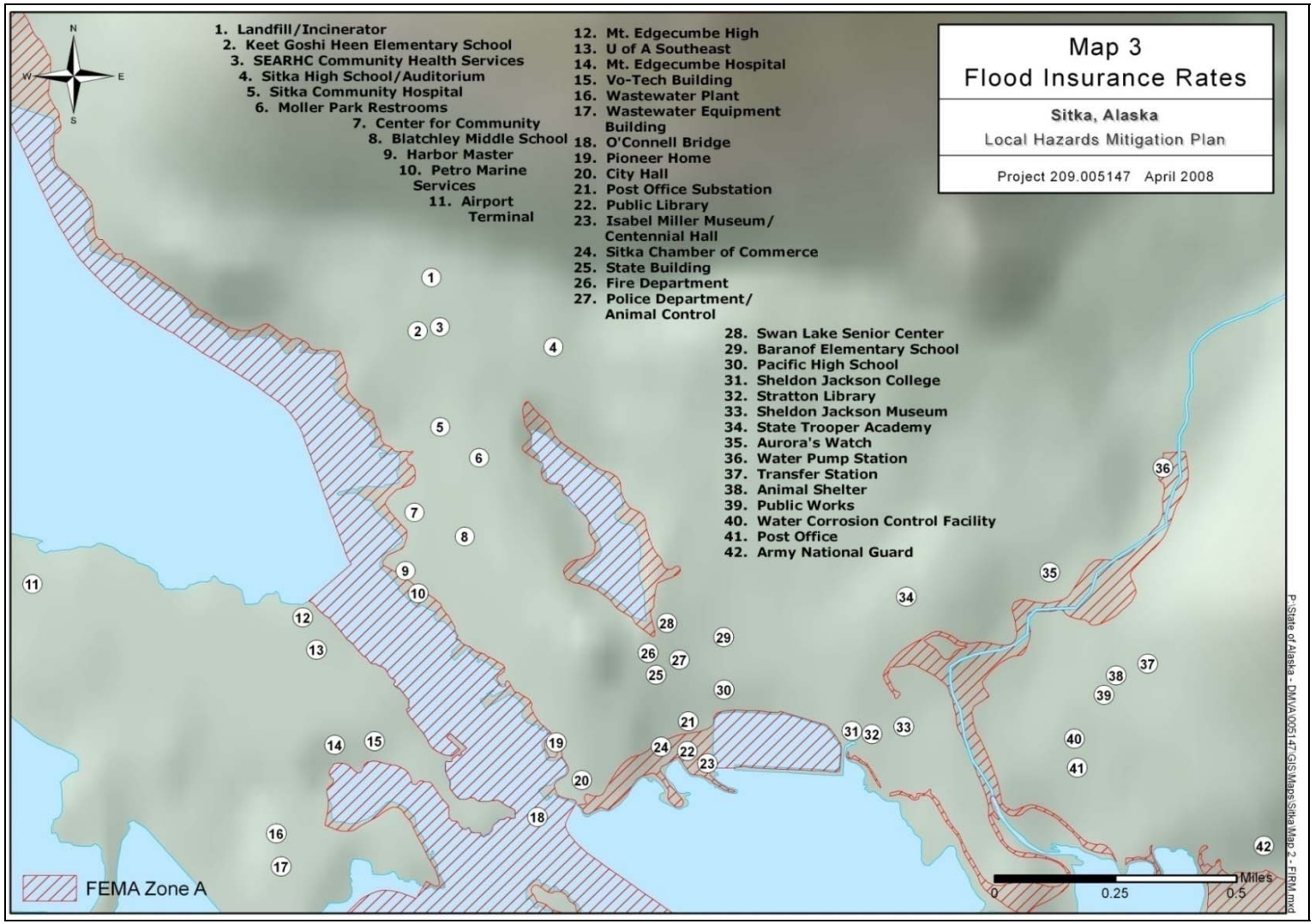
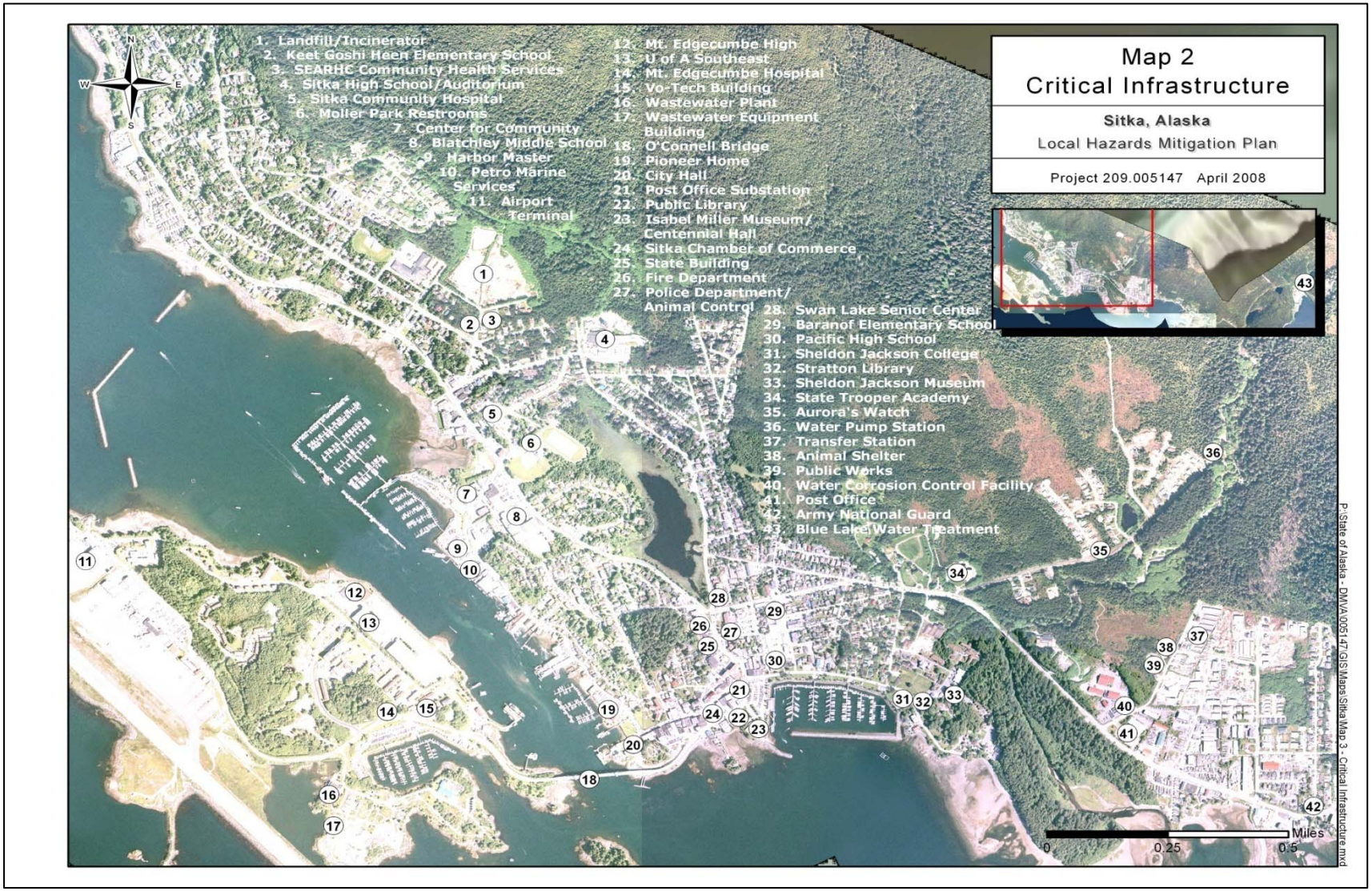


Figure 4 Critical Facilities



The following table presents a basic analysis of the vulnerability of critical facilities in regards to each hazard. Assignation of risk is based on best available data at the time of this plan update.

Table 4 Hazard Asset Matrix

Structure/Facility	Flood	Earthquake	Tsunami	Severe Weather	Ground Failure
Airport Terminal Building		H		H	
O'Connell Bridge	L	H	H	H	
Public Library	L	H	H	H	
Stratton Library		H	H	H	
Centennial Hall	L	H		H	
Water Pump Station		H		H	
Sitka Chamber of Commerce	L	H	H	H	
Animal Shelter		H		H	
Animal Control Facility		H		H	
Marine Services Building		H		H	
Wastewater Plant		H	H	H	
Wastewater Equipment Building		H	H	H	
Fire Station		H		H	
City State Building		H		H	
City Hall		H	H	H	
Sitka Community Hospital		H		H	
Moller Park Restrooms		H		H	
Harbor Master Office	L	H	H	H	
SCIP Admin Building		H		H	
SCIP Dock & Warehouse		H		H	
SCIP Sewage Treatment Building		H		H	
Public Works Shop & Warehouse		H		H	
Transfer Station		H		H	

MAPPING IN PROGRESS

Structure/Facility	Flood	Earthquake	Tsunami	Severe Weather	Ground Failure
Water Corrosion Control Building		H		H	
Baranof Elementary		H		H	
Keet Gooshi Heen Elementary		H		H	
Blatchley Middle School		H	H	H	
Sitka High School		H		H	
Votech Building		H	H	H	
Sitka High School Auditorium		H		H	
Petro Marine Services	L	H	H	H	
Mt. Edgecumbe/ SEARHC Hospital		H		H	
Sitka Pioneer Home	L	H	H	H	
Aurora's Watch		H		H	
Landfill/Incinerator		H		H	
Sheldon Jackson Museum		H		H	
Isabel Miller Museum		H	H	H	
AK Army National Guard		H	H	H	
US Post Office Main Office		H	H	H	
US Post Office Substation		H		H	
Blue Lake Water Treatment Facility		H		H	
Mt. Edgecumbe High		H	H	H	
Pacific High School		H	H	H	
Sheldon Jackson College		H	H	H	
University of Alaska South East		H	H	H	
AK State Trooper Academy		H		H	
Center for Community		H	H	H	
Swan Lake Senior Center		H		H	

3.5.1 Estimating Potential Dollar Losses

The following table lists the replacement values, plus content values of municipal owned buildings. The Sitka Finance Department provided the Replacement Value column, which was obtained from the city insurance provider. The Content Value Percentage column is percentages of replacement value calculations that were recommended from the *Understanding Your Risks: Identifying Hazards And Estimating Losses (FEMA 386-2).*

Table 5 Potential Dollar Losses of Municipal Structures

Municipal Owned Structures	Replacement Value	Content Value (%)	Total
Airport Terminal Building	$3,300,000	150	$8,250,000
ANB Harbor Restrooms	$178,000	100	$356,000
Crescent Harbor Shelter	$429,000	100	$858,000
Crescent Harbor Restrooms	$178,000	100	$356,000
Harbor Drive Restrooms	$119,000	100	$238,000
Library	$1,800,000	100	$3,600,000
Centennial Hall	$5,800,000	100	$11,600,000
Water Pump Station	$466,000	100	$932,000
Animal Shelter	$423,000	100	$846,000
Marine Services Building	$3,000,000	100	$6,000,000
Wastewater Plant	$11,450,000	100	$22,900,000
Wastewater Equipment Building	$306,000	100	$612,000
Fire Station	$4,750,000	150	$11,875,000
City State Building	$5,000,000	100	$10,000,000
Senior Center	$625,000	100	$1,250,000
City Hall	$3,750,000	100	$7,500,000
Sitka Community Hospital	$17,000,000	150	$42,500,000
Moller Park Restrooms	$119,000	100	$238,000
Sealing Cove Restrooms	$178,000	100	$356,000
Eliason Harbor Restrooms	$178,000	100	$356,000

Municipal Owned Structures	Replacement Value	Content Value (%)	Total
Harbor Master Office	$160,000	100	$320,000
Whale Park Restrooms and Park	$750,000	100	$1,500,000
Lightering Facility Restrooms	$178,000	100	$356,000
Sandy Beach Restrooms	$186,000	100	$372,000
Thomsen Harbor Restrooms	$178,000	100	$356,000
SCIP Admin Building	$4,160,000	100	$8,320,000
SCIP Dock & Warehouse	$4,935,000	100	$9,870,000
SCIP Sewage Treatment Building	$633,000	100	$1,266,000
Public Works Shop & Warehouse	$3,213,000	100	$6,426,000
Transfer Station	$1,425,000	100	$2,850,000
Water Corrosion Control Building	$950,000	100	$1,900,000
Tom Young Cabin	$164,000	100	$328,000
Baranof Elementary	$9,800,000	100	$19,600,000
Keet Gooshi Heen Elementary	$12,141,000	100	$24,282,000
Blatchley Middle School	$17,300,000	100	$34,600,000
Sitka High School	$21,800,000	100	$43,600,000
Votech Building	$1,000,000	150	$2,500,000
Sitka High School Auditorium	$16,000,000	100	$32,000,000
Total Potential Dollar Losses	**$154,022,000**		**$321,069,000**

3.6 Transportation

Sitka Borough has a total of 35.2 miles of paved roads and 4.3 miles of unpaved roads. The national highway system within the borough covers 13.8 miles. Local paved roads account for the other 21.4 miles. The Rocky Gutierrez Airport is state owned and has a 6,500-foot-long by 150-foot-wide paved and lighted runway. The airport, located on Japonski Island, has an instrument landing system and a 24-hour FAA Flight Service Station. Daily jet service, air taxis, charters and helicopter services are available. The City & Borough operate five small boat harbors and a seaplane base. Larger cruise ships anchor in the

Harbor and lighter visitors to shore, or tie up at a private dock in Halibut Point Marina and bus passengers into town. The Alaska Marine Highway System and the fast ferry M/V Fairweather also serve Sitka.

3.7 Environment and Topography

3.7.1 Climate

Mild temperatures and heavy precipitation characterize Sitka's climate. The average low temperature during the winter is 23º to 25º Fahrenheit (F); the average high during the summer is 48º to 61ºF. Temperature extremes have been measured from 0º to 88ºF. Snowfall averages 39 inches, with total precipitation of 96 inches per year.

3.7.2 Vegetation and Soil

Sitka sits atop soil that is stable when undisturbed but changes to a fluid or jelly when shaken or agitated. The soil contains a considerable amount of volcanic ash from an eruption of the Kruzof Island volcanoes about 10,000 years ago. In stream valleys where ash has been washed away Alluvium is present. Sitka also has several low, wet muskeg bogs.

4 HAZARD PROFILES AND RISK/VULNERABILITY ASSESSMENT

Chapter 4 contains hazard profiles and vulnerability assessments to determine the potential impact of hazard to the people, economy, and built and natural environments of the City and Borough of Sitka. They have been streamlined to increase the effectiveness and usability of the HMP.

FEMA	B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect [the City and Borough of Sitka]? (Requirement §201.6(c)(2)(i)) B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for [the City and Borough of Sitka]? (Requirement §201.6(c)(2)(i)) B3. Does the plan include a description of each identified hazard's impact as well as an overall summary of the vulnerability of the tribal planning area? [44 CFR § 201.7(c)(2)(ii)]

4.1 General

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

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

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

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

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

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

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

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

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

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

4.2 Hazard Ranking Methodology

The hazards identified in the HMP were initially ranked based on their original ranking in the first Sitka HMP. For this update, the hazards were re-evaluated based on the following criteria:

- **Probability:** Likelihood of the hazard occurring.
- **Magnitude:** Areas potentially impacted, the overall impacts, and the chance of one hazard triggering another hazard, thus causing a cascading effect.
- **Onset:** The time between recognition of an approaching hazard and when the hazard begins to affect the Tribe.
- **Duration:** The length of time the hazard remains active, the length of time emergency operations continue after the hazard event and the length of time that recovery will take.
- **Frequency:** How often a hazard has resulted in an emergency or disaster.

Following the individual hazard ranking activity, the results were added up and aggregated to show an average score. The aggregate results were shared with the Planning Team and the final rankings were adopted as the official rankings for the HMP.

Table 6 Hazard Ranking Results

Hazard	Probability (1=lowest, 5=highest)	Magnitude (1=lowest, 5=highest)	Onset (1=slower, 5=faster)	Duration (1=shorter, 5=longer)	Frequency (1= lowest, 5=highest)	Total	Average	Rank
Flood	2	1	3	3	1	10	2	5
Earthquake	2	5	5	5	1	18	3.6	2
Landslide	4	4	5	4	3	20	4	1
Severe Weather	5	2	2	1	5	15	3	4
Tsunami	2	5	5	4	1	17	3.4	3

4.3 Hazard-Specific Profiles and Risk Assessments

The following section profiles each hazard identified in Section 4.3 and assesses the risk associated with each. Each risk assessment considers the following attributes:

- **Hazard Description:** A brief introduction to the mechanisms behind the hazard.
- **Location:** An indication of geographic areas that are most likely to experience the hazard.
- **Past Occurrences/History:** Similar to location, a chronological highlight of recent occurrences of the hazard accompanied by an extent or damage cost, if available.
- **Potential Impacts from Future Climate Conditions:** A brief overview indicating ways in which the hazard profile may change over time due to a changing climate, if applicable.
- **Extent/Probability:** A description of the potential magnitude of the hazard, accompanied by the likelihood of the hazard occurring (or a timeframe of recurrence, if available).
- **Cascading Impacts:** A brief overview of secondary hazards often associated with the hazards.
- **Vulnerability:** A description of the potential magnitude of losses associated with the hazard. Vulnerability may be expressed in quantitative or qualitative values depending upon available data.

To enhance the usability of the HMP, risk assessments have been streamlined to provide only critical information within the body of this section

4.4 Flood

Flood hazards in Sitka include voluminous rainfall, snow and glacier melt and release of glacier-dammed lakes and coastal storms.

Floods occur in rivers as a result of a large input of water to the drainage basin in the form of rainfall, snowmelt, glacier melt, or a combination of these inputs. In the Sitka area, as well as most coastal areas of Southcentral and Southeast Alaska, the floods due to snowmelt are typically lower in magnitude than those due to rainstorms in late summer or fall. Glacier melt is typically largest in late summer; increasing the potential magnitude of late summer rainfall floods in glacial streams.

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

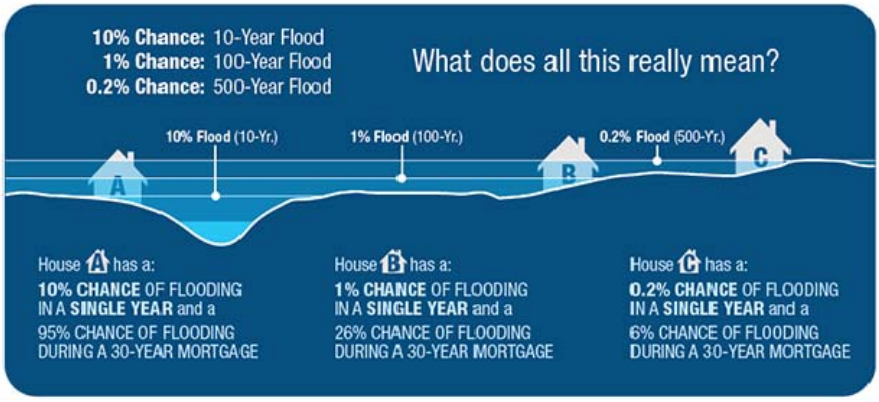
4.4.1 Flood Impact

A flooding event in Sitka could damage the structures and infrastructure that are located along the shoreline in the community and within the flood zones described above. A flooding event in Sitka could isolate the community from other areas of the state and cause wide spread damage.

4.4.2 Flood Probability

Based on the *Alaska State All-Hazard Mitigation Plan, 2013*, NFIP, City & Borough records and previous historical events Sitka has a **"medium"** probability of flooding unrelated to tsunami. As flooding in Sitka usually occurs within the defined parameters of known flood zones (described below), flooding is not considered a major hazard in Sitka. The State of Alaska HMP states that Sitka has a one in ten chance of flooding every year.

Figure 5 Flood Probability



4.4.3 Flood History

The following record of flooding for Sitka was obtained from the *DHS&EM Disaster Cost Index*.

Southeast Alaska, November 26, 1984: A hurricane force windstorm and wind driven tides caused extensive damage to public and private property in five Southeast Alaskan communities. The State provided public and individual assistance grants and temporary housing in Juneau, **Sitka**, Kake, Angoon and Tenakee Springs. Small Business Administration (SBA) provided disaster loan assistance and the American Red Cross made grants to meet immediate needs of victims. The Governor's request for a Presidential declaration was denied.

Southeast Storm (AK-06-216) declared December 23, 2005 by Governor Murkowski: Beginning on November 18, 2005 and continuing through November 26, 2005, a strong winter storm with high winds and record rainfall occurred in the City/Borough of Juneau, the **City/Borough of Sitka**, the City/Borough of Haines, the City of Pelican, the City of Hoonah, and the City of Skagway, which resulted in widespread coastal flooding, landslides, and severs damage and threat to life and property, with the potential for further damage. The following conditions exist as a result of this disaster: severe damage to personal residences requiring evacuation and relocation of residents; to individuals personal and real property; to businesses; and to a marine highway system dock, the road systems eroded and blocked by heavy debris that prohibited access to communities and residents, and other public infrastructures, necessitating emergency protective measures and temporary and permanent repairs. The total estimated amount of assistance is approximately $1.87 million. This includes Individual Assistance totaling $500,000 for 52 applicants. There was no hazard mitigation.

4.4.4 National Flood Insurance Program Participation

FEMA	C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3))

4.4.4.1 Repetitive Loss Properties

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 but within the City & Borough of Sitka there have been ***zero*** properties that meet the FEMA definition of repetitive loss.

4.4.5 Flood Location

The Flood Overlay map in the Community Profile section shows areas of the community that are located within the National Flood Insurance Rate Map (FIRM) "A" zone. The "A" zones are defined as areas of 100-year flood zones.

The FIRMs for Sitka are from mapping that was completed in 1982. Since that time, areas have been filled to above the Base Flood Evaluation in some cases. Until the FIRM has an official revision or a Letter of Map Revision is approved by FEMA, the designations stand but may not be accurate and do not necessarily reflect the current situation in the field.

The Emergency Operations Plan (EOP) states that the most probable source of flooding in Sitka is along Indian River. The EOP also states that homes located along the shoreline are also vulnerable from storm surges. The Coastal Management Plan (CMP) states that there is some potential for damage by local flooding, should an earthquake dislodge a snow avalanche or landslide that could dam a creek and later give way, sending a wall of water downstream.

Properties unaffected directly by flooding may suffer due to road closures, impacts to public safety (access and response capabilities), limited availability of perishable commodities, and isolation.

Indian River Floodway

The Indian River Floodway prohibits all development unless an engineer demonstrates no encroachment (zero rise in water surface elevation). The flood elevations for coastal flooding (flood having 1% chance of occurrence in any given year or "100-year-flood" in Sitka Sound in feet) are as follows: (CMP 2007)

- At Dove Island 14.8 ft
- At Marina 14.8 ft
- At Sitka Harbor 17.0 ft
- At Harbor Point 14.8 ft
- At Alice & Charcoal Islands 15.7 ft

- At Galankin Island 14.8 ft

4.4.6 Flood Vulnerability

The extent (i.e. magnitude or severity) of the flood/erosion hazard is measured in this plan by using statistics from the National Flood Insurance Program (NFIP), historical previous events and the *Alaska State All-Hazard Mitigation Plan, 2007*. Based on these factors and using the criteria established in the City & Borough of Sitka has a **limited** extent of flooding not due to tsunami, which is covered in Section 4 of this chapter.

The City & Borough of Sitka (CID 020006) participates in the NFIP. Only one critical facility complex, the Greater Sitka Chamber of Commerce buildings, is located in the "A" flood zone.

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

The table below describes the FIRM zones.

Table 7 FIRM Zones

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

Development permits for all new building construction, or substantial improvements, are required by the City & Borough 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 must maintain records of elevations for all new construction, or substantial improvements, in floodplains and must keep the certificates on file.

Elevation Certificates are used to:

1. Record the elevation of the lowest floor of all newly constructed buildings, or substantial improvement, located in the floodplain.

2. 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 FIRM 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.

Table 8 NFIP Statistics

NFIP Statistics	
Emergency Program Date Identified	11/8/1974
Regular Program Entry Date	6/1/1982
Map Revision Date	None
NFIP Community Number	0200006
CRS Rating Number	N/A
Total Number of Current Policies	92
Total Premiums	$97,830
Total Loss Dollars Paid Since 1978	$20,130
Average Value of Loss Since 1978	$4,260
Number of Current Policies in the State of Alaska (10/13/09)	2,818

NFIP Statistics	
AK State Total Premiums (10/13/09)	$2.2 Million
AK Total Loss Dollars Paid since 1978	$97,830
Sitka Average Premium	$1,063
AK State Average Premium	$796
Sitka Repetitive Loss Claims	0

4.5 Earthquake

Approximately 11% 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.

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.

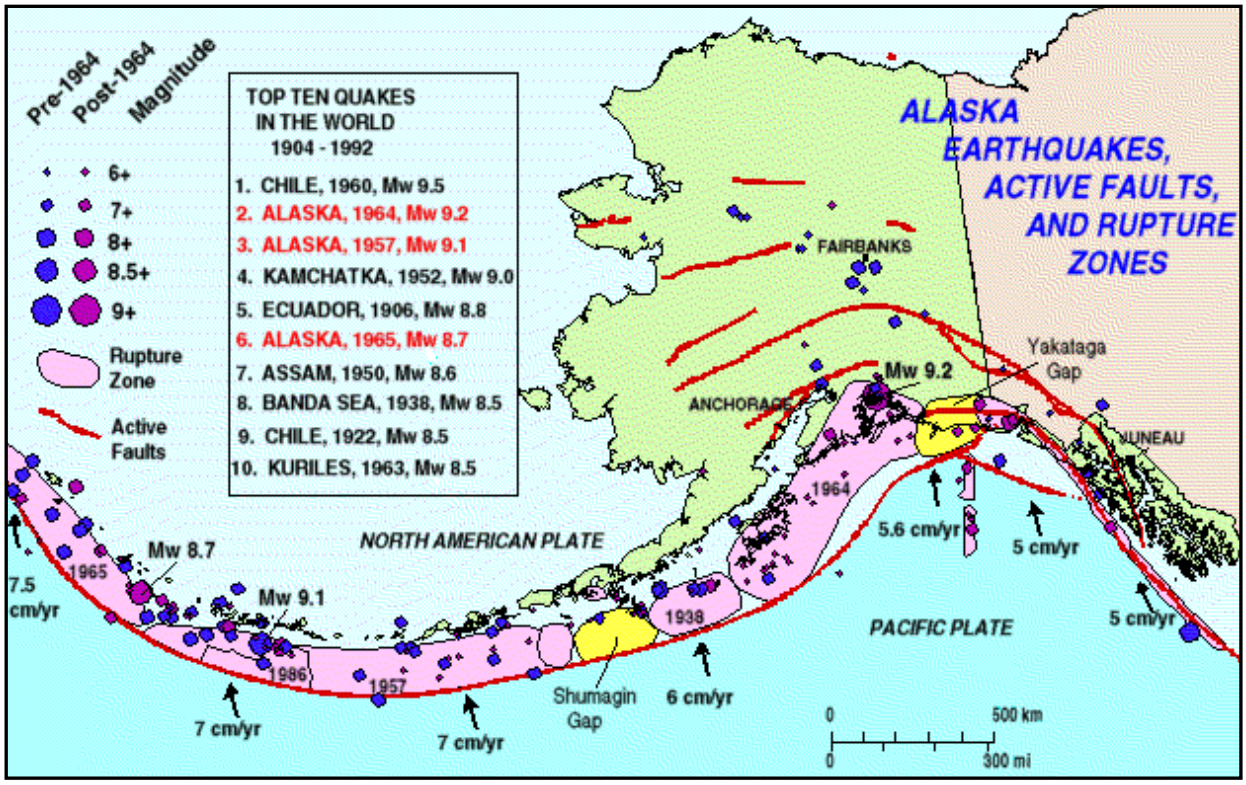
Earthquake-induced ground failure is often the result of liquefaction, which occurs when soil (usually sand and course silt with high water content) loses strength as a result of the shaking and acts like a viscous fluid.

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.

The following figure was obtained from the University of Alaska, Fairbanks (UAF), Alaska Earthquake Information Center (AEIC) website at: http://www.giseis.alaska.edu/Seis/

Figure 6 AEIC Earthquake Active Faults



Southeastern Alaska

Southeastern Alaska, also known as "the panhandle", includes the area of the state from Prince of Wales Island to Icy Bay. In 1904, the state's first seismic monitoring station was installed in southeastern Alaska at the Astronomical Observatory in Sitka. It was the only seismic station monitoring earthquakes in Alaska until 1935 when a second station was installed at College near Fairbanks. The Sitka station continues to operate today as part of a statewide network of seismograph stations (AEIC).

Major faults in the area include the Queen Charlotte fault, the Fairweather fault, and the Chatham Strait fault, described in further detail below. Minor faults in the area include the Clarence Strait fault and the Peril Strait fault. The eastern end of the Denali and Transition faults (main discussions in Interior and Southcentral seismicity sections) are also found in southeastern Alaska (AEIC).

The strongest shaking will occur in muskeg, man-made fills, modern alluvial and delta deposits, and volcanic ash deposits. The saturated muskeg and reworked volcanic ash would be subject to possible liquefaction during severe earthquake-caused ground shaking, and are thus unreliable as stable foundation materials.

An earthquake potentially could also cause other disastrous events to occur at the same time, including tsunamis, fires, release of hazardous materials, and energy shortages (EOP 2003).

4.5.1 Earthquake Impact

The greatest potential earthquake effects include compaction, settlement, liquefaction, subsidence and ground fracturing of poorly consolidated, water-saturated deposits, as well as sliding on steep slopes of fine grained plastic sediments and damage from waves induced by submarine sliding.

The impact on the community of Sitka of a high-magnitude earthquake could be extensive. Earthquake damage could be area-wide with potential damage to critical infrastructure. Limited building damage assessors are available in Sitka to determine structural 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.

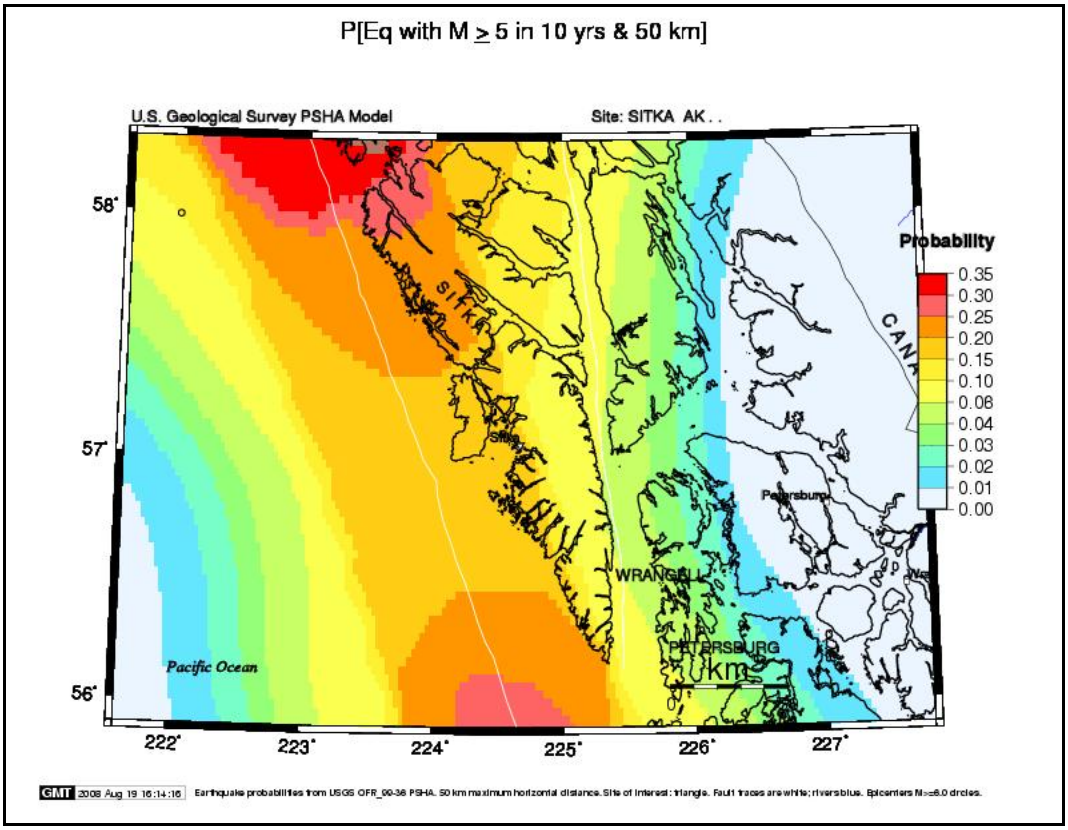
4.5.2 Earthquake Probability

Sitka has a significant risk of earthquake damages. It is generally accepted that a “high” probability of a large, damaging earthquake will occur in Sitka; however it is unknown how soon this will happen. One could occur in the next year or one might not occur for a hundred years.

While it is not possible to predict an earthquake, the 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.

Figure 4 was developed by using the USGS website (see source for web address). The figure indicates that the probability of an earthquake with an intensity of 5.0 or greater will occur within the next ten years within 50 kilometers (31 miles) of Sitka is 20 percent.

Figure 7 USGS Probability Map



Source: USGS Earthquake Probability Mapping; http://eqint.cr.usgs.gov/eqprob/2002/index.php

The *Alaska All-Hazard Mitigation Plan* Vulnerability Matrix, Table 10, page 24 of this plan, lists the probability of an earthquake occurring within one year in Sitka as high. Which is defined as the event has up to 1 in 1 year chance of occurring.

4.5.3 Earthquake History

Four major earthquakes have been linked to the Queen Charlotte-Fairweather fault system in the last century. In 1927, a magnitude 7.1 (Ms - surface wave magnitude) earthquake occurred in the northern part of Chichagof Island; in 1949, a magnitude 8.1 (Mw - moment magnitude) earthquake occurred along the Queen Charlotte fault near the Queen Charlotte Islands; in 1958, movement along the Fairweather fault near Lituya Bay created a magnitude 7.9 (Ms) earthquake; and in 1972, a magnitude 7.4 (Ms) earthquake occurred near Sitka. The 1958 Lituya Bay earthquake, which was felt as far away as Seattle, Washington, caused a large rockslide, which deposited the contents of an entire mountainside into the bay. The gigantic wave that resulted from this rockslide scoured the shores of the bay down to bedrock and uprooted trees as high as 540 meters above sea level. Fishing boats were carried on the wave at a reported height of at least 30 meters over the spit at the entrance to the bay and tossed into the open ocean.

Geologic evidence shows that the Chatham Strait fault was active as recently as the mid-Tertiary period and had total right lateral displacement up to 150 km.

Although a 1987 magnitude 5.3 (mb - body wave magnitude) earthquake was located near the Chatham Strait fault, very few earthquakes in the area appear to have been directly related to the fault (AEIC).

Table 18 was developed from the AEIC Database, using the following search criteria:

- 56.0 <= latitude <=58
- -137 <= longitude >= -134
- 0 to 350 feet depth
- 01/01/1898 to 5/31/2008
- Earthquakes of over 5.0 magnitudes

Table 9 Historical Earthquake Events

Date	Depth (feet)	Mb	ML	MS
05/18/1919	0.0		6.0	
10/24/1927	80.0	7.1	7.1	7.1
9/18/1939	0.0		6.0	
10/31/1949	0.0		6.2	6.2
10/31/1949	0.0		5.0	6.2
7/30/1972	92.8	6.5	7.6	7.6
08/04/1972	57.6	5.1	5.0	5.0
08/04/1972	0.0	5.6	5.8	5.8
08/15/1972	0.0	5.6	5.4	4.8
11/17/1972	105.6	5.0	4.8	
01/06/2006	3.2	5.5	6.1	5.9

Mb - Body wave Magnitude - Based on the amplitude of P (compressional) body-waves. This scale is most appropriate for deep earthquakes.

ML - Local Magnitude - The original magnitude relationship defined by Richter and Gutenberg for local earthquakes in 1935. It is based on the maximum amplitude of a seismogram recorded on a Wood-Anderson torsion seismograph. Although these instruments are no longer widely used, Ml values are calculated using modern instruments with appropriate adjustments.

MS - Surface wave Magnitude - A magnitude for distant earthquakes based on the amplitude of the Rayleigh surface wave.

Source: http://www.aeic.alaska.edu/html_docs/db2catalog.html

4.5.4 Earthquake Location

While earthquakes are large events that affect regions, rather than individual locations, the following information illustrates the specifics of Sitka's position relative to the nearest sources of damaging earthquakes:

Queen Charlotte - Fairweather Fault System

The Queen Charlotte and Fairweather faults are part of a long fault system that marks the eastern boundary of the Pacific plate and the western boundary of the North American plate. The Pacific plate moves in a northwestward direction relative to the North American plate, creating a transform boundary, the name given to the interface between two plates moving horizontally in opposite directions. The fault associated with a transform boundary is a strike-slip fault. The Queen Charlotte and Fairweather faults are very similar to California's San Andreas Fault system, some of the most well known strike-slip faults in the world.

At the northern end of the Queen Charlotte-Fairweather fault system is the Fairweather fault, a strike-slip fault with right lateral movement. The Fairweather fault is visible on land for about 280 kilometers from Cross Sound northwestward to its junction with the St. Elias fault in the vicinity of Yakutat Bay. Seismic exploration methods have projected the Fairweather fault just offshore of the Alexander Archipelago from Cross Sound to the mouth of Chatham Strait. At this point, the fault is believed to connect with the Queen Charlotte fault. The Queen Charlotte fault, which extends southeastward from Chatham Strait past the Queen Charlotte Islands, is also a strike-slip fault with right lateral movement (AEIC).

Chatham Strait Fault

The Chatham Strait fault is the second largest right lateral strike-slip fault in southeastern Alaska. Starting near Sitka, the fault follows Lynn Canal south into Chatham strait and is thought to be truncated by the Fairweather-Queen Charlotte fault system west of Iphigenia Bay (AEIC).

4.5.5 Earthquake Vulnerability

The hazards of earthquake could potentially impact any part of Sitka.

Earthquake damage would be area-wide with potential damage to critical infrastructure up to and including the complete abandonment of key facilities. Limited building damage assessors are available in Sitka to determine structural 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. The extent of an earthquake in Sitka could be ***critical***.

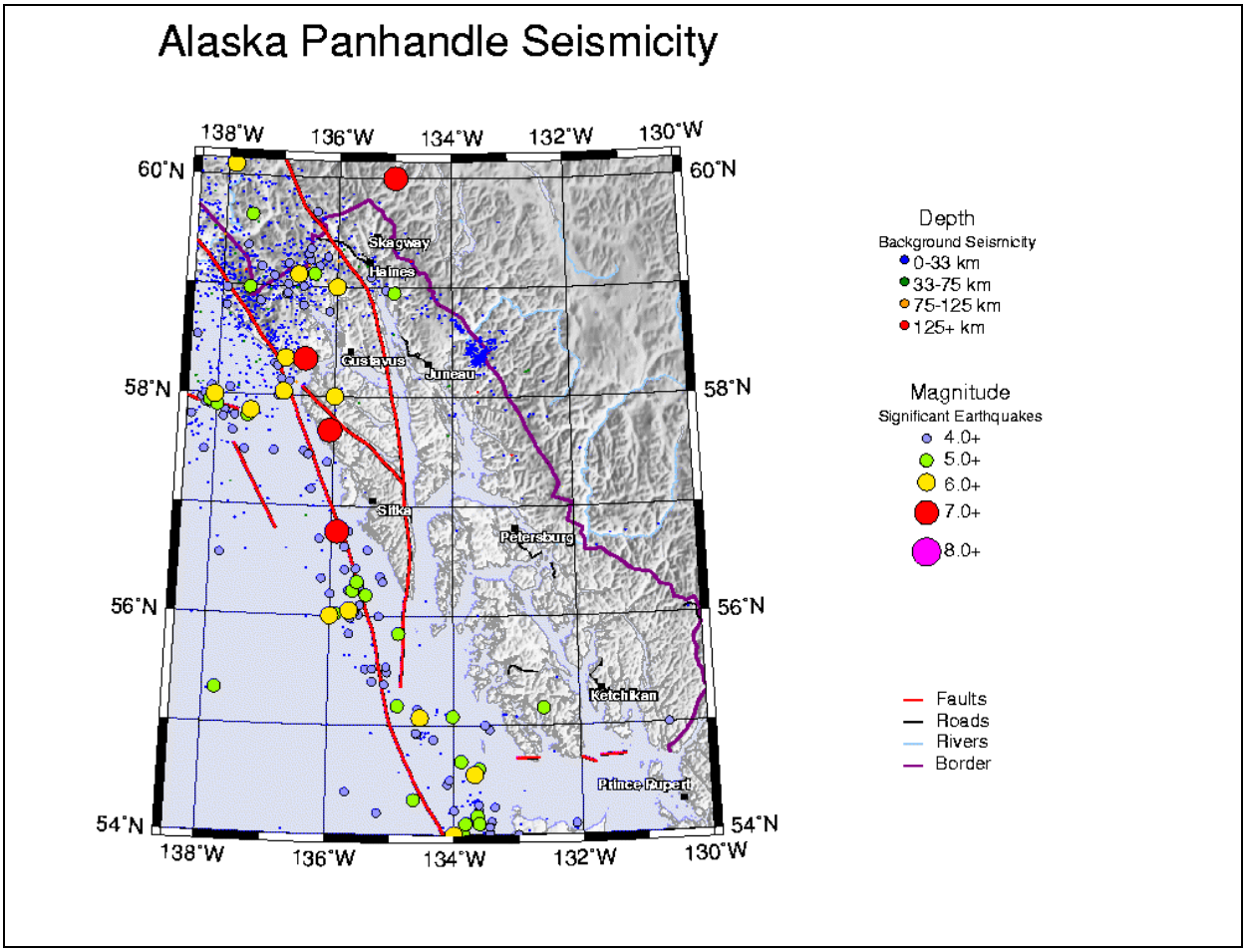
Intensity is a subjective measure of the strength of the shaking experienced in an earthquake. Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. It varies from place to place within the disturbed region depending on the location of the observer with 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 2 to 3 units higher than sites on bedrock.

The Richter Scale expresses magnitude as a decimal number. 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

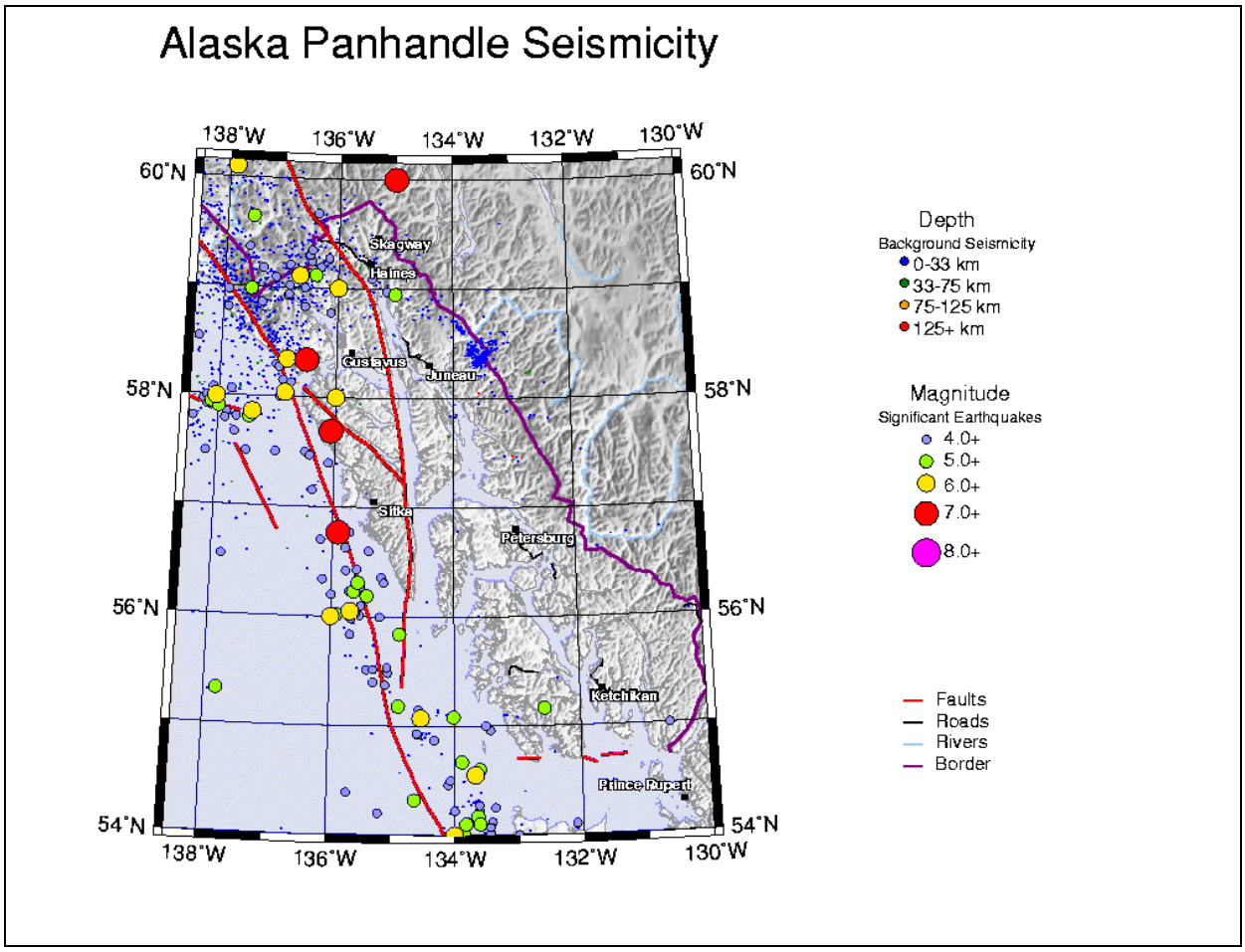
moment magnitude scale is used. The modified Mercalli Intensity Scale is used to describe earthquake effects on structures.

The extent of a major earthquake in Sitka could be critical. Sitka is located near the Fairweather fault, which extends from south of Queen Charlotte Islands to Sitka. The fault moves right-laterally approximately 2.25 inches per year. A study by the U.S. Geological Survey predicts a magnitude 8 or greater earthquake will occur near Sitka in the future. from south of Queen Charlotte Islands to Sitka. The fault moves right-laterally approximately 2.25 inches per year. A study by the U.S. Geological Survey predicts a magnitude 8 or greater earthquake will occur near Sitka in the future. This could be especially devastating because ground shaking can cause liquefaction of Sitka's thixotropic soils.



, from the UAF AEIC, illustrates that a major earthquake has occurred near Sitka in the past and indicates that a fault is located near the Greater Sitka area.

Figure 8 AEIC Alaska Panhandle Seismicity



Source: http://www.aeic.alaska.edu/html_docs/information_releases.html

4.6 Tsunami

Note: The Sitka Borough Fire Department and Local Emergency Planning Committee wrote portions of this section, in 2003, as part of the Emergency Operation Plan. The 2003 Tsunami Plan has been reformatted to fit this plan.

4.6.1 Tsunami Description

A tsunami is a series of long waves generated in the ocean by a sudden displacement of a large volume of water. Underwater earthquakes, landslides, volcanic eruptions, meteor impacts, or onshore slope failures can cause this displacement. Most tsunamis originate in the Pacific "Ring of Fire," the area of the Pacific bounded by the eastern coasts of Asia and Australia and the western coasts of North America and South America that is the most active seismic feature on earth.

Tsunami waves can travel at speeds averaging 450 to 600 miles per hour. As a tsunami nears the coastline, its speed diminishes, its wavelength decreases, and its height increases greatly. Unusual waves have been known to be over 100 feet high. However, waves that are 10 to 20 feet high can be very destructive and cause many deaths and injuries.

After a major earthquake or other tsunami-inducing event occurs, a tsunami could reach the shore within a few minutes. From the source of the tsunami-generating event, waves travel outward in all directions in ripples. As these waves approach coastal areas, the time between successive wave crests varies from 5 to 90 minutes. The first wave is usually not the largest in the series of waves, nor is it the most significant. One coastal community may experience no damaging waves while another may experience destructive deadly waves. Some low-lying areas could experience severe inland inundation of water and deposition of debris of more than 1000 feet inland.

The Alaska and Aleutian Seismic Zone that threatens Alaska has a predicted occurrence (84 percent probability between 1988 to 2008) of an earthquake with magnitude greater than 7.4 in Alaska. According to the West Coast and Alaska Tsunami Warning Center (WCATWC), if an earthquake of this magnitude occurs, Alaska's coastlines can be expected to flood within 15 minutes.

Types of Tsunami

Tele-Tsunami

Tele-tsunami is the term for a tsunami observed at places several thousand kilometers from their source. In many cases, tele-tsunamis can allow sufficient warning time for evacuation.

No part of Alaska is expected to have significant damage due to a tele-tsunami. Only one tele-tsunami has caused damage in Alaska; the 1960 Chilean tsunami. Damage occurred to pilings at MacLeod Harbor, Montague Island on Cape Pole, and Kosciusko Island where a log boom broke free.

Seismically generated local tsunami

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

Landslide-generated tsunami

Submarine and subaerial landslides can generate large tsunami. Subaerial landslides have more kinetic energy associated with them so they trigger larger tsunamis. An earthquake usually, but not always, triggers this type of landslide and they are usually confined to the bay or lake of origin. One earthquake can trigger multiple landslides and landslide generated tsunamis. Low tide is a factor for submarine landslides because low tide leaves part of the water-saturated sediments exposed without the support of the water.

Landslide generated tsunamis are responsible for most of the tsunamis deaths in Alaska because they allow virtually no warning time.

Seiches

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 because 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. The onset of the first wave can occur in a few minutes, giving virtually no time for warning.

Characteristics of Tsunamis

Debris: As the tsunami wave comes ashore, it brings with it debris from the ocean, including man-made debris such as boats, and as it strikes the shore, creates more on-shore debris. Debris can damage or destroy structures on land.

Distance from shore: Tsunamis can be both local and distant. Local tsunamis cause more devastation and give residents only a few minutes to seek safety. Distant tsunamis originating in places like Chile, Japan, Russia, or other parts of Alaska can also cause damage.

High tide: If a tsunami occurs during high tide, the water height will be greater and cause greater inland inundation, especially along flood control and other channels.

Outflow: Outflow following inundation creates strong currents, which rip at structures and pound them with debris, and erode beaches and coastal structures.

Water displacement: When a large mass of earth on the ocean bottom impulsively sinks or uplifts, the column of water directly above it is displaced, forming the tsunami wave. The rate of displacement, motion of the ocean floor at the earthquake epicenter, the amount of displacement of the rupture zone, and the depth of water above the rupture zone all contribute to the intensity of the tsunami.

Wave runup: Runup is the height that the wave extends up to on steep shorelines, measured above a reference level (the normal height of the sea, corrected to the state of the tide at the time of wave arrival).

Wave strength: Even small wave heights can cause strong, deadly surges. Waist-high surges can cause strong currents that float cars, small structures, and other debris.

4.6.2 Tsunami Impact

A tsunami in Sitka could be of a ***catastrophic*** extent. Sitka has been designated by DHS&EM and DGGS as having a high potential both local and Pacific-wide tsunamis. Sitka is located directly on the Gulf of Alaska and is not protected by islands, as is much of Southeastern Alaska. It is possible for a catastrophic event that could cause multiple deaths, complete shutdown of facilities and severe property damage.

A tsunami event in Sitka could damage the structures and infrastructure that are located along the shoreline in the community, and within the flood zones described above. A tsunami event in Sitka could isolate the community from other areas of the state and cause wide spread damage.

The following factors will affect the severity of a tsunami:

Coastline configuration: Tsunamis impact long, low-lying stretches of linear coastlines, usually extending inland for relatively short distances. Concave shorelines, bays, sounds, inlets, rivers, streams, offshore canyons, and flood control channels may create effects that result in greater damage. Offshore canyons can focus tsunami wave energy, and islands can filter the energy. The orientation of the coastline determines whether the waves strike head-on or are refracted from other parts of the coastline. A tsunami wave entering flood control channels could reach a mile or more inland, especially if it enters at high tide.

Coral reefs: Reefs surrounding islands in the western North Pacific and the South Pacific generally cause waves to break, providing some protection to the islands.

Earthquake characteristics: Several characteristics of the earthquake that generates the tsunami contribute to the intensity of the tsunami, including the area and shape of the rupture zone, and:

Fault movement: Strike-slip movements that occur under the ocean create little or no tsunami hazard. However, vertical movements along a fault on the seafloor displace water and create a tsunami hazard.

Magnitude and depth: Earthquakes with greater magnitude cause more intense tsunamis. Shallow-focus earthquakes also have greater capacity to cause tsunamis.

Human activity: With increased development, property damage increases, multiplying the amount of debris available to damage or destroy other structures. Additionally, loading on the delta from added weight such as trains or a warehouse or added fill can add to an area's instability.

4.6.3 Probability

Sitka has a **high** probability of a tsunami event. However, like the earthquake hazard, it is impossible to predict how soon a damaging tsunami could occur.

Alaska has the greatest earthquake and tsunami potential in the entire United States. It is a very seismically active region where the Pacific plate is subducting under the North American plate. This subduction zone, the Alaska-Aleutian megathrust zone, creates high tsunami hazards for the adjacent

coastal areas. The coseismic crustal movements that characterize this area have a high potential for producing vertical sea floor displacements, which are highly tsunamigenic (AEIC).

The Alaska and Aleutian Seismic Zone that threatens Alaska has a predicted occurrence (84 percent probability between 1988 to 2008) of an earthquake with magnitude greater than 7.4 in Alaska. If an earthquake of this magnitude occurs, Alaska's coastlines can be expected to flood within 15 minutes (WCATWC).

Since science cannot predict when earthquakes will occur, they cannot determine exactly when a tsunami will be generated. But, with the aid of historical records of tsunamis and numerical models, science can get an idea as to where they are most likely to be generated. Past tsunami height measurements and computer modeling help to forecast future tsunami impact and flooding limits at specific coastal areas. There is an average of two destructive tsunamis per year in the Pacific basin. Pacific wide tsunamis are a rare phenomenon, occurring every 10 - 12 years on the average (WCATWC).

4.6.4 Tsunami History

Earthquakes have generated local subaerial and subaqueous landslides, which have the potential to trigger local tsunamis. The largest tsunami to impact Sitka was 7.8-foot high wave, generated by the 1964 Prince William Sound earthquake. This tsunami caused the loss of one dock in Sitka. There was no other damage or loss of life (AEIC).

Historic tsunamis that were generated by earthquakes in the Alaska-Aleutian subduction zone, have resulted in widespread damage and loss of life along the Alaskan Pacific coast and other exposed locations around the Pacific Ocean. Seismic water waves originating in Alaska can travel across the Pacific and destroy coastal towns hours after they are generated. However, they are considered to be a near-field hazard for Alaska, and can reach Alaskan coastal communities within minutes after an earthquake. Therefore, saving lives and property depends on how well a community is prepared, which makes it essential to model the potential flooding area in a case of a local or distant tsunami (AEIC).

There has been at least one confirmed volcanically triggered tsunami in Alaska. In 1883, debris from the Saint Augustine volcano triggered tsunamis that inundated Port Graham with waves 30 feet high.

4.6.5 Tsunami Location

The State of Alaska Department of Natural Resources completed a Tsunami Inundation Study, complete with inundation mapping, for the City and Borough of Sitka in 2013. This study is included as an appendix to this plan, and contains detailed information about the specifics of tsunami hazard in Sitka.

4.6.6 Tsunami Vulnerability

See Appendix for detailed information regarding Tsunami Vulnerability for Sitka.

4.7 Severe Weather

In Alaska, there is great potential for weather disasters and, while weather events vary greatly region by region, Sitka is no exception to the potential for weather disasters. Weather extremes in Sitka are due to heavy rainfall and high winds, with winter storms producing record rainfall and wind-driven high tides. Emergencies could arise from a combination of events.

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

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". 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. This is of concern to Sitka, as water and air access are the only supply sources to the island.

4.7.1 Severe Weather Impact

Because of its remote location, Sitka must be very self-reliant. Severe weather can cut off air access limiting medevac availability and access to goods and services, including groceries and medical supplies. Severe wind and heavy snow can cause extensive damage to critical structures including residences and public facilities.

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

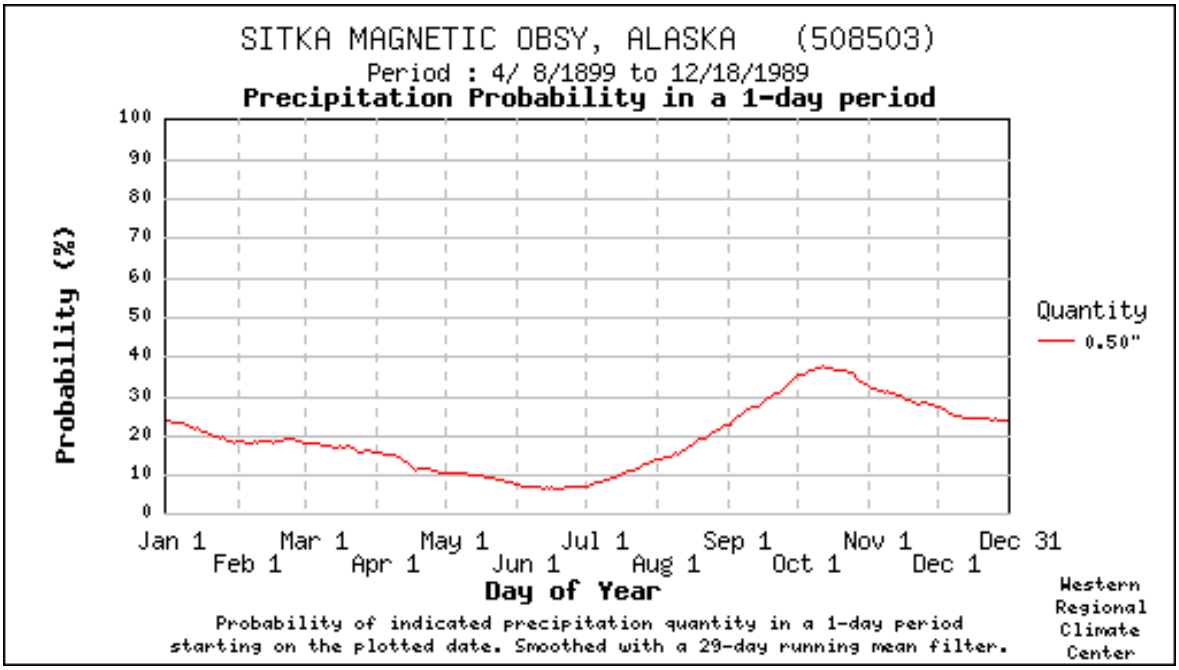
Severe weather events of the type that occur in Sitka can have implications that affect the likelihood of other hazards. Significant rainfall events can increase the risk of landslides as can high winds. High winds can also cause flooding from wind-driven high tides.

4.7.2 Severe Weather Probability

The past Sitka Fire Chief (S. Ulmer) related that severe weather is the highest natural hazard risk in Sitka, due to extreme rainfall and high winds. As noted on the table below, Sitka 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 1 in 1 year chance of occurring.

Figure 7 from the Western Regional Climate Center shows that Sitka has a 10% to 40% chance of at least a half-inch of rainfall most days.

Figure 9 Precipitation Probability in a 1-day period



4.7.3 Severe Weather History

Severe weather is a yearly occurrence in Sitka. Most years the severe weather events do not result in disasters or incidents, but when the "perfect" combination of conditions exist, damages have resulted.

Southeast Alaska, November 26, 1984: A hurricane force windstorm and wind driven tides caused extensive damage to public and private property in five Southeast Alaskan communities. The State provided public and individual assistance grants and temporary housing in Juneau, Sitka, Kake, Angoon and Tenakee Springs. SBA provided disaster loan assistance and the American Red Cross made grants to meet immediate needs of victims. The Governor's request for a Presidential declaration was denied.

Southeast Storm (AK-06-216) declared December 23, 2005 by Governor Murkowski: Beginning on November 18, 2005 and continuing through November 26, 2005, a strong winter storm with high winds and record rainfall occurred in the City/Borough of Juneau, the City/Borough of Haines, the City/Borough of Sitka, the City of Pelican, the City of Hoonah, and the City of Skagway, which resulted in widespread coastal flooding, landslides, and sever damage and threat to life and property, with the potential for further damage. The following conditions existed as a result of this disaster: severe damage to personal residences requiring evacuation and relocation of residents; to individual's personal and real property; to businesses; and to a marine highway system dock, the road systems eroded and blocked by heavy debris that prohibited access to communities and residents, and other public infrastructures, necessitating emergency protective measures and temporary and permanent repairs. The total estimated amount of assistance is approximately $1.87 million. This includes the following: Individual Assistance totaling $500,000 for 52 applicants. There was no hazard mitigation (DHS&EM Disaster Cost Index).

Periods of heavy rains and high winds contributed to the cause of a **fatal landslide event on August 28, 2015**, causing three deaths and over $1M in damage. At least six landslides occurred in that event that

directly affected the town, including the one that killed three people. The landslide was declared a state-level disaster by Governor Bill Walker.

4.7.4 Severe Weather Location

All areas of Sitka are affected by severe weather. Of particular concern are flood zones, coastal storm surge zones, and areas that might be affected by rain-induced landslides (landslide zones are currently being mapped).

4.8 Landslide/Ground Failure

Landslides are described as downward movement of a slope and materials under the force of gravity. The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Landslides are influenced by human activity (mining and construction of buildings, railroads, and highways) and natural factors (geology, precipitation, and topography). They are common all over the United States and its territories.

Landslides occur when masses of rock, earth, or debris move down a slope. Therefore, gravity acting on an overly steep slope is the primary cause of a landslide. They are activated by storms, fires, and by human modifications to the land. New landslides occur as a result of rainstorms, earthquakes, volcanic eruptions, and various human activities.

Mudflows (or debris flows) are flows of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or "slurry." Slurry can flow rapidly down slopes or through channels and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. Mudflows/debris flows present the most significant landslide hazard to Sitka due to the heavy rains common to the region and the steep slopes that exist above the community.

Geology, precipitation, topography and cut and fill construction practices all influence landslide activity. They often are the result of seismic activity, flooding, volcanic activity, heavy precipitation, construction work, or coastal storms. Landslides can also trigger secondary hazards, such as tsunamis and flooding.

4.8.1 Landslide Probability

Due to the voluminous rainfall, soil type, and topography in Sitka, the probability of landslides is high.

4.8.2 Landslide History

Even before the devastating and fatal landslide of 2015 that killed three people and caused over a million dollars of damage to the community, numerous landslides have occurred in uninhabited areas of Sitka Borough. Blue Lake Road, Green Lake Road and powerline corridor all intersect avalanche chutes. Blue Lake Road is heavily traveled during winter months to access cross-country skiing, sledding, walking pets and mountain biking. Past landslides have destroyed remote sections of the powerline (EOP 2003).

4.8.3 Landslide Location/Landslide Vulnerability

The City and Borough of Sitka has commissioned two landslide studies which have been completed and are available to the public. Another study is currently underway. of this writing, a comprehensive landslide hazard mapping project is being completed by the State of Alaska DGGS through a grant from FEMA to, in part, help determine the specific areas of vulnerability throughout the community. This information will be added to the plan when it is completed.

4.9 Hazards Classified as "Negligible"

The following hazards have been identified as existing within Sitka, but having minor or negligible effects at this time.

4.9.1 Erosion

No known or significant erosion problems exist in Sitka.

4.9.2 Wildland Fire

The soil conditions and abundant rainfall combine to make wildland fire hazard unlikely.

4.9.3 Avalanche

Avalanche zones are present in the mountains surrounding Sitka, but no known avalanche paths present a hazard to infrastructure or to the community at large. Avalanche hazards are encountered only by individuals who venture into the mountains and should be managed appropriately by each recreational user.

4.9.4 Volcano

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

The AVO, which is a cooperative program of the U.S. Geological Survey (USGS), DGGS, and the University of Alaska Fairbanks Geophysical Institute (UAF/GI), monitors the seismic activity at 23 of Alaska's 41 active volcanoes in real time. In addition, satellite images of all Alaskan and Russian volcanoes are analyzed daily for evidence of ash plumes and elevated surface temperatures. Russian volcanoes are also a concern to Alaska as prevailing winds could carry large ash plumes from Kamchatka into Alaskan air space. AVO also researches the individual history of Alaska's active volcanoes and produces hazard assessment maps for each center.

The AVO identifies the closest active volcano to Sitka at being over 300 miles away.
http://www.avo.alaska.edu/

4.10 Impacts of Global Climate Change

Earth's 2015 surface temperatures were the warmest recorded since modern record keeping began in 1880. Climate change is a recognized phenomenon caused by human activity. The planet's average surface temperatures has risen about 1.8 degrees Fahrenheit since the late 19th century, a change driven

by dramatically increased carbon dioxide and other human-made emissions into the atmosphere (NASA, 2017).

The nature of global climate change leads to more dramatic affects in the arctic region. Over the past 60 years, the average temperature across Alaska has increased by approximately 3 degrees Fahrenheit. This increase is more than twice the warming of the rest of the United States. Warming in the winter has increased by an average of 6 degrees Fahrenheit and has led to changes in ecosystems, such as earlier breakup of river ice in the spring. As the climate continues to warm, average annual temperatures in Alaska are projected to increase an additional two to four degrees by the middle of this century. Precipitation in Alaska is projected to increase during all seasons by the end of this century. Despite increased precipitation, the state is likely to become drier due to greater evaporation caused by warming temperatures (Chapin, et al., 2014) (EPA, 2017).

Rising temperatures are expected to exacerbate wildfire danger, erosion, and flooding.

5 CAPABILITY ASSESSMENT

This chapter identifies the community mitigation capabilities. These are the plans and policies, programs, and projects that are currently in place to reduce vulnerability to hazards. It includes key mitigation accomplishments that have been achieved since the last update. As mitigation actions identified in the mitigation strategy are completed, they become new mitigation capabilities.

5.1.1 Government

The City & Borough of Sitka is organized under a home rule charter. It was first adopted in October 1960 and has been amended eight times since that date, most recently in 2002. Any amendments to the Charter must be approved by a vote of the public. The Sitka Charter may be viewed on the City & Borough website.

The City & Borough of Sitka Assembly consists of a mayor and six council members, elected by the citizens in Sitka. The vice mayor is selected to serve a one-year term from among the council members shortly after the elections. Municipal elections are held the first Tuesday of October and each council member elected serves a three-year term. The Council meets for regularly scheduled meetings the first and third Tuesdays of each month.

5.1.2 Local Resources

Sitka has a number of planning and land management tools that will allow it to implement hazard mitigation activities. The resources available in these areas have been assessed by the Borough, and are summarized in Tables 4, 5 and 6.

Table 10 Local Planning Resources

Regulatory Tools	Local Authority?	Most Recent Update
Building code	Yes	
Zoning ordinance	Yes	2002
Subdivision ordinance or regulations	Yes	2002
Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Flood Plain Regulations 1982	Need new FIRMs
Growth management ordinances (also called “smart growth” or anti-sprawl programs)	No	
Site plan review requirements	No	
Comprehensive plan	Yes	2007, 2018
A capital improvements plan	Yes	Annually
An economic development plan	No	
An emergency response plan	Yes	2003
A post-disaster recovery plan	No	
Real estate disclosure requirements	No	

Regulatory Tools	Local Authority?	Most Recent Update
Building code	Yes	
Zoning ordinance	Yes	2002
Subdivision ordinance or regulations	Yes	2002
Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Flood Plain Regulations 1982	Need new FIRMs

Table 11 Sitka Staff Resources

Resources on Staff	Dept/Agency and Position
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	One building official, one building inspector One building maintenance supervisor
Planners or Engineer(s) with an understanding of natural and/or human-caused hazards	City engineers
Floodplain manager	Building official
Surveyors	Private Sector
Staff with education or expertise to assess the community's vulnerability to hazards	None
Personnel skilled in GIS and/or HAZUS	Planning Director, Engineering Tech
Scientists familiar with the hazards of the community	None
Emergency manager	Fire Chief
Grant writers	None

Table 12 Fiscal Capability

Financial Resources	Accessible or Eligible to Use
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	Yes
Incur debt through special tax and revenue bonds	Yes
Incur debt through private activity bonds	No
Withhold spending in hazard-prone areas	No

5.1.3 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 another high priority list item for the State of Alaska. Providing hazard mitigation training, current hazard information, and the facilitation of communication with other agencies encourages 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 Veterans Affairs:** Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits.

5.1.4 Federal Resources

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

FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from FEMA Publication Warehouse (1-800-480-2520) and are briefly described 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 Sitka Hazard Mitigation Plan. The last five how-to guides address special topics that arise in hazard mitigation planning such as conducting cost-benefit analysis and preparing multi-jurisdictional plans. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting Disaster Mitigation Act (DMA) 2000 requirements (http://www.fema.gov/fima/planhowto.shtm).

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

- **Mitigation Resources for Success CD.** FEMA 372, September 2001. This CD contains 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 process for obtaining this assistance, and provides a brief overview of each program.

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

Other resources: 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 – 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.

5.1.5 Other Funding Sources and Resources

- **Real Estate Business.** State law for properties within flood plains requires real estate disclosure.

- **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.

6 MITIGATION GOALS AND STRATEGIES

Chapter six details the community's goals and strategies. The strategies are made up of mitigation goals and objectives, mitigation actions, and a mitigation plan for implementation.

Figure 10 Mitigation Strategy Process

6.1 Mitigation Goals

FEMA	C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))

Mitigation goals represent what the community seeks to achieve through the mitigation plan. Goals are general guidelines providing a framework for more detailed objectives and actions. During the 2018 update, the planning team reviewed the goals and objectives from the original 2007 plan and re-evaluated them for effectiveness, relevance, and likelihood of achievement. The team added new goals focusing on cost-effectiveness and protection of the community from hazards that in recent years proved to be significant:

Table 13 Mitigation Goals

Goal	Description
1	Choose strategies and actions that are the most cost-effective for the community.
2	Identify the most substantial risks and choose the actions to mitigate those risks effectively
3	Increase public awareness about hazards and threats
4	Continue to reduce vulnerability to identified hazards through an ongoing and effective mitigation program that builds on past efforts
5	Prioritize mitigation actions that provide early warning and detection

6.2 Mitigation Actions

FEMA	C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for the [City and Borough of Sitka] being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure ? (Requirement §201.6(c)(3)(ii))

Mitigation actions are specific projects that are meant to reduce or eliminate the damages from hazards and their impacts. Implementation of mitigation actions will help the community achieve mitigation goals and reduce vulnerability to threats and hazards identified in the plan, and will make Sitka more resilient to hazards and disasters. In compliance with mitigation planning regulations, the planning team identified and analyzed a comprehensive range of specific mitigation actions and projects to reduce the risks identified as affecting Sitka.

6.2.1 Review of 2007 Hazard Mitigation Actions

As a part of the 2018 update, all mitigation actions identified in the 2007 plan were evaluated to determine the status of the action, its current relevance, and whether or not it should be included in the update.

Table 14 Status of Past Mitigation Actions

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Project Status (during annual review)
Flood/Erosion (FLD)					
FLD-1. Identify Drainage Patterns and Develop a Comprehensive Drainage System	FEMA NFIP	N/A	PDM FMA	>1 year	A stormwater drainage plan was completed in 2013 and the projects from that plan are included in this mitigation plan update.
FLD-2. Structure Elevation and/or Relocation	FEMA DHS&EM	N/A	PDM FMA HMGP	>1 year	No structures were determined to require elevation or relocation.
FLD-3. Updated FIRM Sitka Maps	FEMA	>$100,000	FMA	<1 year	FIRM maps are currently being updated as of this writing.
FLD-4. Public Education	Borough DHS&EM	Staff Time	Borough	Ongoing	Public education regarding flood hazards is ongoing as a part of CBS's public education efforts.
FLD-5. Pursue obtaining a CRS rating to lower flood insurance rates.	Borough DCRA	<$1,500	Borough	<1 year	TBD
FLD-6. Continue to obtain flood insurance for all Borough structures, and continue compliance with NFIP.	Borough	<$1,500	Borough	Ongoing	The City and Borough of Sitka remains in compliance with NFIP.
FLD-7. Require that all new structures be constructed according to NFIP requirements and set back from the shoreline to lessen future erosion concerns and costs.	Borough	Staff Time	Borough Budget	Ongoing	The City and Borough of Sitka remains in compliance with this requirement of NFIP.

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Project Status (during annual review)
Earthquake (E)					
E-1. Identify buildings and facilities that must be able to remain operable during and following an earthquake event.	City & Borough DHS&EM DCRA	Staff Time	State Grants	>1 year	This project was completed.
E-2. Contract a structural engineering firm to assess the identified bldgs and facilities.	City & Borough DHS&EM	>$10,000	State/local funds	>5 years	This project was completed.
E-3. Nonstructural mitigation projects (i.e. assessing whether heavy objects are tied down)	Borough	Staff time	Borough	<1 year	This project was completed but remains active as regular assessments are necessary as offices are altered and/or moved.
E-4. Conduct mock emergency exercises to identify response vulnerabilities.	Borough DHS&EM	Staff/Volunteer time	Borough DHS&EM	>1 year	The City and Borough conducts regular exercises and drills as a part of its emergency management program.
Snow Avalanche (S/A)					
S/A-1. Prohibit new construction in avalanche areas.	Borough	Staff Time	Borough Budget	Ongoing	This project has been removed as there are no avalanche paths that affect the community.
S/A-2. Utilize appropriate methods of structural avalanche control.	FEMA	>$25,000	PDM HMGP	>5 years	This project has been removed as there are no avalanche paths that affect the community
S/A-3. Enact buyout of homes in avalanche paths.	FEMA	>$25,000	PDM HMGP	>5 years	This project has been removed as there are no avalanche paths that affect the community
S/A-4. Install warning signage in mapped avalanche areas.	State DOT	<$10,000	State/local funds	Ongoing	This project has been removed as there are no avalanche paths that affect the community

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Project Status (during annual review)
S/A-5. Continue to educate public about avalanche hazards.	Borough	Staff Time	Borough Budget	Ongoing	Avalanche education is provided by avalanche education organizations and other resources. Avalanche risk reduction is the responsibility of recreational users when they enter avalanche-prone areas.
Tsunami (T)					
T-1: Continued Participation in the Tsunami Awareness Programs.	Borough DHS&EM	Staff Time	Borough DHS&EM	Ongoing	Sitka participates in Tsunami Awareness Programs.
T-2. Update Sitka Emergency Operations Plan, as needed, Conduct Emergency Operation Plan Exercises	Borough DHS&EM	>$20,000	Borough DHS&EM	Ongoing	The EOP was updated in 2012 and the City and Borough continues to participate in EOP exercises and drills.
T-3. Inundation Mapping	NOAA NTHMP* DHS&EM	>$150,000	NOAA - NTHMP	>5 years	A tsunami inundation study and mapping for the City and Borough of Sitka was completed in 2013 by the State of Alaska Department of Natural Resources. This paper is included as an appendix to this plan.
Severe Weather (SW)					
SW-1. Conduct special awareness activities, such as Winter Weather Awareness Week, Flood Awareness Week, etc.	Borough DCRA DHS&EM	Staff Time	Borough DCRA DHS&EM	<1 year	The City and Borough of Sitka continues to participate in special awareness activities for hazards that affect the community.
SW-2. Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability	Borough	Staff Time	Borough NOAA	Ongoing	This is an ongoing/continuous project.
SW-3. Encourage weather resistant building construction materials and practices.	Borough	Staff Time	Borough	<1 year	This is an ongoing/continuous project.

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Project Status (during annual review)
Ground Failure (G/F)					
G/F-1. Prohibit removal of vegetation in areas prone to landslides.	City & Borough	Staff Time	City & Borough Budget	Ongoing	The efficacy of this action has yet to be determined so it has not yet been implemented. This is a potential action that may result from the landslide mitigation study proposed in this 2018 update.
G/F-2. Require public disclosure of risk linked to deed or title of property. Require owners notify renters of hazard prior to occupancy.	City & Borough	Staff Time	City & Borough Budget	Ongoing	Disclosure of known risks is required and future development is required to link risk status to deed/title.
G/F-3. Install warning signage in mapped landslide zones.	DHS&EM FEMA CBS	<$10,000	State/local funds	Ongoing	Landslide hazard zones are currently being mapped and are expected to be completed in late 2018 or early 2019. The results of those efforts will be utilized to determine the efficacy of and need for warning signs.
G/F-4. Continue to educate public about avalanche and landslide hazards.	CBS	Staff Time	Borough DHS&EM	Ongoing	Public education campaigns continue and are included in this 2018 update as continuing mitigation actions.

6.2.2 Identification and Analysis of Mitigation Actions

In order to achieve its chosen mitigation actions, the community identified a series of mitigation objectives and supporting actions that are focused on cost effective ways to reduce vulnerability and improve sustainability and resilience throughout the community. The following types of actions were considered:

- **Plans and Regulations** – Regulatory actions or planning processes that help reduce vulnerability to hazards
- **Infrastructure** – Actions that involve modification of or repairs to the community's infrastructure to make them more disaster resistant or protect them from a hazard in their area

- **Education and Awareness** – Actions to inform and educate residents and stakeholders about hazards and ways to mitigate them
- **Preparedness** – Actions that can help reduce response time during a disaster, improve capabilities, or improve community resilience during an incident or disaster event.

- **Information Gathering** – These actions bolster disaster resistance by providing information, filling information gaps, or collecting data related to the hazards that affect Sitka.

Table 15 Mitigation Actions By Category

Mitigation Category	Related Mitigation Actions
Plans and Regulations	1
Infrastructure/Capital Project	2, 3, 5
Natural System Protection	1, 2, 3
Education and Awareness	4, 6, 7
Preparedness and Response	4, 6, 7
Information Gathering	1, 5

Mitigation actions identified in the plan are addressed in the Mitigation Implementation Plan provided in section 6.5.

All mitigation actions included in the plan address at least three priority hazards outlined in Chapter 4:

Table 16 Mitigation Actions by Hazard

Hazard*	Related Mitigation Actions
All Hazards	4, 6, 7
Landslide/Ground Failure	1, 2, 3, 4, 5
Severe Weather	3, 5, 6, 7
Tsunami	4, 5, 6, 7
Flooding	3, 4, 5, 7
Earthquake	4, 6, 7

6.2.3 Evaluating and Prioritizing Mitigation Actions

The planning team, along with other key stakeholders, evaluated and prioritized each mitigation action to determine which actions were the most relevant for the Plan. A Mitigation Action Worksheet was developed for each proposed Mitigation Action that includes the following information:

- Description of the action
  - ***Specific*** – target a specific area for improvement
  - ***Measurable*** – quantify or at least suggest an indicator of progress
  - ***Assignable*** – specify who will do it
  - ***Realistic*** – state what results can be achieved realistically, given available resources
  - ***Time-related*** – specify when the result(s) can be achieved
- Action status
  - ***New*** – The action is new and will be included for the first time in the 2018 plan update.
  - ***Existing*** – The action was implemented prior to the 2018 plan update, but is ongoing and additional or ongoing action is required for completion.
  - ***Complete*** – The action has been completed.
- Type of action
  - ***Plans and Regulations***
  - ***Infrastructure/Capital Project***
  - ***Natural Systems Protection***
  - ***Education and Awareness***
  - ***Preparedness and Response***
- Mitigation goals supported by the action
- Lead and supporting departments
  - ***Tribal agencies***
  - ***Local or County agencies***
  - ***Others***
- Timeline for implementation and expected life of the action
  - ***Less than 1 year***
  - ***1 to 3 years***

- *3 to 5 years*

- Hazards addressed by the action
- Anticipated cost and funding source

6.2.4 Mitigation Action Analysis

The planning team worked to analyze the proposed mitigation actions for the 2018 update to develop a more detailed vision of what the actions will look like as they are implemented. The following worksheets present each action in greater detail and discuss interactions between mitigation actions, potential benefits, estimated costs, and factors that might affect the results of the mitigation action.

6.2.4.1 Stormwater System Repair and Upgrade

Project: Stormwater System Repair and Upgrade
Problem Addressed: Drainage problems due to inadequate culverts have been reported by the public and discerned from maintenance history. Public works reports that 30% of maintenance time is spent clearing culverts.
Co-Benefits: Improved drainage from saturated soils, possibly reducing landslide risk, , reducing pollutant runoff, allowing for better drainage data collection, providing opportunities for road upgrades.
Estimated Costs: Study has been completed and is included in this plan as an appendix for reference. Costs have been broken down into individual projects ranging from $20,000 to $372,000. Total for all projects is $1,877,000. Projects have been prioritized according to criteria detailed in the study and can be funded individually or all together.
Potential Funding: Capital Projects, DHS&EM, FEMA
Additional Factors to Consider: This project may be a good candidate for combining with other mitigation actions such as data collection.
Associated Activities: 1. Prioritize sub projects based on criteria in study and available funding 2. Engineering design phase(?) 3. Partner agency involvement 4. Strategize combined projects (data collection, etc)
Measuring Success: Project will be considered successful when all identified repairs are complete.
Coordinating Agency: CBS Public Works
Lead Agencies: CBS Public Works
Supporting Agencies: ▪ USACE, ADFG
Existing Groups to Support Project: ▪ TBA
Project Phases: 1. Prioritization of sub projects as funding becomes available 2. Funding plan 3. Implementation
Other: This project is a high priority mitigation action as a comprehensive study has already been done, making this project cost effective.

6.2.4.2 Gavan Hill Landslide Mitigation Study

Project: Gavan Hill/Keet Gooshi Heen Landslide Mitigation Study
Problem Addressed: Project is Phase One in an effort to reduce potential damages from landslide to critical facilities adjacent to Gavan Hill including Keet Gooshi Heen elementary school, Sitka High School, a water standpipe, and CBS recreation fields.
Co-Benefits: This project might provide baseline information on landslide mitigation in general, which could be beneficial in other landslide zones. Even if study recommendations are not implemented, the information itself could be beneficial for landslide mitigation in the area.
Estimated Costs: Study to accomplish phase one (Desktop studies, Field Reconnaissance, Analyses and Report) has been estimated and the subsequent proposal is included in this plan as an appendix for more detailed information. Cost of Phase 1 is $73,005. Cost of implementation is TBD and thus is included in this plan update as a separate project.
Potential Funding: Capital Projects, FEMA, DHS&EM
Additional Factors to Consider: The information gleaned from this study might be helpful in public education and public involvement activities in regards to landslide hazards.
Associated Activities: Phase Two: Implementation (Separate project)
Measuring Success: Project will be considered successful when the study is complete and alternatives for landslide mitigation have been identified.
Coordinating Agency: CBS Public Works
Lead Agencies: CBS Public Works
Supporting Agencies: ▪ Sitka Fire Department ▪ USACE
Existing Groups to Support Project: ▪ LEPC
Project Phases: 1. TBA
Other:

6.2.4.3 Gavan Hill Landslide Mitigation Implementation

Project: This project would seek to implement the preferred alternatives for Gavan Hill landslide mitigation based on the results of the Phase One study (above).
Problem Addressed: This project would mitigate landslide damages to the identified facility. Particular details regarding efficacy are unknown at this time and would be identified in the Phase One (above) study.
Co-Benefits: While the specifics of the type of mitigation that would be implemented have yet to be identified, this project could yield valuable information about landslide mitigation in general that might be applicable to the rest of the community.
Estimated Costs: Unknown
Potential Funding: TBA
Additional Factors to Consider: It may not be possible to structurally mitigation landslide hazard in this area.
Associated Activities: Phase One Keet Gooshi Heen/Gavan Hill Landslide Mitigation Study (above)
Measuring Success: This project will be deemed successful when the preferred alternative from Phase One is implemented, constructed, or installed.
Coordinating Agency: CBS Public Works
Lead Agencies: CBS Public Works
Supporting Agencies: ▪ USACE, ADFG
Existing Groups to Support Project: ▪ TBA
Project Phases: Phase One (above – separate project)
Other: It is important to note that many data gaps regarding this project will be filled once all relevant studies, public process, and planning have been completed.

6.2.4.4 Public Education Campaign

Project: All-Hazards Public Education Campaign
Problem Addressed: This project is an ongoing effort and may fill gaps in public awareness and education regarding hazards in Sitka, what can be done to prepare for them, and what is being done to mitigate them. Improving home and family preparedness throughout the community ensures that disaster response will be more organized and sustainable.
Co-Benefits: This project has a number of benefits, from promoting disaster preparedness to giving the community educational opportunities. This project can share benefits with the CERT team development project.
Estimated Costs: Can range from minimal on up. Public education and communication is already a part of the CBS day-to-day mission and this type of information could readily be incorporated into regular messaging. Additional/specialized activities in regards to public education can be funded as funds become available.
Potential Funding: City and Borough of Sitka, HMGP, PDM
Additional Factors to Consider: Sitka is already a community with a tight-knit social environment; this can be leveraged to improve preparedness.
Associated Activities: CERT team development
Measuring Success: This project will be considered successful when surveys indicate that Sitka's populace feels an increase in preparedness and an increased confidence in their own ability to sustain themselves through a disaster or incident.
Coordinating Agency: City of Sitka
Lead Agencies: City of Sitka, PIO
Supporting Agencies: Local Media, State of Alaska, FEMA, Sitka Fire Department, LEPC, Sitka School District, Police Department, Fire Department, US Coast Guard
Existing Groups to Support Project: City of Sitka, KCAW, KIFW, Sitka Sentinel, LEPC
Project Phases: 1. Planning phase – decide what types of outreach should be done 2. Design phase – plan and develop outreach materials 3. Implementation
Other:

6.2.4.5 Data collection Plans and Systems

Project: Data Collection Plans and Systems
Problem Addressed: Currently a lack of data presents an issue for preparedness in the community. Monitoring systems for rainfall, weather, stream turbidity, and other data sets would improve the community's ability to assess weather-related hazards (such as flooding and landslide hazards) and determine whether hazards are increasing or decreasing at any given time. Data collection systems are the first step to a robust early warning system.
Co-Benefits: The data can have benefits to other studies and can be shared when warranted. The systems may be used by students for research projects, benefitting the city by provisioning more uses for the data.
Estimated Costs: See "Project Phases" – costs to perform phased development of the data collection systems must be researched via RFQs and quotes from qualified vendors.
Potential Funding:
Additional Factors to Consider: Local conditions affecting lifespan of equipment, maintenance costs, cost sharing, information sharing
Associated Activities: Cataloguing current conditions
Measuring Success: This project will be deemed successful when data collection points are installed and functioning, and data is collected. Further success will be measured by application of the data to preparedness-related projects such as landslide hazard monitoring.
Coordinating Agency: CBS Planning Department
Lead Agencies: CBS Planning Department, Fire Department
Supporting Agencies: ADFG, University of Alaska, BLM, land owners, State of Alaska, NOAA
Existing Groups to Support Project: Weather Service, NOAA
Project Phases: 1. Feasibility study for individual weather stations/data collection points 2. Project plan – develop plan for which stations/collection points will be installed 3. Implementation/Installation 4. Monitoring/Maintenance 5. Data Collection
Other:

6.2.4.6 CERT Team Development

Project: Community Emergency Response Team Development
Problem Addressed: Currently there is no organized volunteer disaster response team or function in Sitka. Implementing a CERT team would formalize the effort and allow access to CERT funding, training, and other benefits.
Co-Benefits: CERT can help improve disaster preparedness via public education and educational opportunities.
Estimated Costs: Minimal – CERT curriculum is already established and is a volunteer program. Grants are available to help teams with training and equipment. Providing some hours for City personnel to support the team would be helpful.
Potential Funding: FEMA/State of Alaska grants
Additional Factors to Consider: CERT is a volunteer program and can be of great benefit to a community. However, the community should be sure to utilize the team whenever possible to avoid volunteer burnout and boredom. CERT should be regularly involved in community events when possible.
Associated Activities: Public education
Measuring Success: This project will be successful when a CERT is established and functioning within the community.
Coordinating Agency: City of Sitka, State of Alaska
Lead Agencies: City of Sitka
Supporting Agencies: State of Alaska FEMA
Existing Groups to Support Project: City of Sitka Fire Department, Police Department, LEPC
Project Phases: 1. Establishing leadership 2. Supporting team development 3. Team development 4. Maintenance/sustainability
Other:

6.2.4.7 Improve food security for vulnerable populations

Project: Improve food security for vulnerable populations
Problem Addressed: Sitka is an isolated community with limited access (air and sea only). During times of disaster, Sitka may experience disruptions in supplies and services. Vulnerable populations, such as seniors and low-income families, may not be able to sustain a stockpile of food to get them through times of interrupted resupplies. Developing strategies and programs to fill this need will benefit the community's vulnerable population and improve its disaster resilience as a whole.
Co-Benefits: This project presents possibilities that may improve sustainability of the community's food supply as a whole. Projects such as community gardens, greenhouses, co-ops, chicken coops, and other food-producing programs can provide employment, community projects, youth programs, and other benefits.
Estimated Costs: Feasibility study costs; costs to acquire supplies, maintenance costs
Potential Funding: CBS, HMGP, PDM
Additional Factors to Consider: Stockpile-based activities require both space and maintenance; an adequate storage facility must be identified or constructed, the space must be monitored and maintained, and food supplies must be rotated on a regular basis. Another factor to consider is that food is just a part of the survival equation; water availability and water treatment is another important consideration.
Associated Activities: Outreach to community groups to identify potential co-benefits and partnerships, outreach to vulnerable populations to assess needs
Measuring Success: This project will be considered successful when sufficient food to feed Sitka's vulnerable populations for seven days is available.
Coordinating Agency: CBS Planning Department
Lead Agencies: CBS Planning Department
Supporting Agencies: LEPC
Existing Groups to Support Project: Farmer's Market, Community Garden, STA, local fish processors, CBS Planning and Community Development Department and CBS Planning Commission (consider zoning code amendments to enable more residents to grow/harvest food for personal use and local sale), Salvation Army, Swan Lake Senior Center, Sitka Local Foods Network, Sitka Kitsch/Sitka Conservation Society, Sustainable Southeast Partnership
Project Phases: 1. Study phase/development of alternatives 2. Public involvement/input 3. Selection of alternative 4. Planning/research 5. Funding 6. Implementation
Other:

6.2.5 STAPLEE Analysis

The planning team then evaluated each action using STAPLEE criteria as described below. As a group, the planning team discussed each action and assigned a rating to each STAPLEE criteria to determine the total score of the action.

Table 17 STAPLEE Criteria

STAPLEE Criteria	Evaluation Rating
S: Is it Socially acceptable?	Definitely YES = 3 Maybe YES = 2 Probably NO = 1 Definitely NO = 0
T: Is it Technically feasible and potentially successful?	
A: Does the responsible agency/department have the Administrative capacity to execute this action?	
P: Is it Politically acceptable?	
L: Is there Legal authority to implement?	
E: Is it Economically beneficial?	
E: Will the project have either a neutral or positive impact on the natural Environment? (score a 3 if positive impact, 2 if neutral impact)	
Will historic structures or key cultural resources be saved or protected?	
Could it be implemented quickly?	

The STAPLEE scores assigned by the planning team are as follows:

Table 18 STAPLEE Scores by Mitigation Action

Project	S	T	A	P	L	E	E	Total
Gavan Hill Landslide Mitigation Study	2	3	3	2	3	3	2	18
Landslide Mitigation Implementation (can include landslide mapping, land use regulations with upcoming landslide maps)	3	2	3	2	2	2	2	16
Stormwater System Upgrade and Repair	3	3	3	3	3	3	3	21
Public Education	3	3	3	3	3	3	2	20
Install Weather Stations/Data Collection Plan/Systems	3	3	3	3	3	3	3	21
Improve Food Security for Vulnerable Populations	3	3	3	3	3	2	2	19
CERT Team Development	3	3	3	3	3	3	2	20

Planning team members prioritized the mitigation actions based on the STAPLEE scores, with an emphasis on cost effectiveness. FEMA regulations do not require a formal cost-benefit analysis for hazard mitigation plans. However, a formal cost-benefit analysis is required in order to gain approval for Hazard Mitigation Grant Program funding. The community is prepared to conduct a more formal cost-benefit analysis for any future mitigation grant applications after approval of this plan update.

6.3 Mitigation Implementation Plan

FEMA	C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by [City and Borough of Sitka]?(Requirement §201.6(c)(3)(iii))

The mitigation implementation plan lays the groundwork for how the mitigation plan will be incorporated into existing planning mechanisms and how the mitigation actions will be prioritized, implemented, and administered by the community.

Table 19 2018 Mitigation Implementation Plan

Action No.	Mitigation Action	Action Status	Type of Action	Goals Supported	Lead Department	Supporting Departments /Agencies	Timeline	Hazards Addressed	Anticipated Cost	Funding Available?	Funding Source	STAPLEE Score	Public Opinion	Priority
1	Gavan Hill Landslide Study	Ongoing	Plans and Regulations, Information Gathering	1, 2, 3, 4	Public Works	N/A	Complete	Landslide	$73,205	Yes	CBS	18	Neutral	N/A
2	Landslide Mitigation Implementation	New	Infrastructure/Capital Project, Natural Systems Protection, Preparedness and Response, Information Gathering	1, 2, 3, 4	Public Works	Unknown	Unknown	Landslide	Unknown	Anticipated	PDM, HMGP	16	Neutral	TBD
3	Stormwater System Repair and Upgrade	Ongoing	Infrastructure/Capital Project, Natural Systems Protection	1, 2, 4	Public Works	N/A	Varies based on available funding	Flood, Landslide, Severe Weather	Up to $1.8M	Anticipated	PDM, HMGP, Capital Projects	21	Neutral	High
4	Public Education	Ongoing	Preparedness and Response, Education and Awareness	3, 4	CBS Planning Department	Other CBS Departments, Local Radio, Community Groups, Fire Department	Ongoing	All Hazards	Varies	Yes	Operating budget, PDM, HMGP	20	Positive	High
5	Install Data Collection Systems	New	Infrastructure/Capital Project, Information Gathering	4, 5	CBS Public Works, Fire Department	Weather agencies, BLM/Forest Service/Public Land Administrators	1-5 years	Flood, Landslide, Severe Weather	Unknown	Anticipated	Capital projects, Cost-sharing, PDM, HMGP	21	Neutral	High
6	Improve food security for vulnerable populations	New	Preparedness and Response, Education and Awareness	1, 3, 4	CBS Planning Deparment	Community Advocates, Community Organizations, Senior Care Organizations	1-3 years	All-Hazards	Varies	Anticipated	Local fundraising, PDM, HMGP	19	Positive	High
7	CERT Team Development	New	Preparedness and Response, Education and Awareness	1, 3, 4	Fire Department and/or Police Department	Fire Department and/or Police Department	1 year	All Hazards	Minimal	Competitive	FEMA Grants	20	Positive	High

This page intentionally blank.

7 PROGRAM IMPLEMENTATION

Chapter 7 provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

The City and Borough of Sitka HMP is intended to be a "living" document that will help inform all interested parties about the community's hazard mitigation policies and projects. It will be reviewed and updated on a regular basis. The mitigation strategy identified will act as a guide for City departments in determining projects for which to seek FEMA assistance and other mitigation funds from outside sources.

7.1 Plan Adoption

FEMA	E1. Does the Plan include documentation that the plan has been formally adopted by the [City and Borough of Sitka]? (Requirement §201.6(c)(5))

44 CFR §201.6(c)(5) requires that the City and Borough of Sitka HMP be formally adopted by the Assembly which formally adopted the 2018 update of the HMP on [INSERT DATE].

This plan was approved by FEMA on [INSERT DATE].

See the front matter of this plan for adoption and approval materials.

7.2 Plan Monitoring and Evaluation

FEMA	A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))

7.2.1 Annual Review

The Planning Department is responsible for coordinating annual review of the HMP and making appropriate revisions. On an annual basis, the Planning Director or designee will convene the planning team and conduct a review of the plan to ensure that all information is current. Considerations will include:

- Progress made on plan recommendations during the previous 12 months.
- Mitigation accomplishments in projects, programs, and policies.
- Actual losses avoided by implementation of mitigation actions.
- Emerging disaster damage trends and repetitive losses.
- Identification of new mitigation needs.
- Cancellation of planned initiatives, and the justification for doing so.
- Changes in membership to the planning team.

The Planning Director will request input from other departments and outside entities not represented on the planning team in regards to issues listed above. A special effort will be made to gather information on non-capital projects and programs important to mitigation.

7.2.2 Following a Major Disaster

After a major local, state, or national level disaster, the Planning Director will convene the planning team to conduct the same process as used for an annual update. The planning team will consider the implications of long-term recovery and may opt to establish regular meetings while the recovery process is taking place. In addition to the regular annual update process, post-disaster deliberations will also consider:

- "Lessons Learned" from the disaster and what new initiatives should be added to the plan to help reduce the likelihood of similar damage in the future
- Follow up required on any relevant mitigation items
- Action items from after-action reports from exercises or incidents
- Integration of mitigation into the recovery process and coordination with recovery efforts conducted by other agencies and jurisdictions.

7.2.3 Formal Plan Update

Every five years, the plan will be re-submitted for adoption to the Assembly. Prior to this, the Planning Director will use the following process to make sure that all relevant parties are involved:

- Conduct regular reviews of the plan as described above and incorporate feedback from those reviews into the planning document.
- Conduct public engagement activities and initiate meetings with identified groups of interested parties and outside organizations to gain input and feedback.
- Integrate relevant feedback and circulate revised plan to planning team for approval.
- Submit Plan to the Tribal Board of Directors for adoption by resolution.

Submit the revised plan to FEMA.

It is anticipated that the next full update of this plan will take place in 2023 for the planning period of 2022 through 2028.

7.2.4 Mitigation Action Status and Tracking Loss Reduction

All City Departments are tasked with tracking the ongoing status of the mitigation projects to which they are assigned the lead. Tracking includes:

- Project progress, including status of project funding and ongoing needs
- Actual losses mitigated by project implementation
- Project needs that may be addressed in the next mitigation planning cycle

7.2.5 Incorporation of Existing Planning Mechanisms

The Planning Department will coordinate with departments that have jurisdiction over mitigation action implementation areas to incorporate the plan into standard policies and procedures as well as long-term planning documents and budgets.

Short term operational changes that address and consider hazard mitigation may include job description updates, work plans, site reviews, and staff training. Long-term changes may include revisions to existing comprehensive plans, capital improvement plans, zoning and building codes, permitting, and other planning tools.

Additional considerations to long term strategy and to enhance cost effectiveness include ensuring that mitigation projects are present in annual departmental budgets rather than relying solely on grant programs, and integrating hazard mitigation into future land use and comprehensive and strategic planning.

7.2.6 Continued Public Involvement

FEMA	A5. Is there discussion of how the [City and Borough of Sitka] will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))

Public involvement is a key component of the plan implementation and update process. As described above, the City will prepare and make available via the internet an Annual Mitigation Status Report providing an update on the implementation of the current mitigation plan. This report, along with specific reports for each mitigation measure being implemented and all stakeholder comments received, will be assessed to make improvements in the plan update released every five years

In addition to the ongoing input collected and compiled throughout implementation of the previous plan, planning team will review aspects of the draft update plan. Comments received from the public will also be considered and incorporated where appropriate into annual updates of the plan.

Copies of the HMP will be available at:

- Planning Department
- Fire Department
- Public Works Department
- City and Borough Clerk's Office
- Library

The Planning Commission will review the plan on an annual basis, which will be advertised to the public using the same method established under the public involvement section of this plan.