

State of Alaska

Hazard Mitigation Plan

2013



Yukon River 2013 Ice Jam Flooding in Galena, AK

Department of Military and Veterans Affairs

Prepared By

Division of Homeland Security and Emergency Management

October 2013



THE STATE
of **ALASKA**
GOVERNOR SEAN PARNELL

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October 17, 2013

COPY

Mr. Mark Carey, Director
Mitigation Division
Federal Emergency Management Agency, Region X
130 228th Street, SW
Bothell, WA 98021-8627

RE: State of Alaska Hazard Mitigation Plan Update

Dear Mr. Carey:

Culminating a successful collaborative effort, the 2013 State of Alaska Hazard Mitigation Plan Update is hereby adopted. The continued implementation of this plan is a significant step toward protecting lives and property in our state.

The State of Alaska acknowledges the active participation of our local communities, governmental agencies, and subject specialists throughout the writing of this update. Their contributions have been incorporated into this document.

Sincerely,

A blue ink signature of John W. Madden, written in a cursive style.

John W. Madden
Director, Homeland Security and Emergency Management

Executive Summary

This document is the culmination of a cooperative partnership between local government, Alaska Division of Homeland Security and Emergency Management (DHS&EM), the Federal Emergency Management Agency (FEMA), and other State and Federal agencies. This plan serves as the strategy document for Alaska's hazard mitigation program while meeting FEMA requirements for a three-year State Hazard Mitigation Plan update under the Stafford Act. The plan is a living document which is continually refined as new information is obtained and is updated annually. DHS&EM acknowledges the participation of local communities, governmental agencies, and subject specialists throughout the update. Their contributions are incorporated into this document.

Alaska is a vast state with many severe hazards, therefore it is vital to have a proactive and comprehensive mitigation strategy. Mitigation measures save lives, reduce injuries, and decrease financial losses. Mitigation measures range from public education and land use planning to specific construction actions that reduce hazard losses. Alaska's hazards, vulnerabilities, and mitigation strategy are incorporated into this plan.

To coordinate a statewide mitigation approach, DHS&EM formed the State Hazard Mitigation Advisory Committee (SHMAC) comprised of multiagency and private sector mitigation experts in Alaska. The SHMAC played a key role in the update and review of this plan and continues to provide Alaska-specific mitigation planning and project reviews to DHS&EM through the State Hazard Mitigation Officer (SHMO). In addition, successful mitigation is a community-wide effort involving an informed public and dedicated community leaders. This mitigation plan update includes contributions from Alaska's boroughs, communities, schools, private sector partnerships and the public. Currently over 80 local communities in Alaska have State and FEMA approved local hazard mitigation plans. These local plans, in coordination with this State plan, form the mitigation strategy for the State of Alaska.

STATE OF ALASKA HAZARD MITIGATION PLAN

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1. Introduction

Hazard mitigation is sustained action taken to reduce or eliminate the long-term risk to human life and property from natural and human-caused hazards. Mitigation actions include activities aimed at reducing the probability of damage, injury and death from natural hazards.

1.1 Purpose

The purpose of the Alaska State Hazard Mitigation Plan (SHMP) is to identify and coordinate risk mitigation efforts with State, Federal, and local partners and to fulfill the requirements set forth by the Code of Federal Regulations, Title 44 *Emergency Management and Assistance*, Part 201 *Mitigation Planning*, subsection 4 *Standard State Mitigation Plans* (44 CFR 201.4):

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage reconstruction, and repeated damage. As such, States, Territories, Indian Tribal governments, and communities are encouraged to take advantage of funding provided by HMA programs in both the pre- and post-disaster timeframes. (FEMA 2010)

Specific FEMA programs, such as Public Assistance categories C through G, Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), and the Hazard Mitigation Grant Program (HMGP) are detailed in Chapter 6, “Resources.”

1.2 Authority

On October 30, 2000, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390) which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (Title 42 of the United States Code [USC] 5121 et seq.) by repealing the act’s previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). Section 322 directs State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. Additionally, it establishes the hazard mitigation plan requirement for Federal Emergency Management Agency’s (FEMA) Hazard Mitigation Assistance (HMA). Specific information regarding the Stafford Act may be found at http://www.fema.gov/pdf/about/stafford_act.pdf

On October 2, 2015, FEMA published the most recent Mitigation Planning Final Rule in the Federal Register, [Docket ID: FEMA-2015-0012], 44 CFR Part 201, effective November 2, 2015. The planning requirements for local and tribal entities are described in detail in Section 201.6, Section 201.7, and are identified in their appropriate sections throughout this HMP. Local and tribal hazard mitigation plans now qualify communities for several Federal Hazard Mitigation Assistance (HMA) grant programs. This HMP complies with Title 44 CFR current as of April 4, 2016 and applicable guidance documents. Additional statutory and regulatory authorities for this plan are listed in Appendices 15 and 16.

State Assurances

The State supports 44 CFR 201 and assures compliance with all applicable Federal statutes and regulations (Figure 1.1). The State Hazard Mitigation Officer (SHMO), with assistance from the State Hazard Mitigation Advisory Committee (SHMAC), is responsible for monitoring, evaluating, and updating the State Hazard Mitigation Plan in accordance with 44 CFR §201.4(c)(5)(i). The SHMO will monitor the plan continually, evaluate the plan annually and update the plan every three years, or within 90 days of a Presidential Declared Disaster (if required), or as necessary to reflect changes in State or Federal law. The State Hazard Mitigation Plan Annual Progress Report and State Hazard Mitigation Plan Annual Evaluation Form are plan review tools, (Appendix 3). The SHMO determines when significant changes warrant an update prior to the scheduled date.

1.3 A Guide to this Plan

This plan will provide a focus on mitigation as part of the State's emergency management efforts. The plan contains seven sections:

1. Introduction
 2. Planning Process
 3. Hazard Profiles
 4. Hazard Analysis
 5. Mitigation Strategy and Goals
 6. Resources (includes links and references to information, graphics and documentation)
- Appendices (numerical, cited throughout the text)

Figure 1.1 Relationships within the State's Emergency Management Authority

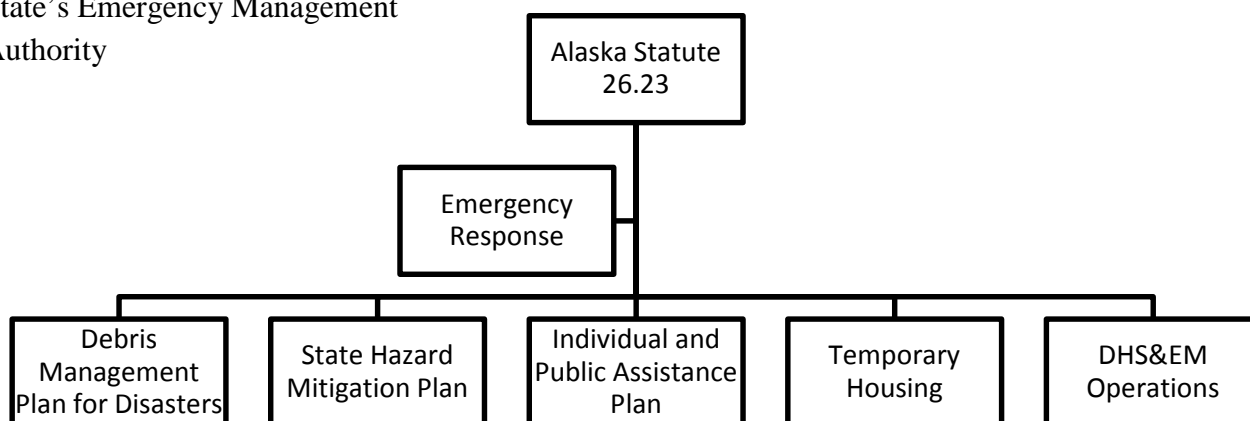


Figure 1.1 Relationships within the State's Emergency Management Authority.

1.4 Alaska Background Information

The State's constitution establishes a policy of maximum self-government for its citizens. Its 16 boroughs are not the equivalent of county governments in the emergency management context. Emergency services in Alaska are provided by independent regional service areas throughout the State. Four of the boroughs and municipalities have government-run emergency management systems similar to county style agencies. The remaining twelve boroughs have area-wide powers focusing on education, land-use planning, and tax assessment - collection. The boroughs cover approximately 38% of the land mass and encompass ~89% of the population; the remaining ~11% of the population resides in a vast, sparsely inhabited rural area called the Unorganized Borough. The State's Unorganized Borough is not politically subdivided and is managed by the State's Legislature in accordance with the Alaska State Constitution, Article 10, Subparagraph 6.

1.5 Alaska's Regions

Alaska is divided into eight distinct regions based upon variations in climate, terrain, and economics (Figure 1.2).

Figure 1.2 Alaska Regions Map



Figure 1.2 Alaska Regions Map from the State of Alaska Division of Community and Regional Affairs (DCRA).

The State of Alaska references Boroughs and Regional Educational Attendance Areas (REAA) when requesting federal disaster declarations (Figure 1.3). Each REAA is a school attendance area in a rural, unincorporated area of the State.

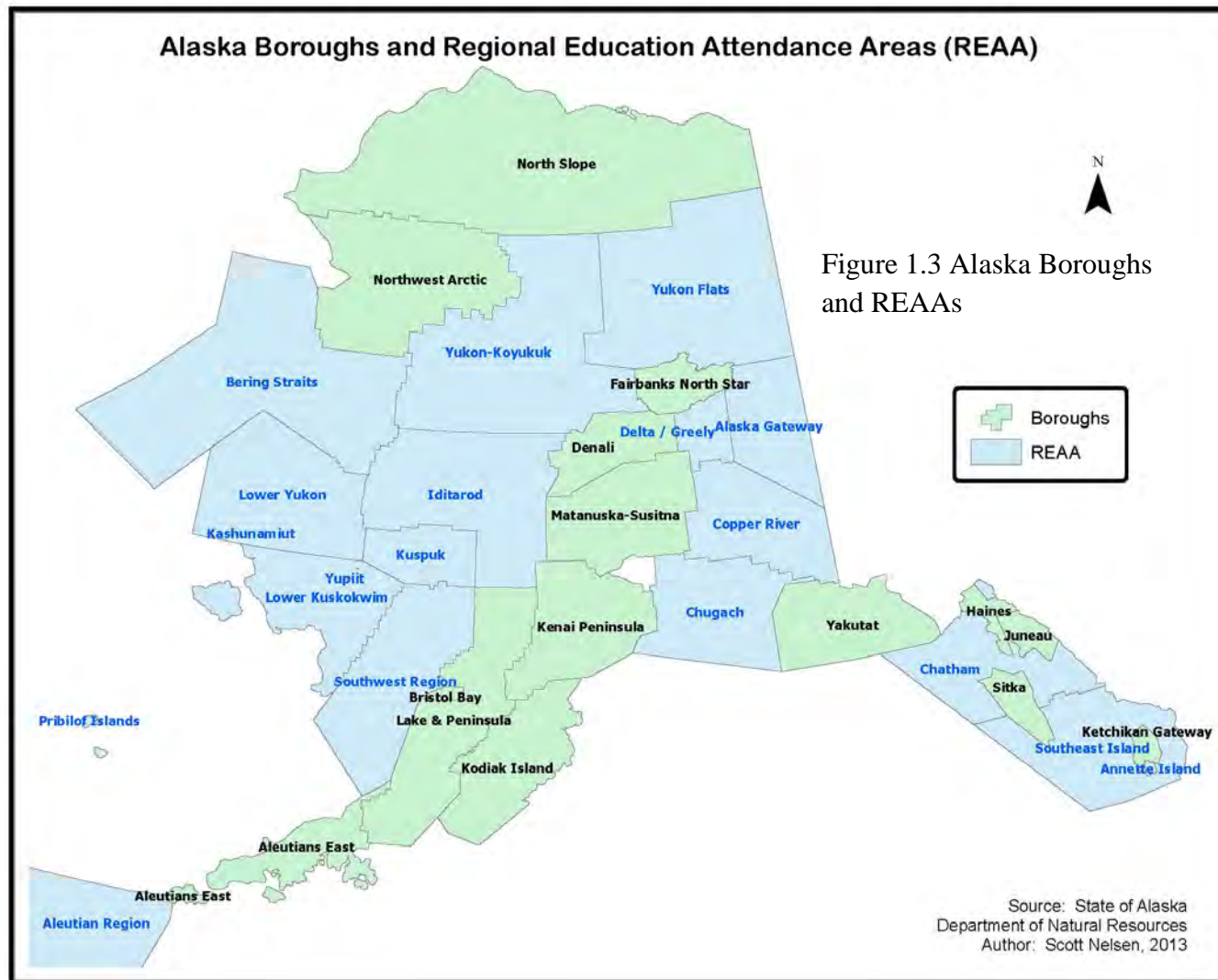


Figure 1.3 Alaska Regional Educational Attendance Areas (REAA) and Boroughs from the State of Alaska, Department of Natural Resources

1.6 General Facts

Except where noted, the following statistics are from:

- US Census Bureau People USA “QuickFacts”
- Alaska’s Department of Labor Population & Census
- State of Alaska Office of Economic Development

Population: Alaska’s 2013 population estimate is 710,231. This is roughly two tenths of one percent (0.2%) of the total US population.

Land Area: With 586,412 square miles, Alaska is the largest state in the union and is approximately one-fifth the size of the lower, contiguous 48 states. There is ~1 person per square mile in Alaska compared to the national average of 87 people per square mile.

Highest Point: At 20,320 feet Mount Denali is the tallest mountain in North America. Alaska has 39 mountain ranges containing 17 of the 20 highest peaks in the US.

Geographic Center: The geographic center of the State is 63° 50’N, 152° 00’W and is ~60 miles NW of Mount Denali.

Largest natural freshwater lake: At ~1,012 square miles, Iliamna is the largest freshwater lake in Alaska. Alaska has 94 lakes with surface areas greater than 10 square miles among Alaska’s more than 3 million lakes.

Longest river: The Yukon River is 2,298 miles long and 1,875 miles of it flows through Alaska. There are more than 3,000 rivers in the State. The Yukon River ranks third longest in the US, behind the Mississippi and Missouri Rivers.

Largest island: At 3,588 square miles, Kodiak Island in the Gulf of Alaska is the largest in the State. It is larger than Rhode Island and Delaware. There are 1,800 named islands in the State, 1,000 of which are located in Southeast Alaska.

Largest glacier: According to the Bering Glacier Portal the Bering Glacier is the largest (area of 2,008 square miles) and longest (~118 miles) glacier in North America.

Largest city in population: Anchorage, population 298,842.

Largest city in area: According to their website, the City of Sitka is the largest city in the State with an area of ~4,800 square miles (~40% of this area is water).

Geographic Extent: Alaska is not just large it is also far-flung, with the Southeast panhandle and Aleutian Chain extending its geographic scope (Figure 1.4). From north to south, it measures 1,420 miles, about the distance between Denver and Mexico City, and from east to west it measures nearly 2,400 miles, about the distance from Savannah, GA to Santa Barbara, CA (Figure 1.5).

Rural Myth: Contrary to widely held perceptions, Alaska’s population is decidedly urban. In 2013, ~80% of Alaskans lived in cities of over 30,000 people (Table 1.1).

Land Ownership: Including Federal and State land ownership, nearly 90% of the land in Alaska

is publicly owned (Figure 1.6).

Education: Alaska has fifty-three school districts that provide public educational services in the State. Thirty-four are City and/or Borough Districts. Nineteen are Regional Educational Attendance Areas (REAA) in the Unorganized Borough, established by the State Legislature in cooperation with regional corporations established under the Alaska Native Claims Settlement Act (Figure 1.3). The City and Borough Districts participate in hazard mitigation planning through their local jurisdiction. The REAA Districts participate in hazard mitigation planning through inclusion in the State Hazard Mitigation Plan just as unincorporated communities in the Unorganized Borough, with the State functioning as their governmental jurisdiction.



Figure 1.4 Location of Alaska relative to the contiguous 48-states on North America Shaded Relief map by USGS Education Map Catalog online.



Figure 1.5 Geographic Extent of Alaska from FEMA Region Ten

Figure 1.6 Alaska Land Management and Ownership

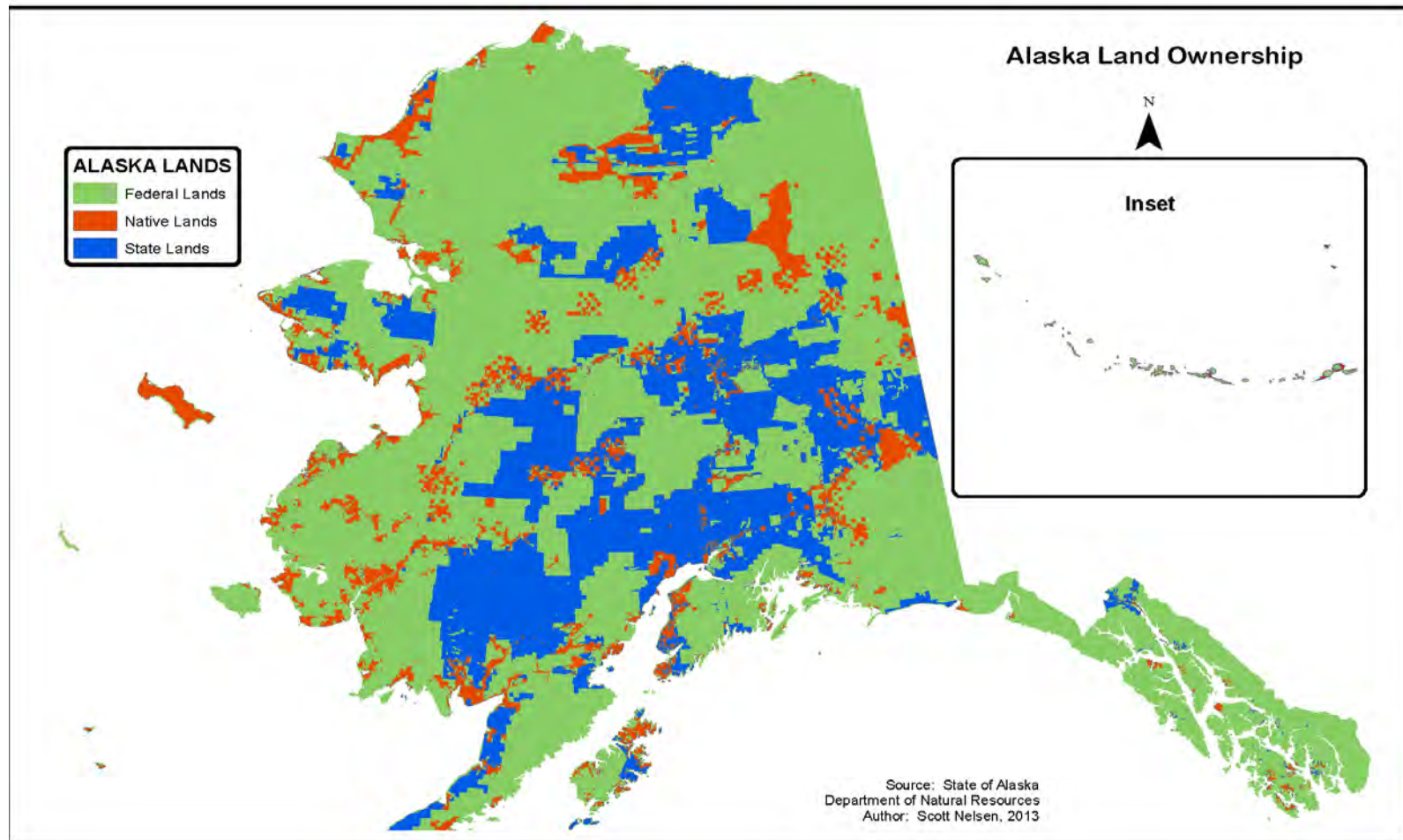


Figure 1.6 Alaska Land Management and Ownership Map from the State of Alaska Department of Natural Resources.



State of Alaska – 105 million acres

Under the terms of the Alaska Statehood Act of 1959, the federal government granted the new state 28% ownership of its total area. Approximately 103,350,000 acres were to be elected under three types of grants:

- 1) Community – 400,000 acres
- 2) National forest Community – 400,000 acres
- 3) General – 102,550,000 acres

Additional territorial grants for schools, university and mental health trust lands totaling 1.2 million acres were confirmed with statehood.



Alaska Native Lands – 44 million acres

On December 18, 1971, P. L. 92-203, the Alaska Native Claims Settlement act was signed into law. The purpose of ANCSA was to legislate the terms by which Alaska Natives could acquire title to their lands. This claim had been unresolved for more than 100 years since the United States purchased Alaska from Russia in 1867.

Native lands are private lands. ANCSA mandated the creation of regional and village Native corporations to manage 44 million acres and payment of one billion dollars. Thirteen regional corporations were created for the distribution of ANSCA land and money. Twelve of those shared in selection of 16 million acres. The thirteenth corporation, based in Seattle, received a cash settlement only. 224 village corporations, of 25 or more residents, shared 26 million acres. The remaining acres, which include historical sites and existing Native owned lands, went into a land pool to provide land to small villages of less than 25 people.



Federal Lands – 237.8 million acres

Five different agencies manage federal lands in Alaska: the Bureau of Land Management (82.5 million acres), U. S. fish and Wildlife Service (78.8 million acres), the National Park Service (52.4 million acres), U. S. Forest Service (22.3 million acres), and the Department of Defense (1.7 million acres).

Table 1.1 Alaska Population Density Estimates for 2013

| City / Borough | 2013 Population Estimates | Area (mi ²) |
|---------------------------------|---------------------------|-------------------------|
| Anchorage | 298,842 | 1,697 |
| Fairbanks North Star Borough | 100,343 | 7,361 |
| Juneau | 32,832 | 2,717 |
| Kenai Peninsula Borough | 56,756 | 16,013 |
| Matanuska-Susitna Borough | 98,801 | 24,681 |
| Totals | 587,574 | 52,469 |
| Total State of Alaska | 710,231 | |
| Population Percentage | 82.73% | |
| Total Land Area in Square Miles | | 586,412 |
| Area Percentage | | 17.89% |

Table 1.1 The population statistics are from the State of Alaska Department of Labor Population Estimates Vintage 2013. The area data is from the Division of Community and Regional Affairs (DCRA) Communities Database online.

1.7 Land Transportation

Except where noted, additional statistics are from:

- State of Alaska Department of Transportation and Public Facilities (DOT/PF) Fast Facts
- DOT/PF Public Mileage
- US Department of Transportation Federal Highway Administration Highway Statistics

Road Mileage: Alaska has 3,119 miles of Marine Highway and 16,674 miles of land road statewide (Table 1.2). The US has 4,058,347 miles of paved and unpaved roads. Alaska is home to ~0.04% of all roads in the US

Road Density: Alaska has one mile of road for every 38 square miles of land area. The US average is less than one to one.

Road Miles per Capita: Alaska has ~ 22 road miles per 1,000 people. The US average is 13 road miles per 1,000 people.

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Table 1.2 Certified Public Road Mileages

| 2011 Certified Public Road Mileages | | | | | |
|-------------------------------------|----------------------------|-----------------------------|------------------------------|-----------------|----------------------------|
| | Central Region Total | Northern Region Total | Southeast Region Total | Marine Total | Statewide Land Total |
| AK DOTPF-Land | | | | | |
| Interstate | 390 | 694 | - | 0 | 1084 |
| Principle Arterials | 219 | 631 | 73 | 0 | 923 |
| Minor Arterials | 117 | 403 | 64 | 0 | 584 |
| Major Collectors | 323 | 885 | 174 | 0 | 1382 |
| Minor Collectors | 483 | 404 | 97 | 0 | 984 |
| Local | 186 | 356 | 109 | 0 | 651 |
| AK DOTPF Land Totals | 1718 | 3373 | 517 | 0 | 5608 |
| AK DOTPF Marine Total | | | | 3119 | |
| AK DNR Land | | | | | |
| Local | | | | | 0 |
| Forestry | 19 | 359 | 61 | | 439 |
| Parks | 51 | 19 | 4 | | 74 |
| AK DNR Totals | 70 | 378 | 65 | | 513 |
| Boroughs – Land | | | | | |
| Principle Arterials | 18 | | | | 18 |
| Minor Arterials | 34 | 3 | 2 | | 39 |
| Major Collectors | 45 | 17 | 3 | | 65 |
| Minor Collectors | 240 | 41 | 26 | | 307 |
| Local | 2426 | 575 | 242 | | 3243 |
| Borough Totals | 2763 | 636 | 273 | | 3672 |
| City – Land | | | | | |
| Minor Arterials | 6 | 6 | 0 | | 12 |
| Major Collectors | 68 | 57 | 2 | | 127 |
| Minor Collectors | 158 | 107 | 29 | | 294 |
| Local | 754 | 487 | 183 | | 1424 |
| Municipal Totals | 986 | 657 | 214 | | 1857 |
| Other Local Agencies | | | | | |
| Major Collectors | | 1 | 17 | | 18 |
| Minor Collectors | 1 | 12 | | | 13 |
| Local | 15 | 181 | 1 | | 197 |
| Other Local Agency Totals | 16 | 194 | 18 | | 228 |
| Private Agency | 1 | 52 | 3 | | 56 |

| 2011 Certified Public Road Mileages | | | | | | |
|--|--------------|--------------|--------------|--|--------------|---------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| BIA – Indian Nations | | | | | | |
| Major Collectors | | | 15 | | | 15 |
| Minor Collectors | | | 6 | | | 6 |
| Local | 1651 | 1255 | 112 | | | 3018 |
| Indian Nations Totals | 1651 | 1255 | 133 | | | 3039 |
| | | | | | | |
| U. S. Forest Service | Classes 3-5 | | | | | |
| Minor Collectors | 1 | | 47 | | | 48 |
| Local | 43 | 13 | 445 | | | 501 |
| U. S. Forest Service Totals | 44 | 13 | 492 | | | 549 |
| | | | | | | |
| National Park Service | | | | | | |
| Major Collectors | | 15 | 5 | | | 20 |
| Minor Collectors | | | | | | |
| Local | 31 | 107 | 1 | | | 139 |
| National Park Service Totals | 31 | 122 | 6 | | | 159 |
| | | | | | | |
| Mileage Listed Below is Local | | | | | | |
| | | | | | | |
| U. S. Corps of Engineers | | 12 | | | | 12 |
| | | | | | | |
| U. S. Army | 262 | 439 | 2 | | | 703 |
| | | | | | | |
| U. S. Navy | 161 | 8 | | | | 169 |
| | | | | | | |
| U. S. Coast Guard | 2 | | | | | 2 |
| | | | | | | |
| U. S. Fish & Wildlife Service | 86 | 4 | | | | 90 |
| | | | | | | |
| Bureau of Land Management | | 17 | | | | 17 |
| | | | | | | |
| STATEWIDE TOTALS | 7,791 | 7,160 | 1,723 | | 3,119 | 16,674 |

Table 1.2 Source: Alaska DOT&PF, Program Development, Transportation Information Group, PH: (907) 465-8592, Email: jill.sullivan@alaska.gov. 2011 Certified Public road Mileage includes mileage reported from January 1, 2011 thru December 31, 2011.

Connectivity: Nearly 30% of Alaska's population is not connected by road or ferry to the

continental road network.

Pavement: Approximately 48.5% of Alaska's roads are unpaved whereas only 33% of roads are unpaved in the rest of the US

Vehicles and Drivers: Alaska has 1.2 vehicles per person while the US average is 0.8. Alaska has 524,158 licensed drivers.

Vehicle Miles Traveled (VMT): Alaskans often travel by air and ferry, consequently the VMT represents only 0.16% of the US total.

1.8 Air Transportation

Information from:

- Statewide Library Electronic Doorway (SLED)
- DOT/PF Ted Stevens Anchorage International Airport Statistics
- FAA 2012 Passenger Boarding and All-Cargo Data

Pilots: It is estimated Alaska has about six times as many pilots per capita and 16 times as many aircraft per capita as the rest of the United States.

Commuter Air Travel: General aviation hours flown in Alaska annually are about 995,000, which is 3% of the US total general aviation hours flown. Alaska averages 105 hours flown per pilot, while the US as a whole averages 43 hours per pilot. Alaska's population comprises only 0.2% of the U.S. population yet Alaskans utilize 13% of all commuter airline and air taxi trips in the US. Alaskans use commuter airlines 65 times more often than the average US citizen.

Seaplane Bases: Alaska not only has the largest seaplane base in the world, Lake Hood, it also has 102 seaplane bases, far more than any other state. This is 25% of the US total. Minnesota ranks second with 66.

Air Freight: Alaska's Ted Stevens International Airport (ANC), located in Anchorage, is the number two airport in the US for total air freight by weight for 2012 (second to Memphis International Airport in Tennessee). ANC ranks 4th in the world for tonnage of cargo serviced.

Airports: Alaska has ~300 airports.

1.9 Waterborne Transportation

Information from:

- Alaska Marine Highway System
- National Oceanic and Atmospheric Association (NOAA) Fisheries Service
- State of Alaska Department of Commerce website

Ferries: Alaska's ferry system is unique among the fifty states, operating eight, 24 hour/day long haul vessels that include restaurants, lodging, and lounges. The total route structure covers more than 3,500 miles and includes ocean passages of the Gulf of Alaska.

Ports: The Alaska Marine Highway serves 33 Ports of Call.

Coastline: Alaska has 6,640 miles of coastline and, including islands, has 33,904 miles of shoreline. Alaska has more than 50% of the entire coastline in the US

Fishing: Commercial fishermen operating in the Bering Sea and along the Aleutian Islands harvest over two million metric tons of fish and over one million pounds of crab annually, according to the National Marine Fisheries Service Alaska Region Bering Sea Aleutian Islands Catch Report, making Alaska the country's top state for seafood.

1.10 Space Transportation

The Pacific Spaceport Complex is the nation's only high latitude full service spaceport, developed by The Alaska Aerospace Corporation (AAC). Since its formation by the State of Alaska, the AAC has entered agreements with the Lockheed Martin Corporation, BlackBridge, the Hawaii Office of Aerospace Development, and the Virginia Commercial Spaceflight Authority. In January 2016, the AAC opened an office in Huntsville, Alabama. This is the first permanent presence outside Alaska for the company.

1.11 Winter Transportation

Trails

Winter dog sled and snow machine trails are a historically important transportation system utilizing long winter conditions to provide a solid surface where wet ground and water surfaces exist in summer. Various agencies and groups mark many of these trails for public use. These trails form an important element of the rural transportation system in areas lacking roads and highways.

Ice Roads

A few areas of Alaska utilize ice roads to traverse rivers and soft ground. The ice roads are an acceptable alternative to the damage caused by permanent roads in sensitive landscapes. These roads are also commonly used in other high-latitude countries such as Canada and Russia.

1.12 Cost of Living

Information from:

- The Cost of Living in Alaska by Neal Fried and Dan Robinson in, Alaska Economic Trends, July 2012, developed by the State of Alaska Department of Labor and Workforce Development, Research and Analysis.
- State of Alaska Office of Economic Development.

The American Chamber of Commerce Researchers Association (ACCRA) Cost of Living Index compares living costs for ~300 urban areas in the U.S. ACCRA's focus is on households with incomes in the top 20% for the area. It's often used by companies to equalize employee salaries in different cities (Figure 1.7). Of the seven detailed categories studied, the four Alaska cities all had higher than average costs with the exception of Anchorage utility costs.

Figure 1.7 ACCRA Cost of Living Index

| ACCRA cost of living index, select U. S. cities, 2011 | | | | | | | |
|--|-------|-----------|---------|---------|-----------|---------|-------|
| Alaska | | | | | | | |
| | Total | Groceries | Housing | Utility | Transport | Medical | Misc. |
| Anchorage, AK | 130.6 | 137.4 | 149.8 | 98.2 | 112.0 | 139.4 | 126.3 |
| Fairbanks, AK | 137.0 | 132.4 | 140.3 | 211.5 | 109.9 | 142.5 | 120.2 |
| Juneau, AK | 139.0 | 130.8 | 172.8 | 163.8 | 107.9 | 149.8 | 113.2 |
| Kodiak, AK | 127.6 | 149.1 | 123.1 | 152.3 | 130.5 | 133.0 | 113.2 |
| West | | | | | | | |
| Portland, OR | 113.6 | 111.2 | 130.6 | 88.4 | 113.7 | 114.0 | 107.6 |
| Honolulu, HI | 167.8 | 155.6 | 251.8 | 161.9 | 125.9 | 123.7 | 120.5 |
| San Francisco, CA | 162.7 | 115.8 | 283.0 | 91.3 | 111.5 | 112.6 | 122.4 |
| Las Vegas, NV | 100.1 | 105.0 | 92.2 | 91.5 | 103.8 | 106.6 | 105.9 |
| Reno, NV | 94.0 | 100.6 | 87.1 | 87.4 | 103.9 | 102.7 | 95.1 |
| Seattle, WA | 117.1 | 111.6 | 129.2 | 90.4 | 112.4 | 118.7 | 118.8 |
| Spokane, WA | 92.9 | 94.6 | 85.9 | 79.0 | 100.9 | 105.8 | 98.6 |
| Tacoma, WA | 107.3 | 107.2 | 110.0 | 96.2 | 102.6 | 107.9 | 110.1 |
| Bellingham, WA | 115.3 | 116.6 | 136.8 | 83.3 | 115.6 | 116.8 | 105.8 |
| Boise, ID | 96.1 | 101.2 | 83.4 | 97.2 | 101.3 | 101.6 | 102.3 |
| Bozeman, MT | 101.7 | 111.1 | 96.5 | 92.9 | 97.0 | 100.8 | 106.9 |
| Laramie, WY | 99.9 | 103.5 | 107.4 | 95.3 | 90.8 | 104.3 | 95.8 |
| Southwest / Mountain | | | | | | | |
| Salt Lake, UT | 94.6 | 94.1 | 94.1 | 77.3 | 96.6 | 96.1 | 100.0 |
| Phoenix, AZ | 96.5 | 103.7 | 87.2 | 100.3 | 102.9 | 102.8 | 97.7 |
| Denver, CO | 105.0 | 102.6 | 112.9 | 90.0 | 95.0 | 106.8 | 106.9 |
| Dallas, TX | 96.2 | 100.6 | 75.2 | 108.1 | 105.0 | 104.7 | 105.0 |
| Houston, TX | 89.8 | 80.7 | 83.1 | 89.3 | 95.2 | 98.3 | 96.8 |
| Midwest | | | | | | | |
| Fargo-ND-MN | 93.2 | 103.8 | 84.2 | 89.3 | 96.9 | 102.8 | 95.5 |
| Cleveland, OH | 101.4 | 110.4 | 91.4 | 99.1 | 101.7 | 111.1 | 105.9 |
| Chicago, IL | 114.7 | 114.4 | 133.8 | 97.6 | 114.5 | 107.1 | 104.6 |
| Southeast | | | | | | | |
| Orlando, FL | 97.3 | 100.1 | 79.5 | 107.8 | 99.2 | 94.4 | 108.2 |
| Mobile, AL | 92.0 | 98.0 | 80.0 | 100.8 | 93.1 | 85.1 | 98.0 |
| Atlanta, GA | 97.3 | 101.6 | 89.2 | 93.4 | 102.1 | 101.2 | 101.8 |
| Atlantic / New England | | | | | | | |
| New York City / Manhattan, NY | 218.8 | 148.7 | 413.5 | 143.7 | 122.9 | 128.0 | 144.0 |
| Boston, MA | 137.3 | 118.8 | 160.2 | 147.3 | 106.7 | 121.3 | 133.7 |
| Philadelphia, PA | 125.0 | 124.5 | 140.2 | 129.9 | 107.7 | 104.8 | 118.6 |
| Note: Index numbers represent a comparison to the average for all cities for which ACCRA volunteers collected data. Source: The Council For Community And Economic Research | | | | | | | |

Figure 1.7 Alaska Cities Generally More Expensive. ACCRA cost of living index, selected cities, 2011 from Fried and Robinson, 2012

Another way to assess the cost of living is to look at cost differences relative to Anchorage (Table 1.3).

Table 1.3 Cost of Living Relative to Anchorage

| Community | Food at Home for a Week | Percent of Anchorage |
|---------------------|-------------------------|----------------------|
| Anchorage | \$ 141.95 | 100% |
| Anvik | \$ 301.75 | 213% |
| Bethel | \$ 282.82 | 199% |
| Cordova | \$ 218.35 | 154% |
| Delta Junction | \$ 188.85 | 133% |
| Dillingham | \$ 354.72 | 250% |
| Fairbanks | \$ 158.83 | 112% |
| Haines | \$ 207.61 | 146% |
| Homer | \$ 168.28 | 119% |
| Juneau | \$ 153.45 | 108% |
| Kenai/Soldotna | \$ 152.62 | 108% |
| Ketchikan | \$ 173.28 | 122% |
| Nome | \$ 256.96 | 226% |
| Palmer/Wasilla | \$ 153.49 | 108% |
| Petersburg | \$ 179.93 | 127% |
| Portland, OR | \$ 115.62 | 81% |
| Russian Mission | 312.05 | 220% |
| Sitka | 200.43 | 141% |
| Tok | 178.75 | 126% |
| Unalaska | 196.81 | 139% |
| Valdez | 184.22 | 130% |

*Table 1.3*Weekly cost for a family of four with children ages 6-11, University of Alaska Fairbanks, Cooperative Extension Service 2013*

The remoteness of Alaska communities is one factor to consider when comparing their living costs to those in the contiguous United States. Rural communities primarily rely upon diesel generators for electrical power and fuel oil for heat. Costs attributed to logistics raise the price of utilities, goods and services in Alaska. Fuel prices are no exception, even though Alaska is an oil producing state. In general, communities without road access pay a much higher price for fuel than other Alaskan communities (Table 1.4).

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Table 1.4 Rural Fuel Cost Per Gallon

| Rural Fuel Per Gallon Alaska, January 2012 | | | |
|---|---------------------------------------|-----------------|-------------------------------------|
| Community¹ | Heat. fuel #1, residential | Gasoline | Method of transportation |
| Anvik | \$5.25 | \$5.50 | Barge |
| Arctic Village | - | \$10.00 | Air |
| Atkasuk ² | \$1.40 | \$4.10 | Barge / Air |
| Barrow ³ | - | \$5.75 | Barge |
| Chenega Bay | \$6.63 | \$6.76 | Barge |
| Cordova | \$4.37 | \$4.80 | Barge |
| Delta Junction | \$3.96 | \$3.92 | Truck |
| Dillingham | \$5.16 | \$6.25 | Barge |
| Emmonak | \$6.74 | \$6.74 | Barge |
| Fairbanks | \$3.93 | \$3.83 | Refinery / Truck |
| Glennallen | \$4.07 | \$4.18 | Truck |
| Gambell | \$6.75 | \$7.01 | Barge |
| Homer | \$3.83 | \$4.14 | Barge / Truck |
| Hoonah | \$4.50 | \$4.39 | Barge |
| Hooper Bay | \$7.09 | \$6.98 | Barge |
| Hughes | \$9.00 | \$8.25 | Air |
| Huslia | \$6.00 | \$5.00 | Barge |
| Juneau | \$4.31 | \$4.00 | Barge |
| Kodiak | \$4.02 | \$4.21 | Barge |
| Kotzebue | \$5.92 | \$5.97 | Barge |
| Nelson Lagoon | \$5.98 | \$6.40 | Barge |
| Nenana | \$4.12 | \$4.18 | Truck |
| Nondalton | \$6.67 | \$6.60 | Air |
| Pelican | \$4.95 | \$4.92 | Barge |
| Petersburg | \$4.03 | \$4.36 | Barge |
| Port Lions | \$5.13 | \$4.90 | Barge |
| Russian Mission | \$5.75 | \$6.20 | Barge |
| Unalaska | \$4.53 | \$4.50 | Barge |
| Valdez | \$3.73 | \$3.37 | Refinery /Barge |

¹This is a partial list of the 100 communities surveyed.

²The North Slope Borough subsidizes heating fuel.

³Barrow uses natural gas as a source of heat.

Table 1.4 Source: Department of Commerce, Community, and Economic Development, Current Community Conditions: Fuel Prices Across Alaska, January 2012 Update.

2. Planning Process

2.1 State Coordination

While the major hazard mitigation programs in Alaska are primarily coordinated at the State level, effective mitigation is comprehensive and engages all levels of government and the private sector. This State Hazard Mitigation Plan (State HMP) provides a framework for local hazard mitigation planning and outlines a comprehensive mitigation strategy with statewide goals.

Within State emergency management, the State HMP is a resource for the statewide emergency management planning system which includes the State of Alaska Emergency Operations Plan, State Emergency Operations Center Standard Operating Procedures, the State of Alaska Critical Facility Inventory, and Alaska's Vulnerability Analysis and Buffer Zone Protection Plan. Emergency management planning coordinates with local Alaska communities and tribes for consistent bilateral support.

The hazard mitigation planning process provides an opportunity to independently create a local hazard mitigation plan (Local HMP). Local hazard mitigation planning is the process identifying and analyzing hazards for a specific community. Through public involvement, Local HMPs identify community specific hazards, goals, and projects supported by the State HMP. Therefore, it is important for Alaska communities to participate in the continuing development of the State HMP. The State of Alaska supports hazard mitigation planning efforts at the regional, tribal, and local levels of government.

The State will continue assisting local communities with Federal and State hazard mitigation grants appropriated for local mitigation planning. In addition to mitigation planning assistance, there is State financial support for qualifying local community hazard mitigation projects developed during mitigation planning. While the mitigation projects must meet eligibility requirements, they are developed at the local level and supported by economic assistance from the State. For example, historically the State of Alaska has absorbed the applicant's share of the match requirement under the Federal disaster funded Hazard Mitigation Grant Program (HMGP). In some disasters this has amounted to millions of dollars of State funds dedicated to locally developed mitigation projects through HMGP.

2.2 Groups Involved in Planning

2.2.1 State Hazard Mitigation Officer

The State Hazard Mitigation Officer (SHMO) is a position within the State DHS&EM responsible for implementing and managing Alaska's mitigation program activities. The duties of the SHMO include the management of HMGP, PDM, the State HMP, local mitigation planning support, tsunami and earthquake mitigation programs, and other hazard mitigation activities. The SHMO serves as the primary coordinator and reviewer to insure that local mitigation planning efforts and projects are consistent with the State hazard mitigation strategy, and goals. The State Hazard Mitigation Advisory Committee (SHMAC) supports the SHMO with technical advisement.

The SHMO provides mitigation expertise, guidance, advice, and assistance to government and private entities within the State of Alaska. The SHMO implements and manages mitigation

projects, programs, and plans. The SHMO provides local communities technical assistance, mitigation project development support, and coordinate financial resources. The SHMO establishes State level requirements for mitigation grant funding, coordinates funding decisions and manages grant reporting requirements.

2.2.2 State Hazard Mitigation Advisory Committee

Chaired by the SHMO, the SHMAC is a diverse panel of subject experts in a statewide partnership engaged in local mitigation activities. The SHMAC is composed of 56 members representing various government agencies and private organizations throughout the State of Alaska (Appendix 4). Each SHMAC member has delegated authority for making policy decisions for their agency or organization, or has direct access to the appropriate authority. The SHMAC assists in coordinating the State's hazard mitigation actions among government and private agencies operating in the State of Alaska. The SHMAC also prioritizes Hazard Mitigation Grant Program (HMGP) projects following federal disasters. The SHMAC meets through teleconference and electronic document exchange.

2.2.3 Local Communities

The State of Alaska obtains and manages federal grants in support of local hazard mitigation activities. In addition, the State reviews local hazard mitigation plans for consistency with the State HMP and incorporates newly identified local hazards into State HMP updates.

Current Federal regulations (DMA 2000) require the State to have in place a FEMA approved hazard mitigation plan to participate in most of FEMA's funding (all but PA Category A, B, and IA). Currently, Federal regulations require the State plan to be formally updated and approved by FEMA every five years.

Similarly, Federal regulations (44 CFR §201.6, §201.7) require local communities, except under Regional Administrator approved "extraordinary circumstances" (§201.6(a)(3)), to have a FEMA approved Local or Tribal Hazard Mitigation Plan for FEMA hazard mitigation assistance. FEMA requires local and tribal plans be updated and approved by FEMA every five years.

Criteria for local hazard mitigation planning include:

- Documentation of the planning process
- Documentation of public involvement
- A Risk Analysis including
 - A description of previous hazard events
 - A description of the type, location, and extent of all hazards possibly affecting the jurisdiction
 - A description of the jurisdiction's vulnerability to hazards
- A mitigation strategy
- A plan maintenance strategy
- Formal adoption by the governing body of the jurisdiction

2.2.4 Unincorporated Communities in the Unorganized Borough

In Alaska, unincorporated communities in the Unorganized Borough participate in hazard mitigation planning, but have no adoption authority. Therefore, the State has received promulgation authority from FEMA for these communities (Appendix 9).

2.2.5 Tribal Governments

Federal regulations provide eligible tribal governments with the opportunity to function as a sub-grantee through the State or as a grantee directly with FEMA. If tribes elect to function as a sovereign grantee, they are required to meet all responsibilities of the FEMA approved Tribal Plan (44 CFR §201.7). They also must pay the non-Federal share of grantee funds and fulfill grant accounting requirements. Tribal governments electing to function as a sub-grantee through the State are eligible to apply for hazard mitigation project funding in cooperation with their local communities and meet the same local government or sub-grantee responsibilities as non-tribal communities.

In the State of Alaska, planning cooperation among tribal entities and their boroughs and cities is highly encouraged. Tribal entities are eligible to apply for hazard mitigation project grant funds through the Borough and the incorporated city of residence or through the State if they are in an unincorporated community in the Unorganized Borough.

2.2.6 Small and Impoverished Communities

Federal regulations establish some special provisions for communities identified as *Small and Impoverished* (Appendix 10). This Federal designation is based upon population, location and income. These communities may be entitled to special funding considerations for mitigation planning and projects.

2.2.7 Multi-jurisdiction Hazard Mitigation Planning

Multi-jurisdiction planning is a coordinated effort among all the communities within a borough. For FEMA approval, each jurisdiction included in the plan must meet section 201.6 requirements, participate in the planning process, and formally adopt the plan.

2.2.8 Private Non-Profit & Rural Electric Cooperatives

Utility private non-profit (PNP) entities, including Rural Electric Cooperatives (RECs), which sometime span several boroughs, are eligible sub-applicants for assistance under some hazard mitigation grant programs. Their infrastructure is critical to the State's resilience and is vulnerable to disasters. RECs are treated as PNPs for the purposes of Federal disaster assistance under the Stafford Act. They participate in their Local HMP and the State HMP to satisfy the mitigation planning requirement for grant eligibility. Additionally, each jurisdiction involved with the project must have a FEMA approved mitigation plan and the project must be consistent with each plan's goals and objectives.

2.2.9 Participating Groups

Groups participating in the 2013 plan review and update process are:

- The Alaska Seismic Hazard Safety Commission
The Alaska Seismic Hazard Safety Commission (ASHSC) has 11 members appointed by the Governor to advise the State on seismic hazard issues. The Commission has

representatives from State and local government, science, and the private sector concerned with seismic safety. The Commission reviewed the seismic hazard sections for accuracy and updated them with the most recent information. They also reviewed and updated the seismic mitigation goals through electronic exchange.

- **The Alaska Partnership for Infrastructure Protection**
The Alaska Partnership for Infrastructure Protection (APIP) is an interagency group of public and private partners providing a broad emergency management and homeland security perspective across the State. This group reviewed the 2010 plan and the 2013 plan draft.
- **Local Emergency Planning Committees**
There are nineteen Local Emergency Planning Committees (LEPCs) in the State of Alaska. Each LEPC operates within their Local Emergency Planning District. (LEPD). LEPCs are comprised of volunteers and government employees residing within a specific LEPD. Alaska Statute 26.23.071 establishes the Alaska LEPCs, and specifies their duties (Appendices 15 and 20). State of Alaska LEPC's reviewed the 2010 plan and the 2013 plan draft. LEPCs are also key participants in their local hazard mitigation planning process.
- **The Citizens of the State of Alaska** were offered an online opportunity to comment on the current 2010 plan and the 2013 plan draft through the DHS&EM internet homepage, titled Citizens Involvement Opportunity.
<http://ready.alaska.gov/plans/mitigation/community.htm>

2.3 State Plan Development & Maintenance

The State of Alaska 2013 plan update complies with DMA 2000 and all current FEMA state mitigation planning requirements. The SHMO, with assistance from the State Hazard Mitigation Advisory Committee, is responsible for monitoring, evaluating, and updating the State Hazard Mitigation Plan in accordance with 44 CFR §201.4(c)(5)(i). The SHMO will monitor the plan continually, evaluate the plan annually, and update the plan every three years, or within 90 days of a Presidential Declared Disaster (if required), or as necessary to reflect changes in State or Federal law (44 CFR 13.11 (c, d)). The State Hazard Mitigation Plan Annual Progress Report and State Hazard Mitigation Plan Annual Evaluation Form are used to assist in annual evaluations. The SHMO determines when significant changes warrant an update prior to the scheduled date.

Updates to this State HMP include; demographic information, revised capability assessments, SHMAC and agency reviews, hazard identification and risk assessment, public involvement, and new disaster information. For plan updates, specific sections such as Earthquake are distributed to subject experts for review. Additionally, the SHMAC and mitigation staff meets monthly to consider potential mitigation efforts for the State HMP. A list of public participation opportunities and SHMAC meetings during the 2013 update cycle are located in Appendices 11 and 12. Additional interagency groups such as ASHSC and APIP are included in the update process (Appendices 7 and 8). For public consideration, the updated plan drafts are posted on the DHS&EM website. For the 2013 plan update, the project process was tracked using mobile phone conferencing and electronic mail.

For formal adoption, the DHS&EM Staff reviews the plan and presents it to the Director for adoption. This formal process was followed in the 2013 update and is intended for each required formal three year update.

2.3.1 Plan Incorporation

The State hazard mitigation planning process incorporates information from other plans, business practices, and governmental operations (44 CFR §201 (c)(4)(ii)). While coordinating their planning activities, the State and local communities have the opportunity to implement mitigation concepts and goals into other plans, such as comprehensive, transportation, and capital improvement plans. By establishing a comprehensive planning approach and a refined decision process, the State and communities may mitigate their risk to hazards and reduce or eliminate loss from disasters (Table 2-1).

Table 2-1 State Planning Publications

| State Planning Publications | Contents Summary |
|--|--|
| State of Alaska Emergency Operations Plan 2011 | All hazards plan documents recent advances in emergency management and homeland security capabilities. |
| Small Community Emergency Response Plan | Resource for developing emergency response measures in small communities. |
| Alaska RiskMAP Program | FEMA directed program for flood mapping, risk assessment and outreach support |
| Municipal Land Trustee Program | State program managing trust responsibilities for unincorporated villages |
| Alaska Sanitation Planning Guide for Small Communities, June 1999 | A planning guide for developing water and sewer systems in small Alaskan communities. |
| Floodplain Management Quick Guide 2003 | A planning guide for protecting lives and property in flood prone areas. |
| Understanding and Evaluating Erosion Problems, March 1998 | Educational manual for small communities and landowners seeking erosion mitigation solutions. |
| Getting Started on ANCSA 14(C)(3), February 2012 | A guide to assist native communities with the Alaska Native Claims Settlement Act. |
| Capital Project Management Handbook, April 2001 | A planning guide for implementing and managing capital projects in Alaska. |
| Alaska Department of Natural Resources Land Use Plans | An online repository of area land use plans and maps. |

Table 2-1 State Planning Publications

2.3.2 Planning Process

The mitigation planning process considers conceptual and technical information from a full range of community plans including comprehensive plans, transportation plans, and capital improvement programs. The mitigation planning process incorporates a comprehensive planning approach leading to long-term disaster loss reduction.

The following is a description of the specific process used for the 2013 State HMP update:

The DHS&EM mitigation team reviewed the 2010 SHMP in its entirety and evaluated content based upon the State Standard Plan Update Guidance document and Crosswalk included in the FEMA mitigation planning guidance Blue Book, January 2008. The 2010 Plan review Crosswalk and FEMA review comments were incorporated into the 2013 plan update. Additionally, a substantial volume of revision ideas and suggestions had been collected by the SHMO and were incorporated into the 2013 plan update. They were derived from local plan reviews, planning workshops, disasters, research, community visits, staff discussions, and training.

In 2012 specific DHS&EM staff was assigned to the plan update project under the supervision of the SHMO. The SHMO developed a project task timeline for the update (Appendix 11). The 2010 State Hazard Mitigation Plan was reviewed and revised into the current, updated format.

In 2012, the SHMAC added the 2010 plan and 2013 plan drafts to their monthly meeting agendas. Topics covered during the meetings were:

- 2010 plan review.
- 2013 update draft revisions.
- Subject matter advisement.
- Mitigation goals and projects review and revision.
- Additional goals and projects.

The SHMAC also provided a critical review of the 2010 Plan goals and actions. Additional SHMAC evaluations were gathered from email, telephone calls, and personal visits. Additional groups contributing to the plan update are listed in Section 2.2.

2.3.3 Update Accomplishments for 2013

The following is a summary of revisions accomplished during the 2013 State HMP review. See Appendix 11 for specific annual reviews and revisions:

1. Introduction

The introduction includes updated maps and State specific demographic information. Economic fishing disaster declarations were incorporated into chapter 3 as a new hazard, "Economic".

2. Planning Process

Formerly *Mitigation Strategy*, Chapter 2 incorporates the elements from the former Chapter 3 *Planning, Monitoring, and Maintenance* into the State's planning process.

3. Hazard Profiles

Formerly *Planning, Monitoring, and Maintenance*, Chapter 3 profiles the natural and man-made hazards applicable to the State of Alaska. An Economic hazard specific to Alaska Fisheries was incorporated from chapter 1.

4. Hazard Analysis

Formerly *Hazard Analysis – Risk Assessment*, Chapter 4 prioritizes the State’s risk to hazards using criteria such as hazard history, location, nature, extent, impact, and probability.

5. Mitigation Strategy and Goals

Formerly *Alaska Hazards and Assessment*, Chapter 5 incorporates the goals from Chapter 6 into a comprehensive mitigation strategy.

6. Resources

Formerly *Hazard Mitigation Goals*, Chapter 6 incorporates reference materials, sources of information, and funding opportunities from the former Chapter 7, *Hazard Mitigation Funding*, which has been removed.

Appendices

Relevant appendices were maintained and updated. Other appendices were removed or incorporated into the body of the State HMP.

2.4 Local Hazard Mitigation Planning Support

The State of Alaska is committed to supporting local mitigation planning efforts. The State supports communities engaged in local mitigation planning with grant and contract funding, technical assistance, and consultation with the FEMA Region 10 mitigation planners.

The State of Alaska provides technical assistance for local plan development including web resources, workshops, community visits, teleconferences, and contractor support. The State also reviews each local plan and seeks needed revisions prior to the final FEMA review. State engagement in the local planning process ensures local plan consistency with the State HMP and a State understanding of local mitigation strategies and risk.

Additional support for local planning is provided through funding. Funding for the 2010 to 2013 planning effort represents an investment of several hundred thousand dollars in mitigation program grants and direct State expenditures. Each hazard mitigation grant funding announcement is an opportunity to apply for hazard mitigation planning grants.

2.5 Local Hazard Mitigation Plan Approval Process

Draft local hazard mitigation plans are submitted to the SHMO for review. The SHMO reviews the plan for consistency with the State HMP and the Disaster Mitigation Act of 2000 (DMA 2000) regulations. The primary guidance is the FEMA Local Mitigation Plan Review Guide and Tool, October 2011, and the FEMA Local Mitigation Planning Hand Book, March 2013. The State assists the community with any necessary revisions and then forwards the plan to FEMA Region 10 for final review. If no further revisions are necessary, FEMA issues an “approval pending adoption” (APA) letter to the community council. The local community council will formally adopt the plan by a resolution. If the community is unorganized, the State will act as the promulgate authority for plan adoption. Once the plan is adopted, the SHMO forwards a copy of the adoption resolution to FEMA Region 10 for final approval. FEMA sends the final approval letter to the community and the State for their records. Finally, the SHMO places copy of the FEMA approved Local HMP in DHS&EM files and on the State web site for reference.

2.6 Local Plan Maintenance

While it is the responsibility of each community to maintain their local mitigation plan, the State supports communities in this effort as Local HMPs are used for additional community planning. For example, Local HMPs are providing hazard vulnerability and risk assessment data for Emergency Operations Plans (EOPs), and Security Vulnerability Assessments (SVAs). Communities will use the process described below in Figure 2.1 Local Hazard Mitigation Planning Process Flow Chart, for comprehensive updates to their plans.

Annual Community Plan Reviews and Updates

1. Annually, the DHS&EM mitigation team will contact each participating community to:
 - Encourage them to conduct an annual review of their plan in accordance with the plans monitoring section.
 - Inform them of their five year plan update requirement.
 - Encourage them to review their vulnerability, hazards and risk assessment for any changes, particularly if the community has suffered disaster losses.
 - Encourage them to review their mitigation project list for progress, timeline and potential funding opportunities.
 - Ask them to consider providing additional opportunities for public involvement in reviewing the mitigation plan.
2. Monthly, the State mitigation team will contact communities whose mitigation plans are within eighteen months of a FEMA required update to:
 - Remind the community of their update requirement and the due date.
 - Offer technical assistance.
 - Explain possible grant opportunities for funding their plan update work.
 - Encourage utilizing the update process to further develop mitigation projects and conduct specific hazard studies or assessments.

2.7 Local Plan Integration

Eighty three communities have approved Local HMPs in the State of Alaska (Appendix 12). As new and updated plans are reviewed by the State, local strategies, goals, hazard information and vulnerabilities are incorporated into the State HMP as appropriate. The State also references Local HMPs to evaluate mitigation project applications and develop appropriate mitigation projects.

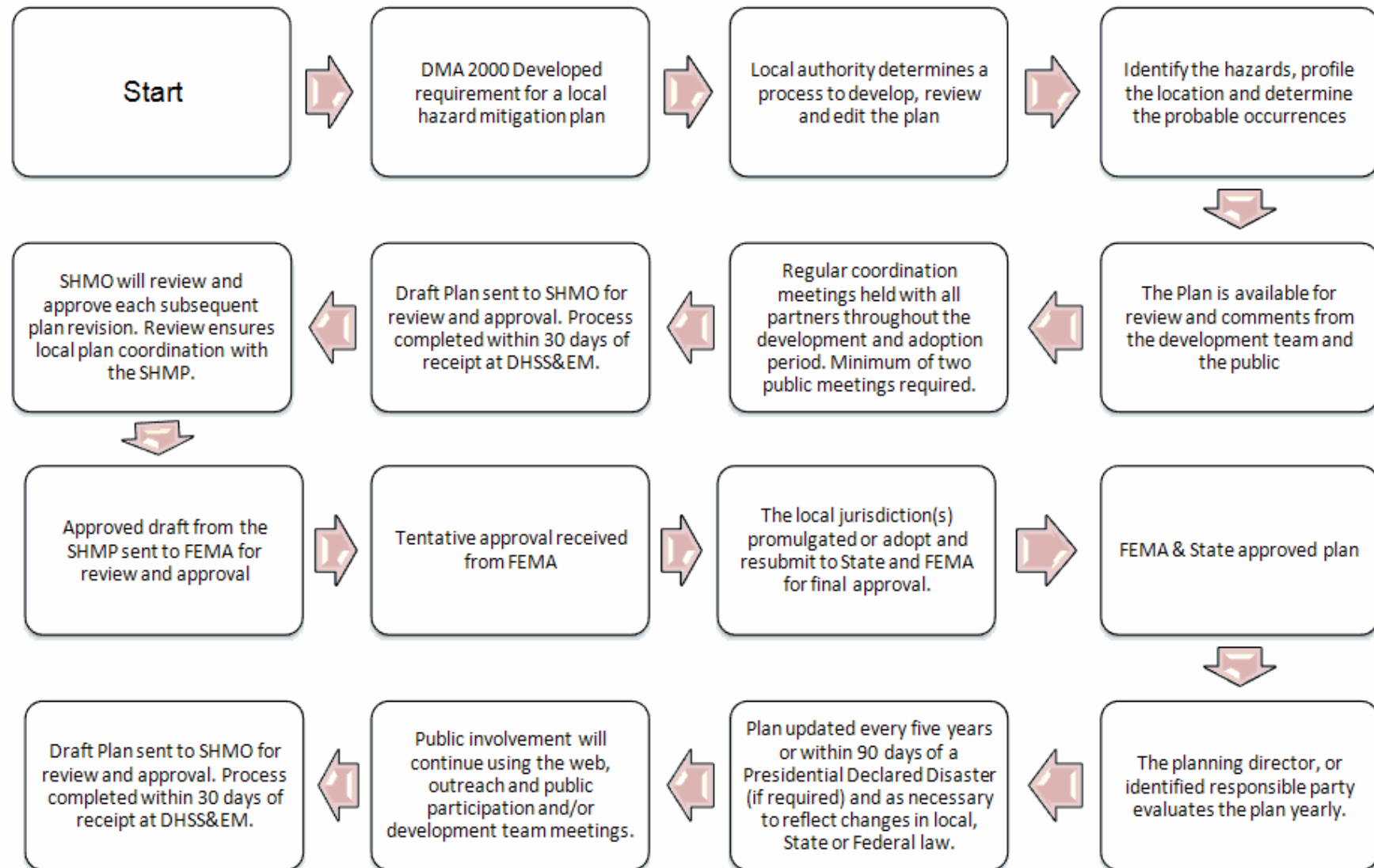


Figure 2.1 Local Hazard Mitigation Planning Process Flow Chart

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3. Hazard Profiles

Profiling hazards is the act of researching their nature, history, magnitude, frequency, location, extent, and probability. Communities identify hazards through historical and anecdotal information, and reviews of pertinent plans and studies. Mapping the hazards determines their geographic extent and proximity to populated areas. A natural phenomenon, such as a volcanic eruption, must involve humans to become a natural hazard. All natural hazards potentially affecting the State are considered, and those found to have minimal impact or unlikely to occur are eliminated from consideration. Human, Technological, and Terrorism related hazards are included in this plan in support of communities profiling them in their local mitigation plans. However, recognizing the public nature of hazard mitigation plans, the State of Alaska advises information on these hazards be limited to general knowledge.

3.1 Floods

3.1.1 Hazard Characteristics

A flood is the overflow of an expanse of water submerging normally dry land. Water defeats natural or artificial barriers protecting adjacent floodplains such as beaches, stream banks, and levees. Flooding is typically a natural event and considered a hazard only when people and property are at risk. Flooding is Alaska's most common disaster, costing the state in excess of one million dollars annually, major disruptions to society, and occasionally the loss of life.

Forms of Flooding

There are nine distinct forms of flooding in Alaska:

- Rainfall-Runoff
- Snowmelt
- Coastal Storm Surge
- Alluvial Fan
- Ice Jam
- Flash
- Groundwater
- Fluctuating Lake Levels
- Glacial Outburst

Rainfall-Runoff Flooding is the most common type of flooding in Alaska, typically occurring from late summer through the fall season. Rainfall intensity, duration, distribution, and geomorphic characteristics of the watershed all contribute to a flood's magnitude.

Snowmelt Floods typically occur from April through June. Snowpack depths, spring weather patterns, and geomorphic characteristics of the watershed determine the magnitude of flooding. Rainfall and melting glacial ice often exacerbate snowmelt floods.

Coastal Storm Surge or coastal floods, occur when the sea surges inland above the high-tide level onto land that is normally dry. Very low-pressure storm systems are often responsible for coastal storm surge. Therefore, storm related coastal flood events are profiled in Section 3.7 Severe Weather.

Alluvial Fan Floods

Alluvial fans are areas of deposited rock and soil eroded by rivers in steeper terrain upstream. When debris deposits fill the existing river channels on the alluvial fan, the water overflows the stream banks and floods land downstream. The overflow may establish a new channel. Alluvial fan flooding frequently damages roads and infrastructure in the Cities of Seward and Girdwood and communities along the Richardson, Haines, and Dalton Highways (Figure 3.1.1).

Figure 3.1.1 Lowell Point Road Alluvial Fan



Figure 3.1.1 Lowell Point Road alluvial fan Seward, AK. Image from the Kenai Peninsula Borough

Ice Jam Floods occur after an ice jam develops on a river or stream and blocks the path of flowing water. Ice jams may occur any time when ice is present but typically form during the following three seasons:

- Fall freeze up.
- Midwinter when stream channels freeze forming anchor ice.
- Spring breakup, when the existing ice cover weakens and breaks apart, flows downstream and jams together at narrow sections of the stream channel.

Ice jams commonly develop in areas of decreased channel slope, shallow sections, or constrictions and frequently impede waterways during spring breakup.

The water level rises upstream behind the ice jam. If the ice jam is higher than the riverbank, the adjacent land will flood. The effect is analogous to a dam. There is usually little damage upstream of the jam unless a community development is nearby. In that situation, low-lying structures will be subject to significant flooding and ice impact.

When the stream breaches the ice jam, the water will drain rapidly and further damage structures as it flows back into its channel. The water level downstream will rise quickly and behave much like a flash flood, carrying large chunks of ice, trees, bank vegetation, and other debris. Ice jams were the cause of recent large and destructive floods along the Kenai, Susitna, Kuskokwim, and Yukon rivers.

Flash Floods are sudden and potentially violent events. Circumstances associated with flash floods are localized or distant heavy rainfall, and breaches in natural or manufactured dams. They are usually swift moving, debris laden, and destructive. Topography such as narrow canyons and steep slopes are prone to flash flooding.

Groundwater Floods occur when water accumulates and saturates the soil. The water table rises to levels that flood low-lying areas, including structures, septic tanks, and other facilities. It has been a significant problem in Fairbanks, especially downstream of the Chena Lakes Dam. Additionally the basements of structures along the Chena River flood when the river stage remains high for more than a few days.

Fluctuating Lake Level Floods

Generally, lakes prevent flooding downstream by storing large amounts of runoff. However, during periods of excessive inflow, the area around the lake will flood. The Kenai and Skilak Lake areas occasionally flood due to excessive rainfall, snowmelt, and glacier-dammed lake releases.

Glacial Outburst Floods

Also known as jökulhlaup, glacial outburst is a sudden release of water from a glacier or a glacier-dammed lake. Potential natural causes are overtopping, earthquakes, volcanic activity, or decomposition of the glacier dam.

Subglacial releases occur when enough hydrostatic pressure builds to float the glacial ice. Water then drains rapidly from the bottom of the lake.

Glacial outburst flooding is possible in many parts of the State. A USGS study found 750 glacier-dammed lakes and outburst floods in Alaska and adjacent portions of Canada [Post and Mayo, 1971]. The Copper, Snow, Tazlina, and Kenai Rivers all have periodic outbursts of approximately 2 to 5 year frequency. While the Kennicott Glacier at McCarthy outbursts annually.

Aufeis (Ice Overflow) Flood

Also named glaciation or icing, aufeis form from frozen layers of ground water. Most aufeis are a few hundred yards long but they can cover several square miles. They are usually 2 or 3 feet thick but can reach a thickness of 30 feet or more. Aufeis may form in stream channels and other water bodies. Known as bottom fast icing, this form of aufeis may force water up and over its

catchment. In March of 2015, an Aufeis event in the Sag River flooded the adjacent Dalton Highway (Figure 3.1.2).



Figure 3.1.2 Source: Alaska Native News, April 9, 2015

3.1.2 Climate Factors

The following is from the *Special Supplement to the Bulletin of the American Meteorological Society*, published in August 2013:

The climate of the Arctic in 2012 was dominated by continued significant changes in the cryosphere. There were new records for minimum sea ice extent and permafrost warming in northernmost Alaska. And, a negative North Atlantic Oscillation (NAO) in spring and summer, which promoted southerly airflow into the Arctic, had a major impact on lake ice break-up, snow cover extent, Greenland Ice Sheet melt extent and albedo, and mass loss from the ice sheet and from Canadian Arctic glaciers and ice caps. Lake ice break-up was up to three weeks earlier in Arctic Canada and up to one month earlier in Eurasia, consistent with changes in spring snow cover extent.

In 2012 and 2013, Alaska's riverine communities experienced two of the quickest spring thaws on record. Melt-water inundated many watersheds, and the swollen rivers broke their ice cover

prematurely, forming large ice dams downstream. The 2013 Spring Ice Jam Flood disaster (DR-4122) was one of the largest events of its kind in Alaska's history.

Disasters attributed to the rapid spring thaw of 2013 were not limited to Alaska. Ivu events in northern Minnesota and Canada coincide with DR-4122. The rapid spring thaw in concert with high winds pushed lake ice into nearby homes destroying them in as little as 15 seconds (Figure 3.1.3).



Figure 3.1.3 Source: New York Daily News, Author Erik Ortiz, Sunday, May 12, 2013

3.1.3 Deposition and Erosion

Other hazards related to flooding are deposition and erosion. Deposition refers to the accumulation of soil, silt, debris and other materials within flood control structures (levees), on a river bottom, or over a delta. For example, boulders, organic material and gravel accumulated during flood events in Lowell Creek, Jap Creek, and the Resurrection River in Seward, the Lowe River in Valdez, and Gold Creek in Juneau. Excessive deposition contributes to the destruction of fish habitat and constricts navigable waterways. Deposition also reduces channel capacity and increases the risk of flooding or bank erosion.

Erosion is a process that involves the gradual wearing away, transportation, and movement of land. However, not all erosion is gradual. It can occur quite quickly as the result of a flash flood, coastal storm, or other event. Most of the geomorphic change to a river system is due to a peak flow event. Erosion is a natural process and considered a hazard only when people and property are affected. Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure.

There are three main types of erosion in Alaska:

- Coastal erosion
- Riverine erosion
- Wind erosion

Coastal erosion occurs over the area roughly from the top of the bluff out into the near-shore region to about 30-feet of water depth. The erosion rate is the amount of change in the position or horizontal displacement of a shoreline over time. Events associated with erosion are storms, ice run up (Ivu), human activities, thawing permafrost, and flooding. Surface and ground water flow, and freeze-thaw cycles also contribute.

Riverine erosion is the wearing away of riverbanks and riverbeds over time. In Alaska, high breakup rates, thawing permafrost, and heavy rainfall accelerate this process. The eroded sediment eventually deposits in slower moving sections such as dams or reservoirs. The river may eventually change course and threaten developments. Riverine erosion threatens many Alaskan villages and they need extensive mitigation measures to either relocate or stay put.

Wind erosion is very selective, carrying the finest particles, particularly organic matter, clay and loam (top soil) long distances. Wind erosion reduces the capacity of the soil to store nutrients and water, thus making the environment drier. However, deposits of this alluvial formed the fertile loess soils covering large areas of Europe and North America, where highly productive farming has developed. The wind moves soil particles 0.1-0.5 mm in size in a hopping or bouncing fashion (known as saltation) and those greater than 0.5 mm by rolling (known as soil creep). The finest particles (less than 0.1 mm) are suspended in the air. Wind erosion will increase during periods of drought.

3.1.4 Flood History

Coastal and riverine communities throughout the State have lengthy histories of flooding. Rapid snowmelt, ice jams, heavy precipitation, and seasonal variations all increase the risk. Flooding has overwhelmed wastewater treatment facilities, warranted evacuations of entire communities, inundated road systems, and forced agencies under considerable pressure to rebuild before winter. Given the limited highway infrastructure in Alaska, damaged runways, roads and bridges may isolate communities for weeks and hamper disaster recovery projects for months or years.

➤ Rainfall-Runoff Floods

2013 October KPB Flood Disaster (DR-4161)

Beginning October 27, 2013, heavy rains inundated much of the Kenai Peninsula. Seward, Homer, Kenai, Anchor Point, and the Tyonek area along Beluga Road all reported major flood damage, prompting the Kenai Peninsula Borough to declare local disaster and request state and federal assistance.

2012 September Storm (DR-4094)

On September 4, 2012, a strong weather system produced high winds and heavy rains, resulting in severe and widespread wind damage and flooding throughout much of South-central and Interior Alaska. The series of storms created a threat to life and property in the Matanuska-

Susitna Borough, Kenai Peninsula Borough, Alaska Gateway Regional Educational Attendance Area (REAA), and the Chugach area. The magnitude of the storm necessitated emergency protective measures enacted by the Rescue Coordination Center (RCC). Damages from wind and flooding were substantial and widespread.

2012 October Kuskokwim Delta Flood (12-241)

On October 5, 2012, a strong fall storm moved north into the Bering Sea and produced severe winds, heavy rain, and storm surges up to 4 feet above mean tide levels in the Kuskokwim Delta, with severe impact to the Native Village of Napaskiak. The impact of the storm resulted in floodwaters surrounding the tribal-owned maintenance garage undermining and shifting the building and foundation; damage to the driveway ramp to the maintenance yard; and substantial damage to community boardwalks.

2008 Tanana Valley Flooding (DR-1796)

From July 27 - August 6, 2008, flooding from excessive storm activity destroyed property and threatened life in the interior region of the State. The most severely damaged were buildings and infrastructure near the City of Nenana (Figure 3.1.4). In particular, the sewage lift stations required costly and extensive repairs. The lengthy absence of the City's sewer system created an unhealthy environment for the community. Following repairs, the City completed a hazard mitigation project to protect the sewer system from future flooding.

Additionally, the Alaska Railroad Company (ARRC) temporarily stopped all northbound freight and passenger rail service due to track failures in the City of Nenana and Healy Canyon. The ARRC completed a series of mitigation projects designed to prevent future flood damage and service interruption in the Nenana area.

Figure 3.1.4 Flooding in Nenana



Figure 3.1.4 Flooding in 2008 in Nenana. DHS&EM photo.

➤ **Snowmelt Floods**

2015 Fort Yukon Flooding (AK-15-252)

Abnormally warm temperatures in mid-May 2015 rapidly melted snow in the highlands of northeastern Alaska and elevated water levels in the Yukon and Porcupine Rivers. By May 20, the water levels overtopped the Porcupine River in some locations and inundated the Fort Yukon area with up to two feet of water.

➤ **Ice Jam Floods**

2013 Spring Floods (DR-4122)

From May 17, through June 10 2013, excessive snow pack and ice thickness, combined with rapid spring warming formed ice jams and severe flooding throughout the Yukon and Kuskokwim River communities. Large ice jam floods severely damaged approximately 194 homes and much of the infrastructure, prompting evacuations. Impacts from this event include loss and damage to personal property and multiple businesses including loss of revenue (Figure 3.1.5). Impacts to public infrastructure include: hazardous and non-hazardous debris removal, emergency protective measures (leading to ongoing mass care operations), damage to city and state roads, bridges, water and sewer systems, electrical generation and distribution systems, recreation areas and fuel storage facilities.

Figure 3.1.5 Ice Jam Flooding in Galena



Figure 3.1.5 Ice Jam Flooding in Galena, 2013. Source: DHS&EM.

2007 Ice Jam Flooding

In the winter of 2007, the Skilak glacier-dammed lake breached and released a four-foot high surge of water into the Kenai River. The sudden rise in the water level dislodged the river ice. The ice moved downriver and impacted public and private riverbank fishing platforms, stairs, and elevated walkways. Ice continued downriver and formed ice jams at various points. Behind the ice jams, water and ice overtopped the riverbanks and flooded several public campgrounds, fishing parks, and residential homes (Figure 3.1.6). Damage in the Kenai Peninsula Borough (KPB) extended from the community of Sterling to the City of Soldotna. Approximately 150 homes and riverside businesses reported damage to their buildings, fishing structures, and docks. Another 775 homes within the KPB sustained damage from the floodwaters and ice and some roads became inundated and impassable.

Figure 3.1.6 Kenai River Ice Jam Flood



Figure 3.1.6 Kenai River Ice Jam flood, 2007. Source: Kenai Peninsula Borough.

2009 Spring Ice Jam Flooding on the Yukon River (DR-1843)

The 2009 event was the largest disaster in Alaska in over ten years and involved communities along thousands of miles of the Kuskokwim and Yukon River system. Ice jams formed along various points of the rivers. The water level rose behind the ice jams and flooded nearby communities. Additionally, enormous ice chunks, some exceeding 15 feet in height, crashed into structures in the already flooded communities of Eagle and Stevens Village (Figures 3.1.7 and 3.1.8).

Thirty-nine communities along the river systems sustained damages in the month long disaster.

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Communities along the entire stretch of the Yukon River (1,980 miles-long), sustained flood and ice damage. Challenges to the recovery teams were the remoteness of the communities and the fast approaching winter season. The recovery effort included Public Assistance (PA), Individual Assistance (IA), SBA disaster loans and temporary housing. See Appendix 17 for mitigation success stories related to this disaster.



Figure 3.1.7 Ice flood in Stevens Village, AK, 2009, DHS&EM photo.



Figure 3.1.8 Flooded structure in Eagle, AK, 2009, DHS&EM photo.

Key components in flood mitigation efforts are surveyed high water marks post flood. The surveyed high water marks from the 2009 ice jam floods are available on these NOAA web pages:

Tanana: http://aprfc.arh.noaa.gov/gages/HWM/HWMsite_tal.html

Stevens Village: http://aprfc.arh.noaa.gov/gages/HWM/HWMsite_svs.html

Fort Yukon: http://aprfc.arh.noaa.gov/gages/HWM/HWMsite_fyu.html

➤ Ice Overflow (Aufeis) Floods

2015 Dalton Highway Flooding (AK-15-253)

Beginning on March 13, 2015 and continuing, the Sagavanirktok (Sag) River experienced an unprecedented ice overflow flood between Mile 390 and 415 of the Dalton Highway about 25 to 30 miles south of Deadhorse. Road clearing and overflow diversion efforts were hampered by very cold temperatures, high winds, and poor visibility.

➤ Outburst Floods

In late May 2002, the Hubbard Glacier pushed a moraine across the seaward entrance to Russell Fjord and began to restrict the tidal exchange between Disenchantment Bay and Russell Fjord. By early June, the moraine forming Russell Lake. The lake level rose at an average rate of more than 0.8 feet per day due to large amounts of runoff and glacial melt in the basin. By late July, the dam completely sealed off the lake and by 3 a.m., Aug. 14, real-time USGS water gage data revealed the water level in the lake had peaked at about 61 feet above sea level and had begun to drop rapidly, creating the second largest glacial lake outburst in recorded world history (Figure 3.1.9).

Following the 2002 outburst flood, the United States Forest Service (USFS) became the lead agency for subsequent activities including the oversight and review of several technical studies dealing with understanding the physical, economic, and biologic impact of an overflow flood on

the Yakutat community and surrounding area. In response, residents formed the Hubbard Glacier Task Force in 2002 to represent their community and assist the USFS.

Perhaps the greatest hazard associated with Russell Lake will result if the Hubbard Glacier dam does not fail, and Russell Lake fills indefinitely. Eventually, the lake will overtop the saddle separating Russell Fjord from the Situk River basin. If the outflow from Russell Fjord basin drains through the Situk River, erosion of a new, larger channel will influence the landscape and aquatic habitat downstream.

Figure 3.1.9 Hubbard Glacial Outburst



Figure 3.1.9 An enlarged eastward-looking view of a small section of the Hubbard Glacier terminus outburst on August 14, 2002 creating the second largest glacial lake outburst in recorded world history. USGS photo.

Skilak Glacier Dam forming Skilak Lake burst in January 2007, and sent a flash flood of water and ice down the Kenai River causing intermittent ice jams (Figure 3.1.10). The large ice floes stripped the Kenai River banks of docks, wharves, and boardwalks resulting in approximately \$3.8 million dollars damage to State and community infrastructure and personal property.

Figure 3.1.10 Skilak Glacier Dammed Lake



Figure 3.1.10 Skilak Glacier Dammed Lake, Alaska. NOAA image.

Alaska also experiences coastal flooding from storm surge detailed in Hazard section 3.7, Severe Weather.

Figure 3.1.11 Alaska Major Rivers



Figure 3.1.11 Outline map of Alaska showing the major rivers from USGS Status and Trends of the Nation's Biological Resources, Part 2—Regional Trends of Biological Resources, Alaska, pg. 708.

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3.2 Wildland and Community Fire Conflagration

While a part of the natural ecosystem, fires in Alaska are a dangerous hazard when they involve local communities. During the five year period spanning 2005 through 2011, over 128 fire related fatalities were recorded in Alaska. Since 1984, the State has declared over 30 fire related emergencies or disasters.

For the purposes of profiling the hazard in Alaska, fires in this section are characterized by their primary fuel source into two categories:

- Wildland fire, which consumes natural vegetation.
- Community fire conflagration, which propagates among structures.

3.2.1 Wildland Fires

Fire is a natural wildland management force in the Alaskan Interior. It is a key environmental factor in cold-dominated ecosystems. Without fire, organic matter accumulates, the permafrost table rises, and ecosystem productivity declines. Fire rejuvenates an ecosystem by removing decaying matter and returning their nutrients to the soil, preserving vegetative diversity and wildlife habitat unique to Alaska. In the absence of wildland fires, many plant and animal species would no longer thrive.

While fire is critical for maintaining the viability of Alaska's ecosystems, it must be tempered with the need to protect human life and property. This is particularly true of fires burning in "wildland urban interface" areas, where human development meet or intermingle with undeveloped wildland. Wildland urban interface (WUI) has gained importance throughout Alaska as development expands into wild lands (Figure 3.2.7).

Firefighter and public safety is the primary concern of the land and wildland management agencies. In Alaska, thousands of acres burn every year in 600 to 800 fires primarily between the months of March and October.

3.2.1.1 Hazard Characteristics

Wildland fires are any non-structural fire occurring in the wildland and are characterized as:

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

Wildland fire risk in Alaska is increasing due to climate trends, increased development within wildland areas, and the results of a spruce bark beetle infestation. Vast stretches of Alaska's forests are littered with beetle-kill spruce which is highly flammable.

3.2.1.2 Climate Factors

According to the *Global Climate Change Impacts in the United States*, published in 2009 by the U.S. Global Change Research Program “Under changing climate conditions, the average area burned per year in Alaska is projected to double by the middle of this century. By the end of this century, area burned by fire is projected to triple under a moderate greenhouse gas emissions scenario and to quadruple under a higher emissions scenario.” Climate Central’s most recent assessment of large wildfires in Alaska appears to support that projection (Figure 3.2.1).

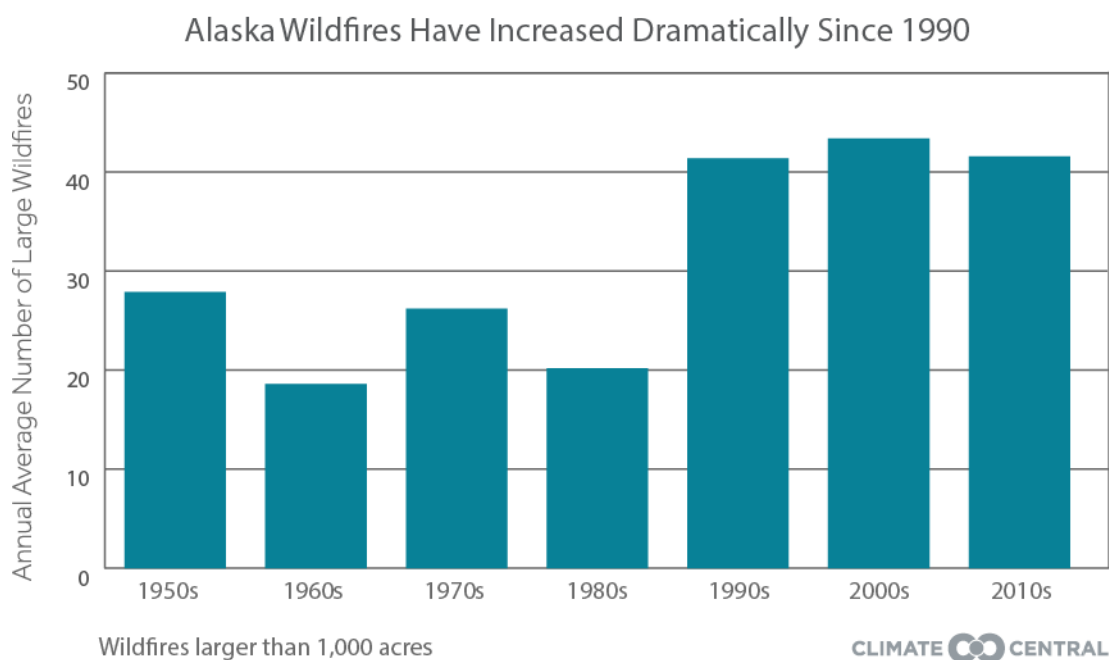
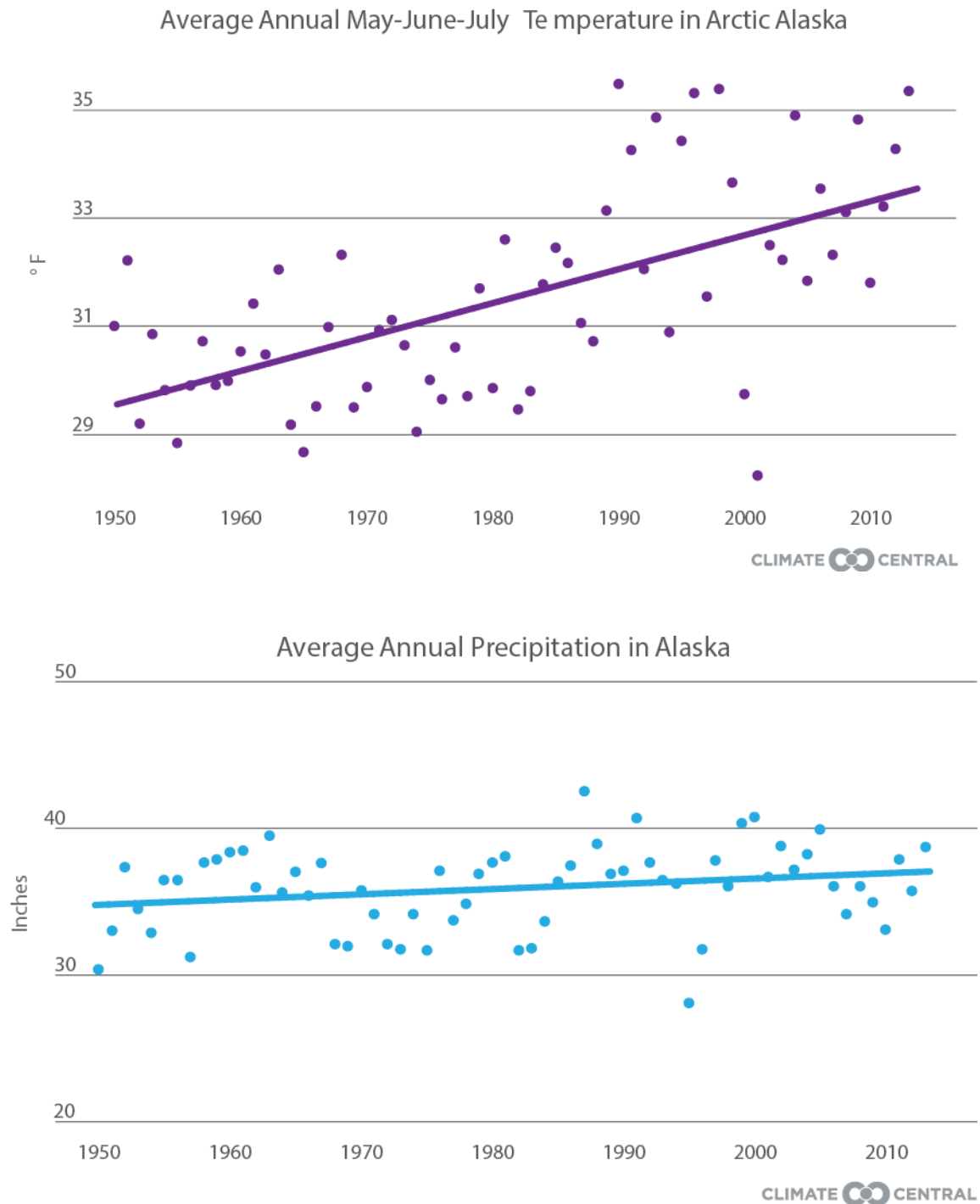


Figure 3.2.1 Source: “Age of Alaskan Wildfires”, Climate Central, 2015

Since 1990, Alaska has experienced nearly twice the number of wildfires per decade compared to periods 1950 through 1980. Additionally, the sparsely populated Arctic region experienced only three wildfires over 1,000 acres from 1950 - 1970. Since 2000, there have been over 33 large wildfires.

The average duration of the wildfire season in the Arctic region runs May through July. Other regions south of the Arctic, such as South Central may run late April through mid-September, depending upon weather related factors. Average annual precipitation in Alaska has increased since 1950, but not quite as much as the average annual temperature (Figures 3.2.2 & 3.2.3).



Figures 3.2.2 & 3.2.3 Source: “Age of Alaskan Wildfires”, Climate Central, 2015

3.2.1.3 Management in Alaska

Wildland fire management in Alaska is a joint effort among Federal, State, and local governments, native organizations, local fire departments, communities and landowners. The land management agencies, also known as jurisdictional agencies, have the overall land and resource management responsibilities as provided by Federal, State or local law (Figures 3.2.4 and 3.2.5).

Alaska is divided into three protection areas supported by the following agencies as specified in the *Alaska Statewide Master Agreement*: (<http://fire.ak.blm.gov/administration/asma.php>). Table 3.2.1 lists the dispatch centers for each protection area.

- Alaska Department of Natural Resources – Division of Forestry
- Bureau of Land Management – Alaska Fire Service
- U.S. Forest Service.

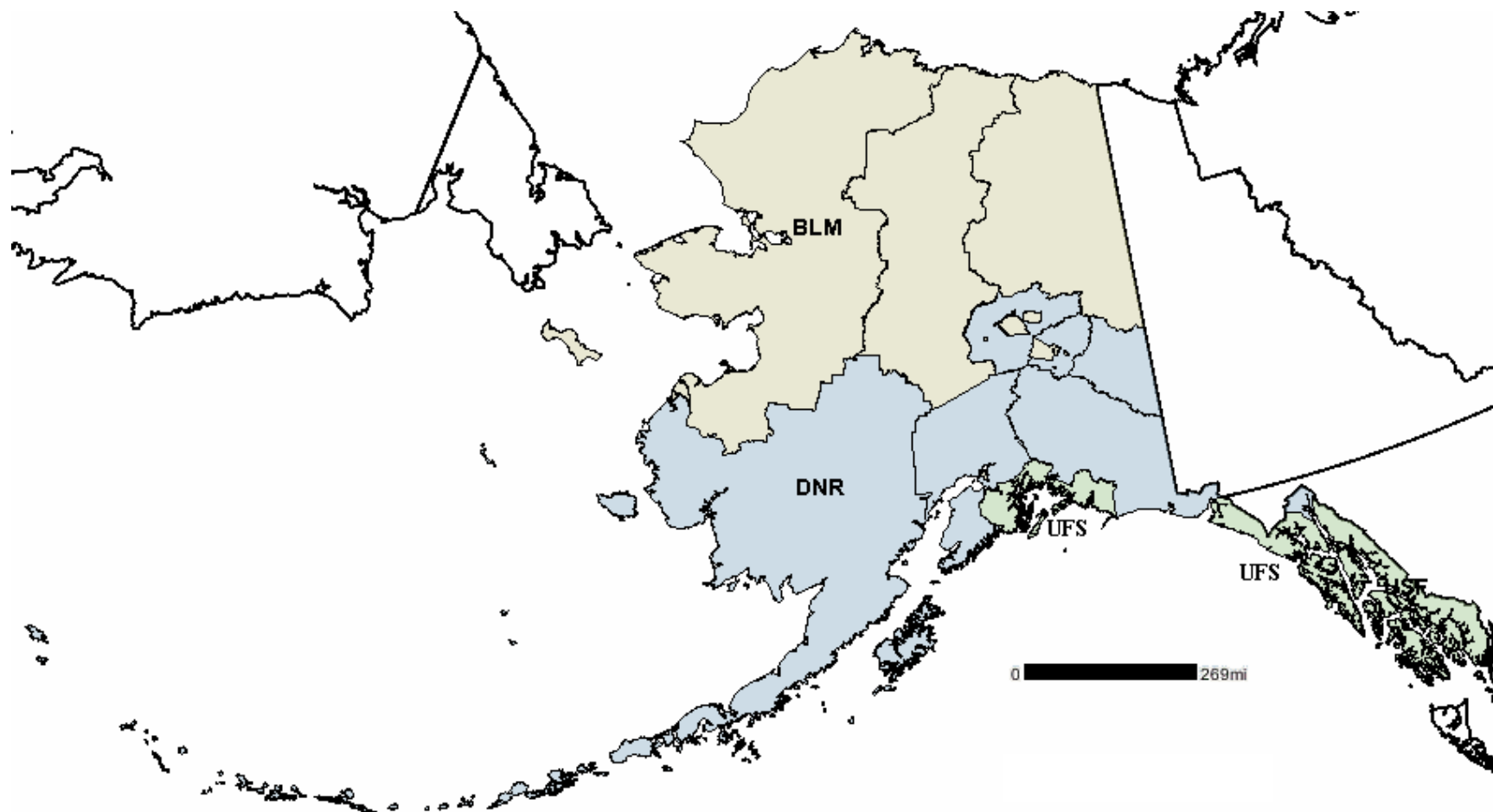


Figure 3.2.4 State & Federal Fire Management Zone Map by Agency from the Alaska Interagency Command Center Fire Information.

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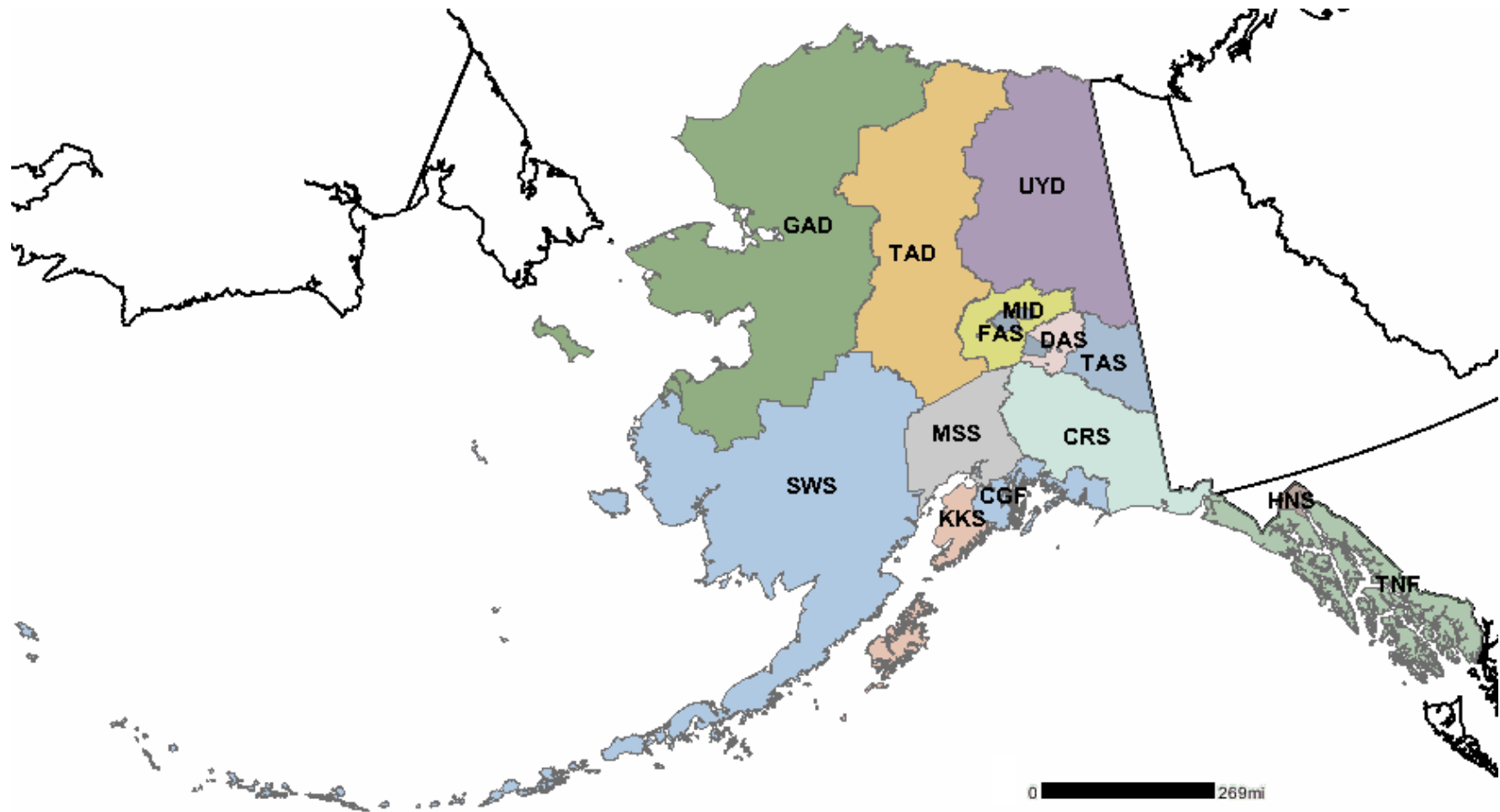


Figure 3.2.5 Alaska Fire Management Zone Map from the Alaska Interagency Command Center Fire Information. Key to zone codes is in Table 3.2.1.

| <i>Interagency Fire Dispatch Centers</i> | | | | | |
|---|--------------------------------------|--|-----------------|------------------------------------|-----------------|
| <i>DNR Protection Area*</i> | | <i>AFS Protection Area***</i> | | <i>USFS Protection Area</i> | |
| <i>Area</i> | <i>Location</i> | <i>Zone</i> | <i>Location</i> | <i>Forest</i> | <i>Location</i> |
| State Logistic Center | Fairbanks | Galena Zone (GAD) | Galena | Chugach Nat'l Forest** (CGF) | Soldotna |
| <u>Northern Region Areas</u> | | (UYD) Upper Yukon /Tanana/ Military (TAD) Zone (MID) | Fairbanks | Tongass Nat'l Forest (TNF) | Sitka |
| Delta Area (DAS) Fairbanks Area (FAS) Tok Area (TAS) Valdez/Copper River (CRS) | Delta Fairbanks Tok Tazlina | | | | |
| <u>Coastal Region Areas</u> | | (HNS) *DNR Protection Area includes the Southeast Area in Haines; the DNR resource staff provides fire suppression services and reporting, as needed; there is no fire Interagency Fire Dispatch Center within the Southeast Area. **Kenai/Kodiak Area and Chugach National Forest maintain a joint Interagency Fire Dispatch Center in Soldotna. ***Southern Zone located in Anchorage is also under the management of AFS; the Southern Zone dispatch center supports the BLM resource staff and does not function as a fire dispatch center. | | | |
| Anchorage/Matsu Area (MSS) Kenai/Kodiak Area** (KKS) Southwest Area (SWS) | Palmer Soldotna McGrath | | | | |

Table 3.2.1 Interagency Fire Dispatch Centers from p. C-12 of the, 2013 Statewide Master Agreement with Exhibits.


3.2.1.4 Fire Management Options in Alaska


Prior to the planning efforts in the 1980s, decisions regarding wildland fire management were based upon available resources. In 1988, interagency planners established four fire management options (Critical, Full, Modified and Limited) and defined response priorities for each wildland fire option. Standard responses ranged from aggressive suppression to surveillance. In, 1998, the 1988 management option definitions were incorporated into the Alaska Interagency Wildland Fire Management Plan update. The plan guides wildland fire response within Alaska. A brief summary of this plan follows:


The agencies in Alaska responsible for wildland fire suppression have developed and implemented the Alaska Interagency Wildland Fire Management Plan - <http://fire.ak.blm.gov/administration/awfcg.php>). The plan establishes response options and priorities. The range of responses provides an opportunity for agencies to achieve both protection and natural resource management goals and objectives. The statewide plan utilizes four wildland fire management options: Critical, Full, Modified and Limited categories to:

- Prioritize areas for protection actions and allocation firefighting resources to achieve protection objectives
- Integrate fire management with land and natural resource management.
- Scale the suppression effort to the need.

The following are legend descriptions for the Fire Management Options map (Figure 3.2.6):

 **Critical Management Option:** These are the highest priority areas for fire suppression and typically involve wildland urban interface fires. The criteria are an immediate threat to human life, primary residences, inhabited property, community-dependent infrastructure, and areas designated as National Historic Landmarks. This classification is scalable from a large area to a single inhabited structure. The objective for Critical is to protect the people/ areas/sites from wildland fire.

 **Full Management Option:** This option includes areas not involving inhabited property, such as cultural and paleontological sites, developed recreational facilities, physical developments, administrative sites and cabins, uninhabited structures, high-value natural resources, and other high-value areas. Structures and areas either on or eligible for inclusion on the National Register of Historic Places are placed within this category. This option is also scalable from broad areas to specific sites. The suppression objective is to minimize damage and control fires at the smallest acreage reasonably possible. Areas in the full protection option are second only to areas within a critical protection option.

 **Modified Management Option:** The Modified option provides a management level between “Full” and “Limited”. Unlike Full management areas, the intent is not to minimize burned acres, but to balance acres burned with suppression costs and, similar to Limited, support land and resource management objectives when conditions are favorable.

- Under suitable fire and environmental conditions, accomplish fire-related land-use and resource objectives in a cost-effective manner while providing appropriate levels of

protection to identified sites.

- Maintain the flexibility to respond to changing fire conditions.

Limited Management Option: The Limited option is designed for wildland fires in low priority areas. The low population density best allows fire to function in its ecological role. Sites warranting higher levels of protection may lie within Limited areas without compromising the Limited option. The objective is to maintain, enhance and improve ecological conditions with wildland fire. Limited is also applied to areas where the cost of suppression exceeds the value or the environmental impact exceeds the potential fire damage.

Figure 3.2.6 State of Alaska Fire Plan

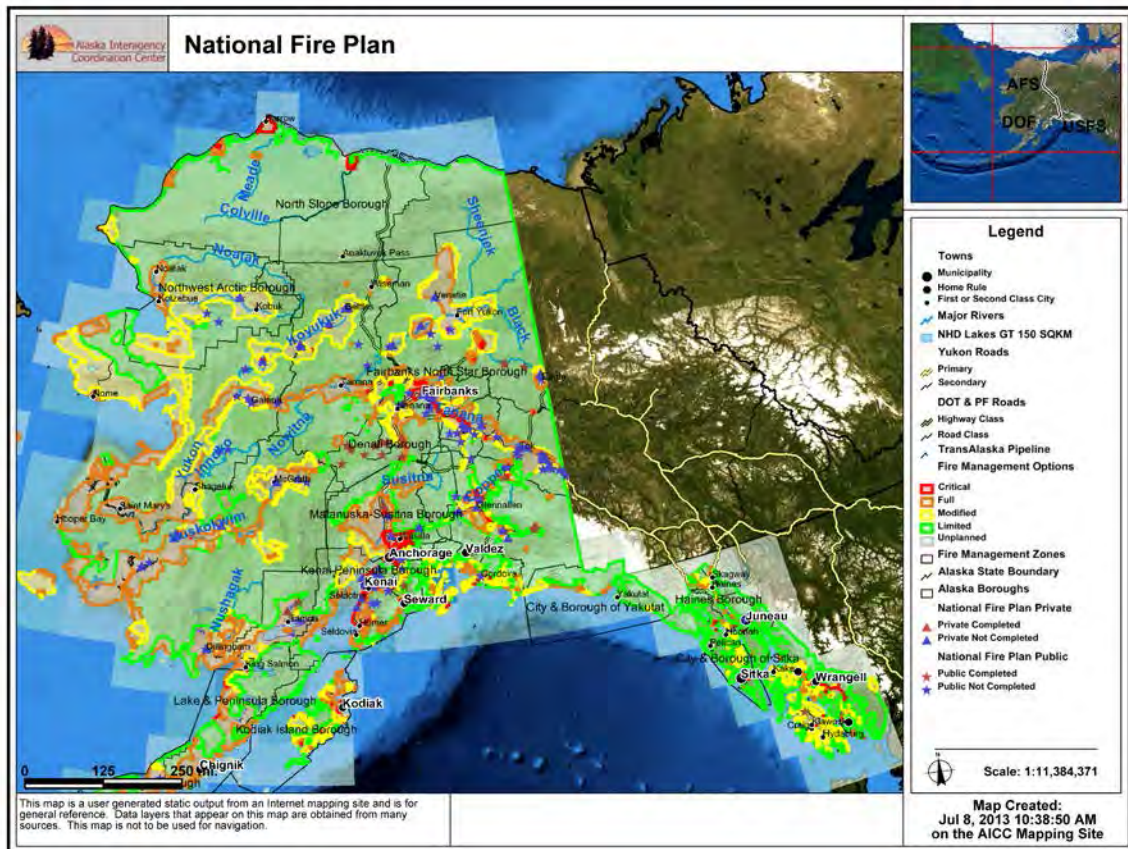


Figure 3.2.6 Fire Management Options 2013 from the Alaska Interagency Command Center.

3.2.1.5 Wildland Fire History

2015 Summer Alaska Wildfires (AK-15-251)

During the summer of 2015, numerous wildfires burned more than four million acres throughout Alaska, prompting the evacuation of more than 200 residents from five different communities. A federal Fire Management Assistance Grant (FMAG) was administered to assist with suppression, repair, and mitigation costs.

2015 Kenai Wildfire (AK15-250)

On June 15, 2015 a series of wildfires burned in the Kenai Peninsula Borough. Of these, the most damaging was the 8,875 acre Card Street Wildfire which damaged 11 buildings in the City of Sterling, including three homes.

2015 Sockeye Wildfire (AK-15-249)

On June 14, 2015 the 7,265 acre Sockeye Wildfire burned through the Matanuska-Susitna Borough, destroying 55 structures in the community of Willow. The total firefighting cost estimate is \$8,449,126.

3.2.2 Structural Fire vs. Wildland Fire

Many wildland firefighters are neither equipped nor trained for structure fires. Structural fire suppression within defined service areas is the responsibility of volunteer, city, or borough fire departments. When wildland firefighters encounter a structure, vehicle, dump or other non-vegetative fires during the performance of their wildland fire suppression duties, firefighting efforts are often limited to wildland areas. The profile and history of widespread community structure fires is addressed in section 3.2.3 Community Fire Conflagration.



Figure 3.2.7 July 2013 Stuart Creek Wildland Urban Interface Fire, Pleasant Valley, AK. Photo courtesy

InciWeb

3.2.3 Community Fire Conflagration

3.2.3.1 Hazard Characteristics

Community fire conflagration is a widespread community fire involving one or more developed areas in the community. In contrast to the commonly destructive individual property fire, conflagration involves a larger portion of the community's built environment. In small communities, conflagrations frequently overwhelm resources and damage infrastructure. In rural Alaskan communities, the loss of a critical building, such as their school, may warrant a local disaster declaration.

Conflagration fires are very difficult to control. Complicating factors are wind, temperature, slope, the proximity of structures, community firefighting capability, building construction, and contents. Additional factors facing response efforts are hazardous substance releases, structural collapse, interruption of water service, unorganized evacuations, and loss of emergency shelters. National examples of conflagrations include the Chicago City Fire of 1871 and the San Francisco City fire following the earthquake of 1906.

3.2.3.2 Conflagration Fire History

2015 Alatna Washeteria Fire (AK-15-247)

On April 15, 2015, the Village of Alatna's multi-purpose building sustained substantial fire damage. The building houses the water treatment facility, power and heating system, washeteria, and health clinic. All facilities within the building were inoperable, forcing residents to recover to Allakaket, five miles across the Koyukuk River for potable water, health care, and shelter. Alatna received a State disaster declaration on April 25, 2015.

2011 Dot Lake Fire (12-235)

On August 28, 2011, the Village of Dot Lake's multi-purpose building completely burned down. The building housed the water treatment facility, power and heating system, washeteria, and health clinic. The 55 residents sheltered in place using wood stoves and melting ice for water. Dot Lake received a State disaster declaration on October 4, 2011.

2011 Birch Creek Fire (12-234)

On May 26, 2011, the Birch Creek Tribal Office caught fire and quickly spread to the power plant, tribal office, water plant, and community building. All structures completely burned down. Birch Creek received a State disaster declaration on August 9, 2011.

2007 Beaver Generator Fire (08-224)

On July 29, 2007, a fire burned the generator building down in the Village of Beaver. They received a State disaster declaration on September, 14, 2007 to cover replacement costs.

2006 Hooper Bay Fire (DR-1666)

On August 3, 2006 a fire started in the western Alaskan community of Hooper Bay. The fire continued through the next day and resulted in the destruction of the community's elementary school, high school, school support facilities, community store, and 14 homes – nearly 10% of the entire community. Multiple fire response crews from neighboring communities and from as far away as Nome battled the fire. The event was declared a State and Federal disaster (DR-

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1666). Challenges included community water contamination and air quality. Damage estimates exceeded \$10 million dollars (Figure 3.2.9).

Sleetmute Core Service Facility Fire, December 20, 2001

A fire destroyed the community building in Sleetmute (Figure 3.2.8). The building housed the clinic, Council Office, Village Public Safety Officer (VPSO) office, washeteria, and the TV equipment for the Alaska Rural Communication Service (ARCS) satellite station. State disaster funds were used to assist in the rebuilding and repair.

Figure 3.2.8 Sleetmute Community Fire



Figure 3.2.8 Location of 2001 fire that destroyed the tribal office, Village Public Safety Officer (VPSO) office, washeteria and the TV equipment for the ARCS satellite station in Sleetmute. DHS&EM photo.

Figure 3.2.9 Hooper Bay Fire



Figure 3.2.9 Structure fire in community wide fire in Hooper Bay, AK 2006. DHS&EM photo.

Tenakee Springs Fire, July 19, 1993

A community-wide fire destroyed 10 single family homes, the hotel, and electrical poles/power lines. State disaster funds were used to rebuild.

Diomedes Fire, September 20, 1991

A fire in the City of Diomedes destroyed the City electric plant, water treatment plant, and damaged the water storage tank. State disaster funds were used to replace and repair the damages.

Stebbins, April 9, 1990

A fire destroyed the high school in Stebbins and State disaster funds were used to rebuild the school with the stipulation the design emphasize safety and the mitigation of damage by fire or other hazards.

Nondalton, April 5, 1988

A fire destroyed the City Hall, fire station, and firefighting equipment. State disaster funds were used to replace the facility and equipment.

Gambell, August 31, 1985

A fire originating in the power plant owned by Alaska Village Electric Cooperative (AVEC) destroyed the plant, the adjacent tank farm and city shop, and six private residences and buildings. The State provided temporary housing, public, individual, and family assistance to replace uninsured losses. American Red Cross provided additional assistance to individuals and families.

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City and Borough of Juneau - Douglas

- March 9, 1911 - A fire destroyed sixteen buildings in the Douglas business district (Figure 3.2.10).
- October 10, 1926 - The eastern side of Douglas City, the Native village, and the small mining town of Treadwell were leveled by fire.
- February 23, 1937 - Fire destroyed a large part of Douglas City.



*Figure 3.2.10 Douglas after the fire, March 9, 1911.
Alaska State Library PCA 01-959.*

3.3 Snow Avalanches

3.3.1 Hazard Characteristics

A snow avalanche is a swift, downhill-moving snow mass. Their force potential varies, but large scale avalanches have leveled forests, killed wildlife, and buried entire communities. Many snow avalanches occur in Alaska every year. The exact number is undeterminable as most occur in unpopulated areas. Alaska leads the nation in avalanche accidents per capita and has experienced multiple fatalities due to this hazard. In the winter of 1999 and early 2000, unusually high snow precipitation from the Central Gulf Coast Storm fueled avalanches in Cordova, Valdez, Anchorage, Whittier, Cooper Landing, Moose Pass, Summit, Matanuska Susitna Valley, and Eklutna. Damages to these communities exceeded 11 million dollars resulting in the first presidentially declared avalanche disaster in U.S. history.

Forms of Avalanches

There are five distinct forms of avalanches in Alaska:

- Loose Snow
- Slab
- CorniceCollapse
- Ice Falls
- Slush

Loose Snow Avalanches

Loose snow avalanches, also known as point releases, begin as small amounts of snow which quickly grow larger as they move downhill. They typically occur on slopes greater than 35 degrees, leaving behind an inverted V-shaped scar. Common causes are snow overloading (common during or just after a snowstorm), vibration, or warming. This type of avalanche typically carries small amounts of powder snow and virtually no other debris. However a loose snow avalanche may trigger a larger slab avalanche.

Slab Avalanches

A Slab avalanche begins as a block of cohesive snow breaking away from the rest of the snowpack and running quickly downhill. Size varies from that of a car to an entire hillside. It is the most destructive type of avalanche and human encounters are often fatal.

Cornice Collapse

A cornice is an overhanging snow mass formed by wind blowing snow over a ridge crest or the sides of a gully. The cornice collapses and often triggers a snow avalanche when it hits the snow pack.

Ice Fall Avalanches

Ice fall avalanches are composed of broken glacier ice. They are unrelated to temperature, time of day, or other typical snow avalanche factors.

Slush Avalanches

Slush avalanches are associated with smooth and impermeable surfaces, such as rock. As the overlying snowpack releases water, pressure builds between the snow and the rock. Eventually the water pressure overcomes friction and the slushy snow runs downhill reaching speeds over 40 miles per hour.

Avalanche Terrain Factors

Terrain factors influencing avalanches are slope angle, slope aspect and topography. Other factors include slope shape, vegetation cover, and elevation. Avalanches usually occur on slopes greater than 25 degrees and less than 60 degrees. The snowpack tends to remain in place on slopes less than 25 degrees, while slopes greater than 60 degrees very rarely accumulate enough snow to create avalanches.

Avalanche Path

The local terrain features determine an avalanche's path. The path is comprised of three parts:

- **Starting Zone**

The starting zone is where the avalanche forms and moves downhill. It's generally near the top of a steep slope between 25 and 50 degrees. This area is characterized by the accumulation and rapid acceleration of the avalanche.

- **Track**

The track has milder slopes, between 15 and 30 degrees, but this is where the snow avalanche will reach maximum velocity and mass. Tracks can branch onto adjacent slopes, creating successive avalanches. The track is characterized by little or no avalanche debris.

- **Run-out Zone**

The run-out zone is a flatter area (around 5° to 15°) where the avalanche slows down and deposits debris.

The impact pressure determines the amount of damage caused by a snow avalanche. The impact pressure is related to the density, volume (mass), and velocity of the avalanche.

3.3.2 Avalanche History

Alaska has a long history of snow avalanches. Many communities are at risk to avalanches as are all major highways and the Alaska railroad (Figure 3.3.5).

In late 1999 and early 2000 avalanches occurred in Cordova, Valdez, Anchorage, Whittier, Cooper Landing, Moose Pass, Summit, Matanuska Susitna Valley, and Eklutna from the Central Gulf Coast Storm.

Cordova

In 2000, the City of Cordova became part of a federally declared avalanche disaster attributed to the Central Gulf Coast Storm. Multiple avalanches reached within the City and damaged homes, buildings, and infrastructure (Figure 3.3.1). Entire areas of Cordova were evacuated as avalanches continued threatening the City.

Juneau

Juneau, the State's capital city, is considered to be one of the largest urban avalanche hazard areas in the nation. In the past 100 years, more than 70 buildings within 10 miles of downtown have been damaged or destroyed by avalanches. Juneau has over 62 buildings in avalanche zones, including one hotel, a boat harbor, and the only East/West expressway (Figure 3.3.4). One large avalanche has the potential to dissect the community, leaving 50% of the population isolated from their only hospital and airport.

On April 16, 2008, at 3:30 a.m., an avalanche occurred 26 miles southeast of the City of Juneau, destroying or damaging approximately 1.5 miles of electrical transmission lines supplying roughly 85% of the City and Borough's power, including Douglas Island (Figures 3.3.3 and 3.3.4). The damaged power lines connect the City of Juneau with the Snettisham Hydroelectric project, operated by Alaska Electric Light and Power (AEL&P). In response, AEL&P activated its more expensive diesel generator backup power system. Power rates rose five-fold from 11 cents/KW hour to approximately 55 cents/KW hour. The City and Borough of Juneau (CBJ) declared a local disaster emergency, and forwarded a request for State assistance to alleviate the estimated \$25 million dollar financial impact.

Figure 3.3.1 House Damaged by Avalanche in Cordova



Figure 3.3.1 House damaged by avalanche during 2000 declared disaster in Cordova and other areas.

DHS&EM photo.

Figure 3.3.2 Natural Avalanche Buries Thane Road



Figure 3.3.2 Natural Avalanche Buries Thane Road Photo Courtesy of Mike Janes of Alaska Avalanche Specialists on City and Borough of Juneau Emergency Management website. Used with photographer's permission.

Figure 3.3.3 Damaged Electrical Tower



Figure 3.3.3 Avalanche damage to power lines and infrastructure. Photo from Alaska Electric Light and Power (AEL&P) / DHS&EM.

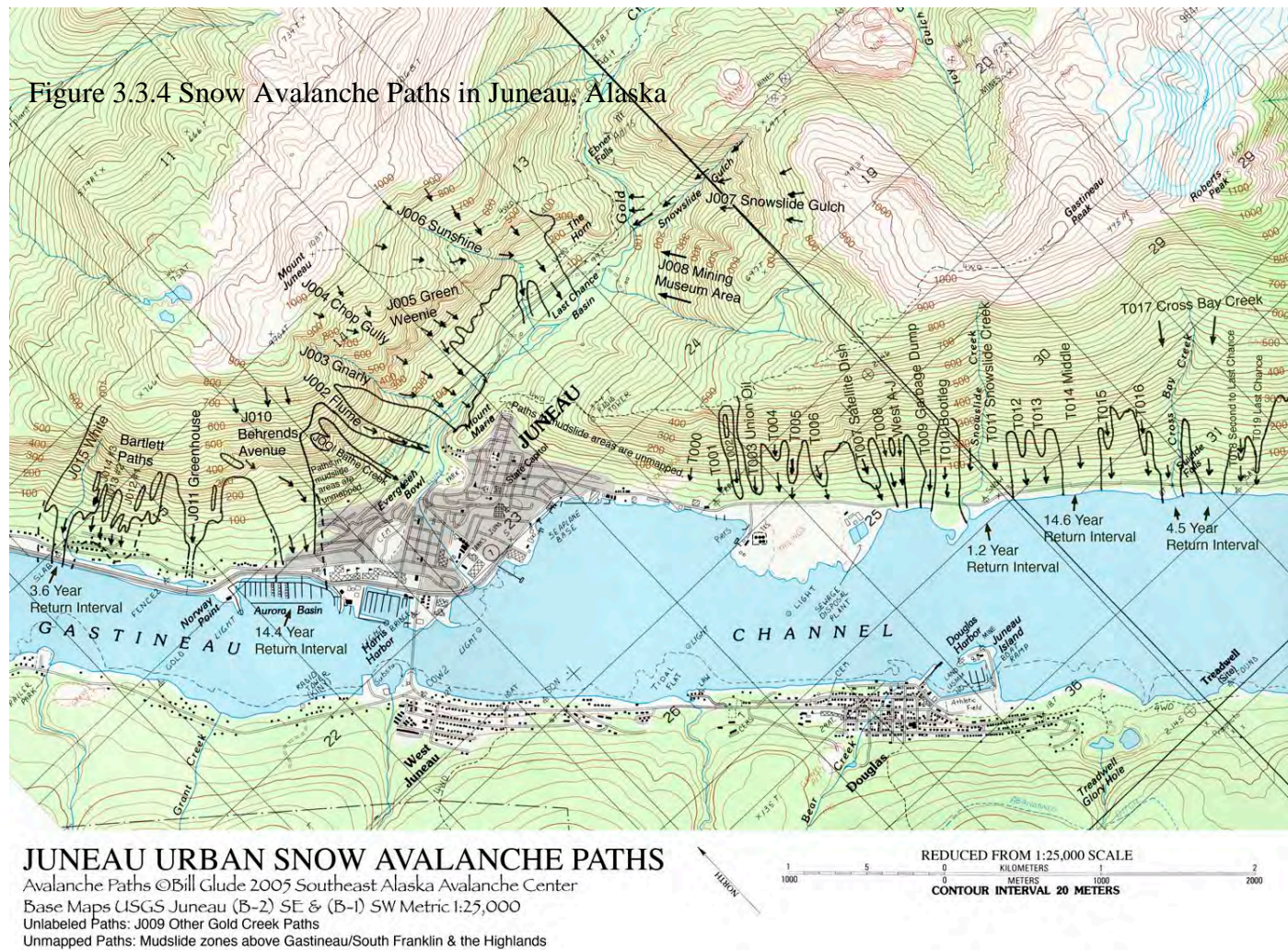
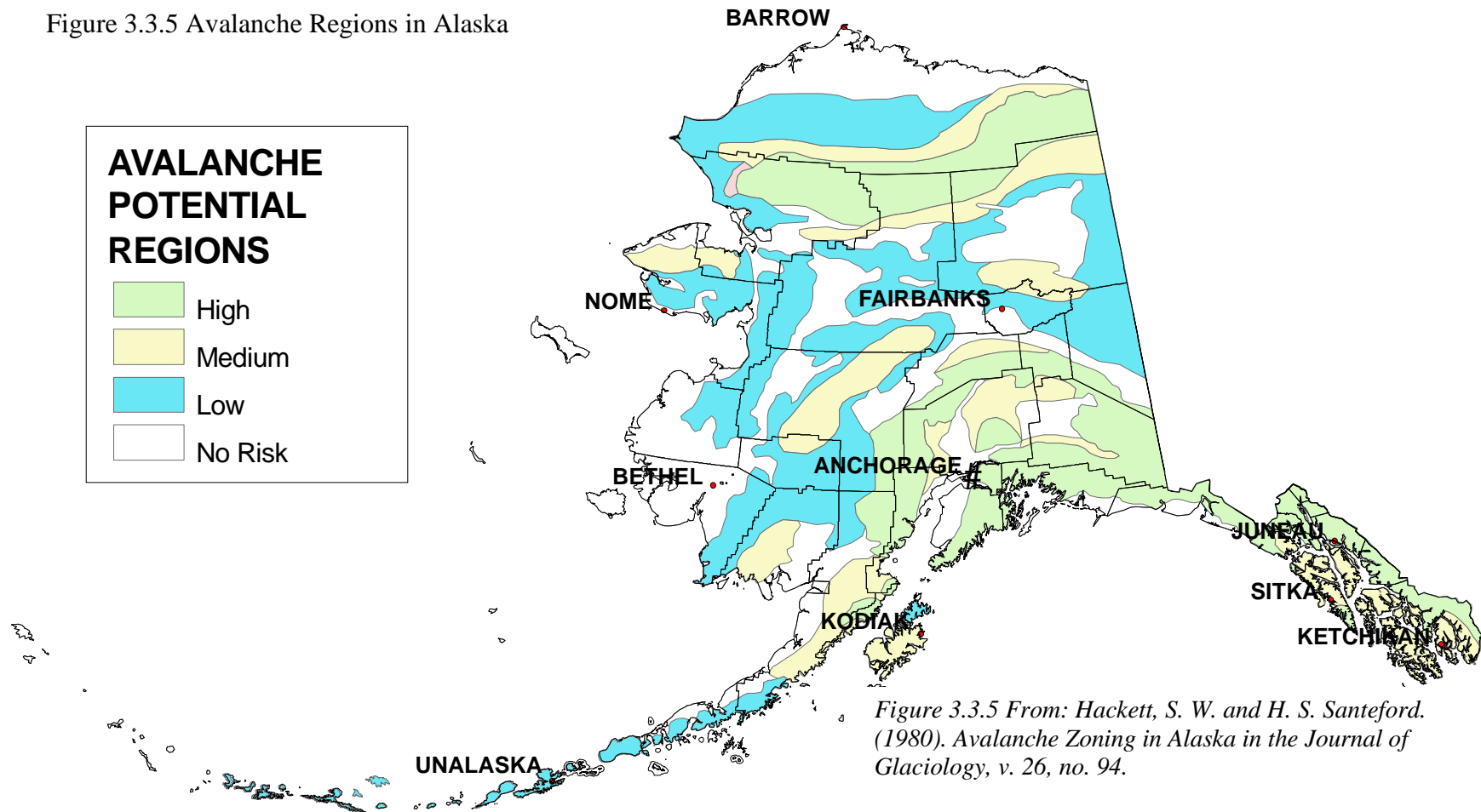


Figure 3.3.4 Map illustrating Juneau Urban Snow Avalanche Paths, 2005 from the City and Borough of Juneau.

Figure 3.3.5 Avalanche Regions in Alaska



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3.4 Volcanoes

3.4.1 Hazard Characteristics

The Alaskan landscape continues to be profoundly shaped by volcanic processes. An average of one to two eruptions per year occurs in Alaska. During the last 2 million years, more than 130 volcanoes or volcanic fields have been active within the State. Of these, more than 50 are considered by Alaska Volcano Observatory (AVO) scientists to be active since about the year 1760 (Figure 3.4.8). These young volcanoes stretch primarily from the Wrangell Mountains to the far Western Aleutians. In 1912, the largest eruption of the 20th Century occurred at Novarupta and Mount Katmai, located in what is now Katmai National Park and Preserve on the Alaska Peninsula. Volcanoes in Alaska have the potential to permanently displace entire communities and disrupt all modes of travel.

Forms of Volcanoes

Volcanoes display a wide variety of shapes, sizes, and behavior. However, they are commonly classified among three main types: cinder cone, composite (stratovolcanoes or stratocones), and shield.

A cinder cone is the simplest type of volcano. They are formed of cooled lava ejected from a single vent. As the lava is blown into the air, it breaks into small fragments and solidifies into cinders and bombs around the vent to form a circular or oval cone. Most cinder cones have a bowl-shaped crater at the summit and rise rarely more than a thousand feet above ground. Cinder cones may form flank vents on the sides of larger volcanoes, such as Aniakhak and Okmok volcanoes.

Shield volcanoes are formed of fluid mafic lava flows, accumulating into a broad, gently sloping volcano. Common examples are volcanoes in the Hawaiian Islands. In Alaska, Wrangell, Yunaska, and Westdahl are examples of shield volcanoes.

Most Alaskan volcanoes are of composite type including those in Cook Inlet: Iliamna, Redoubt, Spurr (**IRS**), and Augustine. Composite volcanoes, sometimes called stratovolcanoes, are typically steep-sided, symmetrical cones of large dimension built by layers of lava, ash, and cinders. Composite volcanoes tend to erupt explosively because of the viscous nature of magmas within them. A few past eruptions have been large enough to completely deplete their magma chamber and collapse, forming calderas. These are among the largest eruptions known.

Volcano Age and Activity

Volcanoes are also categorized according to the age of their eruptive activity. Active volcanoes are those having recently erupted, are currently erupting, or show signs of unrest, such as unusual earthquake activity or significant new gas emissions. Dormant volcanoes are those not currently active, but could become so in the future. Extinct volcanoes are those considered unlikely to erupt again. However, extinct volcanoes may become active in the future.

Volcano Hazards

Volcanic Ash, Bombs and Ash Clouds

Volcanic ash consists of very fine fragments of volcanic rock ejected into the air by an explosive eruption. The fragments in the ash cloud vary in size and the heavier particles fall near the source.

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The weight of significant accumulations may collapse structures.

Large ejected rock fragments called bombs are also a significant hazard to structures near the volcano. Further away, the primary hazards are the disruption of infrastructure and transportation. Chronic exposure to ash may be a significant public health hazard. Ash ejected high into the atmosphere drifts downwind presenting a significant hazard to aircraft and maritime vessels. An in-flight encounter with a volcanic ash cloud may damage or disable aircraft systems to include the engines.

Okmok Volcano on Umnak Island in the Aleutian Islands erupted explosively and without warning, on July 12, 2008, sending ash to 50,000 feet (Figure 3.4.1). During successive eruptions over five and a half weeks, the residents of Nikolski were stranded. In Unalaska, (65 miles northeast) outbound flights were grounded and inbound flights were diverted elsewhere. Floating rafts of scoria and airborne ash prompted the US Coast Guard to close Umnak Pass to marine traffic, and the Bering Pacific cattle ranch on the flanks of Okmok was periodically evacuated, once during noon-time darkness caused by heavy ash fall. The 2008 eruption was by far the largest at Okmok since the early-19th century.

Figure 3.4.1 Eruption Plume from Okmok Volcano



Figure 3.4.1 Eruption plume from Okmok volcano, August 3 2008. This photo was taken from Fort Glenn, Bering Pacific Ranch, on the eastern flanks of the volcano. Image courtesy of the AVO/UAF-GI.

Pyroclastic Flows and Surges

Pyroclastic flows are turbulent avalanches of hot gases and rock (tephra) reaching speeds of 450 mph and temperatures in excess of 1,800 Fahrenheit. They may flow directly from a volcano or from the collapse of an eruption column. Pyroclastic flows incinerate and smother everything in their path and are among the most hazardous of volcanic phenomena. Pyroclastic flows and surges tend to follow glacier valleys and other low-lying terrain and may travel over topographic features such as lakes, ridges, and hills.

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Lava Domes

Lava domes are remnants of slow viscous lava flows. Their chemistry varies although the lava typically has high silica content. The domes often appear as a pile of unstable rubble. Volcanic domes commonly occupy summit craters or the flanks of large composite volcanoes. The Novarupta Dome measures 800 feet across and 200 feet high and was formed at the end of the 1912 eruption of Katmai Volcano, Alaska (Figure 3.4.2). The 2009 eruption of Mount Redoubt in Cook Inlet produced many lava domes, the largest one measuring 3,300 feet in length, 1,640 feet in maximum width, and at least 650 feet thick. The total volume of this 2009 Redoubt lava dome would fill more than 500 Conoco-Philips buildings, at 300 feet, the tallest structure in Anchorage.



Figure 3.4.2 Novarupta in the Valley of Ten Thousand Smokes, Katmai National Park and Preserve. 1999. Photo credit Jennifer N. Adleman.

Volcanic Gases / Acidification

Volcanic gases are corrosive acidic mists which irritate eyes and respiratory systems. They consist mostly of water vapor, carbon dioxide, sulfur dioxide, hydrogen sulfide, and chlorine compounds, but may include other substances.

Between November 2004 and early May 2005, activity within Chiginagak volcano melted ice and snow on the summit, filling the crater with acidified water. In early May 2005, an eruption sent the acidic water and sulfurous debris 17 miles downslope and into Mother Goose Lake, headwaters of the King Salmon River. The flow killed all vegetation in its path and all aquatic life in the lake, including the annual salmon run (Figure 3.4.3). The few fishing lodges and guide services in the area lost revenue. Scientists from various government agencies studied the event and the Alaska Volcano Observatory deployed a data-logging seismometer for about one month and recorded no significant seismicity.

Lateral Blasts

Lateral blasts are eruptions radiating primarily outward from a volcano, as opposed to upward. The shock wave flattens forests and structures while the super-heated blast debris and gasses disperse over the local area, incinerating and burying everything in their path. Lateral blasts travel at speeds approaching 370 miles per hour and often



Figure 3.4.3 Orange colloidal iron-oxides along the shore of Mother Goose Lake, August 2005. Image courtesy of the Paul Tickner on AVO website.

trigger pyroclastic flows and lahars. The deadly eruption of Mt. Saint Helens on May 18, 1980 in Washington State was a lateral blast.

Debris Avalanches

Debris avalanches often occur without warning and travel quickly. The mass moves as a fluid and can attain speeds of 100 m/s. There is usually abundant moisture around the fragments derived from ground water. Their runout may extend many miles. The eruption of Mt. Saint Helens began as the largest debris avalanche in recorded history.

Lahars (mudflows) and Debris Flows

Lahar is an Indonesian term describing a hot or cold mixture of water and rock fragments flowing down the slopes of a volcano and (or) river valleys. When moving, a lahar looks like a mass of wet concrete consisting of rock debris ranging in size from clay to boulders more than 10 m in diameter. Lahars vary in size and speed. Small lahars less than a few meters wide and several centimeters deep may flow a few meters per second. Large lahars hundreds of meters wide and tens of meters deep may flow several tens of meters per second--much too fast for people to outrun. They form in a variety of ways but are commonly associated with volcanic eruptions (Figures 3.4.4 and 3.4.5). However, lahars may form from intense rainfall on loose volcanic rock deposits, breakout of a lake dammed by volcanic deposits, or water saturated debris avalanches.

Lahars are common in Alaska due to the abundance of snow and ice present on the State's volcanoes.



Figure 3.4.4 April 4, 2009 lahar/flood features in Drift River valley. Note prominent tree scars, and diffuse mud line that is up to 1 meter higher than the tree scars. Deposit at base of trees is the April 4 lahar deposit. AVO/USGS image.

Figure 3.4.5 USGS Volcano Hazards

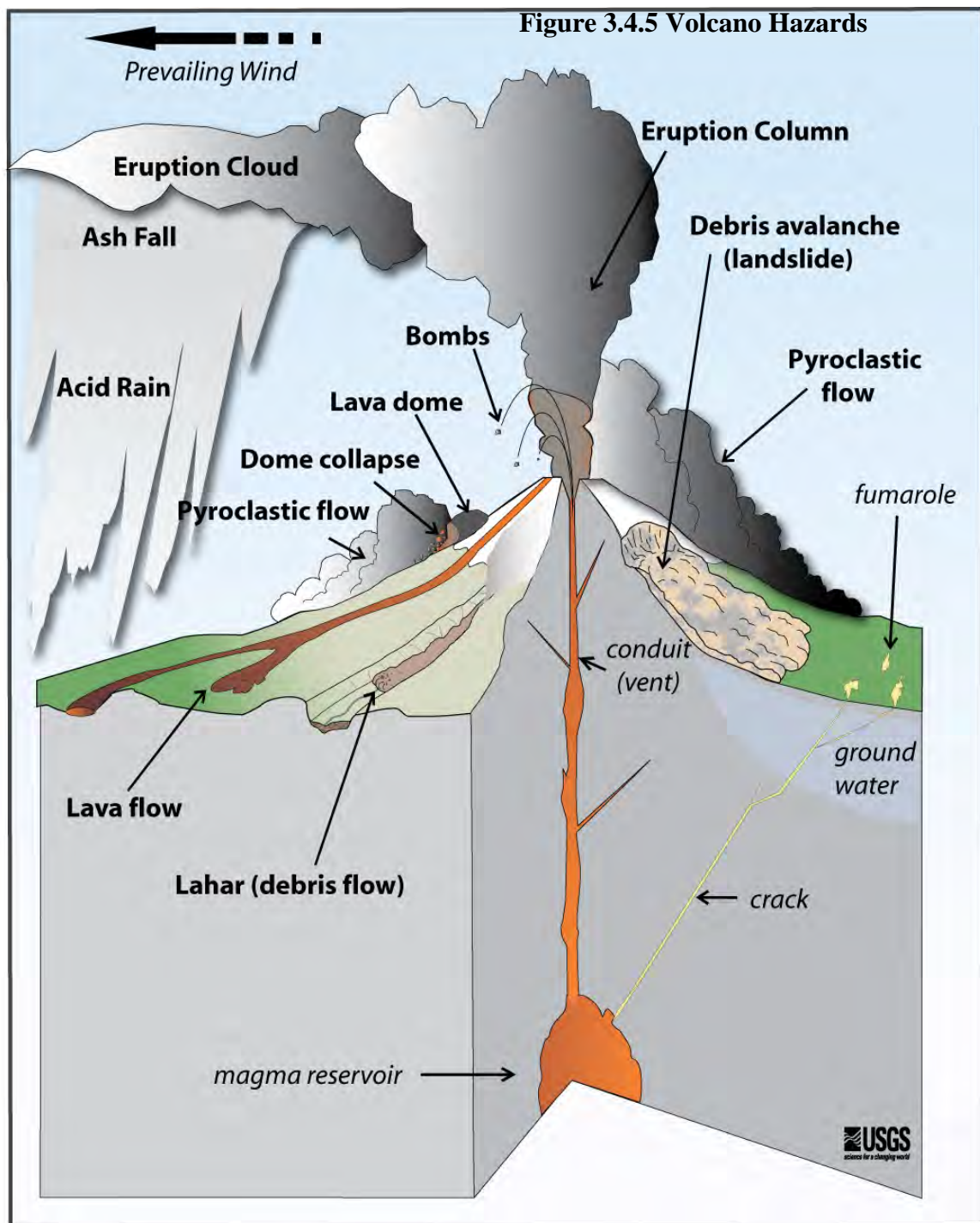


Figure 3.4.5 USGS Volcano Hazards

3.4.2 Volcanic Eruption History

The largest volcanic eruption of the 20th century occurred at Novarupta Volcano in June 1912. It generated an ash cloud extending over thousands of miles during the three-day event (Figure 3.4.7). Within four hours of the eruption, the ash reached Kodiak, and paralyzed the city within a few hours. Many structures eventually collapsed and some buildings were destroyed by ash avalanches. Ash tainted the drinking water and the air. Entire villages on the Alaska Peninsula evacuated including Katmai and Savonoski. The volcanic ash and acid rain also killed animal and plant life. Many animals starved to death.



Figure 3.4.7 Novarupta ash fall compared to that from recent Alaskan eruptions. From USGS FS 075-98.

The amount of ash fall from this eruption was significantly greater than the recent eruptions of Redoubt, Spurr, and Augustine Volcanoes (Figure 3.4.6). Fourteen earthquakes of magnitude six and seven were associated with this event. An event of similar magnitude in the future is possible at a number of volcanoes along the Aleutian arc.



Figure 3.4.6 Volcanic ash fell onto Kodiak Island, ~ 100 mi east of the origin of the 1912 eruption. Shown here, decades later, this ash fall remains as an ~1 ½ foot thick unit under just a few centimeters of post-1912 organics. USGS photo.

Over the last few hundred years, an average of one to two eruptions occur each year in Alaska. Some eruptions are far to the west in the Aleutian Islands and have a low impact. Eruptions near or within Cook Inlet have the potential to damage a significant portion of the State's population and infrastructure.

Examples include the recent eruptions of Augustine Volcano in 1986 and again in 2005-6. During both eruptions repeated ash plumes rose to 30,000 feet above sea level or higher, disrupting air traffic, and dusting Cook Inlet communities with ash. A lava dome formed in the summit crater towards the end of each of these eruptions. A concern during both eruptions was the possibility of a flank collapse and debris avalanche into Cook Inlet. Such an event could trigger a tsunami along lower Cook Inlet, as happened in 1883.

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Redoubt Volcano erupted in 1989-1990 and again in 2009 (Figure 3.4.10). During both eruptions, voluminous lahars, or mudflows temporarily closed the Drift River Oil Terminal 27 miles downstream. During the 1989 eruption, a Boeing 747 aircraft temporarily lost power in all four engines when it entered the Redoubt ash plume over the Talkeetna Mountains. Fortunately, the flight crew was able to restart their engines about 4,000 feet above ground and the plane landed safely in Anchorage.

In Alaska, disruption of air transportation is a major issue with volcanoes due to the numerous flight routes across the North Pacific downwind of historically active volcanoes (Figure 3.4.8).

Figure 3.4.8 Active Volcanoes and Flight Routes in Alaska

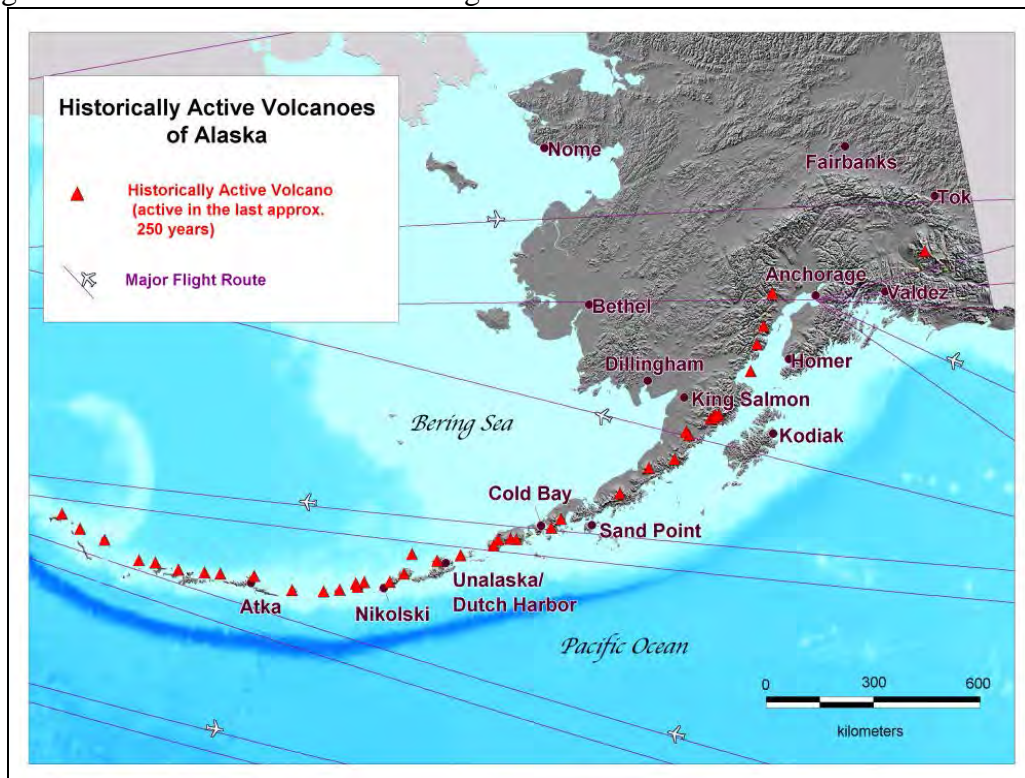


Figure 3.4.8 Alaska's active volcanoes and a schematic depiction of selected major air routes across Alaska. Map courtesy of USGS and AVO.

Volcanoes in Alaska are tightly spaced and their deposits often overlap (Figure 3.4.9). Small communities along the Alaska Peninsula and Aleutian Islands are at risk to volcanic eruptions for extended periods of time. Seasonal and subsistence lifestyles may be severely impacted due to periodic eruptions in these regions.

Figure 3.4.9 Overlapping Volcanic Deposits



Figure 3.4.9 Background left is Aniakchak Caldera, right is Mt. Griggs. Mid-ground left are Tertiary volcanics from prior volcanic peaks of the region. Mid ground right is the altered rim of Black Peak caldera and foreground are the present day volcanic domes within Black Peak caldera. Location is inside Black Peak caldera on the Alaska Peninsula near Port Heiden. Photo credit Jennifer N, Adleman.

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Figure 3.4.10 Redoubt Volcano Preliminary Hazard Assessment

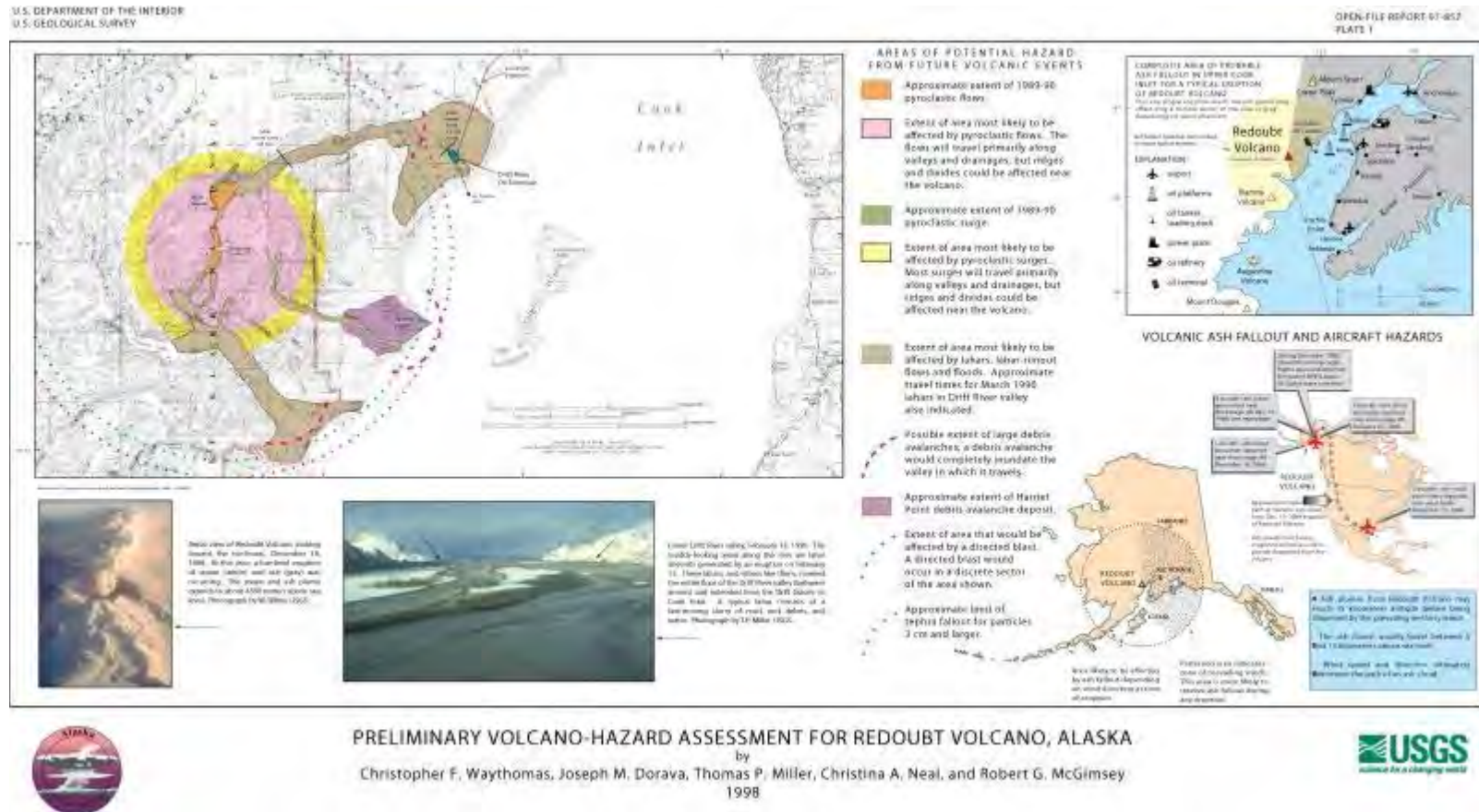


Figure 3.4.10 Plate 1 from the Redoubt preliminary volcano--hazard assessment, as an 11x17 sheet instead of a full map-sized plate. Source: Waythomas, C. F., Dorava, J. M., Miller, T. P., Neal, C. A., and McGimsey, R. G., 1998, Preliminary volcano-hazard assessment for Redoubt Volcano, Alaska: U.S. Geological Survey Open-File Report OF 98-0857, 40 p. AVO/USGS image.

3.5 Earthquakes

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 13 years between events. Earthquakes have killed over 130 people in Alaska during the past 60 years, demonstrating the potential for catastrophic losses. Earthquake caused tsunamis are covered in Section 3.6.

3.5.1 Hazard Characteristics

An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the epicenter. Earthquakes usually occur without warning and after only a few seconds can cause massive damage and extensive casualties. The immediately perceived effect of earthquakes is ground motion.

The dangers associated with earthquakes include ground shaking, surface faulting, ground settlement, snow and rock avalanches, tsunamis, and seiches. 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.

Ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. An earthquake sends seismic waves through the earth's interior (body waves) and surface waves along the earth's surface. The first jolt felt during an earthquake is the push-pull body wave, or P (primary) wave. P waves are compression waves moving through the earth. The second wave felt is another type of body wave, called an S (secondary) wave. S waves, also known as shear waves, are slower than P waves and are similar in character to sound waves. The rolling motion felt along the surface is an R or Raleigh wave. R waves move continuously forward, although the individual particles move in an elliptical path, similar to water waves. L (Love) waves, like R waves, are continuously forward travelling surface waves, but the individual particles move side to side, perpendicular to the direction of travel. Surface waves are responsible for much of the ground motion experienced during an earthquake.

Magnitude and Intensity measure different characteristics of earthquakes. Magnitude measures the energy released at the source of the earthquake. Magnitude is determined from measurements on seismographs. Intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, human structures, and the natural environment and is summarized in the Modified Mercalli Scale (Table 3.5.1).

In addition to ground motion, other earthquake generated hazards are:

- ☐ **Surface Faulting** is the differential ground movement of a fault at the earth's surface. Displacement along faults varies but may be significant (e.g., over 20 feet), as may the length of the surface rupture (e.g., over 200 miles). Surface faulting may severely damage linear structures, including railways, highways, pipelines, and tunnels.
- ☐ **Liquefaction** result from seismic waves passing through saturated granular soil,

distorting its granular structure, and collapsing the empty spaces between granules. The soil will deform and behave like a fluid. A few visual indicators are:

1. Lateral spread, horizontal movements commonly ten to fifteen feet, possibly reaching over one hundred feet in length.
2. Debris flows, massive flows of soil, typically hundreds of feet, possibly reaching over twelve miles in length.
3. Loss of bearing strength, warped and cracked foundations or tipped structures.

☐ **Landslides** are often induced by ground shaking. The most common earthquake-induced landslides are rock falls, rockslides, and soil slides.

The severity of an earthquake is expressed in terms of intensity and magnitude. Intensity is determined from the effects on people and their environment. The intensity generally increases with the amount of energy released and decreases with distance from the epicenter, which is the point on the earth's surface directly above the origin, (Focus). The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale. As shown in Table 3.5.1, the MMI Scale loses strength consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location. PGA can be measured as acceleration due to gravity (g) (MMI 2012).

Magnitude (M) is the measure of the earthquake strength. It is related to the amount of seismic energy released at the earthquake's hypocenter, the actual location of the energy released inside the earth. It is based on the amplitude of the earthquake waves recorded on instruments, known as the Richter magnitude test scales, which have a common calibration (Table 3.5.1).

Table 3.5.1 Modified Mercalli Intensity and Magnitude

| Scale | | Description |
|-----------------|------------------|--|
| Mercalli | Magnitude | |
| I | 1.0 - 3.0 | Not felt except by a very few under especially favorable conditions. |
| II | 3.0 - 3.9 | Felt only by a few persons at rest, especially on upper floors of buildings. |
| III | | Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated. |
| IV | 4.0 - 4.9 | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. |
| V | | Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop. |
| VI | 5.0 - 5.9 | Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. |
| VII | | Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. |
| VIII | 6.0 - 6.9 | Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. |
| IX | | Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations. |
| VIII or higher | 7.0 and higher | X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly. XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air. |

Table 3.5.1 Relationship of the Levels of Modified Mercalli Intensity and Magnitude
The table gives intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes. Source: USGS

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Figure 3.5.1

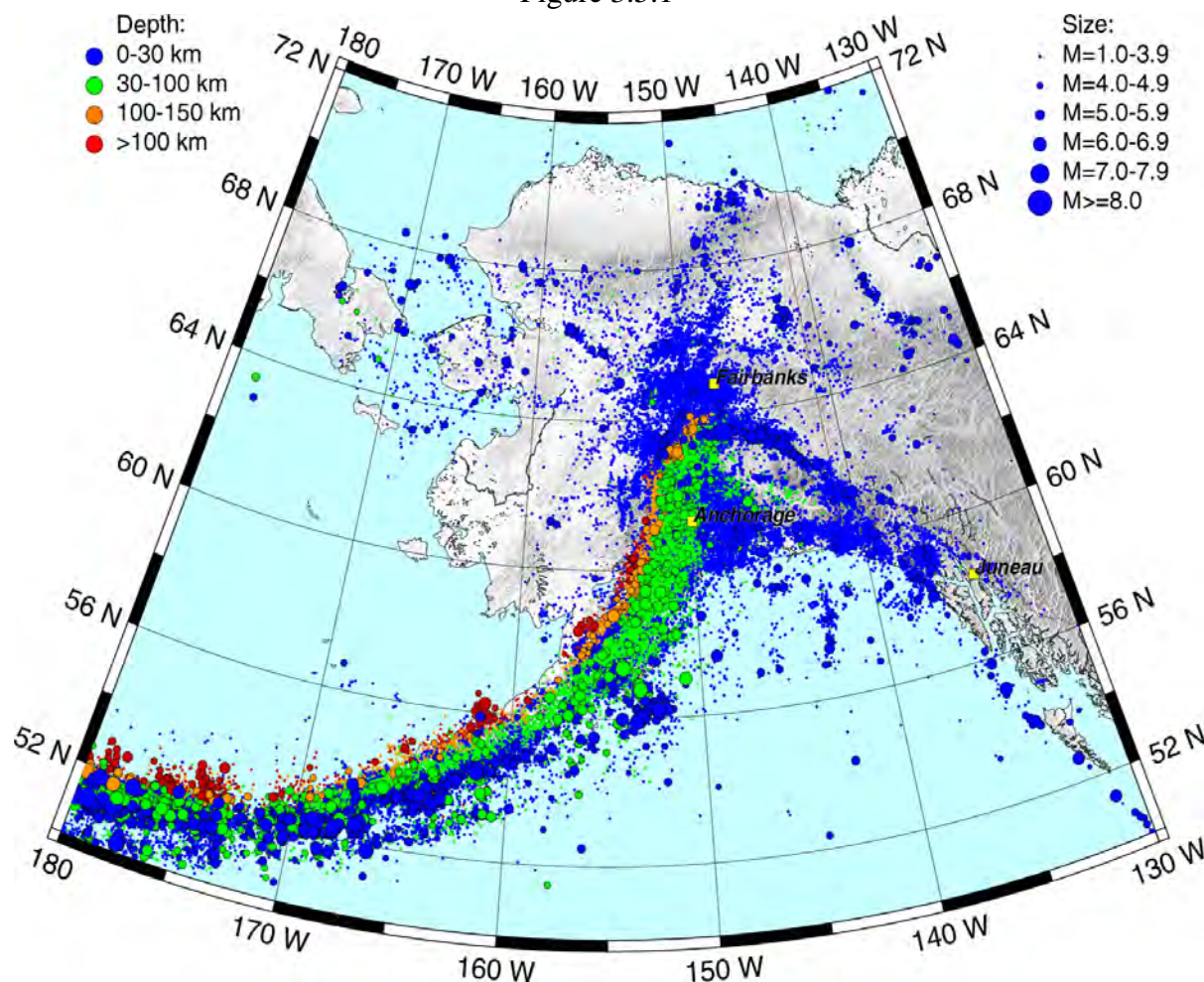


Figure 3.5.1 Seismicity in Alaska regions for 2010-2013. Symbols are color-coded and scaled according to the depth and magnitude (size) of the earthquakes, respectively. Total number of events = 1120. From the Alaska Earthquake Information Center (AEIC).

3.5.2 Seismic History in Alaska

Earthquake risk is high throughout much of Alaska. Seismicity from 2010 to 2013 (Figure 3.5.1) shows the vast majority of earthquakes occur in the southern part of Alaska and throughout the Aleutian Islands. However, earthquakes up to magnitude 7.5- 8.0 can occur anywhere in the State. The USGS map *Earthquakes in Alaska* (Figure 3.5.5) shows the overall tectonic setting in Alaska producing earthquakes. The Pacific plate (darker blue) is sliding northwestward past southeastern Alaska and then dives beneath the North American plate (light blue, green, and brown) in southern Alaska, the Alaska Peninsula, and the Aleutian Islands. Most earthquakes are produced where these two plates come into contact and slide past each other. Major earthquakes also occur throughout much of interior Alaska as a result of collision of a piece of crust with the southern margin.

Descriptions of the significant or notable earthquakes in Alaska can be accessed via the Alaska Earthquake Information Center (AEIC) and USGS. A few of these significant events are further described below.

Alaska Earthquake Information Center

<http://www.aeic.alaska.edu/>

USGS Earthquake Hazard Program Largest Earthquakes

http://earthquake.usgs.gov/earthquakes/states/10_largest_us.php

West of Anchor Point 2016

A magnitude 7.1 earthquake 53 miles west of Anchor Point and 161 miles south west of Anchorage struck January 24 at 1:30 am local time. The USGS reported an intermediate depth earthquake from strike slip faulting within the subducted lithosphere of the Pacific plate. Intermediate depth earthquakes have focal depths between 70 and 300 km and indicate movement within subducted plates rather than where plates meet. Thus, this earthquake created less damage than what would normally be associated with a shallow M 7.1. However, it did manage to create several power outages from Anchor Point to Willow and open a fissure in the Kalifornsky Beach Road in Kasilof. In Kenai, a ruptured gas main was responsible for two homes spontaneously, sending their roofs to a height of 40 feet. Two other nearby homes burned down. In Anchorage, the Anchorage School District's West High School and Romig Middle School sustained structural and non-structural damage. Specifically, the Romig Middle School Gymnasium was closed indefinitely due to a compromised roof and the shared library with West High School was closed for a damaged ceiling system.

The Denali Earthquake 2002

A powerful magnitude 7.9 earthquake struck Alaska on November 3, 2002, rupturing the Earth's surface for 209 miles along the Susitna Glacier, Denali, and Totschunda Faults. Striking a sparsely populated region, it caused thousands of landslides but little structural damage and no deaths. Although the Denali Fault shifted about 20 feet beneath the Trans-Alaska Oil Pipeline, the pipeline did not break, averting a major economic and environmental disaster (Figure 3.5.2). This was largely the result of stringent design specifications based upon geologic studies performed 30 years earlier.

According to the USGS, the Trans-Alaska Oil Pipeline transports about 17% of the domestic oil supply for the United States. Where it crosses the Denali Fault, the pipeline is supported by Teflon coated beams allowing it to flex during lateral ground movement.

Figure 3.5.2 Trans Alaska Oil Pipeline Teflon Shoes



Figure 3.5.2 To accommodate the projected fault movement and intense earthquake shaking from a magnitude 8 earthquake, the zigzagging Trans-Alaska Oil Pipeline, where it crosses the Denali Fault, is supported on Teflon shoes that are free to slide on long horizontal steel beams. USGS photo.

The Great Alaskan Earthquake, Good Friday 1964

The largest recorded earthquake in North American history occurred at the east end of the Alaska-Aleutian seismic zone in on Good Friday in 1964. That quake was a magnitude 9.2, lasting roughly 5 minutes. Effects were heavy in many towns, including Anchorage, Chitina, Glennallen, Homer, Hope, Kasilof, Kenai, Kodiak, Moose Pass, Portage, Seldovia, Seward, Sterling, Valdez, Wasilla, and Whittier. It caused significant ground deformation and the triggering of landslides and tsunamis resulting in major damage throughout the region. This great earthquake and ensuing tsunamis took 128 lives (tsunamis 113, earthquake 15), and caused about \$311 million in property loss. In Alaska's 1964 Good Friday 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 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.

Andreanof Islands 1957

A magnitude 8.6 earthquake in Andreanof Islands occurred in 1957. This great earthquake destroyed two bridges on Adak Island, damaged houses, and left a 4.5 meter crack in a road. On Umnak Island, part of a dock was destroyed, and Mount Vsevidof erupted after being dormant for 200 years. Further, this shock generated a 15 meter tsunami smashing into the coastline at Scotch Cap and an 8 meter tsunami washed away many buildings and damaged oil lines extensively at Sand Bay. This tsunami continued to Hawai'i, where it destroyed two villages and inflicted about \$5 million in property damage on Oahu and Kauai Islands. The tsunami also caused minor damage in San Diego Bay, California before traveling to such distant countries as Chile, El Salvador, Japan, and other areas in the Pacific region. More than 300 aftershocks were reported along the southern edge of the Aleutians, from Unimak Island to Amchitka Pass.

The Castle Mountain Fault

The Castle Mountain fault is one of several major east-northeast-striking faults in southern Alaska, and it is the one with historic seismicity and Holocene surface faulting. It is approximately 200 km long, and is one of the longest structures in the Cook Inlet basin (Figure 3.5.3). It is an active fault that comes to the earth's surface in the Anchorage region, and the eastern part of the fault produced light to moderate magnitude 5.7 and 4.6 earthquakes in 1983 and 1996. This area is of concern, as the Parks Highway and Alaska Railroad cross the fault, and a great deal of residential development continues to occur along the fault.

Figure 3.5.3 Castle Mountain Fault

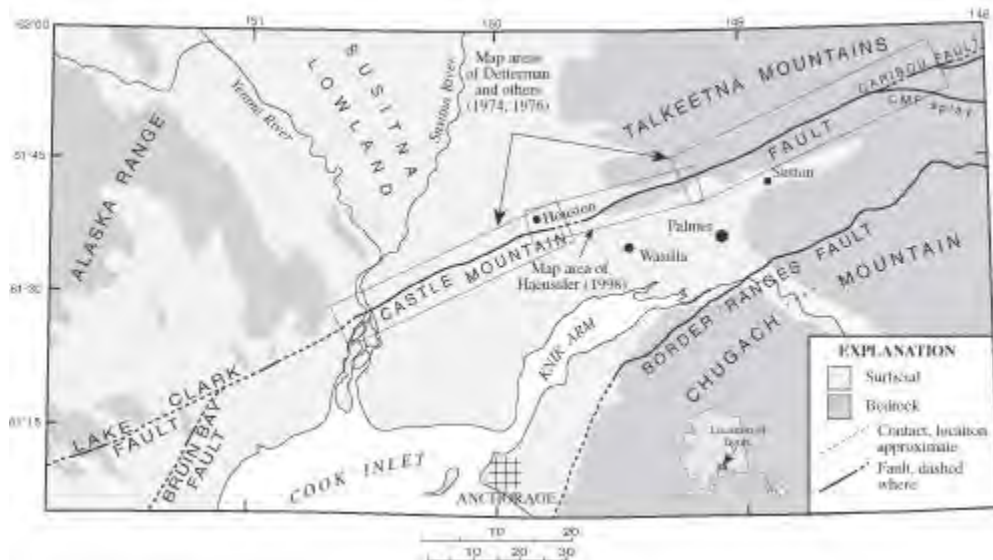


Figure 3.5.3 Location of Castle Mountain fault in south central Alaska, and previous USGS maps along the fault from the USGS.

Statewide

Earthquakes have affected other parts of the State. Since the early 1900's, three magnitude 7+ earthquakes have occurred within 50 miles of Fairbanks. Southeast Alaska also receives earthquakes from Queen Charlotte-Fairweather fault movement including a magnitude 8.1 earthquake in 1949 and a magnitude 7.9 in 1958 which triggered a giant landslide-generated

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tsunami in Lituya Bay. Areas at greatest risk from earthquakes along this fault zone are communities along the outer coast of Southeast Alaska (Figures 3.5.4 and 3.5.5).

Figure 3.5.4 Map of Quaternary Faults

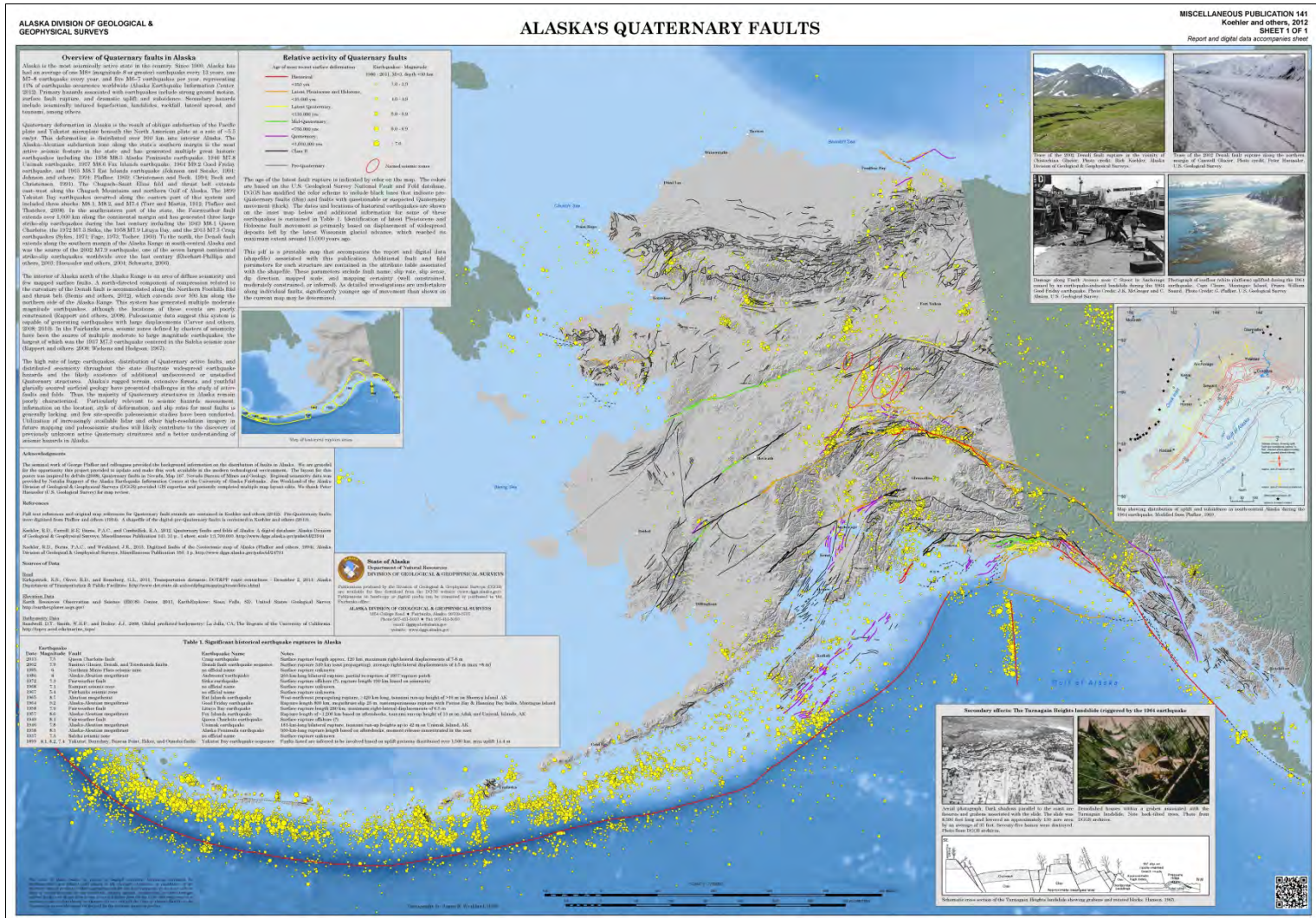


Figure 3.5.4 Map of Quaternary Faults from the Alaska Division of Geological and Geophysical Surveys, 2013.

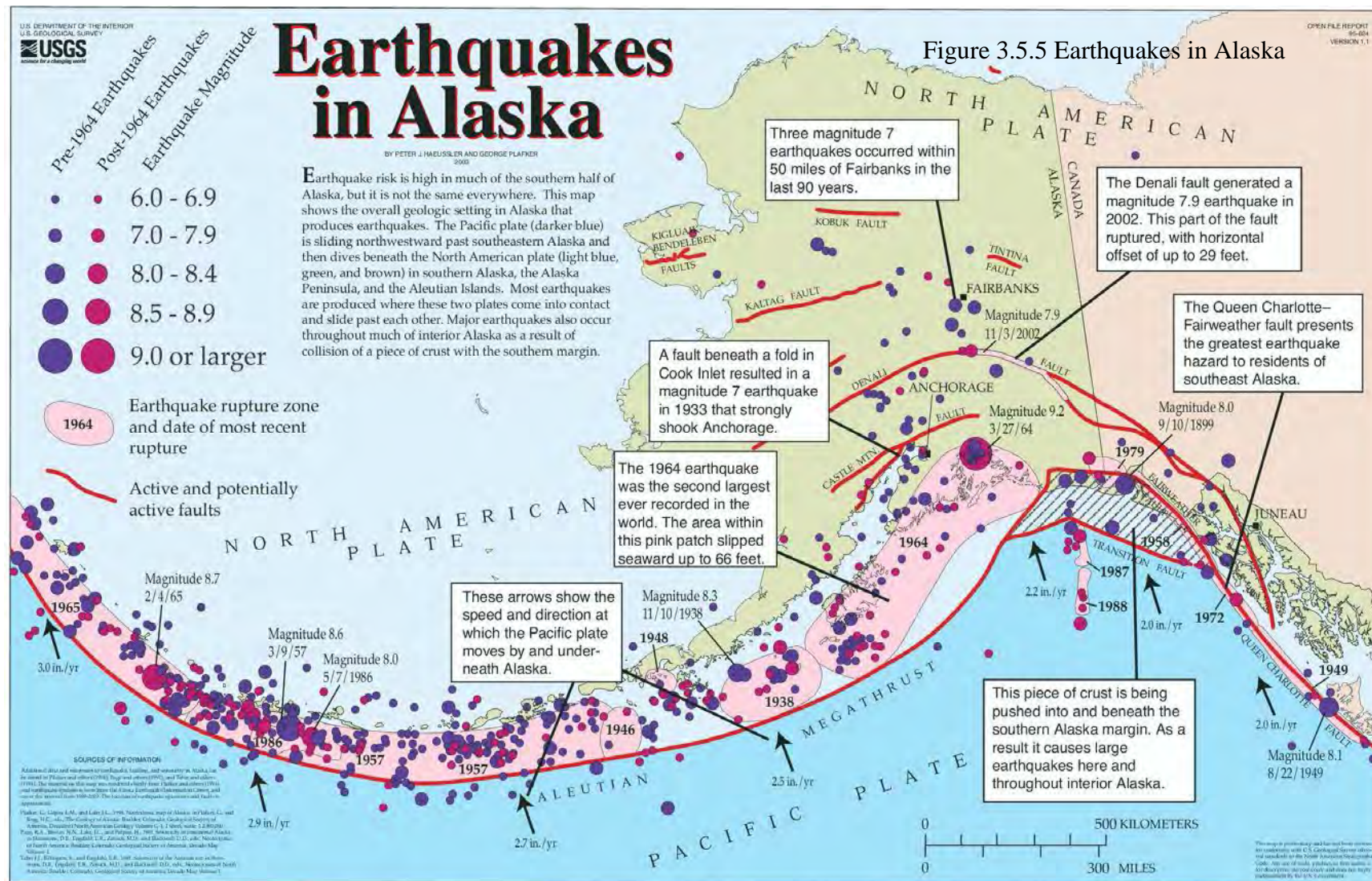


Figure 3.5.5 Earthquakes in Alaska from the USGS.

3.6 Tsunamis and Seiches

During the past 60 years, tsunamis have killed over 100 people in Alaska and destroyed entire towns. Some previously inhabited areas are now permanently vacant due to this threat.

3.6.1 Hazard Characteristics

Tsunamis

Tsunami is a Japanese term for waves generated by a large and sudden displacement of water. Subduction zone earthquakes, landslides, and volcanic eruptions may generate tsunamis. However, most tsunamis are small and are only detectable by instruments. A tsunami event may contain a series of waves, known as a train. In open water, tsunamis exhibit long wave periods (up to several hours) and wavelengths extending up to several hundred miles. In contrast, a typical wind-generated wave or swell may have a period of 10 seconds and a wavelength of 300 feet.

In open water, tsunami travel at speeds exceeding 500 miles per hour (mph). They appear shallow at the surface and are often imperceptible without instruments. As tsunamis approach shore, they drag on the rising terrain and compress into a shorter and much steeper amplitude. By landfall, tsunamis may rise over 90 feet. Two major factors are used in determining risk: proximity to the shore and the amount of inundation (run-up).

Seiches

A seiche is the Swiss term for a standing wave in an enclosed or partially enclosed body of water, often observed on lakes. Generated by localized events, such as landslides, seiche is characterized as the “bathtub effect”, where waves slosh back and forth, repeatedly impacting the shore until their energy is fully spent. Landslides generate more lake bound Seiches in Alaska than anywhere else in the United States.

Geography

The Alaskan-Aleutian seismic zone is the portion of Alaska at high risk for tsunamis. Communities within this zone border the Pacific Ocean, while communities bordering the Bering Sea generally are at very low risk for tsunami. However, evidence exists of a volcanically induced tsunami in Bristol Bay about 3,500 years ago.

Forms of Tsunamis

Tsunamis are grouped by one’s proximity to its origin:

- Local
- Regional
- Distant

Local Tsunami

A local tsunami applies to a tsunami event within 100 km from its source. The total elapsed time from the source event to the tsunami event is usually less than one hour. The nature of the source event could be seismic, volcanic, a land slide, and any combination thereof. If the source event is not immediately observed, such as an underwater landslide, there will be no warning. A local tsunami is especially dangerous as it typically arrives faster than the evacuation notice from the

Tsunami Warning Center or local authorities. Coastal residents and visitors will need to self-evacuate based upon the intensity of the source event, if observed.

Regional Tsunami

A regional tsunami refers to a tsunami event striking land between 100 km and 1,000 km from its source. Regional tsunamis may travel one to three hours before reaching land. This type of tsunami allows for more accurate and timely evacuation notices.

Distant Tsunami

Also referred to as tele-tsunami or ocean-wide tsunami, a distant tsunami applies to a tsunami event more than 1,000 km from its source, and usually take more than three hours to arrive. In many cases, tele-tsunamis allow for sufficient warning time and evacuation.

Most tele-tsunamis reaching Alaska are not damaging. For example, Massacre Bay on Attu Island has historically received tele-tsunamis with less than one foot recorded amplitudes. In one rare instance, the 1960 Chilean earthquake, Massacre Bay recorded a tsunami over six feet in amplitude. This same tsunami damaged docks and pilings at MacLeod Harbor, Montague Island, and Cape Pole on Kosciusko Island.

3.6.2 Tsunami History

1883 Augustine Volcanic Tsunami

In 1883, a debris flow from the Augustine volcano inundated Port Graham with over 30 foot high tsunami waves.

1946 Unimak Island Tsunami

A magnitude 8.6 earthquake occurred near Unimak Island on April 1, 1946. The resulting tsunami had a run-up of approximately 100 feet and totally destroyed the Scotch Cap lighthouse, a reinforced concrete structure. All five occupants and the lighthouse washed out to sea. The tsunami caused about \$250,000 in damages in with widespread effects elsewhere. Relatively minor damage was reported in Washington and Oregon as well as in French Polynesia and Chile. California suffered \$10,000 in damages and one death. Hawaii was heavily impacted, with \$26 million in damages and 159 fatalities.

1957 Andreanof Islands Earthquake Tsunami

West of Unalaska, a magnitude 8.6 earthquake generated 9-23 meter high tsunami waves along Aleutian shores and a distant tsunami in Hawaii with maximum runups to 16 meters. The tsunami event destroyed two bridges on Adak Island, and damaged houses. On Unimak Island, tsunami waves destroyed part of their community dock. Additionally, Mount Vsevidof erupted after being dormant for over 200 years. The north western side of the Island of Kauai, Hawaii, experienced more inundation and damage than the 1946 tsunami. The tsunami damaged boats and docks in San Diego Bay, California, and reached Chile, El Salvador, and Japan. Although there were no reported fatalities from this event, the Hawaiian Islands suffered over \$5 million dollars in damages, 1957 estimate.

1958 Lituya Bay Tsunami

A giant earthquake generated landslide in July 1958 ran into the head of Lituya Bay in Glacier Bay National Park, generating a tsunami. The wave traveled up the adjacent mountainside to a

height of more than 1,720 feet. Two fishing vessels anchored in the bay were sunk, killing two people. A third boat was swept over the La Chaussee Spit and back into the bay, landing upright. Lituya Bay is a tsunami-prone area, and at least three other fatal, landslide-generated tsunamis have occurred there in the past. The 1958 earthquake triggered at least eight separate local tsunamis, including the Yakutat Bay tsunami that caused three fatalities.

1964 Earthquake Tsunami

The 1964 Good Friday earthquake in Southcentral Alaska triggered several tsunamis, including one major tectonic tsunami and about 20 local submarine and aerial landslide tsunamis. The tectonic tsunami hit between 20 and 45 minutes after the earthquake, depending on location. The locally generated tsunamis struck between two and five minutes post-earthquake and caused most of the deaths and damage. Tsunamis caused more than 90% of the deaths associated with this earthquake – 106 Alaskans and 16 California and Oregon residents were killed.

Alaska's damages were most extensive in Kodiak Island, Seward, Whittier, and Valdez with significant tsunami damage throughout areas adjacent to the Gulf of Alaska.

Kodiak

Witnesses to the Kodiak tsunami event observed ten waves which damaged or destroyed everything they reached, such as the dock pier, roads, houses, and other facilities. They also destroyed the main electrical and water distribution systems. The tsunami event generated \$31.3 million in damages, destroyed 80% of the city's industrial base, and rendered 600 people homeless out of a population of 2,658. There were only six reported fatalities as most residents moved to high ground when they felt the earthquake (Figure 3.6.1).

Figure 3.6.1 Tsunami Damage in Kodiak



Figure 3.6.1 Close-up view of tsunami damage along the waterfront at Kodiak. USGS photo.

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Seward

In Seward, the earthquake subsided land at the waterfront, generating a local tsunami event. The local tsunami destroyed most of the facilities near the former shore, including a fuel tank farm which started the first of many fires. Additionally, the local tsunami spread floating burning oil which ultimately engulfed another large fuel tank farm further inland.

The main dock collapsed with the waterfront and sank 30 fishing boats and 40 pleasure craft in the small boat harbor. The local tsunami also heavily damaged the railroad yards, moving a 120-ton locomotive 100 feet and a 75-ton locomotive 300 feet (Figure 3.6.2).

About 25 minutes after the earthquake and local tsunami event, the tectonic tsunami event arrived in Seward. The waves carried flaming oil and debris into Seward and set fire to a large section of the town. Overall, Seward lost about 95% of its industrial base and 15% of its residential properties. There were 12 fatalities and 200 injuries, and approximately \$14 million in damages.

Figure 3.6.2 Alaska 1964 Good Friday Earthquake and Tsunami Damage



Figure 3.6.2 Alaska 1964 Good Friday earthquake and tsunami damage, Seward, AK. From the NOAA Photo Library.

Whittier

A series of at least eight tsunami waves struck Whittier destroying two saw mills; the Union Oil Company, the Alaska Railroad depot, and several houses. The small boat harbor was also heavily damaged. The tsunamis were responsible for 13 deaths and approximately \$10 million in damages in Whittier.

Valdez

Much like Seward, a portion of the Valdez waterfront subsided into the bay during the earthquake, generating a local tsunami. The earthquake and local tsunami heavily damaged or destroyed all structures near the former waterfront. Half of the downtown business district was totally destroyed and fires burned uncontrolled for two weeks. Almost the entire town's fishing fleet (68 out of 70 boats) sank. The local tsunami swept away twenty eight people gathered to watch a freighter unload. Shifting cargo in the freighter's hold caused additional fatalities.

Figure 3.6.3 Aerial Image of Valdez, Alaska Post Earthquake



Figure 3.6.3 Aerial image of Valdez, Alaska, showing the extent of inundation along the coastline following the tsunami generated by an earthquake on March 27, 1964. A slice of the delta, approximately 1,220 m long and 183 m wide, slid into the sea and carried the dock area and portions of the town with it. Photo US Dept. of Interior & NOAA.

1994 Skagway Tsunami

On November 3rd, 1994 an underwater landslide formed during the collapse of a cruise ship wharf undergoing construction at the head of Taiya Inlet. The landslide generated a tsunami and subsequently a seiche within the harbor, causing one fatality and over \$25 million in damages. The mechanism for the landslide is not definitively known.

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3.7 Severe Weather

The majority of disasters in Alaska are related to severe weather. Storm driven wind and waves flood and erode coastlines and also drive large chunks of sea ice inland (Ivu) destroying buildings near the shore. During winter months, blizzards may form anywhere in Alaska, forcing people to shelter in place. Additionally, extreme cold (-40°F to -60°F) and ice fog may last weeks at a time, forcing entire communities to evacuate to emergency shelters. While excessive snowfall is typically associated with South Eastern Alaska, it has occurred in other regions, including South Central Alaska. Large snow storms build glaciers, but also increase the risk of avalanches. A quick thaw often brings flooding, especially during breakup season (spring thaw) along Alaska's river systems.

Weather conditions, and archived data, for Alaska are available through the National Weather Service Alaska-Pacific Forecast Center online at <http://www.weather.gov>. Several of the highlights described within this resource are summarized below.

3.7.1 Hazard Characteristics

Forms of Severe Weather

There are twelve distinct forms of severe weather in Alaska:

- Severe Storms
- Excessive Snowfall
- Extreme Cold
- Ice Storms
- Freezing Rain
- High Winds
- Mountain Waves
- Thunderstorms and
- Lightening
- Tornadoes
- Hail
- Storm Surge
- Ivu

Severe Storms

Severe storms originate as mid-latitude depressions or cyclonic weather systems. Low pressure cyclones develop in the Pacific Ocean and expend their energy in the Bering Sea and Gulf of Alaska, where warm moist air meets cold air from the Arctic (Figure 3.7.1). They are most common from the fall through the spring and are known causes of coastal flooding and erosion. In the Arctic, shore ice plays a large role in protecting coastal areas from storm damage. If ice is absent, the coastal permafrost is exposed to storm surge, wind, and rain.

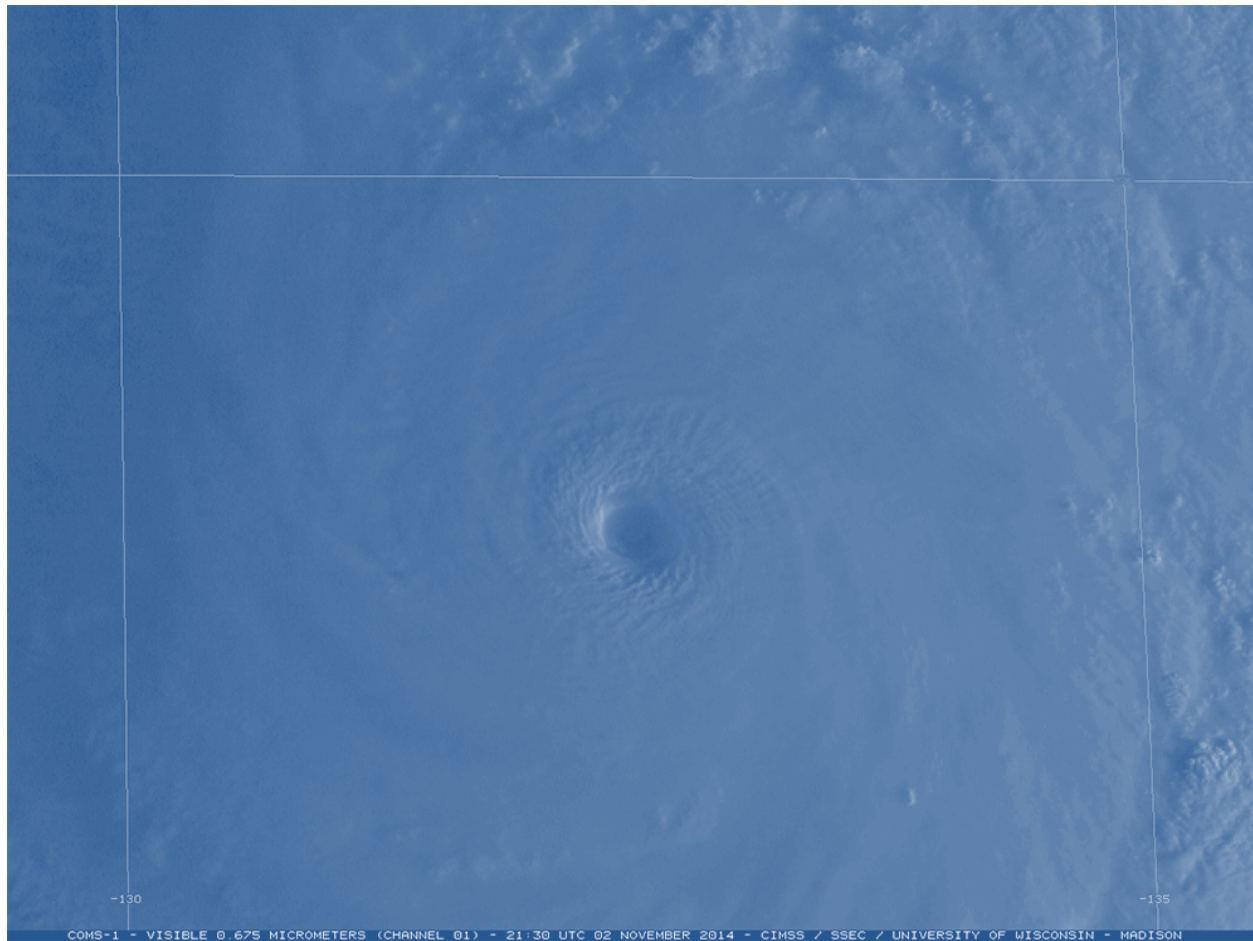


Figure 3.7.1 Source: Cooperative Institute for Meteorological Satellite Studies, November 11, 2014

Figure 3.7.1 is a satellite photo of Typhoon Nuri as it heads over the Aleutian Chain and into Western Alaska; a 924 mb low far stronger than Hurricane Sandy and carried peak winds of 180 mph. Shemya, the furthest western station on the Aleutian Chain, recorded wind speeds of 97 mph.

Excessive Snowfall

Excessive snow accumulation of more than 12 to 24 inches inside of 24 hours may immobilize a community. Airports and major roadways will close, disrupting the flow of supplies and emergency services. Excessive accumulation will collapse roofs, knock down trees, power lines, damage parked light aircraft, and capsize small boats. Heavy snow dramatically increases avalanche and flood risks. Snow removal, damage repairs, and business loss will financially impact communities.

Extreme Cold

Excessive cold varies with the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." In Alaska, extreme cold is temperature less than -40°F. The temperature may accompany winter storms or high barometric pressure and clear skies.

Extreme cold interferes with infrastructure across Alaska for days or sometimes weeks at a time. Liquid fuels may congeal or freeze denying motorized transportation, heat and electricity. In desperation, some people choose to burn propane stoves indoors, increasing their risk to carbon monoxide poisoning. Aircraft may be grounded, delaying the flow of supplies to remote villages. Water and sewer pipes often freeze and rupture, flooding later when they thaw.

Ice Storms

Ice Storms are excessive accumulations of ice during a freezing rain or sleet event. They are a particularly hazardous winter weather phenomena and often cause numerous automobile accidents, power outages, and personal injuries.

Freezing Rain

Freezing rain most commonly develops within a narrow band of a winter snow storm. Falling snow encounters a deep layer of warm air in the atmosphere and melts. As the rain drops pass through a thin layer of cold air just above the ground, they cool to below freezing. The drops remain in a liquid state until they impact a surface and instantly freeze.

High Winds

High winds in excess of 60 miles per hour (mph) frequent the coastal communities of Alaska and often inflict minor damage and temporarily disrupt transportation (Figure 3.7.2). Alaska's interior also occasionally experiences wind storms. If the storms occur during winter, high winds will combine with loose snow and produce blizzards.

The Mountain Effect

Strong winds, created by localized temperature and pressure differentials in mountainous regions, may travel downslope in excess of 120 mph. Additionally, mountain waves may generate moderate to severe clear air turbulence near areas like the Alaska Range.



Figure 3.7.2 Debris and damage within Clarks Point City Cemetery from 2005 high wind storm in the Bristol Bay area. DHS&EM photo collection.

Localized downdrafts, downbursts and microbursts, are also common hazards in Alaska. Often generated by thunderstorms, downbursts are areas of rapidly falling rain-cooled air. Upon reaching the ground, the downburst spreads out in all directions in excess of 125 mph. Similar to downbursts, microbursts are its smaller scale and more concentrated relative, reaching speeds up to 150 mph. Both conditions, commonly lasting five-seven minutes, are hazardous to aviation.

Thunderstorms & Lightning

Thunderstorms may generate lightning, heavy rain, snow, tornadoes, updrafts, downdrafts, severe air turbulence, icing, hail, high winds, and flash floods. A thunderstorm is considered severe if winds reach or exceed 58 mph, produces a tornado, or drops surface hail at least 1.0 inch in diameter. The average thunderstorm is about 15 miles in diameter and remains less than 30 minutes in any given location.

Lightning exists in all thunderstorms. It is formed from built-up charged ions within the thundercloud. Lightning is hazardous to humans and frequently start wildfires (Figure 3.7.3).

Most thunderstorms in Alaska are of the single-cell or pulse variety. They develop from a combination of atmospheric instability and moisture; triggered by surface heating from the sun. The storms generally last only 20-30 minutes and do not usually produce severe weather. Pulse thunderstorms produce lightening and occasionally high winds and hail. Pulse thunderstorms rarely produce tornadoes. Tornadoes are more common in multi-cell and super cell thunderstorms, which are rare events in Alaska.

Wildland fire is one of the most common hazard impacts from thunderstorm activity in Alaska. Bureau of Land Management (BLM) lightening activity sensors positioned across the interior locate an average of 26,000 cloud-to-ground lightning strikes per year. Very active thunderstorm days may feature 8,000 to 12,000 lightning strikes, mainly occurring during the late afternoon hours from the end of June to the beginning of July. Many of these lightning strikes occur in the northern boreal forests of the Alaska interior, which is laden with highly flammable black spruce trees.

In a typical year, Alaska has fewer than 25 days with thunderstorms. A majority of the storms occur over a region between the Yukon and Tanana rivers during the warmest summer months. The most active area for lightning strikes is the White Mountains, north of Fairbanks. Other areas experiencing frequent thunderstorms are the Yukon-Tanana uplands and flats, the Nowitna, Tetlin and Kantishna River flats, the Ray Mountains, and the Kuskokwim Mountains.

Thunderstorms are also observed along the southern coastal areas, with a higher frequency along the eastern Gulf of Alaska coast between Cordova and Craig. Interestingly, these storms occur during the winter months as well as during summer. The risk of wildfire due to lightning strikes is much less prevalent in the coastal region than in the interior, mostly due to the wet climate. Injuries and deaths from lightning are also rare in Alaska. However, in 1986, one person was killed and three others injured near the City of Tok when they took shelter under a tree which was struck by lightning. In 1993 a lightning strike injured one person standing on a ball field in the City of North Pole.

The first ever recorded October thunderstorm occurred in Nome on the evening of the 10th in



Figure 3.7.3 At Eielson Air Force Base, Alaska lightning strikes during a thunderstorm, June 17, 2007. Photo credit U.S. Air Force Airman 1st Class Jonathan Scholl.

2009. The storm brought heavy rain, higher temperatures, and lightning to dark skies. The storm benefitted from higher than normal temperatures along the coastal regions of Alaska.

Tornadoes

Tornadoes are rare in Alaska. The greatest frequency of tornadoes in the State is in the Yukon-Kuskokwim Delta. Of the five degrees of tornado damage potential (1-5), Alaska tornadoes rarely exceed the lowest level, but have the potential to cause damage or casualties when they touchdown in developed areas. Waterspouts are more common in Alaska and occur in all southern maritime areas of the state.

Residents in Sand Point on the Alaska Peninsula witnessed a short-lived tornado in 2005. In December, 2007, a series of waterspouts lightly damaged the City of Juneau.

Hail

Thunderstorms produce hail in ball or irregular shapes greater than 0.75 inch in diameter. The size and severity of the storm determine the size of the hailstones. Unlike the hail in Mid-western states, Alaskan hail is small (pea-sized) and fairly rare (Figure 3.7.4). The extreme atmospheric conditions necessary to generate damaging sized hail (greater than 0.75 inch diameter) are highly unusual in Alaska.

Figure 3.7.4 A Surfbird protects its eggs from hail on the Alaska Peninsula. USGS photo.



Storm Surge

Storm surges, or coastal floods, occur when the sea is driven inland above the high-tide level onto normally dry land. Often heavy surf conditions driven by high winds accompany a storm surge, adding to the destructive-flooding water's force. Coastal floods also contribute to shoreline erosion by undermining roads and other structures. Storm surge is a leading cause of property damage in Alaska (Figure 3.7.5).

Communities situated on low-lying coastal lands with gradually sloping bathymetry and a long fetch over water are particularly susceptible to coastal flooding. Several communities along the Bristol Bay, Bering Sea, Chukchi Sea, and Beaufort Sea coasts have significant coastal flood damage in their history. Most coastal flooding occurs during the late summer or early fall season in these locations. As shorefast ice forms along the coast before winter, the risk of coastal flooding abates.



Figure 3.7.5 October 20, 2004- The Biggest Storm to Hit Nome in 30 years. Photo from DCRA.

Ivu

Ivu, also called an ice override, occurs when floating sea ice is pushed ashore by wind. It is fairly rare as it requires very specific weather, oceanographic conditions and shoreline topology to develop. Ivus are usually associated with coastal storms and storm surge and rarely during calm weather. They usually develop during fall and early winter, but they can form whenever sea ice is present. For example, it is believed that one struck Barrow in May of 1957. The ice usually over-rides the beach a few tens of feet inland and the entire event is generally less than an hour long.

Ivus have been reported on the Seward Peninsula coast from Rocky Point to Cape Rodney, Gambell, the Northwest coast of the Seward Peninsula, and the Arctic coast from Point Hope to Point Barrow.



Figure 3.7.6 The ice-inundated Barrow coast line during an ivu event in 2007. Photo credit US Army Corps of Engineers Alaska District.

3.7.2 Climate Factors

➤ Storms

Both near term climate fluctuations, such as the El Nino/La Nina Southern Oscillation (ENSO) and long term changes to the earth's climate have the potential to dramatically affect Alaska's weather. Some models show increased storm frequency and intensity for Alaska. While a higher sea level would exacerbate coastal flooding, and coastal erosion. Additional information on Climate Change in Alaska is available through the Alaska Climate Change Impact Mitigation Program (ACCIMP) at <http://www.dced.state.ak.us/dca/ACCIMP.htm>

➤ Sea Ice

Within the past two decades, the northern coastal communities of Alaska have witnessed a gradual delay in the formation of winter sea ice and overall far less volume. Sea ice is a critical part of habitat for marine mammals and other species to include humans. Additionally, coastal communities depend upon sea ice for protection from beach erosion and storm driven floods.

3.7.3 Severe Weather History

➤ Severe Storms

2015 August North Slope Borough Sea Storm (DR-4244)

The week of August 27, 2015, a strong sea storm along the Northern Arctic Coast produced high waves and storm surge, which scoured away the beach gravel and redeposited it atop seven miles of borough roads. The storm surge also flooded Borough infrastructure and exposed buried water, sewer, and electrical lines. The North Slope Borough estimates repairs to cost around 7 million dollars (Figure 3.7.7).



Figure 3.7.7 Source: State of Alaska DHS&EM, August 27, 2015

2013 November Storm Disaster (DR-4162)

On November 5, 2013, the west coast of Alaska experienced hurricane force winds, extreme high tides, and strong sea surges. The storm and storm surge damaged buildings and infrastructure, forcing many communities to evacuate to emergency shelters. The federal disaster declaration included 23 cities and villages in the Bering Strait Regional Educational Attendance Area (REAA), Lower Yukon REAA, and Lower Kuskokwim REAA, and the Fairbanks North Star Borough (Figure 3.7.8).



Figure 3.7.8 Source: State of Alaska DHS&EM, November 21, 2013

A series of three widespread storm events along the Bering Sea to Southcentral Alaska occurred from February 23 - 28, 2009. Numerous warnings were issued and a number of communities sustained damage (~ \$0.5M) due to strong winds and storm surge exceeding 5 feet. The most intense event was on the February 25th where St. Paul sustained 91 mph winds. Whiteout conditions existed across the region making travel hazardous or impossible.

On March 28, 2009, St. George experienced blizzard conditions with winds gusting to 55 mph. Winds continued to increase and by early evening the winds peaked at 115 mph which broke the Alaska record set just one month earlier of 94 mph.

On September 12 - 13, 2007, a low pressure system from the Bering Sea generated storm conditions and coastal flood warnings for communities along the Chukchi Sea coast. Substantial coastal erosion by high winds, storm surge, and high waves generated by the storm further damaged the existing sea wall adjacent to the Alaska Village Electric Corporation (AVEC) bulk fuel facility.

A series of severe winter storms in December 1999 and January 2000 triggered avalanches and flooding in Southcentral Alaska and resulted in a Federal Disaster Declaration. The Municipality of Anchorage, the Kenai Peninsula Borough, the Matanuska-Susitna Borough, and the Valdez-

Cordova census area received funding to supplement the governments' recovery needs to pay for debris removal, emergency services, and repair and replacement costs for damaged public facilities related to the storms.

In October 2004, a major storm hit Western Alaska with high winds and coastal flooding, resulting in damages of nearly \$20 million due to wind and storm surge, mostly to the city of Nome, though damages from storm surge also occurred at in additional communities.

On January 20, 1980 an intense storm made land fall near Port Heiden and coastal flooding occurred on Kodiak Island. The area sustained over \$500,000 in damage.

A series of storms struck the west coast of Alaska causing major coastal flooding November 11-13, 1974. Significant damage occurred in several communities. Unalakleet was the hardest hit due to a combination of flooding and wind damage.

➤ **Excessive Snowfall**

Prince William Sound Winter Storm (AK-12-238-2012)

Beginning in mid-December, 2011 and continuing through January 2012, the Cities of Cordova, Valdez, and Yakutat received a record breaking amount of snowfall. On December 12, the City of Cordova with the assistance of the Alaska National Guard began working in emergency snow removal status. Multiple avalanches isolated the Prince William Sound area and heavily damaged private and public facilities (Figure 3.7.9).



Figure 3.7.9 Source: DHS&EM, January 7, 2012

➤ **Extreme Cold**

January 2009 was unusually cold in Alaska. Shortly after Christmas temperatures dropped dramatically and remained 20°F to 30°F below normal. High pressure over much of central Alaska kept temperatures well below zero and down to -60°F in Interior low-lying communities. Anchorage had prolonged temperatures of -19°F. These temperatures disabled cars and froze water pipes. Planes were grounded and supplies began to run low in some communities dependent on air transportation such as Steven's Village, about 90 miles northwest of Fairbanks. In many rural communities in Alaska, the majority of homes rely on wood for heating and prolonged extreme cold compels outside work to gather additional fuel.

A widespread extreme cold event occurred across the State during January 1989. Most operations in The City of Fairbanks stopped for fourteen days when bitter cold and ice fog gripped the area with temperatures of -50 to -70°F. Tanana recorded a low temperature of -76 °F, McGrath followed closely with -75°F. Aircraft in the area were grounded for more than six days during this event.

➤ **Ice Storms**

On January 24, 2000 an ice storm occurred in Naknek when a frontal system associated with a strong low pressure system in the Bering Sea stalled over western Alaska. Naknek Electrical estimated one to two inches of ice accumulation brought down power lines throughout the area. Gale force winds and wet snow prevented repair efforts until the storm abated days later.

From January 18 - 20, 2000 freezing drizzle fell for nearly 52 hours in the local Juneau area, grounding airplanes and contributing to numerous automobile accidents.

➤ **High Winds**

On November 3, 2001, a very powerful storm developed in the Northeastern Gulf of Alaska bringing hurricane force winds to several locations in the Southeast Panhandle. Communities reported peak winds around 85 mph. The high winds inflicted approximately \$100,000 of property damage in the City of Yakutat.

A series of very strong low pressure systems battered the Aleutians November 2-5, 2000. During the storms, wind gusts reached 143 mph at the Dutch Harbor Spit. Several communities recorded hurricane force winds. The community of King Cove sustained considerable wind damage to roofs, fences, windows, and infrastructure. King Cove sustained approximately \$50,000 of damage.

Dangerously high winds, ranging from 70-101 mph, occurred throughout much of Southeast Alaska overnight on December 9-10, 1998. The windstorm caused widespread power and telephone outages, downed trees, and damaged homes, buildings, and airplanes.

➤ **Storm Surges**

2015 August North Slope Borough Sea Storm (DR-4244)

The week of August 27, 2015, a strong sea storm along the Northern Arctic Coast produced high waves and storm surge, which scoured away the beach gravel and redeposited it atop seven miles of borough roads. The storm surge also flooded Borough infrastructure and exposed buried water, sewer, and electrical lines. The North Slope Borough estimates repairs to cost around 7 million dollars.

2013 November Storm Disaster (DR-4162)

On November 5, 2013, the west coast of Alaska experienced hurricane force winds, extreme high tides, and strong sea surges. The storm and storm surge damaged buildings and infrastructure, forcing many communities to evacuate to emergency shelters. The federal disaster declaration included 23 cities and villages in the Bering Strait Regional Educational Attendance Area (REAA), Lower Yukon REAA, and Lower Kuskokwim REAA, and the Fairbanks North Star Borough.

Seward Winter Storm Surge (AK-09-230-09)

On December 1, 2009, near shore areas in the City of Seward were damaged by a winter storm surge. High winds, rainfall, and a 12.6 foot tide, caused extensive damage to the wave barrier along Lowell Point Road, the Seward Greenbelt area and the seawall at the Alaska Sea Life Center. The Governor declared a State disaster for this event (Figure 3.7.10).



Figure 3.7.10 Source: State of Alaska DHS&EM, December 7, 2009

October 11-13, 2006, a fall sea storm with sustained high surf and storm surge caused severe wave damage and coastal erosion in Kivalina.

On August 17-18, 1980, a strong low pressure system moved rapidly into Bristol Bay and 30-foot tides were reported. Fishing boats, homes and canneries were damaged. A fish processing plant sustained \$100,000 of damage losing boats, a dock with a crane, a mess hall, and bunkhouses.

October 25-26, 1977, a storm struck the eastern Aleutians. Buildings were blown from their foundation and barges were temporarily beached. Coastal flooding and high winds caused \$500,000 in damage.

On March 10, 1963, Barrow experienced a storm surge of 11-12 feet, which damaged several homes, buildings, airplanes, and the electrical plant. Barrow's freshwater supply was contaminated with seawater.

➤ **Ivu**

In early December 1987, an ivu struck Nome. The wind driven ice rode up the beach and spilled

over the seawall.

In 1978 Barrow reported 450-foot ivu event. Another ivu occurred in Barrow in January, 2007 (Figure 3.7.6). Offshore winds drove the consolidated ice up onto the beach where it crumbled and rode up over itself making mounds up to 50 feet high on the road near the bank building.

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3.8 Ground Failure

3.8.1 Hazard Characteristics

Factors influencing ground failure are topography (slope), geology, lithology, vegetation, and water. Types of ground failure in Alaska include landslides, land subsidence, and failures related to seasonally frozen ground, erosion, and permafrost.

Forms of Ground Failure

Landslide

Landslide is a generic term for a variety of down slope movements of earth material under the influence of gravity. Landslides usually occur in steep areas either above or under water. Some landslides occur rapidly, while others may take weeks or longer to develop.

Landslides may occur naturally or by human activities. They occur naturally when inherent weaknesses in the rock or soil combine with one or more external mechanisms such as water or seismic activity. Erosion may also contribute to landslides.

Human activities are usually associated with development such as altering a slope, drainage patterns, groundwater level, and surface water runoff. Contributing factors could be concentrated runoff from irrigation, roads and downspouts.

Rock Avalanche

A rock avalanche is a complex type of movement. Rock avalanches or sturzstroms involve the failure and disintegration of a large rock mass and its rapid movement down slope.

Subsidence

Subsidence is any sinking or settling of the earth's surface. Underground mining, ground water and petroleum extraction or movement, and drainage of organic materials are typical causes of subsidence. However, these are rare in Alaska. More common causes are degassing and changes in hydrothermal systems, sediment compaction, earthquakes, and thawing of ice-rich permafrost.

Frost Action

Frost action is repeated cycles of freezing and thawing of water in the pores, cracks, and other openings of a substance, such as soil. Frost action may gradually force man-made structures such as porches, fence posts, and utility poles out of the ground, commonly referred to as “frost jacking” or “frost heaving”. Frost jacking is a widespread problem in lower regions of Alaska (Figure 3.8.1).

Permafrost

Ground failure related to thawing permafrost is a significant problem in Alaska. Permafrost is frozen ground in which a naturally occurring temperature below 32° F has existed for two or more years. Approximately 85% of Alaska is underlain by continuous or discontinuous permafrost (Figure 3.8.2). Permafrost is continuous in extent over most of the Arctic but is discontinuous and sporadic or isolated in most areas south of the Brooks Range. Only the southern coastal margins are permafrost-free. Measured recorded

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depths extend from 1,330 feet near Pt. Barrow to 350 feet at Nome, 265 feet at Fairbanks, and 100 feet near Tok. Permafrost can form a strong and stable foundation material if it is kept frozen, but if it is allowed to thaw the soil can become weak and fail. Materials most susceptible to thaw settlement are fine-grained soils with high ice content. Permafrost can thaw in response to general climate changes and warming or because of human activity that heats the soil or removes insulating cover.

3.8.2 Climate Factors

Continued recording of permafrost temperatures across the North Slope Borough and much of Western and Interior Alaska reveal they are clearly rising in accordance with rising air temperatures. Alaskan communities depend upon a stable permafrost layer to support their buildings and infrastructure. Built on once stable permafrost, the Dalton Highway has also been damaged by both frost heaving and subsidence (Figure 3.8.1). Additional information regarding permafrost degradation may be found at <http://www.climatecentral.org/news/warming-could-mean-major-thaw-alaska-permafrost-19917>



Figure 3.8.1 Source: State of Alaska Department of Transportation (AKDOT), June 2015

3.8.3 Ground Failure History

Ground failure is a problem throughout Alaska with mass movements presenting the greatest threat. For example, multiple mass movements have affected Juneau in the past

100 years. One of the most destructive events occurred on November 22, 1936. Prolonged heavy rainfall triggered a debris flow that struck a residential area causing numerous injuries and deaths. On July 16, 1984, heavy rain fell on already waterlogged soils and triggered a debris avalanche/flow destroying a small hydroelectric dam, damaged two houses and left debris on the Glacier Highway and inside several local businesses.

On April 11, 2009 a rock avalanche blocked the small and large tunnels connecting the town of Whittier to the main highway system. The avalanche deposited a 300-foot long by 30 feet tall pile of rubble on the solitary access road, completely isolating Whittier. The town has no commercial airstrip. The slide completely stopped all transportation and commerce until the rubble pile was removed days later.

In October 2009, the remnant of a typhoon brought the Kodiak Islands their second largest rainfall event ever recorded. In five days, the 6th through the 11th, over 9.5 inches of rain fell resulting in mudslides and rockslides that contributed to road and infrastructure damage. The event was declared a Federal disaster (DR-1865) and included the Kodiak Island Borough and the Kodiak Electric Association.

Ground-failure hazards exist to some degree in all areas of the State. In Ketchikan, on November 29, 1969, a debris flow caused by the overflow of an emergency spillway destroyed the Upper Lake Silvis powerhouse, plunging the city into partial darkness. In 1983, numerous debris flows occurred in the Brooks Range, endangering the Dalton Highway, which services the Trans-Alaskan Pipeline System.

The 1964 earthquake triggered a wide variety of falls, slides, flows, and lateral spreads throughout Southcentral Alaska. The Anchorage area was heavily impacted because of failures in the Bootlegger Cove Clay Formation. Some of the more significant events occurred at Fourth Avenue, L Street, Government Hill, and Turnagain Heights. Several, less devastating slides, occurred throughout town including slides at Point Woronzof and the Potter Hill slides.

The Government Hill Elementary School was severely damaged by a complex translational slide. The south wing of the school dropped about 30 feet while the east wing split lengthwise and collapsed. Part of this slide became an earth flow spreading 150 feet across the flats into the Alaska Railroad yards.

The Turnagain Heights landslide was the largest and most complex translational slide associated with the Good Friday earthquake. The landslide likely began as a block slide but evolved to include lateral spreading, slumping, and possibly other types of movement. This landslide caused serious damage to a housing development in which three people died.

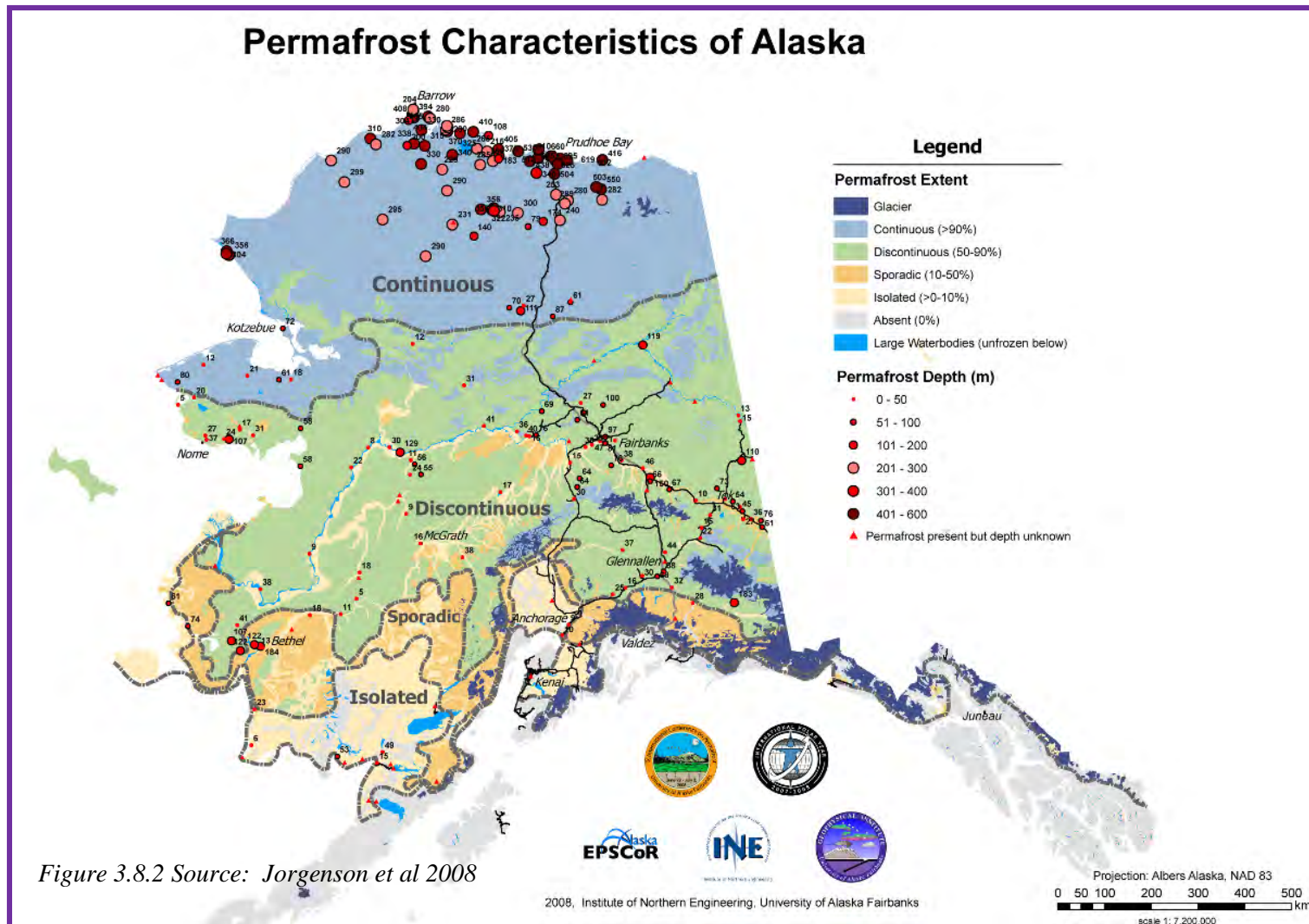
The earthquake caused at least one rock avalanche. A slab of rock became detached from the mountain peak overlooking Sherman Glacier. The rock slab disintegrated as it moved downhill, helping it achieve great velocities, and extend a great distance over the glacier.

Extensive subsidence also occurred as a result of the 1964 Good Friday Earthquake. The zone of subsidence covered about 110,000 square miles including the north and west parts of Prince William Sound, the west part of the Chugach Mountains, most of Kenai

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Peninsula, and almost all the Kodiak Island group. In some areas, subsidence exceeded seven feet. Part of the Seward area is about 3.5 feet lower than before the earthquake and portions of Whittier subsided over five feet. The village of Portage, at the head of Turnagain Arm of Cook Inlet, subsided six feet, partly due to tectonic subsidence and partly due to sediment compaction during the earthquake.

Figure 3.8.2 Permafrost Map



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3.9 Erosion

3.9.1 Hazard Characteristics

Erosion is the wearing and transportation of land. Not all erosion is gradual; it can occur quite quickly as the result of a flash flood, coastal storm, or other event. Most of the geomorphic change in a river system is in response to a peak flow event. Erosion is a natural process but its effects can be exacerbated by human activity. Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure.

Forms of Erosion

There are three basic forms of erosion in Alaska:

- Coastal erosion
- Riverine erosion
- Wind erosion

Coastal Erosion

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

On the coast the principle erosion forces are waves, currents, and wind. Surface and ground water flow, thawing of permafrost, and freeze-thaw cycles may also play a role. Other factors influence coastal erosion rates include beach composition, shoreline orientation and exposure to prevailing winds, open ocean swells, and waves. Storms, floods, and human activities such as boat wakes and dredging may greatly accelerate coastal erosion. Beaches composed of sand and silt, such as those near Shishmaref, easily erode whereas beaches primarily consisting of boulders or large rocks are more resistant.

Coastal erosion rates are also influenced by long-term factors such as sea-level rise, the lack of protective sea ice during fall storms, lack of sediment supply and/or subsidence. Long-term human influences on erosion include aquifer depletion or the construction of shore protection structures. Many studies are currently underway to determine the potential effects of a warming global climate. Coastal erosion is one key potential impact under consideration.

Ironically, attempts to control erosion through shoreline protective measures such as groins, jetties, seawalls, or revetments in one area have increased erosion activity elsewhere. Shoreline structures eliminate the natural wave run-up and sand deposition processes and increase reflected wave action and currents at the waterline. The increased wave action removes material away from structures (scour) and prevents suspended sediment from settling.

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In winter, bottom fast ice along much of the Arctic coastline has prevented erosion. These coastal areas are vulnerable to erosion in the summer and fall, prior to formation of bottom fast ice, and winds from fall storms can push sea ice into the shore fast ice, driving it onto the beach (Ivu). The ice gouges deep depressions in the beach. Recent studies show a trend for sea ice and arctic ice cover formation later in the season, increasing the likelihood of coastal erosion due to fall storms.

Coastal Erosion in Alaska

Coastal erosion is a problem in all 30 coastal states, including Alaska. A 2009 US Army Corps of Engineers (USACE) Baseline Erosion Study states there are nearly 44,000 miles of tidal shoreline and more than 3 million lakes in Alaska - the issue of erosion in Alaska is significant and widespread (See Resources, I. for the study reference).

Erosion does not usually present a problem along undeveloped coastlines unless it affects wildlife habitat. However, erosion is a significant threat in developed areas such as Alaska's western and northern coasts and along the Cook Inlet. Entire communities along the Alaskan coast (e.g., Shishmaref, Kivalina, and Point Hope) are being threatened by coastal erosion and thawing permafrost.

Figure 3.9.1 Cabin Falling into the Beaufort Sea



Figure 3.9.1 This cabin fell into the Beaufort Sea, along Alaska's Arctic coast, in a region where some coastlines retreated more than 24 meters (80 feet) in 2007. USGS photo.

The potential for coastal erosion damage is illustrated in a 2007 USGS study analyzing Landsat satellite data and topographic maps compiled from aerial photographs, USGS scientists found land loss in a study area north of Teshekpuk Lake in National Petroleum Reserve Alaska

(NPRA) more than doubled from 1985-2005, compared to the 30-year span from 1955-1985. This may be the result of greater wave action caused by earlier seasonal melting and reduced size of the Arctic ice pack. In the study area, beaches are absent or severely eroded along most of the coast and there is little protection against the increased wave energy. The waves undercut the mud-rich permafrost land, causing it to collapse into the sea. As the permafrost blocks melt, the muddy sediment they contain is re-suspended in the water and carried offshore.

Figure 3.9.2 Drew Point



Figure 3.9.2 Drew Point, 2004. Coastal erosion of mud-rich permafrost along Beaufort Sea coastline. Cliff height is ~3–4 m. Waves undercut permafrost and cause block slumping (center of photo). USGS photograph depicts no sand beach present to protect permafrost.

The low-lying Arctic coastal plain north of Teshekpuk Lake hosts endangered and threatened species of waterfowl, is the calving grounds for large herds of caribou, and contains potentially significant petroleum resources.

Given competing natural resource demands in this sensitive area, land and resource managers are faced with the need to consider both the natural effects from a 30 year warming trend resulting in ice-pack shrinkage and deterioration of permafrost, as well as the potential impacts of proposed human activity.

The results from this quantitative analysis contribute to an enhanced understanding of the dynamic and interactive processes that shape this landscape, and provide information critically needed in sound land-management and policy decision making for sensitive Arctic areas (I. Resources).

Riverine Erosion

Rivers constantly alter their course, changing shape and depth, trying to find a balance between

the sediment transport capacity of the water and the sediment supply. This process, called riverine erosion, is usually seen as the wearing away of riverbanks and riverbeds over a period of time. Riverine erosion is often initiated by high sediment loads or heavy rainfall. This generates high volume and velocity run-off which concentrates in the lower drainages within the river's catchment area. Erosion occurs when the force of the flowing water exceeds the resistance of the riverbank material. The water continues to increase its sediment load as it flows downstream. Eventually, the river deposits its sediment in slower moving sections such as dams or reservoirs. The river may eventually change course or develop a new channel. In less stable braided channel reaches, erosion and deposition are constant issues. In more stable meandering channels, erosion episodes may infrequently occur.

Riverine erosion has many potential consequences, including land loss and infrastructure. It can also affect marine transportation and channel navigation, and cause increased sedimentation in harbors and river deltas. Other potential problems include reduced water quality due to high sediment loads, loss of native aquatic habitat, damage to public utilities (roads, bridges and dams), and increased maintenance, prevention, and control costs.

Public and private property threatened by riverine erosion is found throughout the State. The Matanuska, Kenai, Yukon, and Kuskokwim rivers are just a few of the rivers with known erosion problems in populated areas.

Bank erosion along the Matanuska River in Southcentral, Alaska, has damaged and destroyed property. The USGS is cooperating with the Matanuska-Susitna Borough Department of Planning and Land Use to investigate bank erosion along this River. Information from the study will assist property owners and managers of the river corridor.

Increased sedimentation and erosion of stream bank cover along the Kenai River has become a serious threat to returning salmon runs. The Kenai River salmon fishing industry generates millions of dollars in revenue and loss of the fishery would be devastating to the community.

Wind Erosion

Wind is a primary agent responsible for transporting sediment across land and to a lesser extent, water. Depending on the type of material and the velocity of the wind, soil may move particles 0.1-0.5 mm in size in a hopping or bouncing fashion (known as saltation) and those greater than 0.5 mm by rolling and sliding (known as traction). Wind can also suspend and carry fine particles (less than 0.1 mm). Under drought conditions with vegetation loss the potential for wind erosion increases because there is less to hold soils in place.

Wind erosion impacts can include reduced agricultural production through topsoil loss, windblown dust impairing visibility, dust and abrasion damaging equipment and diminished air and water quality.

Although wind erosion is not generally a significant problem in most areas of Alaska, the Matanuska Susitna Valley, an important center for agriculture, does experience periodic loss of fertile topsoil due to wind erosion.

3.10 Dams

3.10.1 Hazard Characteristics

Alaska Statute 46.17.900(3) defines a dam as, “an artificial barrier and its appurtenant works, which may impound or divert water”. The State does not have the ability to regulate all dams in Alaska. A dam must meet at least one of the following three descriptions listed in the statute to be under State’s jurisdiction:

1. “Has, or will have, an impounding capacity at maximum water storage elevation of 50 acre-feet and is at least 10 feet tall measured from the lowest point at either the upstream or downstream toe of the dam to the crest of the dam.” A dam with a structural height of 10 feet or taller and that stores 50 acre-feet or more of water meets this description.
2. “Is at least 20 feet tall measured from the lowest point at either upstream or downstream toe of the dam to the crest of the dam.” A dam that is 20 feet or more tall meets this description regardless of its storage capacity.
3. “Poses a threat to lives and property as determined by the department after an inspection.” In other words, a barrier with a Class I (high) or Class II (significant) hazard potential classification is considered a dam, even if it does not meet the geometric criteria of 1 or 2 above.

Figure 3.10.1 Dam Ownership

Dams in Alaska

At present, there are 173 dams listed on the Alaska Dam Inventory database at the Alaska Department of Natural Resources (DNR), including State, Federal and non-jurisdictional dams (Figure 3.10.1). Most non-jurisdictional dams, constructed since the original inventory was compiled in the early 1980s, are not listed. The inventory includes four new State jurisdictional dams either currently under construction or approved for construction since 2010.

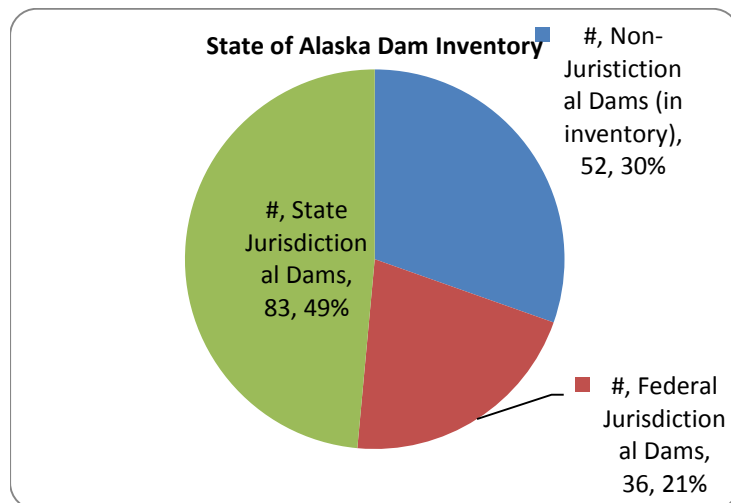


Figure 3.10.1 Dam Ownership State of Alaska dam inventory.

In Alaska, dams exist for many purposes, some of which include:

- Hydroelectric
- Water supply
- Flood control and storm water management

- Recreation
- Fish and wildlife habitat
- Fire protection
- Mine tailings

The Alaska Dam Safety Program (ADSP) is responsible for supervising the safety of the 83 dams under State jurisdiction, which includes issuing Certificates of Approval for new State jurisdictional dam construction. Non-jurisdictional dams are periodically reviewed to determine if a change in jurisdiction has occurred. For example, new development downstream of an existing dam could change the hazard potential classification of the dam.

Dam Failure

The failure of a dam can be a dramatic incident that results in a major catastrophe with substantial economic impacts and loss of life. There are varying degrees of failure which can contribute to the uncontrolled release of water from the reservoir, ranging from improper gated spillway operation to the partial or full breach of the main structural component of the dam. Lesser degrees of failure often occur in advance of a catastrophic failure and are generally amenable to mitigation if detected and properly addressed. There are several general causes of a dam failure including:

- Inadequate spillway capacity which results in dam overtopping during extreme rainfall runoff events
- Internal erosion or piping caused by seepage through the embankment or foundation or along conduits
- Improper or insufficient maintenance leading to decay and deterioration
- Inadequate design, improper construction materials, and poor workmanship
- Operation issues
- Failure of upstream dams on the same river system
- Landslides into a dam's reservoir creating a wave that overtops the dam
- Seismic instability

Figure 3.10.2 compares the causes of dam failures nationally with those in Alaska. Flooding is the nation's overwhelming leading cause of dam failures. This holds true for Alaska as well. This generally can be equated to an inadequate spillway capacity. Failures due to piping, seismic activity, and deterioration appear higher in Alaska than nationally. The low number of dams and limited failure data skews the statistics; however, the trend is generally consistent.

Dam failures can occur wherever there is a dam. The risk increases as dams age and deteriorate from deferred maintenance and decay. Eighty percent of the older dams designed and constructed before Alaska adopted dam safety regulations (1989) may have a higher risk due to design inadequacy.

Dam Hazard Potential Classification

All dams are classified according to the potential impacts of a catastrophic failure. Unfortunately the classification system is inconsistent between Federal and State agencies. FEMA promotes standardized guidelines. In general, the hazard potential classification is based on the potential loss of life, economic loss, and environmental damage. The hazard classification assigned to a structure in Alaska is based on criteria in the current dam safety regulations (11 AAC 93.157). One of three classifications is assigned to an artificial barrier in the State of Alaska:

Class I (high) hazard potential classification, if the department determines that the failure or improper operation of the barrier will result in probable loss of human life;

Class II (significant) hazard potential classification, if the department determines that the failure or improper operation of the barrier will result in

(A) A significant danger to public health;

(B) The probable loss or significant damage to homes, occupied structures, commercial property, high-value property, major highways, primary roads, railroads, or public utilities, other than losses [or damage limited to the owner of the barrier];

(C) Other probable significant property losses or damage, other than losses [or damage

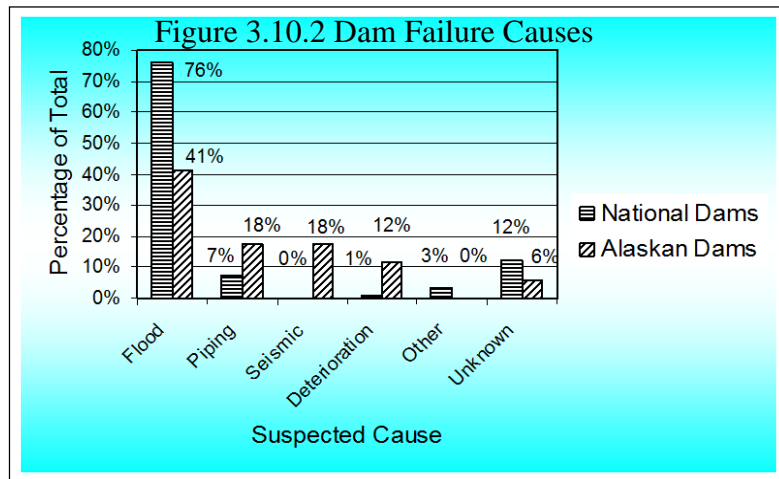


Figure 3.10.2 National and State comparison of Dam Failure Causes.

limited to the owner of the barrier]; or

(D) Probable loss of or significant damage to waters identified under 11 AAC 195.010(a) as important for the spawning, rearing, or migration of anadromous fish; or

Class III (low) hazard potential classification if the department determines that the failure or improper operation of the barrier will result in

- (A) Limited impacts to rural or undeveloped land, rural or secondary roads, and structures;
- (B) Property losses or damage limited to the owner of the barrier; or
- (C) Insignificant danger to public health.

An artificial barrier that is assigned a Class I (high) or Class II (significant) hazard potential is considered to meet the statutory definition of a dam regardless of its geometry.

The approximately 83 dams under the State's jurisdiction can be divided into these three classifications as shown in the appropriate figures previously listed. In general, the Class I dams are located in major urban areas of Alaska such as Anchorage, Juneau, Ketchikan, and Kodiak. Class II dams are located across the State and include the major tailings storage facilities at the Fort Knox and Red Dog mines.

The Alaska dam safety regulations require Class I and Class II dams to have an emergency action plan (EAP) which includes a map of the potential inundation zone in the case of a dam breach. Because of the cost in developing these maps, many of the dams do not have maps of their dam breach inundation areas. In practice, the inundation map is only required for Class I dams in Alaska, however, existing inundation map quality is limited. An informal population risk estimate for State and Federal, Class I (high) hazard potential dams in Alaska is 4,000 people.

3.10.2 Dam Failure History

There have been several dam failures in Alaska's history. The most recent event occurred in July 2000 when the City of Kake's main water supply dam failed. After the dam failed, the small reservoir drained quickly and the town became acutely aware of the importance of the dam. Significantly impacted, Kake was forced to find a temporary and long-term solution to provide water to the 800 person village. The water supply loss was the most apparent impact. The local processor lost production for the next two weeks occurring at the peak of the fishing season. The hatchery experienced an increased egg and fry mortality rate due to water quality problems. No one was injured when the dam failed, but the hatchery experienced some damage to their access road. Tragically, a child was severely scalded by boiling water in a kitchen accident later in the week when trying to make the water safe to use.

The failure of the City of Kake's Dam had a truly significant impact on the entire community.

Figure 3.10.3 Type of Alaska Dams

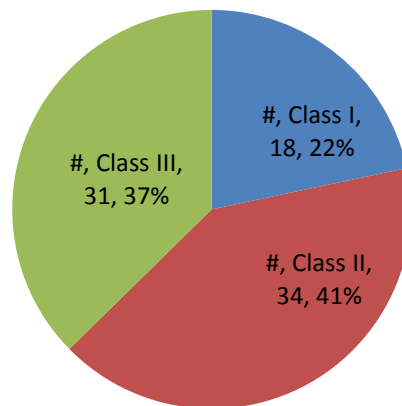


Figure 3.10.3 Type of Alaskan dams.

The response to this disaster included local residents and government entities, businesses, State agencies, and the Federal government. The initial economic impact to the community was estimated at approximately \$2 million, not including replacement of the dam. The budget for a new, replacement dam planned by the Corps of Engineers was approximately \$10 million. Construction of the new dam was completed and operations began in April, 2007.

Only one dam failure in Alaska has resulted in a fatality. Anchorage's Lake O' the Hills dam failed in 1972, allegedly resulting in the death of a child who was swept into a culvert. The inundation map for this dam includes the grounds adjacent to O'Malley Elementary School, homes, and O'Malley Road.

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3.11 Hazardous Materials

The State contains a number of thoroughfares over which hazardous substances may be transported. These include the approximate 2,500 miles of highway system, the Alaska Railroad, airports, and marine vessel traffic. All classes of hazardous substances may be expected on these routes. The most common method of transport along the highway system is with semi-tractor trailer rigs. The Alaska Railroad is also a major transporter of hazardous substances. Ocean-going vessels transport hazardous substances into and out of upper Cook Inlet and other coastal communities. Fresh water transport occurs on a smaller scale, yet can be fairly extensive in the Yukon-Kuskokwim Delta during summer months. Air transport is not a common means of transporting hazardous substances into or out of the State. Small quantities of hazardous substances may be transported to airports for subsequent distribution on fixed-wing aircraft. In addition, there are a number of fixed sites within the State where hazardous substances are stored and used. Hazardous substance releases may also occur as a result of other natural hazards, such as earthquakes, fire, floods, and weather extremes.

3.11.1 Hazard Characteristics

The definition of a hazardous substance is an element or compound which, when it enters into the atmosphere or in or upon the water or surface or subsurface land presents an imminent and substantial danger to the public health or welfare, including but not limited to fish, animals, vegetation, or any part of the natural habitat in which they are found.

“Hazardous substances” generally refers to petroleum products,

natural gas, synthetic gas, acutely toxic chemicals, and other toxic chemicals. “Hazmat” is the common term used to describe hazardous substances – those which pose a threat to safety, human health and the environment. Hazmat releases demand immediate attention because of this threat. Hazardous materials are characterized as HS (Hazardous Substances) or EHS (Extremely Hazardous Substances). While all hazardous substances can present problems when spilled, those classified as EHS are of primary concern. These substances, such as chlorine and ammonia, pose an acute inhalable toxic threat to humans.

Figure 3.11.1 Extremely Hazardous Substances

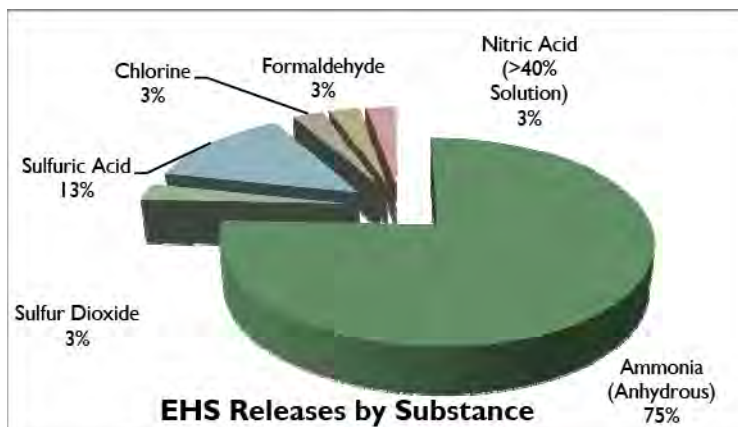


Figure 3.11.1 Extremely Hazardous Substances – Number of Incidents in Alaska during 2013.

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The U.S. Environmental Protection Agency (EPA) has classified over 300 substances as EHS. Approximately 20 of these chemicals are commonly used in Alaska. The State of Alaska experienced a total of 26 extremely hazardous substance (EHS) releases during Calendar Year 2009 (Figure 3.11.1). Figure 3.11.2 shows EHS-handling facilities throughout the State.

Figure 3.11.1 Extremely Hazardous Substances

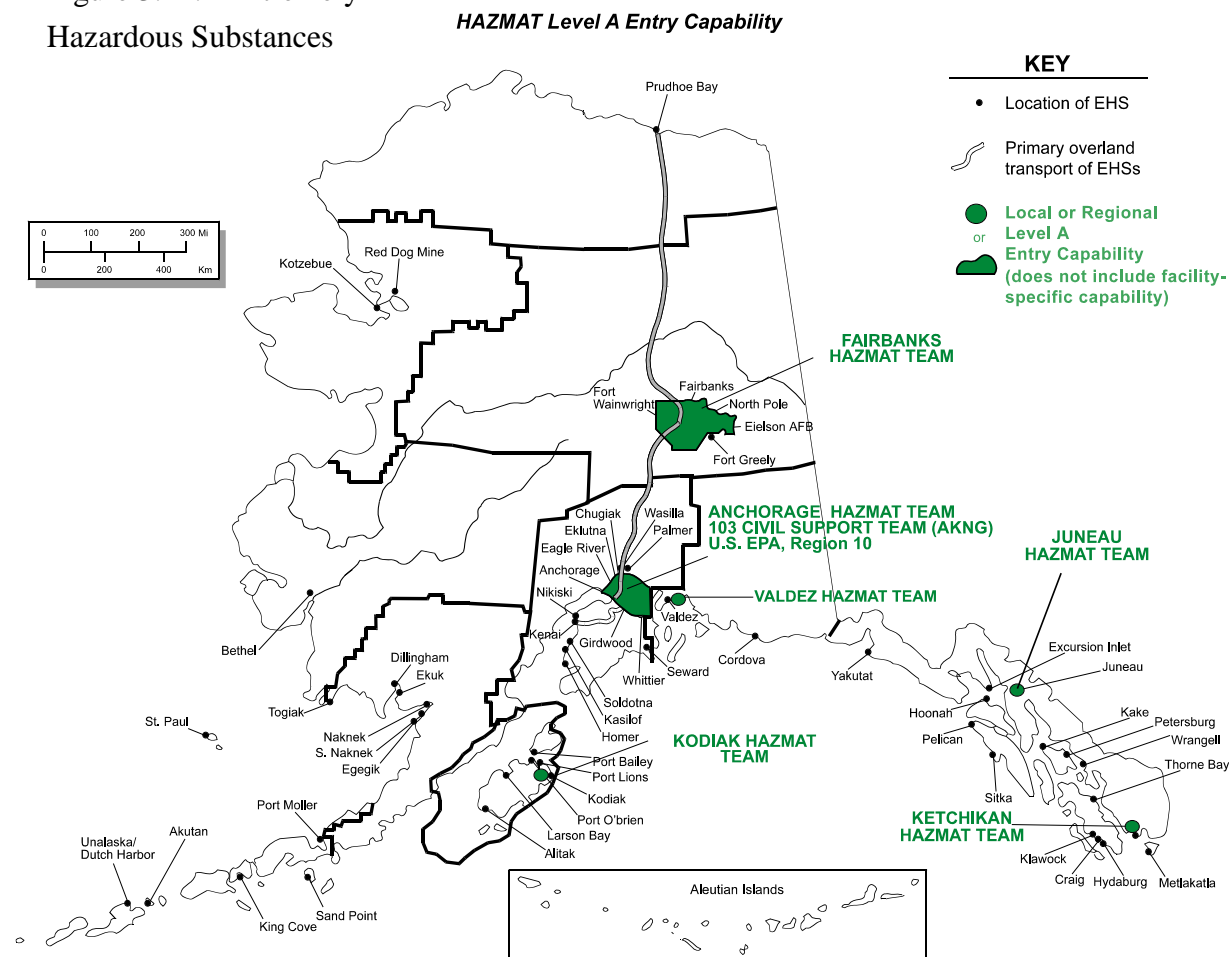


Figure 3.11.2 Extremely Hazardous Substances (EHS) handling capability in Alaska.

3.11.2 Extremely Hazardous Substance Releases

Substance & Quantity

Table 3.11.1 is a breakdown of the EHS released over the 2013 calendar year. To ensure consistency, the total volume released was converted to pounds, using a general factor of 1 gallon = 8 pounds (lbs). Anhydrous ammonia accounted for 69% of the total number of releases, followed by sulfur dioxide (29%), and sulfuric acid (8%). Chlorine, formaldehyde, and nitric acid were the other EHS chemicals released in very small quantities.

By comparison, in CY2012, anhydrous ammonia accounted for 72% of the total number of releases, followed by sulfur dioxide (10%) and sulfuric acid (9%).

Significant EHS Releases

The significant EHS releases for CY2013 were:

- 1,600 lbs. anhydrous ammonia (Sept. 13, 2013 – St. Paul Island)
- 1,169 lbs. of sulfur dioxide (Nov. 22, 2013 - Nikiski)
- 269 lbs. of sulfuric acid (July 26, 2013 – Nikiski)
- 250 lbs. of anhydrous ammonia (Aug. 8, 2013 – Prince William Sound)

Table 3.11.2 Extremely Hazardous Substance Releases

| Substance | Number of Releases | Quantity (lbs) |
|-----------------------------|--------------------|----------------|
| Ammonia (Anhydrous) | 28 | 2,509 |
| Sulfur Dioxide | 1 | 1,169 |
| Sulfuric Acid | 5 | 328 |
| Chlorine | 1 | 0.73 |
| Formaldehyde | 1 | 0.50 |
| Nitric Acid (>40% Solution) | 1 | 0.03 |
| Total | 37 | 4,007 |

Table 3.11.2 Extremely Hazardous Substances (EHS) in pounds released over the past calendar year (2013).

Figure 3.11.3 EHS Percent Quantity Released

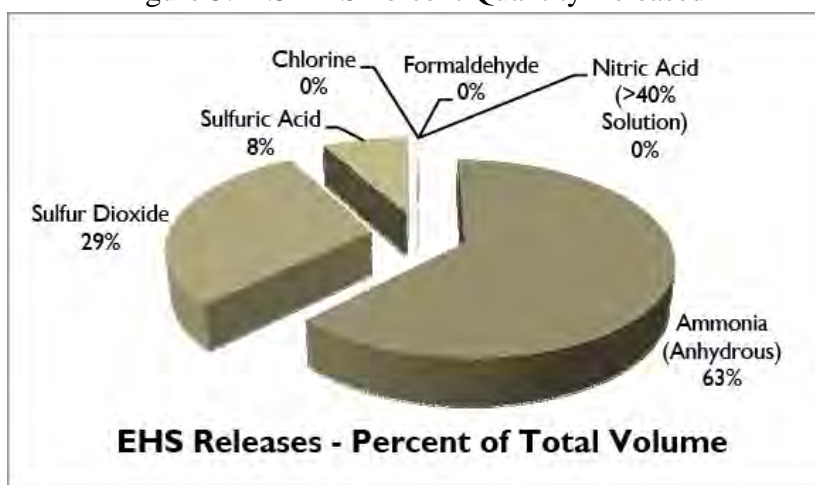


Figure 3.11.3 Extremely Hazardous Substances (EHS) Percent Quantity released in CY2013.

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EHS Releases by Location

In terms of EHS releases by subarea, the Aleutians (46%) and North Slope (16%) accounted for 62% of the total number of releases throughout the State, while the Southeast, Bristol Bay, Prince William Sound, Northwest Arctic, and Kodiak subareas comprised the remaining 38%. The Interior and Western

Figure 3.11.4 EHS Percent Released by Sub-Area

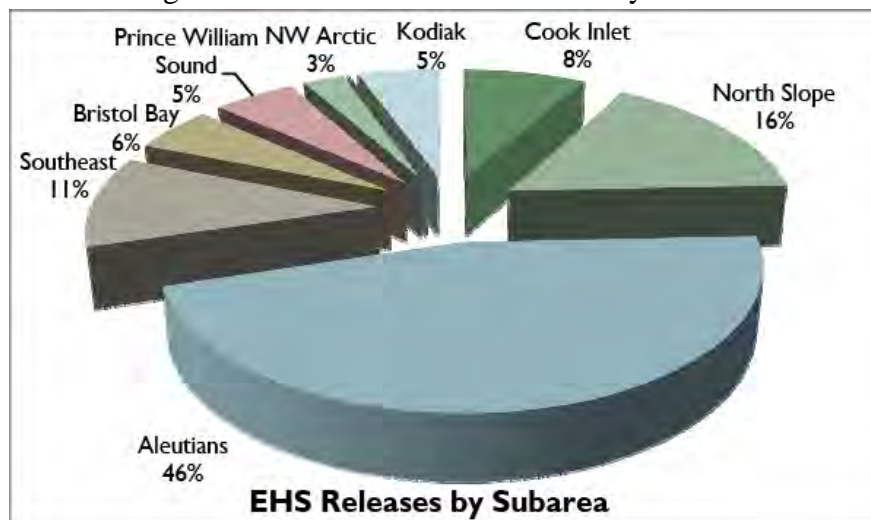


Figure 3.11.4 Extremely Hazardous Substances (EHS) percent released by subarea in 2013. Note: The Interior and Western Alaska subareas did not report any EHS releases for CY2013.

Table 3.11.2 Number of EHS Release Events by Subarea

| EHS Releases by Subarea | Number |
|-------------------------|--------|
| Cook Inlet | 3 |
| North Slope | 6 |
| Aleutians | 17 |
| Southeast | 4 |
| Bristol Bay | 2 |

Alaska subareas did not report any EHS releases for CY2013.

EHS Releases by Cause

Structural/Mechanical (70%), human factors (24%), and other causes (6%) were the primary causes for the EHS releases in the State of Alaska in CY2013.

Table 3.11.3 Number of EHS Release Events by Cause

| EHS Releases by Cause | Number |
|-----------------------|-----------|
| Structural/Mechanical | 26 |
| Human Factors | 9 |
| Other | 2 |
| Total | 37 |

Table 3.11.3 Number of Extremely Hazardous Substances (EHS) releases by cause in CY2013.

The Alaska Department of Environmental Conservation (DEC) is required by law to respond to hazardous substance releases and ensure public health, welfare, and environment protection. This includes ensuring the containment and cleanup of released material and problem correction. The two primary types of hazardous substance releases are:

1. Stationary
The uncontrolled release of hazardous substances from a fixed site such as hazardous substance storage sites, or sites where hazardous substances are used.
2. Transportation
The uncontrolled release of hazardous substances during transport such as highways, railway, pipelines, and waterways.

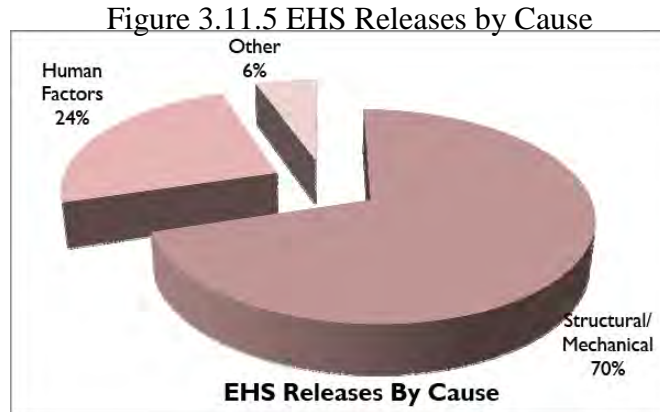


Figure 3.11.5 Extremely Hazardous Substances (EHS) releases by cause in CY2013.

Figure 3.11.6 Statewide Summary of Hazmat Transportation in Alaska

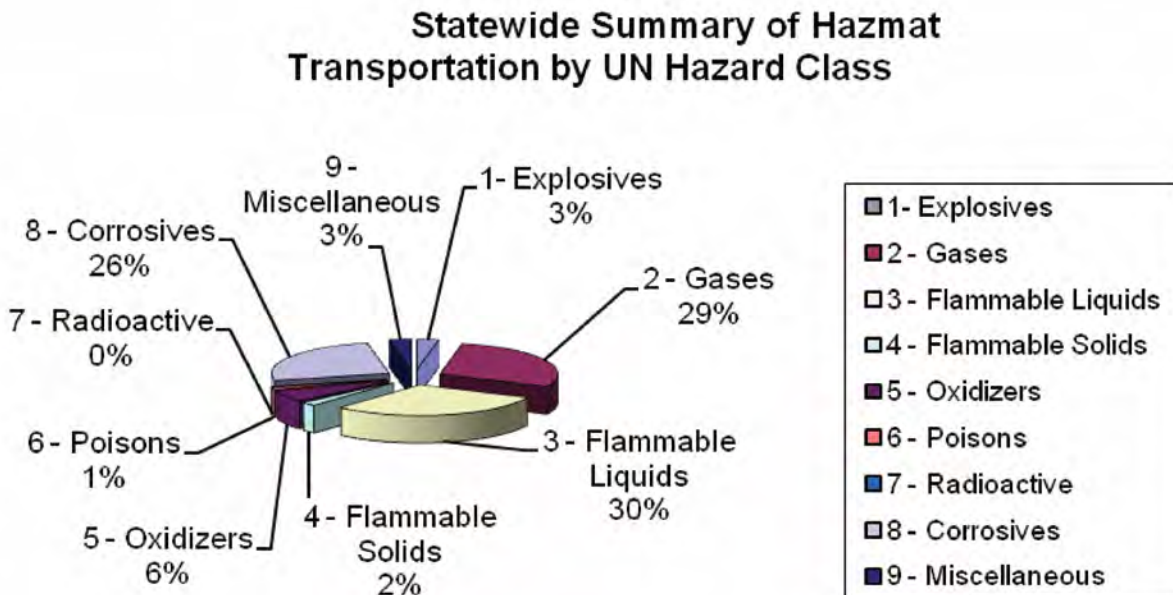


Figure 3.11.6 Statewide Summary of Hazmat Transportation in Alaska by UN Class.

Historically, State major hazardous substance incidents have involved highway and/or railway transportation. Numerous small incidents from fixed sites and roadway transportation have occurred. Persons, property, and environment at risk depend on the nature of the hazardous substance released, quantities, location, and prevailing environmental conditions (i.e. weather).

3.11.3 Contaminated Sites in Alaska

According to the State of Alaska Department of Environmental Conservation (ADEC) Spill Prevention And Response (SPAR) 2015 report, over 7,400 contaminated properties have been documented throughout Alaska. Over the last 35 years, around 70% of those sites have been closed (Figure 3.11.7). As of June 30, 2015, ADEC listed 2,231 open sites in their inventory, of which 1,705 sites were added over the past 10 years. Overall, the number of open sites has decreased 32% from 3,319 in 2004.

Figure 3.11:7 Cumulative Open and Closed Sites

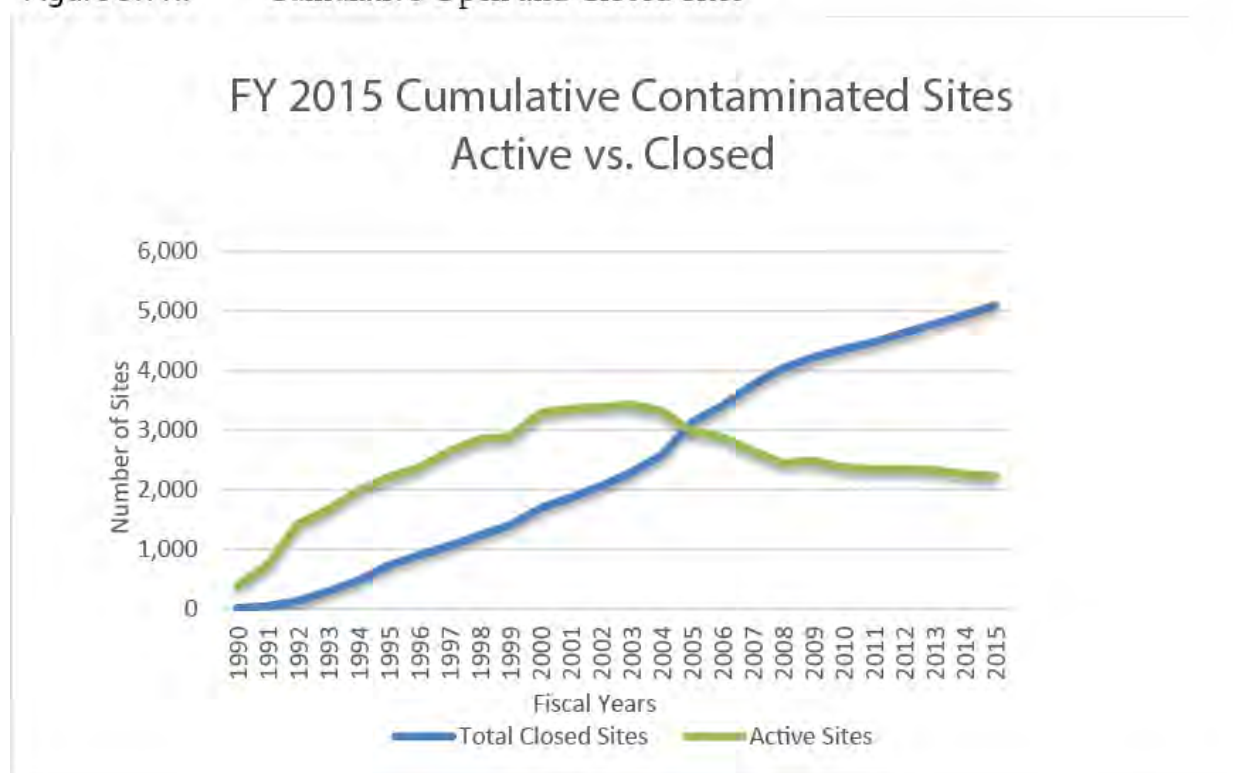


Figure 3.11.7 Source: ADEC FY15 SPAR Annual Report

Beginning July 2016, ADEC will stop tracking total risk reduction and instead report annual progress on all high priority contaminated sites posing the greatest risk to human health and the environment.

Active Sites by Type

According to ADEC, more than half of the open sites in Alaska are attributed to federal military and civilian agencies, while less than one fifth are claimed by State and local governments. The remaining third of open sites are in private ownership (Figure 3.11.8). Regionally, just over half the open sites reside in South Central, 40% in the Interior and North Slope, and less than 10% in

Southeast Alaska (Figure 3.11.9).

Figure 3.11.8 Active Sites by Type

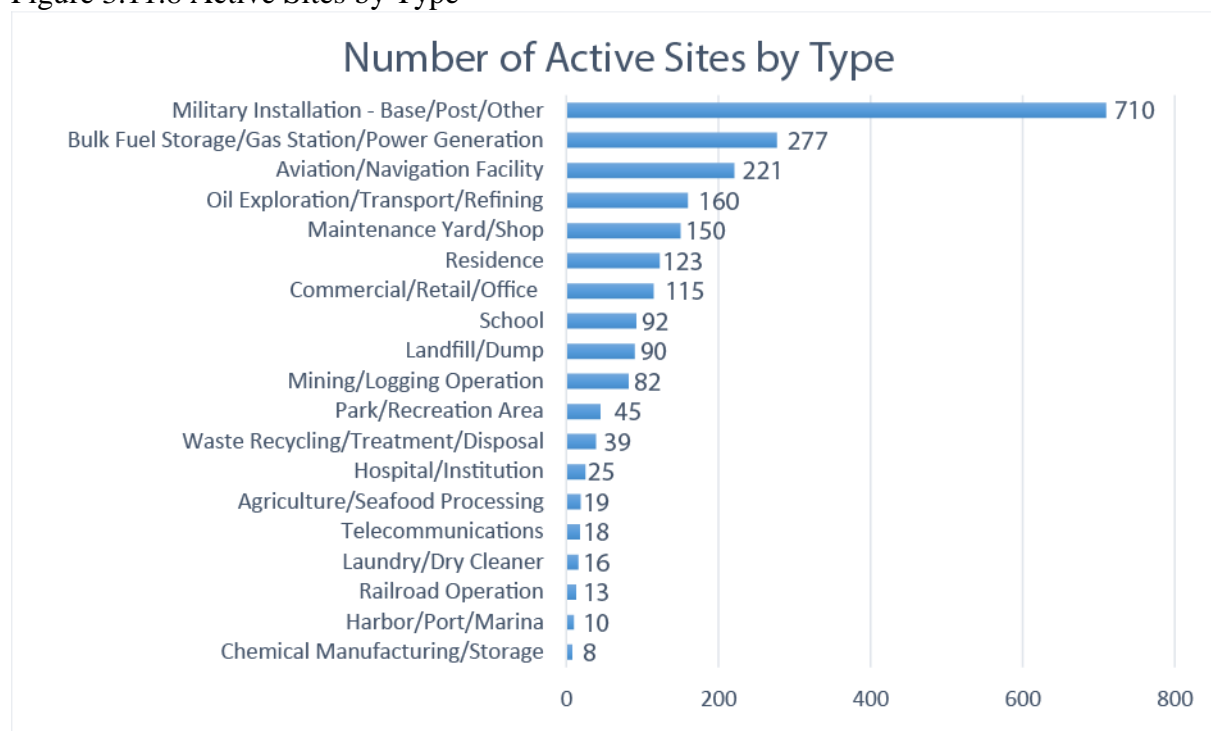


Figure 3.11.8 Source: ADEC FY15 SPAR Annual Report



Figure 3.11.9 Source: ADEC FY2015 SPAR Annual Report

Active Sites by Class and Priority

The majority of contaminant releases involve petroleum related products. Some sites have additional contaminants depending upon the activity. ADEC uses an intra-agency web-based application named the Exposure Tracking Model (ETM) ADEC uses the ETM to prioritize these sites and track cleanup progress (Figure 3.11.10).

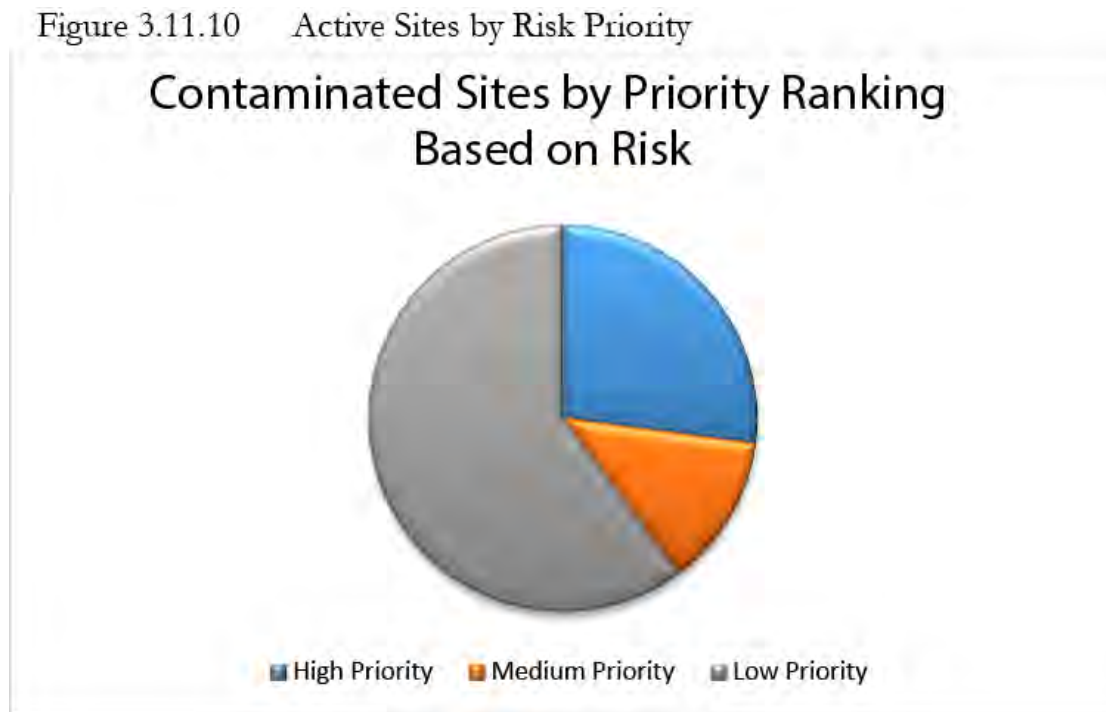


Figure 3.11.10 Source: ADEC FY2015 SPAR Annual Report

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3.12 Terrorism

3.12.1 Hazard Characteristics

The Department of Defense defines terrorism as, "the calculated use of violence or the threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious, or ideological." The threat of terrorism is ever present and an attack can occur when least expected. Combating terrorism requires a continuous state of awareness, hardening of potential targets and cooperation among anti-terrorism agencies and the public. While terrorism crimes may appear to be senseless and random, the attacks make sense to the terrorists. Often attacks are designed to gain public attention and disrupt society. No matter what resources are dedicated to the fight, every possible terrorism target cannot be protected all the time.

For purposes of the State Hazard Mitigation Plan, it is recognized every state in the nation is vulnerable to a terrorist attack and any government official or member of the public can be targeted for attack or a victim. At a minimum, prudence dictates the vulnerability to this hazard at least be considered statewide.

Terrorists strike at government and civilian targets to instill fear. Sometimes they conduct surveillance of potential targets to assess vulnerabilities. Often terrorists seek to blend in with society until they strike.

Generally, people most at risk to terroristic attacks are those working in government facilities, abortion clinics, animal research, key infrastructure and minorities. Generally, business and facilities generate substantial public attention, controversy, involve minorities or are seen as supported by the government can become targets.

Some of Alaska's communities have transportation infrastructure, utility systems, government buildings, courthouses, abortion clinics, other facilities, or provide services considered vulnerable to terrorist attack.

Simple measures such as promptly reporting suspicious activity and hardening occupancies against uninvited access can help deter and prevent terrorism attacks.

3.12.2 Examples of Terrorism

The World Trade Center bombing in New York City (2001), the Alfred P. Murrah Federal Building bombing in Oklahoma City (1995), the Olympic Centennial Park bombing in Atlanta (1996), and the Pan American Flight bombing over Lockerbie, Scotland (1998) are a few recent examples of terrorism.

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3.13 Technological, Public Health, and Human-Caused

3.13.1 Hazard Characteristics

The hazards discussed in this section include:

- Technological and Cyber Threats
- Nuclear Attack/Materials
- Civil Disorder/Disturbance
- Public Health Emergencies
- Mass Transportation Accidents

Historically, Alaska has been fortunate to not experience any significant episodes of these types of hazards. In addition, in the absence of specific intelligence information on threats or historical hazard events, the degree of vulnerability to these hazards is difficult to assess. Some of the hazards in this area present security concerns and vulnerability information is restricted. As a result, vulnerability is based on general prediction and estimation, rather than on historical evidence of impact to the State's population, property, or environment. Nevertheless, given the potential for future loss, prudence dictates that the vulnerability to these hazards at least be considered statewide.

Technological and Cyber Threats

Modern society functions through technology and cyber communications networks. While the importance to Alaska's urban locations is clear, even Alaska's vast rural areas with isolated populations depend to some extent on technology for commerce, medical, and other vital services. In fact in some ways, Alaska's remoteness makes the state more dependent on technology for information, the Internet, telecommunications, and networked systems.

Technological threats are defined as a potential loss or disruption in the State of service delivery, information, or information and telecommunication systems. The continued escalation of cyber-attacks on government, financial, and business computer systems are considered terrorist-related acts. The State Security Office (SSO) is the primary response agency for cyber events and incidents within Alaska State government. The SSO provides coordination with the U.S. Department of Homeland Security, U.S. Department of Justice, and the Alaska Department of Military and Veteran Affairs on the domestic preparedness programs to address the threat posed by cyber terrorists and other threats to Alaskan information, information and telecommunication systems and services. Other targets for cyber terrorism include public works facilities, utilities, oil and gas, and transportation facilities such as airports, train stations, bridges and ferries, military bases, schools, medical facilities, other State, and Federal facilities within Alaska.

Nuclear Attack/Materials

Federal and military installations, as well as weapons-based facilities in the State of Alaska, may house nuclear material at any given time. Management protocols for federally controlled nuclear facilities include but are not limited to the following:

- Manages onsite emergency response
- Directs in-plant radiological protection activities
- Directs emergency mechanical maintenance
- Directs emergency electrical maintenance
- Directs personnel accountability and site security
- Directs safety and hazard-control
- Performs engineering and technical analysis
- Provides computer technical support

Figure 3.13.1 Survey Vehicle

Of all the possible disasters and hazards, a strategic nuclear, biological, or chemical (NBC) attack could be the most devastating with far-reaching consequences. While the use of these weapons against Alaska is unlikely, as long as such weapons exist, there is always a potential risk. Given Alaska's strategic location and assets, there is also risk for traditional war-related attacks using conventional weapons. Regardless where the attack originated, domestic or foreign, the impact on life and property and preparedness, response, and recovery activities, are similar.



Figure 3.13.1 The survey vehicle owned by the CST103rd in Alaska can collect samples of unknown agents which will be analyzed in a lab for further identification. DHS&EM photo.

While preventing an attack may be outside the capacity of the State and its citizens, general all-hazard mitigation actions for other hazards will often support loss reduction in an attack. For example, a building retrofitted for seismic hazard that addresses lateral force resistance also improves the structures survival in a bombing. Therefore, the following list of general mitigation measures can reduce losses even when the hazard is an organized hostile attack.

- Identifying and organizing resources
- Conducting a risk or threat assessment and estimating losses
- Identifying mitigation measures will reduce the effects of the hazards and developing strategies to deal with the mitigation measures in order of priority; and
- Implementing the measures and evaluating the results (and keeping the plan up-to-date).

Civil Disorder/Disturbances

Mass civil disorder events rarely happen in Alaska. As with the hazard of terrorism, this topic is included in the State Hazard Mitigation Plan (SHMP) as a potential hazard. Most communities of the State are not likely to experience mass civil disorder, barring some extraordinary and unprecedented circumstance. The communities/groups considered to be most vulnerable to this hazard are those with concentrations of populations and large gathering places, such as sports stadiums, and universities.

Public Health Emergencies

Public health emergencies can take many forms:

- Disease Epidemics
- Nuclear, Biological, Chemical (NBC) exposure
- Infestations
- Contamination of consumables

Public health emergencies are usually caused by other natural or man-made incidents such as a flood or HAZMAT event.

The common characteristic of most public health emergencies is that they adversely impact, or have the potential to adversely impact, a large number of people. Public health emergencies can be statewide, regional, or localized in scope and magnitude.

Pandemic Potential Influenza

Influenza (flu) is a very common disease worldwide. The Centers for Disease Control and Prevention (CDC) define the flu as a contagious respiratory infection caused by influenza viruses. The virus is spread through the air and either inhaled by the host or inadvertently ingested. Each year, flu infects humans and spreads around the globe. Non-human (novel) influenza viruses, such as “bird flu” strains have a high pandemic potential because there is little to no immunity within humans.

Fortunately, influenza usually is treatable, and the mortality rate remains low. Each year, scientists estimate which particular strain of flu is likely to spread, and they create a vaccine to combat it. A flu pandemic occurs when the virus suddenly changes or undergoes an antigenic shift, permitting it to attach to a person’s respiratory system and leave the body’s immune system defenseless against the invader.

Unlike regional influenza epidemics, which occur seasonally and result in an average of 36,000 deaths in the US each year, influenza pandemics (global epidemics) occur sporadically, and have the potential to result in hundreds of thousands of deaths nationally over the course of one year. During the 20th century there were three influenza pandemics, the most severe of which occurred in 1918-19 and caused over 500,000 deaths in the US and more than 50 million deaths worldwide.

Non-human (novel) influenza strains have the potential to spread rapidly, high levels of absenteeism in the workforce can quickly jeopardize essential community services, including health care services throughout affected regions. Furthermore, it is currently estimated that it will

only take one to six months from the time the pandemic is identified to the time that the first outbreak will occur in Alaska, provided the pandemic does not start in Alaska. No one can predict exactly when or where the next influenza pandemic will occur. Therefore, it is critically important for us to consider public health mitigation measures addressing this threat.

Pandemic influenza mitigation strategy in Alaska is based upon the following knowledge:

1. The identification of a novel influenza virus with sustained human-to-human spread may give warning of a pandemic weeks or months before the first cases are identified in Alaska.
2. Most people who have access to clean water, food, sanitation, fuel, and nursing and medical care while they are sick will survive.
3. Providing services to isolated populations in rural Alaska will be a challenge.
4. Communities across the state and the country may be impacted simultaneously.
5. There could be significant disruption of public and privately owned critical infrastructure and associated services.
6. The strain of influenza that will cause the next influenza pandemic, its pathogenicity, and the time and place of emergence cannot be determined in advance.
7. No effective influenza vaccine will be available early in the course of the pandemic.
8. When influenza vaccine becomes available, it will be in short supply and may require two doses.
9. Supplies of antiviral medications that are effective against influenza will also be inadequate and need to be prioritized for use.
10. Implementation of layered social distancing measures, such as isolating the sick, screening travelers and workers, and reducing or cancelling the number of public gatherings, may help to slow the spread of influenza early in the pandemic period.
11. The State of Alaska Health and Human Services Division estimates up to 30% of the State's population could be affected (195,000 people), 15 % could require out-patience medical services; 0.3% of the total State population could require hospitalization and 0.1% of the total population will die as a result of flu related causes (650 people).
12. State of Alaska Administrative Order No. 228 orders the Department of Military and Veterans Affairs, DHS&EM to assume overall responsibility for interagency coordination of pandemic influenza preparedness and the Department of Health and Social Services, Division of Public Health (DPH) to assume primary functional and technical responsibility for pandemic influenza preparedness.

Pandemic influenza mitigation strategies include public health and disease education including educating health-care providers throughout Alaska on the diagnosis and management of pandemic influenza and on appropriate infection control strategies will minimize the risk of viral transmission in the face of influenza. This may be in-part accomplished through the development of appropriate community-wide strategies that help prevent viral transmission in communities, in

non-healthcare institutions, and in households. Examples of such strategies include:

- Educating the community about social distancing, disseminating travel advisories, screening persons arriving from affected areas, educating schools, addressing public gatherings, and using alternate care sites.
- Improvement of the quality and access to public health facilities and practitioners
- Disease surveillance and investigation including a data management system.
- Integration of pandemic influenza planning with other planning activities conducted in the State of Alaska including State, Federal and local agencies.

Information presented here is from the CDC online at <http://www.cdc.gov/flu/pandemic-resources/index.htm> .

Mass Transportation Accidents

For the purpose of this plan, mass transportation is the means of transferring large groups of people from one place to another. In Alaska, mass transportation accidents include:

- Commercial passenger airlines
- Alaska Railroad
- Buses
- Cruise ships and ferries

Visitor Statistics

The State estimates nearly 1.7 million out-of-state visitors came to Alaska during the summer market between May and September, 2013. Over half of these visitors (53%) exited the state via cruise ship; 43% exited via air; 3% exited via highway; and 1% exited via ferry. The total number of visitors to Alaska from May 2013 through April 2014 was 1,966,700, up 6% from the same period ending in 2013. Visitors during the summer market (1,693,700) represented 86 % of the total while the winter market (273,000) represented 14%.

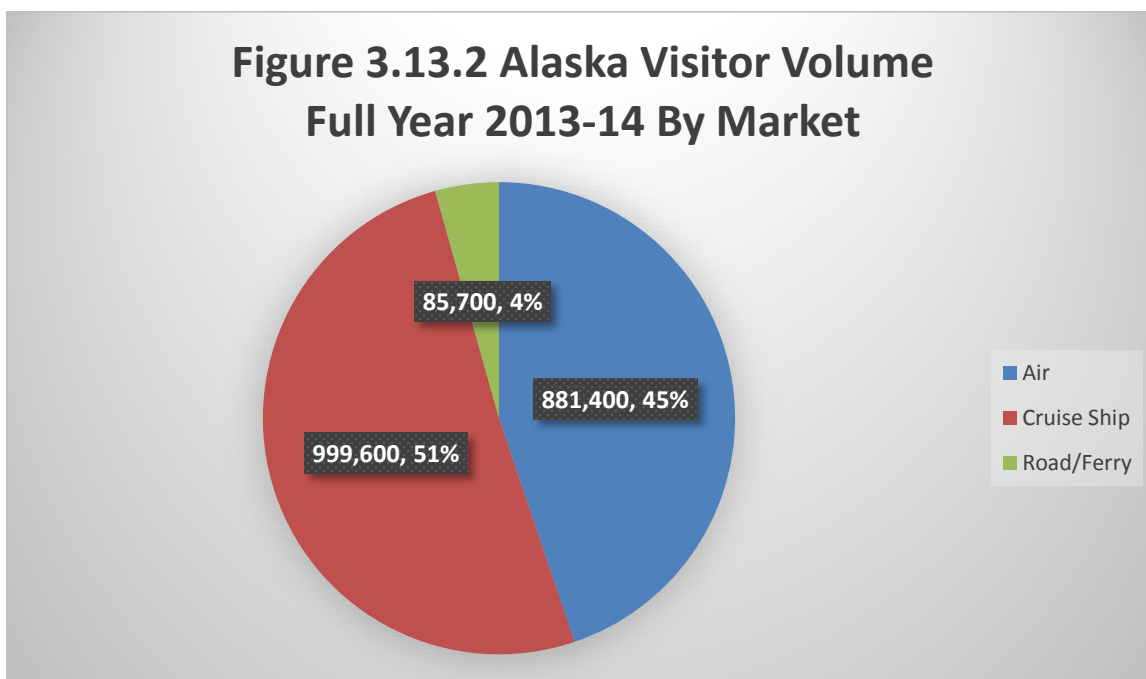


Figure 3.13.2 Source: Alaska Visitor Statistics Program VI, Interim Visitor Volume Report

The Ted Stevens International Airport Police and Fire Department is responsible for ensuring around-the-clock police, fire, and first responder emergency medical services at Anchorage International Airport and its surrounding property, such as Lake Hood. The Airport Police and Fire Department protects over 7,000 employees and over 5,000 acres of land at Ted Stevens Anchorage International Airport. Other responsibilities include enforcing all municipal, State and Federal laws with special emphasis on Transportation Security Administration (TSA) regulations and policies. Airport fire and police are supplemented by automatic mutual aid agreements with the Anchorage Fire and Police Departments.

Rail

The Alaska Railroad is a powerful economic engine hauling over 6 million tons of freight in 2009. They transport building products to construct Alaska homes and businesses and support critical resource industries such as coal, oil, and gas. Trains carried more than 470,000 passengers in 2009, providing access for Alaskans and visitors from tidewater in Seward and Whittier to the interior of Alaska on over 650 miles of track. The railroad operates on only one primary track through most of its routes and therefore has extensive experience with disruption to its passenger rail and tourist operations. The Alaska Railroad routinely uses buses to complement their passenger rail service and can quickly transition to transporting passengers by bus when rail service is interrupted.

3.14 Economic

This section is specific to Alaska's Commercial, Subsistence, and Sport Fishing industry. Information sources are:

- Understanding Alaska: People, Economy, and Resources Institute of Social and Economic Research at the University of Alaska Anchorage, May 2006.
- U.S. Department of Commerce Press Release, Commerce Secretary Gary Locke Announces "Fishery Failure" Determination for Alaska Chinook salmon January 15, 2010.

Alaska's fisheries are among the richest in the world; they are also vital to the economy of Alaskan communities. The State government manages Alaska's commercial salmon fisheries. Much of Alaska's salmon industry has been in economic trouble for years. Between 1988 and 2000, Alaskan fishermen's earnings plummeted by nearly three-quarters.

2010 Yukon River King Salmon

In 2010 there was a commercial fishery failure for the Yukon River King Salmon (also known as Chinook) due to low returns. In 2008 the commercial King Salmon harvest was 89% below the previous five-year average. Commercial King Salmon fishing on the Yukon River was banned in 2009. Consecutive years of low King Salmon returns on the Yukon River caused economic hardship for fishermen and their families

Under Section 312(a) of the Magnuson-Stevens Act the Secretary of the U.S. Department of Commerce can determine the commercial fishery failure resulted from a fishery resource disaster due to natural causes, man-made causes beyond the control of fishery managers, or undetermined causes.

The Association of Village Council Presidents, the Alaska Federation of Natives, and the villages of Kwethluk and Chevak asked the U.S. Department of Commerce Secretary Locke for a disaster determination. Their request was supported by the Alaska State Legislature and Alaska's Congressional delegation. The State of Alaska Department of Commerce, Community, and Economic Development (DCCED) staff provided the Governor's office with necessary economic information to pursue a Federal economic disaster declaration. This analysis and support lead the Governor to request an economic disaster declaration which was granted by Secretary Locke.

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3.15 Hazard Probability

Tables 3.15.1 and 3.15.2 quantify the hazards for each Borough or Rural Education Attendance Area (REAA) and determine probability. The ratings are low, moderate, and high, and indicate the number of previous occurrences. This information references DHS&EM internal records, individual Borough Emergency Operations Plans (EOP) and Hazard and Vulnerability Analyses (HVAs). A summary of community EOPs and HVAs were used and applied to census areas. Table 4.2 references the DHS&EM Disaster Cost Index 1978 - 2013 (Appendix 13). This matrix also includes large, documented events prior to 1978, such as, the 1964 Earthquake, 1958 Lituya Bay landslide and tsunami, and the 1946 Unimak Island tsunami.

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| | Flood | Wildland Fire | Earthquake | Volcano | Snow Avalanche | Tsunami & Seiche | Weather | Ground Failure | Erosion | Technological | Economic |
|------------------------|-------|---------------|------------|---------|----------------|------------------|---------|----------------|---------|---------------|----------|
| Alaska Gateway (REAA) | Y-M | Y-H | Y-M | N | Y-L | N | Y-L | Y-L | N | N | N |
| Aleutians East Borough | N | N | Y-M | Y-M | N | Y-H | Y-M | Y-M | N | Y-L | Y-L |
| Aleutian Region (REAA) | N | N | Y-M | Y-M | N | Y-M | Y-H | N | N | Y-L | Y-H |
| Annette Island (REAA) | N | Y-L | Y-L | N | Y-M | Y-L | Y-L | N | Y-L | N | N |
| Bristol Bay Borough | Y-L | N | Y-L | Y-L | Y-L | N | Y-M | N | N | Y-L | Y-H |
| Bering Strait (REAA) | Y-M | Y-M | Y-M | N | N | N | Y-H | Y-M | Y-H | Y-L | Y-H |
| Juneau | Y-M | Y-M | Y-M | N | Y-H | Y-L | Y-H | Y-M | Y-M | Y-L | N |
| Sitka | Y-M | Y-L | Y-H | N | Y-H | Y-H | Y-H | Y-H | Y-H | Y-L | Y-L |
| Yakutat | Y-M | Y-L | Y-L | Y-L | Y-M | Y-H | Y-H | Y-H | Y-M | Y-L | Y-L |
| Chatham (REAA) | Y-L | Y-M | Y-M | N | Y-H | Y-M | Y-H | Y-H | Y-M | Y-L | Y-L |
| Chugach (REAA) | Y-H | Y-M | Y-H | Y-L | Y-H | Y-H | Y-M | Y-L | Y-M | Y-L | Y-L |
| Copper River (REAA) | Y-M | Y-M | Y-M | Y-L | Y-H | N | Y-M | Y-L | Y-M | Y-L | N |
| Denali Borough | Y-L | Y-H | Y-M | N | Y-M | N | Y-H | Y-M | Y-L | N | N |
| Delta/Greely (REAA) | Y-L | Y-H | Y-M | N | Y-M | N | Y-H | Y-M | Y-L | Y-L | Y-M |
| Fairbanks North Star | Y-M | Y-H | Y-M | N | Y-M | N | Y-M | Y-M | Y-M | Y-L | Y-M |

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| Borough | | | | | | | | | | | |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Haines Borough | Y-M | Y-M | Y-H | N | Y-H | Y-L | Y-H | Y-M | Y-M | Y-L | N |
| Iditarod Area REAA | Y-H | Y-M | Y-L | N | Y-L | N | Y-H | Y-M | Y-M | N | N |
| Kashunamiut REAA | Y-H | Y-L | Y-M | N | N | N | Y-H | Y-H | Y-M | N | Y-L |
| Ketchikan Gateway Borough* | Y-M | Y-L | Y-M | N | Y-M | Y-L | Y-L | Y-L | Y-L | Y-L | Y-M |
| Kodiak Island Borough | Y-H | Y-M | Y-H | Y-H | Y-L | Y-M | Y-H | Y-H | Y-M | Y-L | Y-L |
| Kenai Peninsula Borough | Y-H | Y-H | Y-H | Y-H | Y-M | Y-H | Y-H | Y-L | Y-M | Y-L | Y-H |
| Kuspuk REAA | Y-H | Y-M | Y-M | N | N | N | Y-H | N | Y-M | N | N |
| Lower Kuskokwim REAA | Y-H | Y-M | Y-M | N | N | N | Y-H | Y-H | Y-M | Y-L | Y-M |
| Lake & Peninsula Borough | Y-M | Y-M | Y-H | Y-H | Y-L | Y-M | Y-H | Y-L | Y-L | Y-L | Y-L |
| Lower Yukon REAA | Y-H | Y-H | Y-M | N | N | N | Y-H | N | Y-H | Y-L | Y-H |
| Municipality of Anchorage | Y-M | Y-M | Y-H | Y-M | Y-M | N | Y-M | Y-L | N | Y-M | Y-M |
| Matanuska-Susitna Borough | Y-H | Y-H | Y-H | Y-M | Y-M | N | Y-M | Y-L | Y-M | Y-M | Y-M |
| Northwest Arctic Borough | Y-M | Y-M | Y-M | N | N | N | Y-H | N | Y-M | Y-L | Y-L |

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| | | | | | | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| North Slope Borough | Y-M | Y-L | Y-L | N | N | N | Y-H | Y-M | Y-M | Y-M | Y-M |
| Petersburg | Y-L | Y-M | Y-L | N | Y-M | Y-L | Y-M | Y-M | Y-L | N | N |
| Pribilof Island REAA | Y-L | N | Y-M | N | N | Y-L | Y-H | N | Y-M | N | Y-H |
| Southeast Island REAA | Y-L | Y-M | Y-M | N | Y-H | Y-M | Y-M | Y-L | Y-M | Y-L | Y-L |
| Southwest Region REAA | Y-M | Y-M | Y-M | Y-L | Y-L | Y-L | Y-H | N | Y-M | Y-L | Y-M |
| Wrangell | Y-L | Y-M | Y-L | N | Y-H | Y-L | Y-M | Y-M | Y-L | N | N |
| Yukon Flats REAA | Y-H | Y-M | Y-M | N | Y-L | N | Y-M | N | Y-L | N | N |
| Yukon-Koyukuk REAA | Y-H | Y-M | Y-L | N | Y-L | N | Y-M | Y-L | Y-M | N | N |
| Yupiit REAA | Y-H | N | Y-M | N | N | N | Y-M | Y-L | Y-L | N | Y-L |

Table 3.15.1 2013 Hazard and Vulnerability Matrix. **Y:** Hazard is present in jurisdiction but probability unknown; **Y – L:** Hazard is present with a low probability of occurrence within the next ten years. Event has up to 1 in 10 years chance of occurring; **Y – M:** Hazard is present with a moderate probability of occurrence within the next three years. Event has up to 1 in 3 years chance of occurring; **Y – H:** Hazard is present with a high probability of occurrence within the calendar year. Event has up to 1 in 1 year chance of occurring; **N:** Hazard is not present; **U:** Unknown if the hazard occurs in the jurisdiction.

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| | Flood | Wildland Fire | Earthquake | Volcano | Snow Avalanche | Tsunami & Seiche | Weather | Ground Failure | Erosion | Technological | Economic |
|------------------------------|-------|---------------|------------|---------|----------------|------------------|---------|----------------|---------|---------------|----------|
| Alaska Gateway REAA | 6 L | 2-L | 1 L | | | | 1-L | | | 1 L | |
| Aleutians East Borough | | | | | 1 L | | 2 L | | | 2 L | 1 L |
| Aleutian Region REAA | | | | | | | 2 L | 1L | | | |
| Annette Island REAA | | | | | | | 2 L | | | 1 L | 1 L |
| Bristol Bay Borough | 2 L | | | | 1 L | | 5 L | | | | |
| Bering Strait REAA | 2 L | 3 L | | | | | 21 L | | 1 L | 3 L | 3 L |
| Juneau | 1 L | | | | | | 1 L | | 1 L | | |
| Sitka | 1 L | | | | | | 3 L | 1 L | 1 L | | |
| Yakutat | | | 1 L | | | | 1-L | | | | |
| Chatham REAA | 3 L | 3 L | | | | 1 L | 3 L | 1 L | 1 L | 6 L | 1 L |
| Chugach REAA | 3 L | | 1 L | | 3 L | | 4 L | 1 L | | | 1 L |
| Copper River REAA | 8 L | | 1 L | | | | 3 L | | | | |
| Denali Borough | 2 L | 1 L | 1 L | | 1 L | | 1 L | | | | |
| Delta/Greely REAA | 2 L | 4 L | 1 L | | | | | | | | |
| Fairbanks North Star Borough | 5 L | 1 L | 1 L | | 1 L | | 3 L | | | | |
| Haines Borough | 4 L | | | | | | 1 L | | 2 L | 2 L | 1 L |
| Iditarod Area REAA | 6 L | 3 L | | | | | | | 1 L | | |

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| | | | | | | | | | | | |
|----------------------------|------|-----|-----|-----|-----|--|------|-----|-----|-----|-----|
| Kashunamit REAA | | | | | | | 1-L | | | | |
| Ketchikan Gateway Borough* | | | | | | | | | | 1 L | |
| Kodiak Island Borough | 2 L | | | | 1 L | | 7 L | 1 L | | 1 L | 1 L |
| Kenai Peninsula Borough | 11 L | | 1 L | 3 L | 2 L | | 9 L | | | 1 L | 3 L |
| Kuspuk REAA | 10 L | 1 L | | | | | | | | 2 L | 1 L |
| Lower Kuskokwim REAA | 11 L | 1 L | | | | | 10 L | | 2 L | 2 L | 1 L |
| Lake & Peninsula Borough | 2 L | 2 L | | | 1 L | | 4 L | | | | |
| Lower Yukon REAA | 11 L | 4 L | | | | | 7 L | | 1 L | 1 L | |
| Municipality of Anchorage | 5 L | | 2 L | 2 L | 1 L | | 5 L | | | | 2 L |
| Matanuska-Susitna Borough | 7 L | 2 L | 2 L | 2 L | 7 L | | 7-L | | 2 L | | 2 L |
| Northwest Arctic Borough | 7 L | | | | | | 10 L | | 1 L | 1 L | |
| North Slope Borough | 3 L | 2 L | | | | | 4 L | | | | |
| Pribilof Island REAA | | | | | | | 3 L | | | | |
| Southeast Island REAA | 2 L | 1 L | | | | | 3 L | 2 L | | 2 L | 2 L |
| Southwest Region | 2 L | 1 L | | | | | 7 L | | | 2 L | 3 L |

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| | | | | | | | | | | | |
|--------------------|------|------|-----|--|--|--|-----|--|--|-----|-----|
| REAA | | | | | | | | | | | |
| Yukon Flats REAA | 10 L | 5 L | | | | | | | | 2 L | 1 L |
| Yukon-Koyukuk REAA | 12 L | 1 L | 1 L | | | | 1 L | | | | 1 L |
| Yupiit REAA | 2 L | | | | | | 2 L | | | | |
| Statewide | 1 L | 10 L | | | | | 3 L | | | | 8 L |

Table 3.15.2 Previous Occurrence of Hazards Matrix from 1978 through 2013. **Extent:** **Z** - Zero - Used for historical information. An event occurred but caused no damage or loss; **L** - Limited – Minimal through maximum damage to part of community. short of the definition for total extent; **T** -Total – Impact encompasses the entire community; **Number**-Occurrences.

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4. Hazard Analysis

A hazard analysis predicts the extent of exposure resulting from a hazard event of a known intensity. The analysis provides quantitative data which is applied to identify and prioritize potential mitigation measures by focusing on communities with the greatest risk. A vulnerability analysis is divided into five steps:

1. Asset Inventory
2. Vulnerability Analysis Methodology
3. Data Limitations
4. Exposure Analysis for Current Assets
5. Land Use and Future Development Trends

4.1 Asset Inventory

Assets are grouped into the following categories:

- Critical Infrastructure
- People
- Residential Properties
- Repetitive Loss Properties.

4.1.1 Critical Infrastructure

The following is a list of critical infrastructure classes for communities in Alaska. More specific information was provided for the National Critical Infrastructure Prioritization Program Data Call, 19 February 2013, in coordination with Alaska's Department of Homeland Security Protective Security Advisor. DHS&EM participates in the annual data call using criteria developed by the Homeland Infrastructure Threat and Risk Analysis Center's (HITRAC) National Critical Infrastructure Prioritization Program (NCIPP). The resulting list of critical infrastructure is used in the development of the Division's infrastructure protection plans and programs, and in applying State risk mitigation efforts in the most effective manner.

Critical Infrastructure in Alaska

- Fire Stations
- Police Stations
- Emergency Operations Centers
- Hospitals, Clinics, & Assisted Living Facilities
- Water & Waste Water Treatment Facilities
- Fuel Storage Facilities
- Community Halls & Civic Centers
- Airports
- Schools
- Telecommunications Structures & Facilities
- Satellite Facilities
- Community Washeterias
- Harbors / Docks / Ports
- Landfills & Incinerators
- Power Generation Facilities
- Oil & Gas Pipeline Structures & Facilities
- Any Designated Emergency Shelter
- Community Cemeteries
- Community Stores
- Service Maintenance Facilities
- Critical Bridges
- Radio Transmission Facilities
- Reservoirs & Water Supply Lines
- National Guard Facilities
- Community Freezer Facilities

For the 2013 Plan update, information regarding State facilities, public schools and the University system was incorporated into the risk analysis. State assets and associated values are detailed in the following sections.

- The Departments of Transportation and Public Facilities (DOT/PF) and Administration (DOA), Division of Risk Management provided location and replacement values for State owned facilities and roads (including those found in State Parks and Forests). Information regarding State facilities and roads are displayed on Tables 4.1 and 4.2.
- Schools in Alaska fall under several, varying jurisdictions. Total insured value and staff numbers organized by Borough/REAA are displayed on Table 4.3. The State owns Mt. Edgecumbe High School, a boarding school in Sitka, Alaska. The value of that facility is incorporated into appropriate HVAs. In many Alaska communities, the school facilities serve as the primary emergency shelter and are considered critical infrastructure.
- The University of Alaska provided facility values for university properties throughout the State, displayed on Table. 4.4.

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| Table 4.1 State Infrastructure | Airports (DOT/PF Controlled) | Hospitals | Alaska Railroad Depots | Schools | Insurance Value | Dams | Replacement Value | Bridges | Replacement Value |
|--|------------------------------------|-----------|------------------------------|---------|--------------------|---------|----------------------|---------|----------------------|
| Alaska Gateway (REAA) | 6 | 0 | 0 | 8 | \$48,293,056 | 0 | \$0 | 1 | \$71,963,000 |
| Aleutians East Borough | 5 | 0 | 0 | 6 | \$45,000,000Est | 4 | Unknown | 0 | \$0 |
| Aleutian Region (REAA) | 3 | 0 | 0 | 2 | \$59,074,028 | 10 | \$0 | 2 | \$8,673,435 |
| Annette Island (REAA) | 2 | 0 | 0 | 3 | \$28,060,350 | 0 | \$0 | 1 | \$504,383 |
| Bristol Bay Borough | 2 | 0 | 0 | 2 | \$33,479,006 | 0 | \$0 | 3 | \$3,649,148 |
| Bering Strait (REAA) | 20 | 1 | 0 | 15 | \$353,051,455 | 0 | \$0 | 28 | \$40,441,716 |
| City & Borough of Juneau | 1 | 1 | 0 | 14 | \$22,904,112 | 3 | \$21,000,000 | 37 | \$85,509,526 |
| City & Borough of Sitka | 5 | 2 | 0 | 6 | \$88,246,500 | 0 | \$0 | 8 | \$36,375,026 |
| City & Borough of Wrangell* | 2 | 1 | 0 | 4 | \$44,983,384 | unknown | unknown | * | * |
| City & Borough of Yakutat | 1 | 0 | 0 | 1 | \$15,783,018 | 0 | \$0 | 10 | \$6,622,124 |
| Chatham (REAA) | 5 | 0 | 0 | 5 | \$32,654,437 | 1 | Unknown | 1 | \$921,171 |
| Chugach (REAA) | 1 | 2 | 1 | 4 | \$15,716,499 | 5 | \$14,494,000 | 98 | \$365,117,224 |
| Copper River (REAA) | 9 | 0 | 0 | 7 | \$68,344,164 | 0 | \$0 | 0 | \$0 |
| Denali Borough | 5 | 0 | 1 | 4 | \$29,873,593 | 2 | Unknown | 23 | \$79,313,618 |
| Delta-Greely (REAA) | 9 | 0 | 0 | 6 | \$46,151,188 | 1 | Unknown | 0 | \$0 |
| Fairbanks North Star Borough | 1 | 2 | 1 | 35 | \$1,467,654 | 3 | Unknown | 148 | \$343,362,759 |
| Haines Borough | 3 | 0 | 0 | 4 | \$39,710,747 | 0 | \$0 | 21 | \$26,490,710 |
| Iditarod Area (REAA) | 10 | 0 | 0 | 8 | \$48,787,598 | 1 | \$0 | 0 | \$0 |
| Kashunamiut (REAA) | 1 | 0 | 0 | 1 | \$3,000,000 Est | 0 | \$0 | 0 | \$0 |

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| Table 4.1 State Infrastructure | Airports (DOT/PF Controlled) | Hospitals | Alaska Railroad Depots | Schools | Insurance Value | Dams | Replacement Value | Bridges | Replacement Value |
|-------------------------------------|------------------------------------|-----------|------------------------------|---------|----------------------|------|----------------------|---------|----------------------|
| Ketchikan Gateway Borough | 4 | 1 | 0 | 10 | unavailable | 5 | Unknown | 26 | \$114,640,331 |
| Kodiak Island Borough | 7 | 1 | 0 | 14 | \$300,000,000 est | 18 | Unknown | 21 | \$43,301,494 |
| Kenai Peninsula Borough | 14 | 3 | 1 | 44 | \$549,017,951 | 5 | \$365,000,000 | 58 | \$112,882,724 |
| Kuspuk (REAA) | 7 | 0 | 0 | 9 | \$116,960,300 | 0 | \$0 | 0 | \$0 |
| Lower Kuskokwim (REAA) | 20 | 1 | 0 | 28 | \$375,670,805 | 1 | Unknown | 0 | \$0 |
| Lake & Peninsula Borough | 16 | 0 | 0 | 14 | \$86,777,907 | 0 | \$0 | 2 | \$1,044,495 |
| Lower Yukon (REAA) | 17 | 0 | 0 | 11 | \$302,088,625 | 0 | \$0 | 0 | \$0 |
| Municipality of Anchorage | 2 | 6 | 3 | 99 | \$1,909,107,869 | 2 | \$10,000,000 | 111 | \$390,881,040 |
| Matanuska-Susitna Borough | 8 | 1 | 2 | 43 | \$2,558,470 | 1 | \$300,000 | 70 | \$232,080,752 |
| Northwest Arctic Borough | 12 | 1 | 0 | 12 | \$312,429,495 | 5 | Unknown | 3 | \$1,936,686 |
| North Slope Borough | 6 | 1 | 0 | 11 | unavailable | 2 | Unknown | 43 | \$89,644,448 |
| Pribilof Island (REAA) | 2 | 0 | 0 | 2 | \$63,908,126 | 0 | \$0 | 0 | \$0 |
| Southeast Island (REAA) | 4 | 1 | 0 | 8 | \$182,414,559 | 5 | Unknown | 52 | \$57,699,192 |
| Southwest Region (REAA) | 10 | 1 | 0 | 8 | \$164,187,193 | 0 | \$0 | 5 | \$1,666,565 |
| Yukon Flats (REAA) | 13 | 0 | 0 | 8 | \$75,153,220 | 1 | Unknown | 0 | \$0 |
| Yukon-Koyukuk (REAA) | 13 | 0 | 0 | 10 | \$156,188,082 | 0 | \$0 | 61 | \$99,240,370 |
| Yupiit (REAA) | 3 | 0 | 0 | 3 | \$67,360,000 | 0 | \$0 | 3 | \$2,293,608 |

Table 4.1 State Infrastructure and Estimated Replacement Values

Table 4.2 State Owned Roads and Replacement Value Estimates

| Roads | Paved (miles) | Replacement Cost | Unpaved (miles) | Replacement Cost | Total Replacement Cost |
|---|------------------|-------------------------|--------------------|---------------------------|-------------------------|
| All REAA Roads | 1664.90 | \$8,324,515,000 | 1500.350 | \$3,000,700,000.00 | \$11,325,215,000 |
| Aleutians East Borough | 0.00 | \$0 | 20.704 | \$41,408,000.00 | \$41,408,000 |
| Bristol Bay Borough | 16.30 | \$81,490,000 | 2.788 | \$5,576,000.00 | \$87,066,000 |
| City & Borough of Juneau | 96.24 | \$481,175,000 | 1.140 | \$2,280,000.00 | \$483,455,000 |
| City & Borough of Sitka | 14.85 | \$74,245,000 | 1.621 | \$3,242,000.00 | \$77,487,000 |
| City & Borough of Yakutat | 6.50 | \$32,505,000 | 49.563 | \$99,126,000.00 | \$131,631,000 |
| City & Borough of Wrangell | 13.18 | \$65,915,000 | 0.000 | \$0.00 | |
| Denali Borough | 107.26 | \$536,305,000 | 52.493 | \$104,986,000.00 | \$641,291,000 |
| Fairbanks North Star Borough | 552.85 | \$2,764,265,000 | 69.206 | \$138,412,000.00 | \$2,902,677,000 |
| Haines Borough | 70.97 | \$354,840,000 | 0.413 | \$826,000.00 | \$355,666,000 |
| Ketchikan Gateway Borough | 42.77 | \$213,835,000 | 14.523 | \$29,046,000.00 | \$242,881,000 |
| Kodiak Island Borough | 67.10 | \$335,480,000 | 28.235 | \$56,470,000.00 | \$391,950,000 |
| Kenai Peninsula Borough | 490.49 | \$2,452,435,000 | 106.739 | \$213,478,000.00 | \$2,665,913,000 |
| Lake & Peninsula Borough | 13.28 | \$66,420,000 | 16.805 | \$33,610,000.00 | \$100,030,000 |
| Matanuska Susitna Borough | 543.89 | \$2,719,455,000 | 139.168 | \$278,336,000.00 | \$2,997,791,000 |
| Municipality of Anchorage | 336.15 | \$1,680,735,000 | 8.236 | \$16,472,000.00 | \$1,697,207,000 |
| Northwest Arctic Borough | 1.34 | \$6,695,000 | 41.042 | \$82,084,000.00 | \$88,779,000 |
| North Slope Borough | 162.02 | \$810,105,000 | 182.058 | \$364,116,000.00 | \$1,174,221,000 |
| Totals | 4200.09 | \$21,000,415,000 | 2235.084 | \$4,470,168,000.00 | \$25,470,583,000 |
| Paved \$5 Million per Mile Unpaved \$2 Million per Mile: <i>Mileage source is the State of Alaska Department of Transportation & Public Facilities Highway Data Port.</i> | | | | | |

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Table 4.3 School Systems Insured Value and Full Time Equivalent Staff

| Borough/REAA | Total Valued Insured | FTE |
|-------------------------------------|-----------------------------|-------------|
| Alaska Gateway REAA | \$48,293,056 | 32 |
| Aleutians East Borough | unavailable | 35 |
| Aleutian Region REAA | \$59,074,028 | 33 |
| Annette Island REAA | \$28,060,350 | 32 |
| Bristol Bay Borough | \$33,479,006 | 14 |
| Bering Strait REAA | \$353,051,455 | 47 |
| City and Borough of Juneau | \$22,904,112 | 377 |
| City and Borough of Sitka | \$189,611,658 | 107 |
| City and Borough of Wrangell | \$44,983,384 | 25 |
| City and Borough of Yakutat | \$15,783,018 | 12 |
| Chatham REAA | \$32,654,437 | 10 |
| Chugach REAA | \$15,716,499 | 109 |
| Copper River REAA | \$68,344,164 | 39 |
| Denali Borough REAA | \$29,873,593 | 23 |
| Delta-Greely REAA | \$46,151,188 | 62 |
| Fairbanks North Star Borough | \$1,467,654 | unavailable |
| Haines Borough | \$39,710,747 | 23 |
| Iditarod Area | \$48,787,598 | 25 |
| Kashunamiut REAA | unavailable | 25 |
| Ketchikan Gateway Borough | unavailable | 173 |
| Kenai Peninsula Borough | \$549,017,951 | 645 |
| Kuspuk REAA | \$116,960,300 | 36 |
| Lower Kuskokwim REAA | \$375,670,805 | 300 |
| Lake & Peninsula Borough | \$86,777,907 | 52 |

| | | |
|----------------------------------|------------------------|--------------|
| Lower Yukon REAA | \$302,088,625 | 12 |
| Matanuska-Susitna Borough | unavailable | 1,145 |
| Municipality of Anchorage | \$2,558,470 | 3,207 |
| Northwest Arctic Borough | \$312,429,495 | 158 |
| North Slope Borough | unavailable | 190 |
| Pribilof Islands REAA | \$63,908,126 | 11 |
| Southeast Island REAA | \$182,414,559 | 130 |
| Southwest Region | \$164,187,193 | 72 |
| Yukon Flats REAA | \$75,153,220 | 28 |
| Yukon-Koyukuk REAA | \$156,188,082 | 142 |
| Yupiit REAA | \$67,360,000 | 48 |
| TOTAL | \$3,431,295,521 | 7,379 |

Table 4.3 Source: Alaska Department of Education & Early Development, Mt. Edgecumbe High School, and the Association of Alaska School Boards (2013). Kodiak Island Borough information is unavailable.

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Table 4.4 University of Alaska Facility and Property Values

| Name | | Location | Area Sq. Ft. | Adjusted Value - Buildings | Gross Sq. Ft. | Adjusted Value |
|--|-----|-------------------|------------------|----------------------------------|------------------|----------------------|
| UAA System | | various | | | 15485 | \$35,945,180 |
| Anchorage | UAA | Anchorage | 2,255,395 | \$592,072,878 | 10,867 | \$3,536,394 |
| Kenai Peninsula | UAA | Soldotna | 89,432 | \$26,288,801 | | |
| Kachemak Bay | UAA | Homer | 18,360 | \$6,590,566 | | |
| Kodiak | UAA | Kodiak | 44,981 | \$13,799,752 | | |
| Matanuska-Susitna College | UAA | Palmer | 105,316 | \$34,885,851 | 4,618 | \$1,080,227 |
| Prince William Sound Community College | UAA | Valdez | 61,709 | \$16,174,362 | | |
| UAF System | | various | | | 24418 | \$90,784,760 |
| Fairbanks | UAF | Fairbanks | 2,903,104 | \$89,162,127 | | |
| Fairbanks Agricultural & Forestry Experiment Station | UAF | Fairbanks | 48,868 | \$3,676,394 | | |
| State Virology Laboratory | | Fairbanks | 30,362 | \$33,053,288 | | |
| Matanuska Agricultural & Forestry Experiment Station | UAF | Matanuska Borough | 89,888 | \$11,572,250 | | |
| Agricultural & Forestry Experiment Station Palmer Research Center | UAF | Palmer | | | | |
| Poker Flat Research Range | UAF | Fairbanks | 35,760 | \$12,064,679 | | |
| Seward Marine Center | UAF | Seward | 37,338 | \$9,450,054 | 4,500 | \$2,343,001 |
| Bristol Bay | UAF | Dillingham | 10,523 | \$6,594,432 | | |
| Chukchi | UAF | Kotzebue | 8,948 | \$4,871,069 | | |
| Interior-Aleutians | | various | 25,415 | \$11,308,307 | | |
| Kuskokwim | UAF | Bethel | 51,680 | \$20,558,633 | | |
| Northwest | UAF | Nome | 20,760 | \$4,883,426 | | |
| Tanana Valley Campus | | Fairbanks | 193,229 | \$9,803,798 | | |
| UAS System | | various | | | | \$12,144,430 |
| Juneau | UAS | Juneau | 441,648 | \$115,107,322 | | |
| Ketchikan | UAS | Ketchikan | 47,850 | \$17,589,192 | | |
| Sitka | UAS | Sitka | 68,058 | \$12,543,719 | | |
| Statewide Office of Land Management | SPS | State | 3,745 | \$180,443 | | |
| Statewide Services | SPS | State | 108,670 | \$43,601,128 | | \$638,474 |
| Total | | | 6,701,039 | \$1,095,832,471 | 59,888 | \$146,472,466 |

Table 4.4 Source: University of Alaska 2013 Facilities Inventory, Statewide Planning and Budget, 2013

The State of Alaska Risk Manager uses the Marshall Valuation Service Classification of Construction Statement for insurance classification purposes:

- Class “A”, buildings have fireproofed structural steel frames with reinforced concrete or masonry floors and roofs,
- Class “B”, buildings have reinforced concrete frames with concrete or masonry floors and roofs,
- Class “C”, buildings have masonry or concrete exterior walls with wood or steel roofs and floors, except for concrete slab on grade.
- Class “D”, buildings generally have wood frame, floor, and roof structure. They may have a concrete floor on grade and other substitute materials, but are considered combustible construction. This class includes engineered pole frame buildings.
- Class “S” buildings of Alaska and for the purpose of the evaluation of State structures will not be used until future updates of the Plan when the State Risk Manager incorporates this class into the classification of structures.
- Class “E” buildings are statewide leased.
- Class “F” building refers to uninsured properties

4.1.2 Population

Regional population demographics are a component of the hazard vulnerability assessment. The information for 2013 is provided by the Alaska Department of Labor and Workforce Development Research and Analysis Department.

Alaska’s statewide population increased 1.3%, or 22,067 people, from 2010 to 2012. The growth as a whole is primarily through natural increase (births), listed at just over 17,000. The remaining 5,000 were due to migration.

Many of Alaska’s Boroughs and census areas grew slowly between the 2010 Census and 2012. Of the 29 Boroughs and census areas, only 6 slightly lost population during that time. The largest population increases occurred in the Municipality of Anchorage, Matanuska-Susitna (Mat-Su) Borough, Fairbanks North Star Borough and the Kenai Peninsula Borough. Population growth in the Municipality of Anchorage and the Mat-Su Borough accounted for roughly 50% of the total growth statewide. Refer to Table 3-1 below for additional population information.

Table 4.5: Population of Alaska by Economic Region, Borough and Census Area, 2010-2012*

| | Census | 2011 | 2012 | Natural Increase (Births-Deaths) | | Net Migration | | Pop. Change | | Average Annual Growth Rate (Percent) | |
|--|---------------|--------------|--------------|-------------------------------------|---------------|---------------|---------------|---------------|---------------|--|---------------|
| | April 2010 | July 2011 | July 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 |
| Alaska | 710,231 | 723,136 | 732,298 | 17,064 | 7,288 | 5,003 | 1,874 | 22,067 | 9,162 | 1.36 | 1.26 |
| Anchorage / Mat-Su Region | 380,821 | 387,881 | 392,643 | 9,124 | 3,942 | 2,698 | 820 | 11,822 | 4,762 | 1.36 | 1.22 |
| Anchorage | 291,826 | 296,084 | 298,842 | 7,258 | 3,134 | -242 | -376 | 7,016 | 2,758 | 1.06 | 0.93 |
| Matanuska-Susitna Borough | 88,995 | 91,797 | 93,801 | 1,866 | 808 | 2,940 | 1,196 | 4,806 | 2,004 | 2.34 | 2.16 |
| Gulf Coast Region | 78,628 | 80,377 | 80,750 | 1,303 | 595 | 819 | -222 | 2,122 | 373 | 1.18 | 0.46 |
| Kenai Peninsula Borough | 55,400 | 56,651 | 56,756 | 799 | 386 | 557 | -281 | 1,356 | 105 | 1.07 | 0.19 |
| Kodiak Island Borough | 13,592 | 13,873 | 14,041 | 356 | 151 | 93 | 17 | 449 | 168 | 1.44 | 1.20 |
| Valdez-Cordova Census Area | 9,636 | 9,853 | 9,953 | 148 | 58 | 169 | 42 | 317 | 100 | 1.44 | 1.01 |
| Interior Region | 112,024 | 112,425 | 115,114 | 3,124 | 1,310 | -34 | 1,379 | 3,090 | 2,689 | 1.21 | 2.36 |
| Denali Borough | 1,826 | 1,838 | 1,871 | 34 | 15 | 11 | 18 | 45 | 33 | 1.08 | 1.78 |
| Fairbanks North Star Borough | 97,581 | 97,807 | 100,343 | 2,808 | 1,173 | -46 | 1,363 | 2,762 | 2,536 | 1.24 | 2.56 |
| Southeast Fairbanks Census Area | 7,029 | 7,118 | 7,218 | 200 | 92 | -11 | 8 | 189 | 100 | 1.18 | 1.40 |

Table 4.5: Population of Alaska by Economic Region, Borough and Census Area, 2010-2012*

| | Census | 2011 | 2012 | Natural Increase (Births-Deaths) | | Net Migration | | Pop. Change | | Average Annual Growth Rate (Percent) | |
|--|---------------|--------------|--------------|-------------------------------------|---------------|---------------|---------------|---------------|---------------|--|---------------|
| | April 2010 | July 2011 | July 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 |
| Yukon Koyukuk Census Area | 5,588 | 5,662 | 5,682 | 82 | 30 | 12 | -10 | 94 | 20 | 0.74 | 0.35 |
| Northern Region | 26,445 | 26,957 | 27,312 | 1,050 | 450 | -183 | -95 | 867 | 355 | 1.43 | 1.31 |
| Nome Census Area | 9,492 | 9,734 | 9,869 | 398 | 179 | -21 | -44 | 377 | 135 | 1.73 | 1.38 |
| North Slope Borough | 9,430 | 9,589 | 9,727 | 306 | 142 | -9 | -4 | 297 | 138 | 1.38 | 1.43 |
| Northwest Arctic Borough | 7,523 | 7,634 | 7,716 | 346 | 129 | -153 | -47 | 193 | 82 | 1.13 | 1.07 |
| Southeast Region | 71,664 | 73,715 | 74,423 | 1,033 | 397 | 1,726 | 311 | 2,759 | 708 | 1.68 | 0.96 |
| Haines Borough | 2,508 | 2,614 | 2,620 | 16 | 0 | 96 | 6 | 112 | 6 | 1.94 | 0.23 |
| Hoonah-Angoon Census Area | 2,150 | 2,156 | 2,210 | 21 | 6 | 39 | 48 | 60 | 54 | 1.22 | 2.47 |
| Juneau, City and Borough | 31,275 | 32,393 | 32,832 | 511 | 193 | 1,046 | 246 | 1,557 | 439 | 2.16 | 1.35 |
| Ketchikan Gateway Borough | 13,477 | 13,750 | 13,938 | 195 | 80 | 266 | 108 | 461 | 188 | 1.49 | 1.36 |
| Petersburg Census Area | 3,815 | 3,943 | 3,937 | 44 | 13 | 78 | -19 | 122 | -6 | 1.40 | -0.15 |
| Prince of Wales-Hyder Census Area | 5,559 | 5,812 | 5,771 | 94 | 46 | 118 | -87 | 212 | -41 | 1.66 | -0.71 |
| Sitka, City and Borough | 8,881 | 9,023 | 9,084 | 116 | 50 | 87 | 11 | 203 | 61 | 1.00 | 0.67 |
| Skagway Borough, Municipality | 968 | 966 | 961 | 14 | 2 | -21 | -7 | -7 | -5 | -0.32 | -0.52 |

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Table 4.5: Population of Alaska by Economic Region, Borough and Census Area, 2010-2012*

| | Census | 2011 | 2012 | Natural Increase (Births-Deaths) | | Net Migration | | Pop. Change | | Average Annual Growth Rate (Percent) | |
|-------------------------------|---------------|--------------|--------------|-------------------------------------|---------------|---------------|---------------|---------------|---------------|--|---------------|
| | April 2010 | July 2011 | July 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 | 2010- 2012 | 2011- 2012 |
| Wrangell, City and Borough | 2,369 | 2,411 | 2,448 | 11 | 1 | 68 | 36 | 79 | 37 | 1.46 | 1.52 |
| Yakutat, City and Borough | 662 | 647 | 622 | 11 | 6 | -51 | -31 | -40 | -25 | -2.77 | -3.94 |
| Southwest Region | 40,649 | 41,781 | 42,056 | 1,430 | 594 | -23 | -319 | 1,407 | 275 | 1.51 | 0.66 |
| Aleutians East Borough | 3,141 | 3,230 | 3,227 | 32 | 11 | 54 | -14 | 86 | -3 | 1.20 | -0.09 |
| Aleutians West Census Area | 5,561 | 5,736 | 5,881 | 40 | 15 | 280 | 130 | 320 | 145 | 2.49 | 2.50 |
| Bethel Census Area | 17,013 | 17,474 | 17,600 | 736 | 297 | -149 | -171 | 587 | 126 | 1.51 | 0.72 |
| Bristol Bay Borough | 997 | 1,025 | 987 | 8 | -1 | -18 | -37 | -10 | -38 | -0.45 | -3.78 |
| Dillingham Census Area | 4,847 | 4,946 | 4,988 | 155 | 61 | -14 | -19 | 141 | 42 | 1.27 | 0.85 |
| Lake and Peninsula Borough | 1,631 | 1,678 | 1,673 | 39 | 21 | 3 | -26 | 42 | -5 | 1.13 | -0.30 |
| Wade Hampton Census Area | 7,459 | 7,692 | 7,700 | 420 | 190 | -179 | -182 | 241 | 8 | 1.41 | 0.10 |

* Vintage 2012. All numbers are based on 2010 Census geography.

Sources: Alaska Department of Labor and Workforce Development, Research and Analysis Section; and U.S. Census Bureau

4.1.3 Residential Properties

Residential property values were obtained from the State of Alaska Department of Labor and Workforce Development assessed values for municipalities levying a property a property tax (Table 4.6). Municipalities not levying a property tax are excluded.

Table 4.6 Residential Property Values by Borough and REAA

| Boroughs & Unified Municipalities | Locally Assessed Real Property | Locally Assessed Personal Property | Total Assessed |
|-----------------------------------|--------------------------------|------------------------------------|----------------|
| Anchorage | \$28,833,783,247 | \$2,577,008,221 | \$ |
| Bristol Bay Borough | \$113,387,570 | \$131,458,444 | \$ |
| Fairbanks North Star Borough | \$7,062,875,943 | \$0 | \$ |
| Haines Borough | \$259,247,679 | \$0 | |
| Juneau City & Borough | \$3,793,856,000 | \$297,652,232 | |
| Kenai Peninsula Borough | \$5,697,419,635 | \$302,931,192 | |
| Ketchikan Gateway Borough | \$1,254,230,500 | \$0 | |
| Kodiak Island Borough | \$947,611,296 | \$91,612,537 | |
| Matanuska-Susitna Borough | \$7,650,320,577 | \$71,482,452 | |
| North Slope Borough | \$228,134,332 | \$144,487,334 | |
| Sitka City & Borough | \$908,043,905 | \$77,029,224 | |
| Skagway | \$316,209,783 | \$0 | |
| Wrangell City & Borough | \$123,105,720 | \$0 | |
| Yakutat City & Borough | \$44,476,440 | \$0 | |
| | | | |
| Total Assessed Value | \$57,232,702,627 | \$3,673,661,636 | |

Table 4.6 Assessed Values from Municipality Property Taxes, 2012. Source: Alaska Department of Labor

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4.1.4 Repetitive Loss Properties

Repetitive Loss properties have had at least two \$1,000 claims within any 10-year period since 1978. Severe Repetitive Loss properties have experienced four or more separate building and content claims since 1978 each exceeding \$5,000 with cumulative claims exceeding \$20,000; or at least two separate building claims with cumulative losses exceeding the value of the main living structure. The State of Alaska participates in the NFIP. To date, there are nine Repetitive Flood Claim communities (RFC) and one Severe Repetitive Loss community (SRL) within Alaska (Table 4.7 A and B). Table 4.8 lists the communities participating in the NFIP.

Table 4.7 A. Repetitive Flood Claim Communities

| Area | Community | Total Payments \$ | Losses | Properties | As of Date |
|-------------------------------------|------------------------------|-------------------|--------|------------|------------|
| Anchorage Borough | Anchorage, Municipality of | 12,096.72 | 2 | 1 | 06/30/2013 |
| Bethel Census Area | Aniak, City of | 119,068.30 | 12 | 4 | 06/30/2013 |
| Bethel Census Area | Bethel, City of | 24,040.18 | 3 | 1 | 06/30/2013 |
| Bethel Census Area | Kwethluk, City of | 14,600.57 | 2 | 1 | 06/30/2013 |
| Fairbanks North Star Borough | Fairbanks North Star Borough | 463,475.14 | 36 | 14 | 06/30/2013 |
| Juneau Borough | Juneau, City and Borough of | 27,025.80 | 5 | 2 | 06/30/2013 |
| Kenai-Cook Borough | Kenai peninsula Borough | 98,402.59 | 4 | 2 | 06/30/2013 |
| Nome Census Area | Nome, City of | 15,591.82 | 2 | 1 | 06/30/2013 |
| Valdez-Cordova Census Area | Valdez, City of | 34,859.96 | 3 | 1 | 06/30/2013 |

Table 4.7 B. Severe Repetitive Loss Communities

| Area | Community | Total Payments \$ | Losses | Properties | As of Date |
|-------------------------------------|------------------------------|-------------------|--------|------------|------------|
| Fairbanks North Star Borough | Fairbanks North Star Borough | 46,942.38 | 5 | 1 | 06/30/2013 |

Table 4.7 A. *Alaska Repetitive Loss Data by Community*. Table 4.7 B. *Alaska Severe Repetitive Loss Data by Community*, current as of June 2013. Source: State of Alaska DCCED

| Table 4.8 NFIP Participating Communities | |
|--|--|
| Anchorage | Kenai Peninsula Borough* (KPB) (Seldovia, Homer, Katchemak City, and Seward) |
| Aniak | Ketchikan Gateway Borough* (City of Ketchikan, Saxman) |
| Bethel | Kotzebue |
| Cordova | Koyukuk |
| Delta Junction and Deltana | Kwethluk |
| Dillingham | Lake & Peninsula Borough (Chignik, Egegik, Nondalton, Pilot Point, Port Heiden) |
| Emmonak | Matanuska-Susitna Borough (MSB), (Wasilla and Talkeetna) |
| Fairbanks North Star Borough | McGrath |
| Fort Yukon | Nenana |
| Galena | Nome* |
| Haines Borough | NW Arctic Borough (Ambler, Buckland, Deering, Kiana, Kobuk, Noorvik, Selawik, and Shungnak) |
| Hoonah | Petersburg |
| Houston | Shishmaref |
| Juneau City and Borough | Sitka, City & Borough |
| Valdez | Skagway |
| | Togiak |

(* Community Rating System (CRS) participant)

Table 4.8 Source: State of Alaska DCCED 2013

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FEMA has transitioned to RISKMap, integrating mapping, assessment, and planning. DCRA staff is developing a “Mapping Business Plan” for the State of Alaska via a Cooperating Technical Partnership (CTP) Agreement with FEMA. This plan should outline the strategy that FEMA and the State intend to use during future map update efforts. Until this plan is completed and agreed upon FEMA has scoped out and planned additional work in the Municipality of Anchorage and an alluvial fan study for the City of Seward.

Current RiskMAP Study locations in the State of Alaska:

- Municipality of Anchorage
- City of Cordova
- City of Homer
- City and Borough of Juneau
- Kenai Peninsula Borough
- Ketchikan Gateway Borough
- Kodiak Island Borough
- City of Kotzebue
- Matanuska Susitna Borough
- City of Seward
- City and Borough of Sitka
- City of Valdez

Source: State of Alaska Division of Community and Regional Affairs (DCRA) – Department of Commerce, Community, and Economic Development (DCCED) June 2013.

4.2 Vulnerability Analysis Methodology

A worst case exposure analysis was conducted using HAZUS-MH software and ArcGIS software to assess the State’s risks to earthquake and flood hazards. For other hazards not supported by the HAZUS system, the State of Alaska gathered data from agencies specializing in certain hazards, such as the Alaska Volcano Observatory and the Alaska Interagency Coordination Center for wildland fire. The State calculated hazard extents (affected jurisdictions) using their data. Infrastructure values were totaled for each affected jurisdiction using the above tables for reference. The State also integrated local risk assessments into State risk assessments. Information was gathered during local mitigation plan reviews and through community interaction.

Eighty three local and multi-jurisdiction LHMPs are completed and approved at this time (Appendix 12). An estimated 25 additional local or multi-jurisdictional hazard mitigation plans will be completed in the next 3 years. The hazard information from these communities will be used to identify mitigation actions in areas of highest risk and incorporated into future State HMP updates.

Data Limitations:

The vulnerability estimates provided herein use the most currently available data. The assessment results are an approximation of the State’s risk to hazards. They may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any risk estimation methodology, arising in part from incomplete knowledge and approximations necessary for a comprehensive analysis.

For this 2013 Plan update, revised data on State facilities, public schools and the University system from the tables above was incorporated in the vulnerability exposure analysis for current assets. A description of the data and analysis results follows.

4.2.1 Floods

The State flood hazard analysis was accomplished using FEMA's HAZUS analysis tool. Figure 4.1 depicts river basin region vulnerability. Table 4.9 shows the potential flood threat to State owned facilities and their replacement value estimates according to HAZUS.

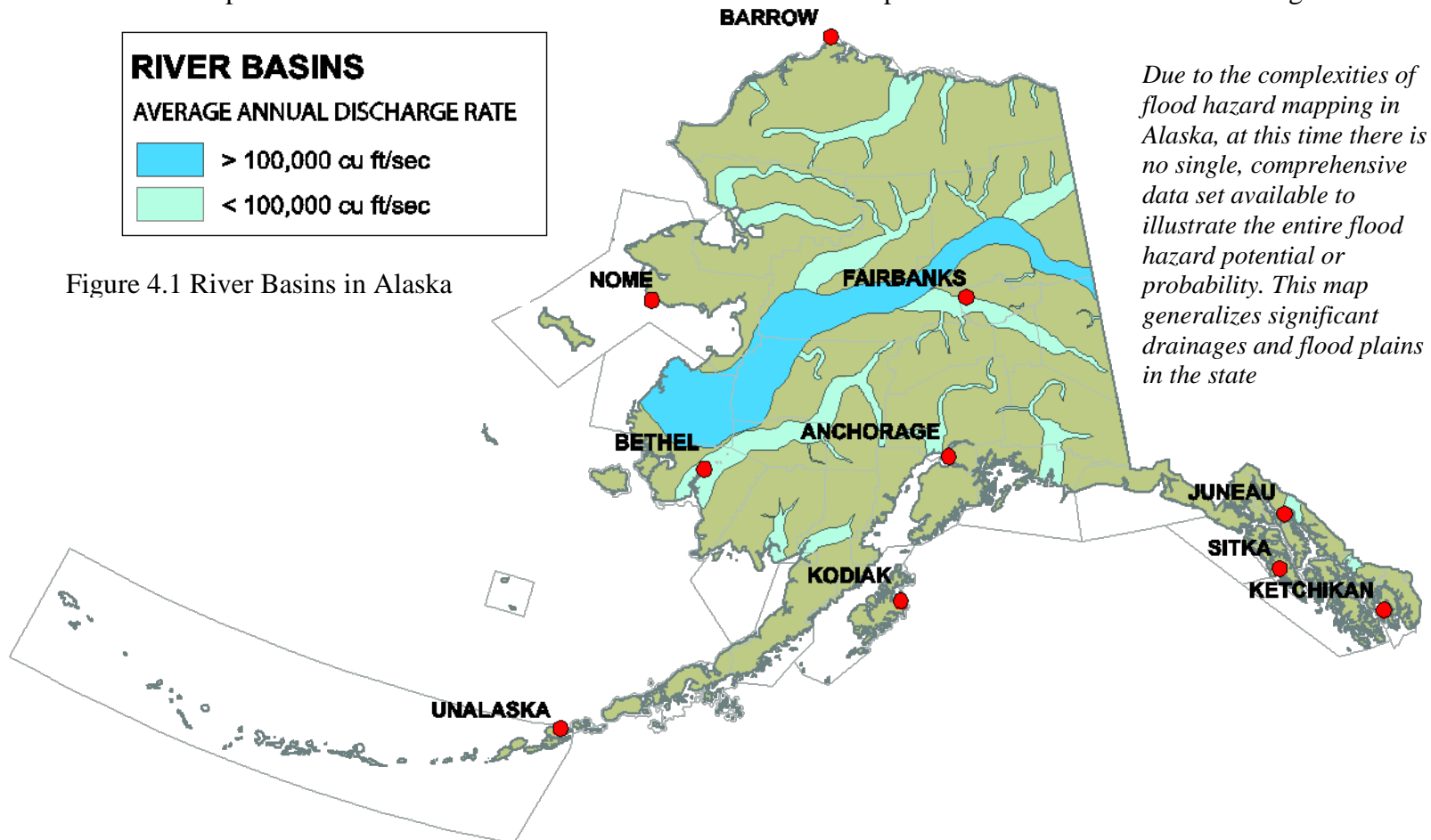


Figure 4.1 River Basins in Alaska

Figure 4.1 Source: Alaska Department of Natural Resources

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Table 4.9 - 2013 Flood Basin Hazard Vulnerability Analysis – State Facilities

| Borough REAA | Facilities | Square Footage | Square Ft at Risk | Value | Replacement Value | Content Replacement Value |
|-------------------------------------|-------------------|-----------------------|--------------------------|---------------|--------------------------|----------------------------------|
| State Totals | 337 | 1,327,754 | 100% | \$120,838,284 | \$154,575,154 | \$37,709,387 |
| Alaska Gateway REAA | 11 | 15,273 | 1.15% | \$154,448 | \$2,385,640 | 0 |
| Bering Straits REAA | 15 | 22,442 | 1.69% | \$2,045,348 | \$3,104,609 | 0 |
| Bristol Bay Borough | 6 | 11,040 | 0.83% | \$407,948 | \$1,462,550 | 0 |
| Chugach REAA | 1 | 2,400 | 0.18% | \$250,000 | \$250,000 | 0 |
| City & Borough of Juneau | 41 | 756,506 | 56.98% | \$49,064,497 | \$64,454,389 | \$29,612,230 |
| Copper River REAA | 29 | 29,520 | 2.22% | \$3,693,708 | \$5,574,798 | 0 |
| Denali Borough | 4 | 12,443 | 0.94% | \$1,135,500 | \$2,445,800 | \$150,720 |
| Fairbanks North Star Borough | 26 | 223,153 | 16.81% | \$35,316,630 | \$36,232,730 | \$6,583,950 |
| Iditarod Area REAA | 9 | 12,030 | 0.91% | \$1,903,639 | \$2,220,001 | \$361,800 |
| Kenai Peninsula Borough | 1 | 1,800 | 0.14% | \$96,209 | \$270,000 | 0 |
| Ketchikan Gateway Borough | 3 | 7,029 | 0.53% | \$745,200 | \$746,220 | 0 |
| Kuspuk REAA | 10 | 22,208 | 1.67% | \$3,270,246 | \$4,072,385 | \$250,687 |
| Lake & Peninsula Borough | 3 | 2,640 | 0.20% | \$786,139 | \$1,171,139 | 0 |
| Lower Kuskokwim REAA | 21 | 32,936 | 2.48% | \$2,595,120 | \$3,853,129 | 0 |
| Lower Yukon REAA | 27 | 35,279 | 2.66% | \$3,883,551 | \$5,414,697 | 0 |

| Borough REAA | Facilities | Square Footage | Square Ft at Risk | Value | Replacement Value | Content Replacement Value |
|------------------------------------|--------------------|-----------------------|--------------------------|--------------|--------------------------|----------------------------------|
| Matanuska-Susitna Borough | 29 | 18,210 | 1.37% | \$1,248,066 | \$1,578,934 | 0 |
| North Slope Borough | 5 | 3,310 | 0.25% | \$265,752 | \$368,852 | 0 |
| Northwest Arctic Borough | 16 | 15,896 | 1.20% | \$1,311,000 | \$1,524,005 | 0 |
| Southwest Region REAA | 11 | 4,507 | 0.34% | \$172,116 | \$478,221 | 0 |
| Yukon Flats REAA | 15 | 19,104 | 1.44% | \$1,317,397 | \$2,659,680 | 0 |
| Yukon-Koyukuk REAA | 47 | 72,420 | 5.45% | \$10,403,565 | \$13,195,171 | \$750,000 |
| Yupit REAA | 7 | 7,608 | 0.57% | \$718,205 | \$1,112,204 | 0 |
| | Residential | | Industrial | | Commercial | |
| Alaska HAZUS Building Count | 34782 | | 24 | | 352 | |
| Alaska HAZUS Building Costs | \$5.755 M | | \$101,950 | | \$741,175 | |
| | Population | | Households | | Average Value | |
| Alaska HAZUS Demographics | 110,707 | | 37,823 | | \$95,173 | |
| | | | | | | |

Source: 2010 Census Data and FEMA HAZUS 2.1

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4.2.2 Wildland and Community Fire Conflagration

A wildland fire analysis was accomplished for each borough and REAA in the State based upon their fire history, proximity to communities, and amount and type of fuels present. They have been grouped by their management option class into the following tables:

Table 4.10 A - 2013 Critical Management Option - Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|------------------------------|-----------------------------|--------------------|----------------------------|-----------------------------------|
| Alaska Gateway REAA | 8 | 15,843 | 0.15% | \$4,308,650 |
| Bering Straits REAA | 3 | 2,556 | 0.02% | \$587,001 |
| Chugach REAA | 5 | 8,968 | 0.08% | \$3,573,000 |
| Copper River REAA | 8 | 9,624 | 0.09% | \$3,218,002 |
| Fairbanks North Star Borough | 26 | 40,921 | 0.38% | \$18,247,718 |
| Kenai Peninsula Borough | 165 | 1,252,608 | 11.68% | \$112,927,708 |
| Kodiak Island Borough | 10 | 22,884 | 0.21% | \$5,650,640 |
| Lake & Peninsula Borough | 11 | 9,042 | 0.08% | \$2,991,139 |
| Matanuska-Susitna Borough | 66 | 199,066 | 1.86% | \$37,036,054 |
| Municipality of Anchorage | 367 | 9,133,692 | 85.17% | \$1,909,107,869 |
| Yukon Flats REAA | 5 | 15,032 | 0.14% | \$7,659,567 |
| Yukon-Koyukuk REAA | 8 | 13,823 | 0.13% | \$3,072,584 |
| State Total | 682 | 10,724,059 | 100.00% | \$2,108,379,932 |

2013 Critical Management Option - Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|-------------------------|-----------------------------------|-------------------------------------|------------------------------|------------------------------|-------------------------------|
| 506,464 | 183,007 | \$128,375 | 1,938 | 101 | 157,484 |

Table 4.10 B - 2013 Full Management Option - Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|---------------------------|----------------------|------------------|---------------------|----------------------------|
| Alaska Gateway REAA | 5 | 4,768 | 0.29% | 1,949,000 |
| Aleutians East Borough | 1 | 2,200 | 0.13% | 990,000 |
| Bering Straits REAA | 18 | 18,690 | 1.13% | 2,891,006 |
| Bristol Bay Borough | 36 | 61,478 | 3.72% | 14,908,913 |
| Chatham REAA | 11 | 19,438 | 1.18% | 6,708,330 |
| City & Borough of Juneau | 7 | 55,213 | 3.34% | 22,655,040 |
| Copper River REAA | 54 | 87,684 | 5.31% | 19,273,448 |
| Iditarod REAA | 12 | 12,980 | 0.79% | 3,734,001 |
| Kenai Peninsula Borough | 86 | 770,471 | 46.63% | 146,714,776 |
| Kodiak Island Borough | 2 | 1,472 | 0.09% | 600,000 |
| Kuspuk REAA | 4 | 4,600 | 0.28% | 2,569,385 |
| Lake & Peninsula Borough | 15 | 19,120 | 1.16% | 6,179,112 |
| Lower Kuskokwim REAA | 87 | 230,106 | 13.93% | 63,177,272 |
| Lower Yukon REAA | 15 | 35,757 | 2.16% | 11,570,956 |
| Matanuska-Susitna Borough | 6 | 19,566 | 1.18% | 3,795,700 |
| Northwest Arctic Borough | 38 | 166,929 | 10.10% | 32,652,709 |
| Southeast Island REAA | 1 | 3,377 | 0.20% | 202,620 |
| Southwest Region REAA | 55 | 110,359 | 6.68% | 19,584,320 |
| Yukon Flats REAA | 9 | 19,104 | 1.16% | 3,949,601 |
| Yukon-Koyukuk REAA | 7 | 6,328 | 0.38% | 1,794,522 |
| Yupiit REAA | 2 | 2,568 | 0.16% | 2 |
| State Total | 471 | 1,652,208 | 100.00% | 365,900,713 |

2013 Full Management Option - Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 76,431 | 24,546 | \$97,574 | 199 | 13 | 28,020 |

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Table 4.10C - 2013 Modified Management Option - Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|---------------------------|-----------------------------|--------------------|----------------------------|-----------------------------------|
| Bering Straits REAA | 24 | 56,603 | 34.47% | \$20,431,631 |
| Denali Borough | 12 | 24,428 | 14.88% | \$7,598,694 |
| Iditarod REAA | 13 | 21,384 | 13.02% | \$6,176,880 |
| Lake & Peninsula Borough | 3 | 2,640 | 1.61% | \$1,171,139 |
| Lower Kuskokwim REAA | 2 | 3,600 | 2.19% | \$1,080,001 |
| Matanuska-Susitna Borough | 23 | 21,410 | 13.04% | \$3,616,009 |
| North Slope Borough | 4 | 4,664 | 2.84% | \$702,002 |
| Northwest Arctic Borough | 8 | 8,456 | 5.15% | \$1,632,002 |
| Southeast Island REAA | 6 | 12,672 | 7.72% | \$1,992,231 |
| Yukon-Koyukuk REAA | 8 | 8,348 | 5.08% | \$1,612,753 |
| State Total | 103 | 164,205 | 100.00% | \$46,013,342 |

2013 Modified Management Option - Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|-------------------------|-----------------------------------|-------------------------------------|------------------------------|------------------------------|-------------------------------|
| 6,578 | 2,213 | \$96,017 | 30 | 1 | 3,631 |

Table 4.10D -2013 Limited Management Option-Hazard Vulnerability Analysis-State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|------------------------------|----------------------|-------------------|---------------------|----------------------------|
| Alaska Gateway REAA | 37 | 89,243 | 0.84% | \$21,862,065 |
| Aleutians East Borough | 19 | 40,509 | 0.38% | \$11,200,680 |
| Annette Island REAA | 1 | 636 | 0.01% | \$137,400 |
| Bering Straits REAA | 5 | 5,392 | 0.05% | \$1,040,001 |
| Chatham REAA | 26 | 112,469 | 1.06% | \$8,285,594 |
| Chugach REAA | 58 | 521,493 | 4.91% | \$72,447,833 |
| City & Borough of Juneau | 185 | 3,710,043 | 34.94% | \$560,116,288 |
| City & Borough of Sitka | 105 | 1,833,544 | 17.27% | \$257,483,473 |
| City & Borough of Wrangell | 12 | 26,330 | 0.25% | \$5,522,896 |
| City & Borough of Yakutat | 49 | 130,823 | 1.23% | \$33,208,836 |
| Copper River REAA | 13 | 15,522 | 0.15% | \$4,644,119 |
| Delta/Greely REAA | 66 | 73,526 | 0.69% | \$18,929,218 |
| Denali Borough | 2 | 5,019 | 0.05% | \$1,708,000 |
| Fairbanks North Star Borough | 191 | 2,230,609 | 21.01% | \$532,519,088 |
| Haines Borough | 34 | 61,540 | 0.58% | \$8,764,237 |
| Kodiak Island Borough | 92 | 496,863 | 4.68% | \$103,188,225 |
| Kuspuk REAA | 16 | 39,930 | 0.38% | \$7,970,216 |
| Lake & Peninsula Borough | 5 | 10,431 | 0.10% | \$3,701,085 |
| Lower Kuskokwim REAA | 4 | 5,810 | 0.05% | \$2,150,001 |
| Lower Yukon REAA | 33 | 36,476 | 0.34% | \$9,860,306 |
| Matanuska-Susitna Borough | 111 | 599,918 | 5.65% | \$196,801,880 |
| North Slope Borough | 34 | 88,967 | 0.84% | \$34,051,311 |
| Northwest Arctic Borough | 16 | 16,608 | 0.16% | \$3,154,006 |
| Southeast Island REAA | 2 | 2,140 | 0.02% | \$400,000 |
| Southwest Region REAA | 3 | 4,564 | 0.04% | \$1,117,501 |
| Yukon Flats REAA | 10 | 9,756 | 0.09% | \$3,487,704 |
| Yukon-Koyukuk REAA | 24 | 62,446 | 0.59% | \$22,365,156 |
| State Total | 1,194 | 10,618,355 | 100.00% | \$2,081,142,755 |

2013 Limited Management Option - Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 15,881 | 5,647 | \$93,488 | 227 | 22 | 8,138 |

Table 4.10 Source: Alaska Interagency Coordination Center and FEMA HAZUS 2.1

4.2.3 Snow Avalanches

There are four avalanche potential regions in Alaska (Figure 4.2). The vulnerability analysis for snow avalanche was conducted by locating all State infrastructure and population within each avalanche region and displaying the total by Borough and REAA (Table 4.11).

Figure 4.2 Avalanche Potential Regions

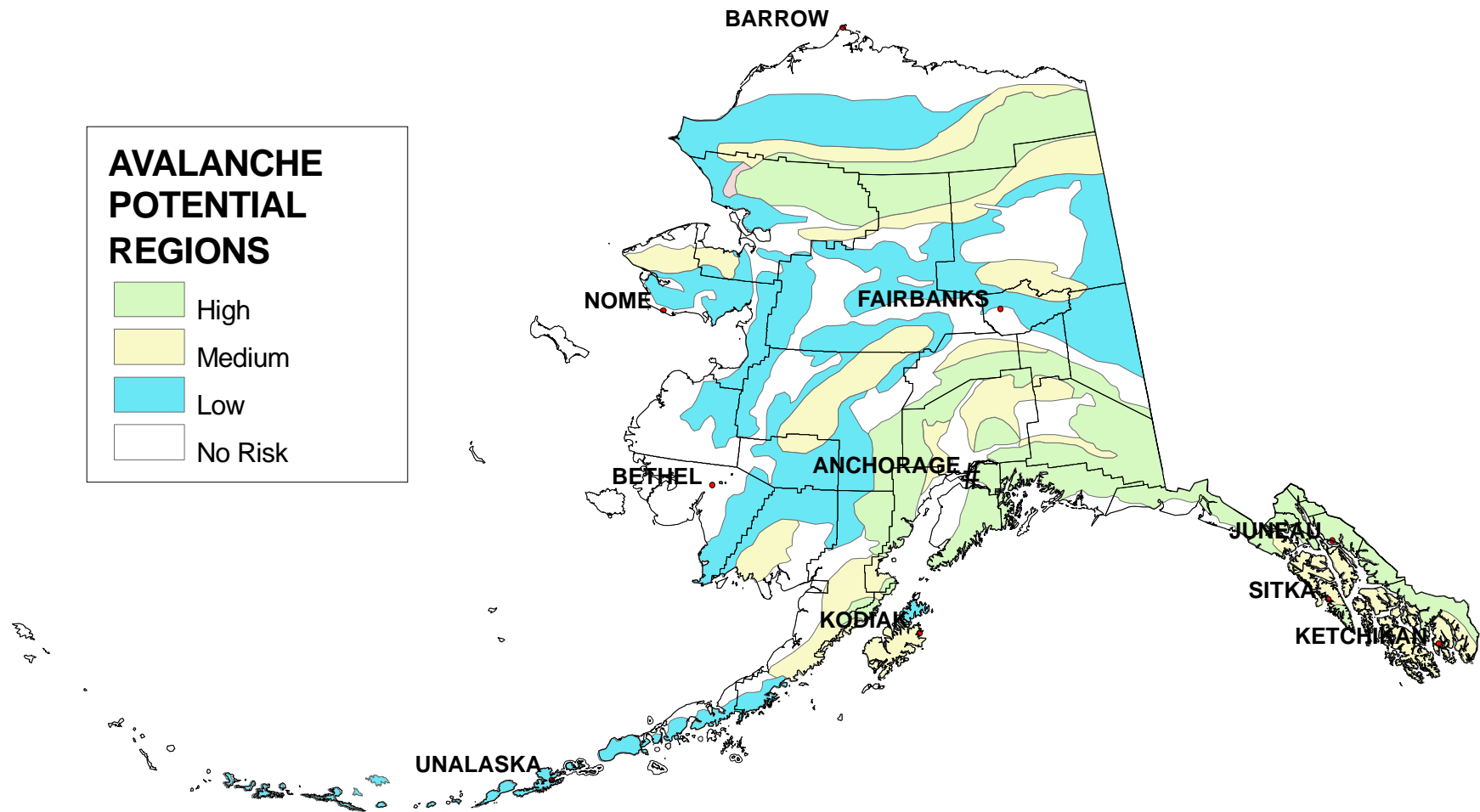


Figure 4.2 From: Hackett, S. W. and H. S. Santeford. (1980). *Avalanche Zoning in Alaska* in the *Journal of Glaciology*, v. 26, no. 94.

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Table 4.11A 2013 High Snow Avalanche Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|----------------------------|----------------------|------------------|---------------------|----------------------------|
| Chatham REAA | 34 | 129,159 | 2.16% | \$14,525,083.00 |
| Chugach REAA | 62 | 527,211 | 8.83% | \$75,020,833.00 |
| City & Borough of Juneau | 190 | 3,721,152 | 62.30% | \$563,752,888.00 |
| City & Borough of Yakutat | 49 | 130,823 | 2.19% | \$33,208,836.00 |
| Copper River REAA | 21 | 25,146 | 0.42% | \$7,862,121.00 |
| Delta/Greely REAA | 66 | 73,526 | 1.23% | \$18,929,218.00 |
| Denali Borough | 12 | 24,428 | 0.41% | \$7,598,694.00 |
| Haines Borough | 34 | 61,540 | 1.03% | \$8,764,237.00 |
| Kenai Peninsula Borough | 53 | 395,099 | 6.62% | \$155,917,636.00 |
| Lake & Peninsula Borough | 3 | 3,624 | 0.06% | \$1,800,000.00 |
| Matanuska-Susitna Borough | 111 | 599,918 | 10.04% | \$196,801,880.00 |
| Municipality of Anchorage | 70 | 234,714 | 3.93% | \$79,776,547.00 |
| Northwest Arctic Borough | 8 | 7,448 | 0.12% | \$1,764,002.00 |
| Southeast Island REAA | 1 | 240 | 0.00% | \$20,000.00 |
| Yukon-Koyukuk REAA | 6 | 12,136 | 0.20% | \$6,880,264.00 |
| City & Borough of Wrangell | 12 | 26,330 | 0.44% | \$5,522,896.00 |
| State Total | 732 | 5,972,494 | 100.00% | \$1,178,145,135.00 |

2013 High Snow Avalanche Hazard Vulnerability Analysis - (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 61,844 | 21,730 | \$135,704 | 282 | 18 | 23,318 |

Table 4.11B 2013 Medium Snow Avalanche Hazard Vulnerability Analysis-State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|---------------------------|-----------------------------|--------------------|----------------------------|-----------------------------------|
| Annette Island REAA | 1 | 636 | 0.01% | \$137,400 |
| Bering Straits REAA | 5 | 6,671 | 0.15% | \$1,020,002 |
| Chatham REAA | 4 | 2,988 | 0.07% | \$483,841 |
| City & Borough of Juneau | 2 | 44,104 | 0.98% | \$19,018,440 |
| City & Borough of Sitka | 105 | 1,833,544 | 40.81% | \$257,483,473 |
| Denali Borough | 2 | 5,019 | 0.11% | \$1,708,000 |
| Iditarod REAA | 3 | 2,454 | 0.05% | \$900,000 |
| Kodiak Island Borough | 104 | 521,219 | 11.60% | \$109,438,865 |
| Kuspuk REAA | 5 | 16,408 | 0.37% | \$1,040,000 |
| Matanuska-Susitna Borough | 25 | 22,460 | 0.50% | \$3,713,509 |
| North Slope Borough | 1 | 180 | 0.00% | \$13,500 |
| Northwest Arctic Borough | 6 | 6,352 | 0.14% | \$1,262,002 |
| Southeast Island REAA | 6 | 15,849 | 0.35% | \$2,508,350 |
| Yukon Flats REAA | 3 | 4,340 | 0.10% | \$2,040,000 |
| Ketchikan Gateway Borough | 107 | 2,010,556 | 44.75% | \$177,135,671 |
| State Total | 379 | 4,492,780 | 100.00% | \$577,903,053 |

2013 Medium Snow Avalanche Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|-------------------------|-----------------------------------|-------------------------------------|------------------------------|------------------------------|-------------------------------|
| 35,297 | 12,954 | \$113,939 | 156 | 8 | 12,755 |

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Table 4.11C 2013 Low Snow Avalanche Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|------------------------------|----------------------|----------------|---------------------|----------------------------|
| Alaska Gateway REAA | 44 | 98,069 | 22.27% | \$25,498,145 |
| Aleutian Region REAA | 4 | 22,200 | 5.04% | \$8,042,000 |
| Aleutians East Borough | 20 | 42,709 | 9.70% | \$12,190,680 |
| Bering Straits REAA | 19 | 23,353 | 5.30% | \$5,336,630 |
| Fairbanks North Star Borough | 23 | 34,431 | 7.82% | \$16,472,866 |
| Iditarod REAA | 5 | 4,930 | 1.12% | \$1,080,001 |
| Kuspuk REAA | 14 | 27,018 | 6.14% | \$8,949,601 |
| Lake & Peninsula Borough | 14 | 23,455 | 5.33% | \$7,079,077 |
| Lower Kuskokwim REAA | 8 | 12,086 | 2.75% | \$2,326,703 |
| Lower Yukon REAA | 11 | 17,778 | 4.04% | \$5,602,501 |
| North Slope Borough | 4 | 4,664 | 1.06% | \$702,002 |
| Northwest Arctic Borough | 7 | 7,960 | 1.81% | \$1,240,003 |
| Southwest Region REAA | 49 | 102,609 | 23.31% | \$16,047,320 |
| Yukon Flats REAA | 3 | 1,464 | 0.33% | \$521,200 |
| Yukon-Koyukuk REAA | 17 | 17,552 | 3.99% | \$3,851,739 |
| State Total | 242 | 440,278 | 100.00% | \$114,940,468 |

2013 Low Snow Avalanche Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 19,910 | 6,193 | \$87,891 | 51 | 7 | 7,820 |

Table 4.11 Source: FEMA HAZUS 2.1

Figure 4.3 categorizes the destructive force of avalanches relative to size.

Figure 4.3 Avalanche Destructive Force Scale

| Size Relative to Path | | Destructive Force | |
|-----------------------|------------|-------------------|--|
| R1 | Very small | D1 | Relatively harmless Approximate path length: 33 ft (10 m) |
| R2 | Small | D2 | Could bury, injure, or kill a person Approximate path length: 330 ft (100 m) |
| R3 | Medium | D3 | Could bury and destroy a car, damage a truck, destroy a wood frame house or break a few trees Approximate path length: 3,300 ft, 0.6 miles (1,000 m) |
| R4 | Large | D4 | Could destroy a railway car, large truck, several buildings, or a substantial amount of forest Approximate path length: 6,600 ft, 1.25 mi (2,000 m) |
| R5 | Maximum | D5 | Could gouge the landscape Approximate path length: 9,900 ft, 1.9 mi (3,000 m) |

The COMET Program & Jim Woodmencey

Source: *The COMET Program & Jim Woodmencey*
<http://www.meted.ucar.edu/afwa/avalanche/print.htm>

4.2.4 Volcanoes

The Alaska Volcano Observatory (AVO) and its constituent organizations (USGS, DNR/DGGS, and UAF/GI) are the authority for the active volcanic centers of Alaska. AVO is in the process of publishing individual hazard assessments for each active volcano in the State. As of 2013, published assessments cover the following volcanoes: Hayes, Spurr, Redoubt, Iliamna, Augustine, the Katmai Group, Aniakchak, Emmons Lake, Shishaldin, Akutan, Makushin, Okmok, Great Sitkin, Tanaga, and Gareloi. Each report contains a description of the eruptive history of the volcano, event descriptions, a map of hazard extents, and the likely effects on populations, facilities, and ecosystems.

Basic information about vulnerable assets and populations are identified in these assessments, however their focus is on identification of hazards. The DCCED and other State agencies may use AVO data to integrate community demographics and State infrastructure and improve the risk and vulnerability analyses for this hazard.

One of the most vulnerable sectors to volcanic activity is the aviation industry. Volcanic ash affects air assets on the ground and in the air. The majority of air traffic routes position aircraft directly over or near Alaska's potentially active volcanoes. Referring to the airborne ash incident in Chapter 3, KLM Flight 867 fell 14,000 feet before successfully relighting the engines. Damage to the aircraft was more than \$80 million. As a result, strong communication developed between AVO, other government agencies with responsibility in aviation management, and the airline and air cargo industries. Emergency coordination procedures and communication standards during eruptions are codified in an Interagency Plan and updated every two years. The original plan was published in 1994 and the next version is scheduled for the year 2014. The online link for the current plan is listed in the Resources Section I.

Figure 4.4 displays the locations of active volcanoes in the State of Alaska.

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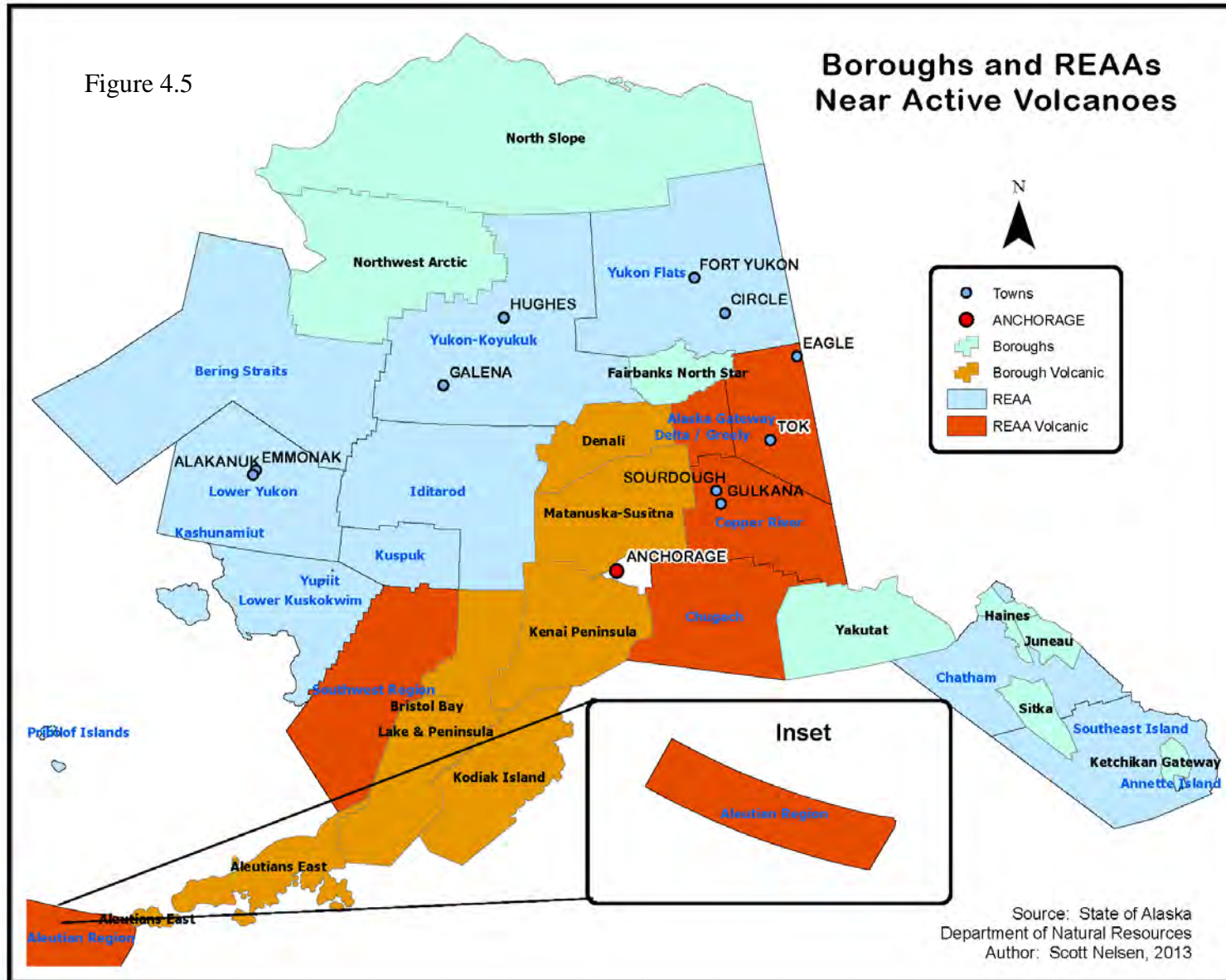
4. Hazard Analysis

Figure 4.4 Historically Active Volcanoes of Alaska



Figure 4.4 Volcanoes of the Aleutian Arc and Wrangell Volcanic Field, current in 2013. Appendix B. p. 45 from, Madden, John, Murray, T.L., Carle, W.J., Cirillo, M.A., Furgione, L.K., Trimpert, M.T., and Hartig, Larry (signatories), 2008, Alaska interagency operating plan for volcanic ash episodes, 52 p

Figure 4.5



Most land areas very near active volcanoes in Alaska are sparsely populated or uninhabited. Thus, the largest threat to people and infrastructure is ash fallout, which may travel hundreds of miles downwind during large explosive eruptions. Even small amounts of ash may temporarily close airports, prompt shutdown of generators and turbines, and have other significant impact on people and the built environment.

Some communities and critical infrastructure are also at risk of other processes impacting areas closer to the volcano such as lahars (volcanic mudflows) and pyroclastic flows. Some notable examples of lahar inundation and damage are the Drift River Oil Terminal near Mt. Redoubt and the Oil Pipeline along the west side of Cook Inlet. Pyroclastic flows have reached within the City of Unalaska (reference AVO hazard report on Makushin). Other volcanoes in Alaska may threaten seasonal facilities or properties located near potential eruption sites.

The extent of damage from volcanic eruptions is dependent upon many factors such as the size and duration of the eruption, the prevailing winds, the weather, and the volume and direction of ejected material. For many volcanoes in the state, there is no published hazard assessment based on modern geologic investigations and hence, understanding of the potential size and severity of future eruptions is uncertain. Thus, an accurate state-wide volcano hazard vulnerability analysis is outside the scope of this plan. For specific discussion of known hazards at some Alaskan volcanoes, see AVO hazard reports. The values for State owned infrastructure displayed in Table 4.12 are for general reference and not indicative of actual loss values due to a volcanic eruption. The vulnerability analysis for volcanic hazards was conducted by identifying Boroughs located within 150 miles of a historically active volcano and displaying their total State asset values.

Table 4.12 Total Values for State Owned Infrastructure

| Jurisdiction | Value |
|-----------------------------------|------------------------|
| Alaska Gateway Borough | \$120,256,056 |
| City of Anchorage | \$1,909,107,869 |
| Aleutian REAA | \$67,747,463 |
| Aleutians East Borough | \$45,000,000 |
| Bristol Bay Borough | \$37,128,154 |
| Chugach REAA | \$385,327,723 |
| Copper River REAA | \$68,344,164 |
| Delta / Greely REAA | \$45,151,188 |
| Denali Borough | \$109,187,211 |
| Kenai Peninsula Borough | \$1,026,900,675 |
| Kodiak Island Borough | \$345,051,494 |
| Lake and Peninsula Borough | \$87,822,402 |
| Matanuska-Susitna Borough | \$234,939,222 |
| Total Value | \$4,481,963,621 |

Table 4.12 Source: FEMA HAZUS 2.1

4.2.5 Earthquakes

The peak horizontal acceleration (PHA) is the most commonly used type of ground acceleration for setting building codes and designing hazard risks. In an earthquake, damage to buildings and infrastructure is related more closely to ground motion, rather than the magnitude of the earthquake.

The most current information, presented in the following figures, is based upon the results of an earthquake study presented by the US Geological Survey in 2007. DHS&EM has determined for this plan, 0-10 peak ground acceleration is a low seismic hazard, 10-30 acceleration is a medium seismic hazard, and 30+ acceleration is a high seismic hazard. The vulnerability analysis for earthquake was conducted using AK HAZUS for each Borough and REAA, and grouped according to their proximity to known peak ground accelerations (Figures 4.5A – 4.5C).

Figure 4.5 A

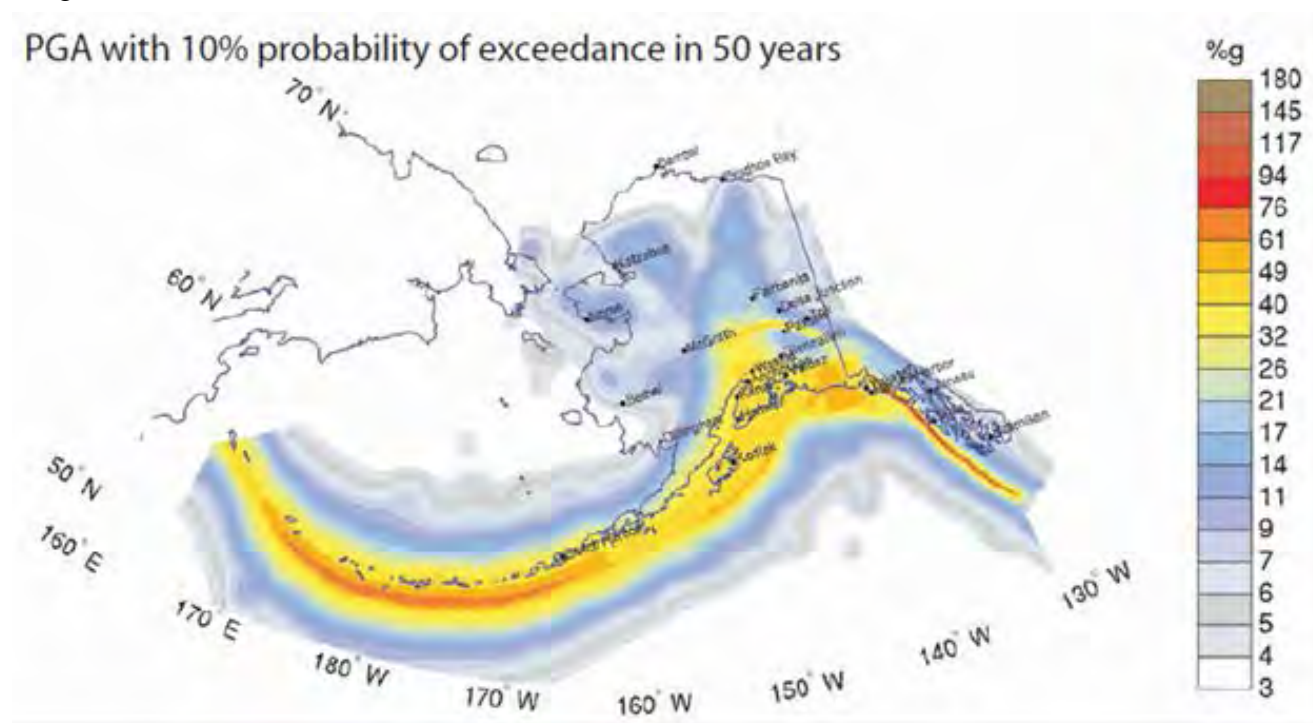
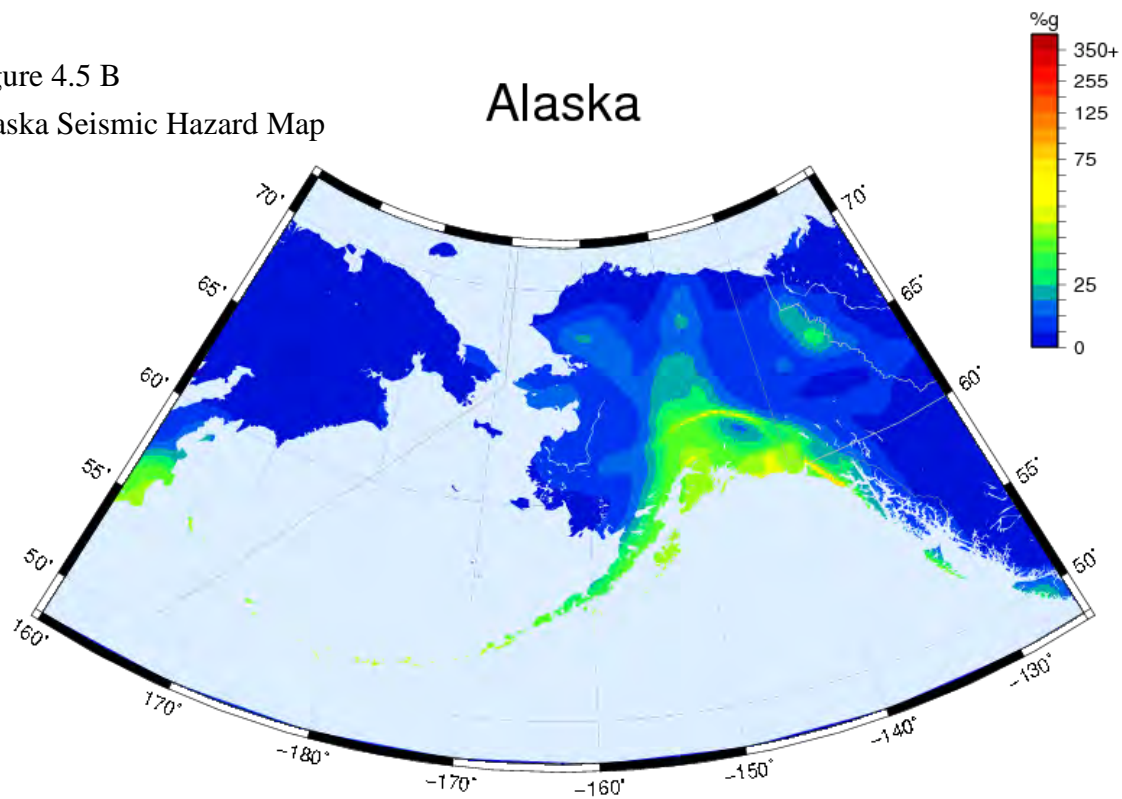


Figure 4.5.A Peak Ground Acceleration with 10% probability of exceedance in 50 years from USGS Mapped Ground Motion Hazard Values from Revision of Time-Independent Probabilistic Seismic Hazard Maps from Alaska, USGS OFR 2007-1043, Fig. 11A, p.25

Figure 4.5 B

Alaska Seismic Hazard Map



PGA, 10% in 50 years

Figure 4.5B. Time-independent probabilistic seismic hazard map for Alaska portraying peak ground acceleration with 10% probability of exceedance in 50 years from the USGS hazard Mapping Images and Data. Maps were produced assuming firm rock soil conditions at 760 m/sec.

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AK Peak Ground Acceleration in 50 years

Acceleration Values




| | |
|---|---------------|
|  | 0 - 10 Low |
|  | 11 - 30 Med |
|  | 31 - 100 High |

Figure 4.5C Seismic data set from the USGS National Seismic Hazards Mapping Project (2007)

<http://earthquake.usgs.gov/hazards/products/ak/2007/>

Figure 4.5 C

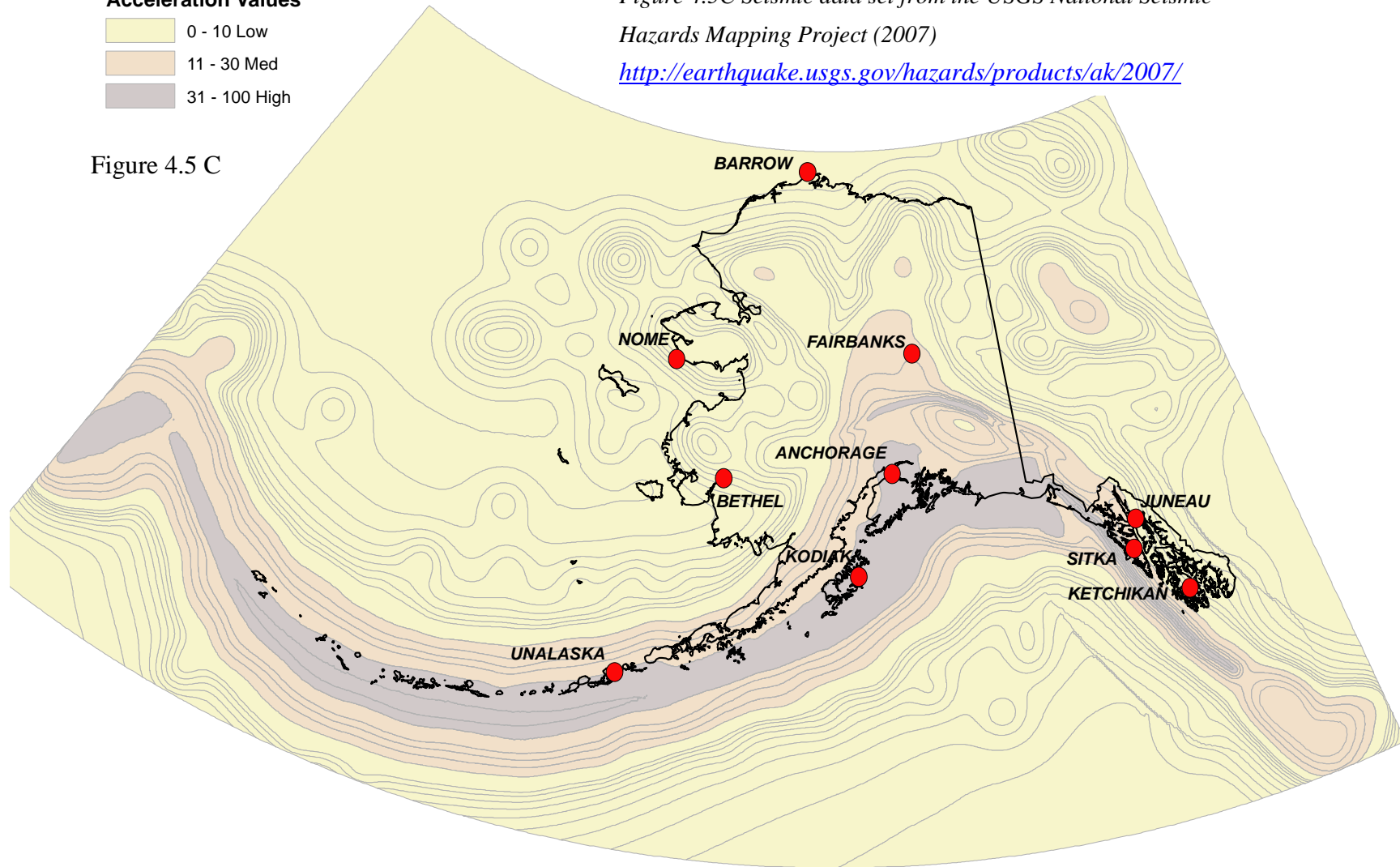


Table 4.13A
2013 High Earthquake Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|------------------------------|----------------------|------------------|---------------------|----------------------------|
| Alaska Gateway REAA | 50 | 109,854 | 1.56% | \$28,119,715 |
| Annette Island REAA | 1 | 636 | 0.01% | \$137,400 |
| Bering Straits REAA | 50 | 83,241 | 1.18% | \$24,949,639 |
| Chatham REAA | 19 | 100,621 | 1.42% | \$7,346,753 |
| City & Borough of Juneau | 192 | 3,765,256 | 53.30% | \$582,771,328 |
| City and Borough of Wrangell | 13 | 26,570 | 0.38% | \$5,542,896 |
| Fairbanks North Star Borough | 5 | 980 | 0.01% | \$300,000 |
| Iditarod REAA | 23 | 33,068 | 0.47% | \$9,350,881 |
| Ketchikan Gateway Borough | 109 | 2,012,636 | 28.49% | \$177,529,171 |
| Kuspuk REAA | 20 | 44,530 | 0.63% | \$10,539,601 |
| Lake & Peninsula Borough | 5 | 10,431 | 0.15% | \$3,701,085 |
| Lower Kuskokwim REAA | 93 | 239,516 | 3.39% | \$66,407,274 |
| Lower Yukon REAA | 48 | 72,233 | 1.02% | \$21,431,262 |
| Municipality of Skagway | 11 | 19,438 | 0.28% | \$6,708,330 |
| North Slope Borough | 38 | 93,631 | 1.33% | \$34,753,313 |
| Northwest Arctic Borough | 59 | 189,437 | 2.68% | \$36,918,716 |
| Pribilof Islands REAA | 4 | 12,054 | 0.17% | \$4,270,000 |
| Southeast Island REAA | 7 | 16,049 | 0.23% | \$2,194,851 |
| Southwest Region REAA | 63 | 119,343 | 1.69% | \$21,300,323 |
| Yukon Flats REAA | 17 | 38,476 | 0.54% | \$13,649,168 |
| Yukon-Koyukuk REAA | 36 | 73,476 | 1.04% | \$23,604,432 |
| Yup'it REAA | 2 | 2,568 | 0.04% | Unk |
| State Total | 865 | 7,064,044 | 100% | 1,081,526,140 |

2013 High Earthquake Hazard Vulnerability Analysis - AK HAZUS (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 110,154 | 40,060 | \$99,471 | 372 | 28 | 40,013 |

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4. Hazard Analysis

Table 4.13B

2013 Medium Earthquake Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|------------------------------|----------------------|------------------|---------------------|----------------------------|
| Alaska Gateway REAA | 6 | 11,785 | 0.16% | \$2,621,570 |
| Aleutian Region REAA | 2 | 5,200 | 0.07% | \$1,042,000 |
| Aleutians East Borough | 27 | 62,643 | 0.85% | \$16,798,680 |
| Bering Straits REAA | 26 | 53,176 | 0.72% | \$18,512,007 |
| Bristol Bay Borough | 36 | 61,478 | 0.84% | \$14,908,913 |
| Chatham REAA | 8 | 12,023 | 0.16% | \$962,041 |
| Chugach REAA | 59 | 524,743 | 7.15% | \$73,447,833 |
| City & Borough of Juneau | 7 | 55,213 | 0.75% | \$22,655,040 |
| City & Borough of Sitka | 105 | 1,833,544 | 24.99% | \$257,483,473 |
| City & Borough of Yakutat | 10 | 50,060 | 0.68% | \$13,548,422 |
| Copper River REAA | 75 | 112,830 | 1.54% | \$27,135,569 |
| Delta/Greely REAA | 66 | 73,526 | 1.00% | \$18,929,218 |
| Denali Borough | 2 | 5,019 | 0.07% | \$1,708,000 |
| Fairbanks North Star Borough | 217 | 2,271,530 | 30.96% | \$550,766,806 |
| Haines Borough | 34 | 61,540 | 0.84% | \$8,764,237 |
| Iditarod REAA | 4 | 4,796 | 0.07% | \$1,644,000 |
| Kenai Peninsula Borough | 182 | 1,340,787 | 18.27% | \$137,897,763 |
| Kuspuk REAA | 19 | 43,426 | 0.59% | \$9,989,601 |
| Lake & Peninsula Borough | 34 | 41,233 | 0.56% | \$14,042,475 |
| Matanuska Susitna Borough | 111 | 599,918 | 8.18% | \$196,801,880 |
| Municipality of Skagway | 11 | 19,438 | 0.26% | \$6,708,330 |
| Northwest Arctic Borough | 15 | 15,240 | 0.21% | \$2,954,005 |
| Southeast Island REAA | 1 | 240 | 0.00% | \$15,000 |
| Yukon Flats REAA | 9 | 6,712 | 0.09% | \$1,967,704 |
| Yukon-Koyukuk REAA | 29 | 71,925 | 0.98% | \$24,950,475 |
| State Total | 1,095 | 7,338,025 | 100.00% | \$1,426,255,042 |

2013 Medium Earthquake Hazard Vulnerability Analysis - AK HAZUS (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 197,324 | 70,797 | \$112,675 | 800 | 46 | 69,068 |

Table 4.13C
2013 Low Earthquake Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|---------------------------|----------------------|-------------------|---------------------|----------------------------|
| Aleutian Region REAA | 9 | 37,925 | 0.21% | \$12,593,250 |
| Aleutians East Borough | 10 | 21,224 | 0.12% | \$5,221,750 |
| Chugach REAA | 63 | 530,461 | 2.93% | \$76,020,833 |
| City & Borough of Yakutat | 49 | 130,823 | 0.72% | \$33,208,836 |
| Denali Borough | 12 | 24,428 | 0.14% | \$7,598,694 |
| Kenai Peninsula Borough | 292 | 2,410,827 | 13.33% | \$414,668,120 |
| Kodiak Island Borough | 107 | 522,989 | 2.89% | \$109,756,365 |
| Matanuska Susitna Borough | 204 | 838,910 | 4.64% | \$241,152,143 |
| Municipality of Anchorage | 367 | 9,133,692 | 50.52% | \$1,909,107,869 |
| State Total | 1,638 | 18,080,290 | 75.50% | \$3,696,212,267 |

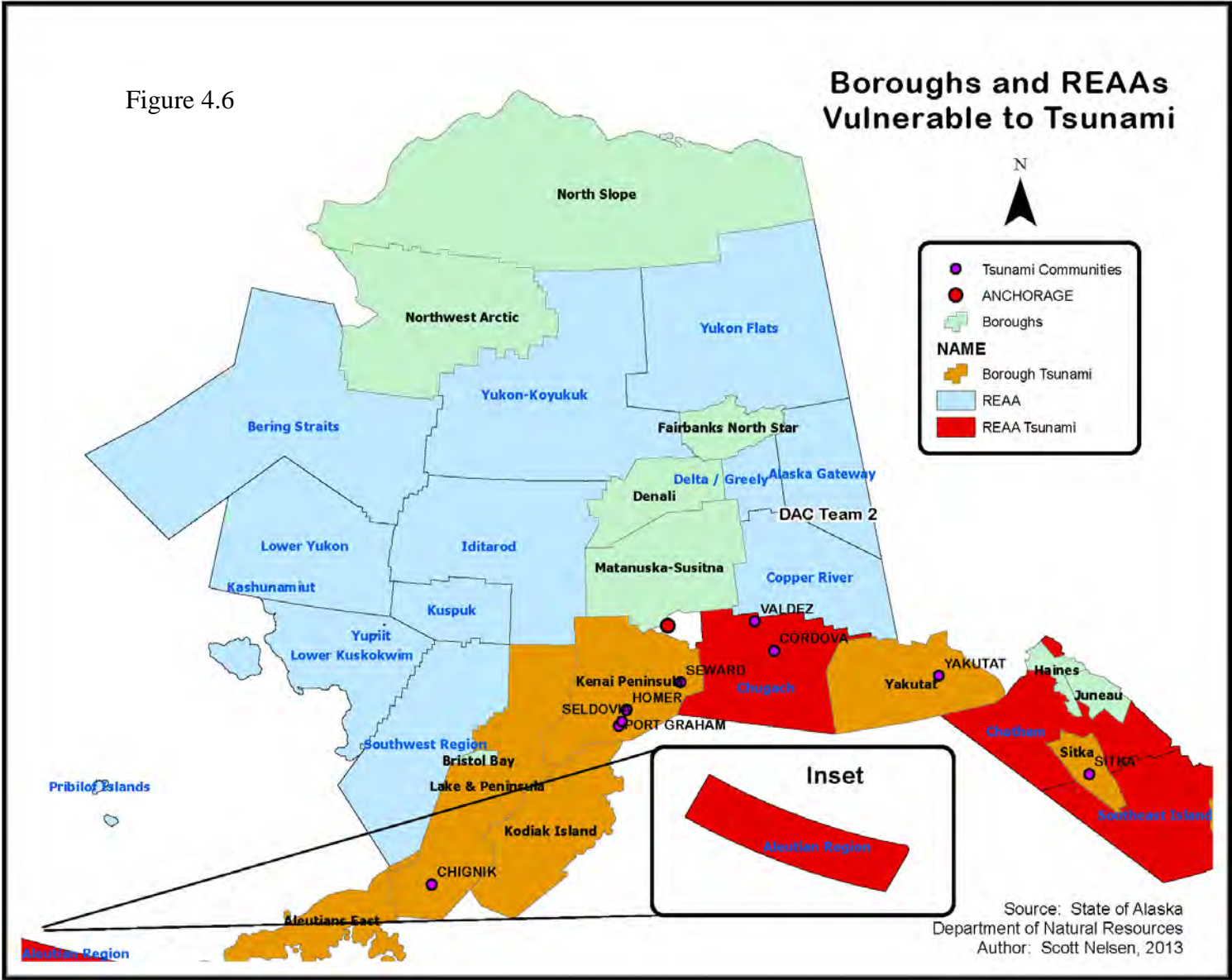
2013 Low Earthquake Hazard Vulnerability Analysis - AK HAZUS (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 398,132 | 142,745 | \$130,379 | 1,672 | 88 | 128,180 |

Table 4.13 Source: FEMA HAZUS 2.1

4.2.6 Tsunamis and Seiches

The State of Alaska is continuing to gather data on tsunami with the goal of conducting a hazard vulnerability analysis. Thus, the values for State owned infrastructure displayed in Table 4.14 are for general reference and not indicative of estimated loss values due to a tsunami event.



Values for State owned infrastructure within at risk Boroughs and REAAs are displayed in Table 4.14.

Table 4.14 State Owned Infrastructure by Borough and REAA

| Jurisdiction | Value |
|----------------------------------|------------------------|
| Annette Island REAA | \$28,564,733 |
| Aleutian REAA | \$67,747,463 |
| Aleutians East Borough | \$45,000,000 |
| Chatham REAA | \$33,575,608 |
| Chugach REAA | \$385,327,723 |
| Ketchikan Gateway Borough | \$114,640,331 |
| Sitka Borough | \$124,621,526 |
| Southwest Island REAA | \$240,113,751 |
| Kodiak Island Borough | \$345,051,494 |
| Yakutat Borough | \$22,404,142 |
| Total Value | \$1,407,046,771 |

Source: State of Alaska DCCED 2013

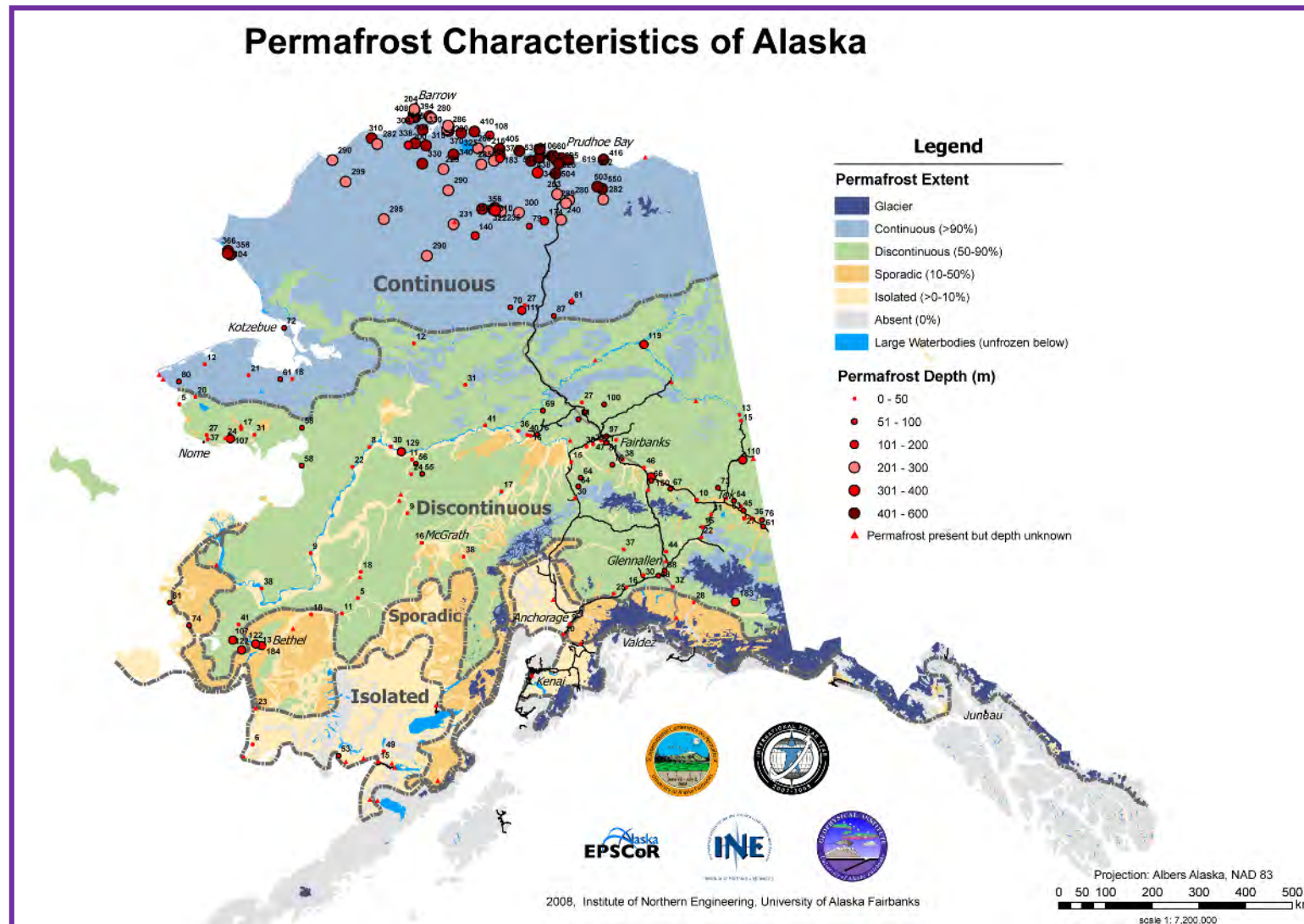
4.2.7 Severe Weather

HVA data acquisition is ongoing. The entire State is vulnerable to severe weather and the loss estimates are statewide. Refer to tables 4.1 through 4.6 for potential loss estimates by REAA and Borough.

4.2.8 Ground Failure

The following are value estimates for at risk state owned facilities within Boroughs and REAAs by permafrost region (Figure 4.7).

Figure 4.7 Permafrost Extents



Source: Jorgenson et al 2008

Table 4.15A
2013 Continuous Permafrost Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|--------------------------|----------------------|----------------|---------------------|----------------------------|
| Bering Straits REAA | 11 | 37,811 | 5.43% | \$16,432,001 |
| Copper River REAA | 58 | 87,908 | 12.63% | \$20,766,450 |
| Iditarod REAA | 2 | 2,096 | 0.30% | \$670,000 |
| Kuspuk REAA | 1 | 1,104 | 0.16% | \$550,000 |
| Lower Kuskokwim REAA | 77 | 215,766 | 31.00% | \$61,380,567 |
| Lower Yukon REAA | 37 | 54,455 | 7.82% | \$15,828,761 |
| North Slope Borough | 38 | 93,631 | 13.45% | \$34,753,313 |
| Northwest Arctic Borough | 50 | 179,041 | 25.73% | \$35,136,713 |
| Yukon Flats REAA | 4 | 3,952 | 0.57% | \$926,504 |
| Yukon-Koyukuk REAA | 11 | 17,588 | 2.53% | \$8,197,586 |
| Yupiit REAA | 2 | 2,568 | 0.37% | Unknown |
| State Total | 291 | 695,920 | 100.00% | \$194,641,897 |

2013 Continuous Permafrost Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 39,124 | 10,537 | \$77,517 | 46 | 8 | 11,481 |

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Table 4.15B

2013 Discontinuous Permafrost Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|------------------------------|----------------------|------------------|---------------------|----------------------------|
| Alaska Gateway REAA | 50 | 109,854 | 4.23% | \$28,119,715 |
| Bering Straits REAA | 39 | 45,430 | 1.75% | \$8,517,638 |
| Copper River REAA | 13 | 15,522 | 0.60% | \$4,644,119 |
| Delta/Greely REAA | 60 | 67,774 | 2.61% | \$18,482,218 |
| Denali Borough | 14 | 29,447 | 1.13% | \$9,306,694 |
| Fairbanks North Star Borough | 211 | 2,105,168 | 81.04% | \$541,034,629 |
| Iditarod REAA | 23 | 32,268 | 1.24% | \$9,240,881 |
| Kuspuk REAA | 19 | 43,426 | 1.67% | \$9,989,601 |
| Lower Kuskokwim REAA | 8 | 11,664 | 0.45% | \$2,700,004 |
| Lower Yukon REAA | 11 | 17,778 | 0.68% | \$5,602,501 |
| Northwest Arctic Borough | 12 | 12,952 | 0.50% | \$2,302,004 |
| Yukon Flats REAA | 18 | 32,940 | 1.27% | \$12,595,368 |
| Yukon-Koyukuk REAA | 36 | 73,357 | 2.82% | \$20,647,429 |
| State Total | 514 | 2,597,580 | 100.00% | \$673,182,801 |

2013 Discontinuous Permafrost Hazard Vulnerability Analysis - AK HAZUS (utilizes 2000 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 100,322 | 35,701 | \$98,013 | 383 | 23 | 33,206 |

Table 4.15C

2013 Isolated Permafrost Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|----------------------------|----------------------|----------------|---------------------|----------------------------|
| Chatham REAA | 30 | 119,819 | 80.39% | \$9,598,583 |
| City & Borough of Wrangell | 12 | 27,086 | 18.17% | \$3,587,801 |
| Southeast Island REAA | 2 | 2,140 | 1.44% | \$400,000 |
| Grand Total | 44 | 149,045 | 100.00% | \$13,586,384 |

2013 Isolated Permafrost Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 1,224 | 532 | \$139,769 | 17 | 0 | 578 |

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Table 4.15D

2013 Sporadic Permafrost Hazard Vulnerability Analysis - State Facilities

| Borough / REAA | Number of Facilities | Square Feet | Square Feet at Risk | Adjusted Replacement Value |
|---------------------------|----------------------|----------------|---------------------|----------------------------|
| Bristol Bay Borough | 36 | 61478 | 6.10% | \$9,292,308.00 |
| Lake & Peninsula Borough | 11 | 16695 | 1.66% | \$5,640,724.00 |
| Lower Kuskokwim REAA | 8 | 9046 | 0.90% | \$852,403.00 |
| Matanuska-Susitna Borough | 131 | 590116 | 58.57% | \$117,937,357.00 |
| Municipality of Anchorage | 67 | 222488 | 22.08% | \$61,252,142.00 |
| Southwest Region REAA | 58 | 107717 | 10.69% | \$13,533,771.00 |
| Grand Total | 311 | 1007540 | 100.00% | \$208,508,705.00 |

2013 Sporadic Permafrost Hazard Vulnerability Analysis (2010 Census data)

| Total Population | Total Number of Households | Average Value for Households | Buildings: Commercial | Buildings: Industrial | Buildings: Residential |
|------------------|----------------------------|------------------------------|-----------------------|-----------------------|------------------------|
| 24,848 | 8,125 | \$116,910 | 74 | 7 | 11,150 |

Table 4.15 Source: FEMA HAZUS 2.1

4.2.9 Erosion

Through a process of stakeholder meetings, review of previous reports, and extensive correspondence with communities, 178 Alaska communities were found by the U.S. Army Corps of Engineers (USACE) to have reported erosion problems. These and other findings are summarized in the USACE Baseline Erosion Assessment (BEA) in Chapter 6, *Resources*.

After subsequent investigation, the USACE designated 26 communities Priority Action Communities (Table 4.16 A) indicating that they should be considered for immediate action by either initiating an evaluation of potential solutions or continuing with ongoing efforts to manage erosion. Sixty-nine communities where erosion problems are present but not significant enough to require immediate actions were designated Monitor Conditions Communities (Table 4.16 B). Eighty-three communities where minimal erosion-related damages were reported or would not be expected in the foreseeable future were designated Minimal Erosion Communities (Table 4.16 C).

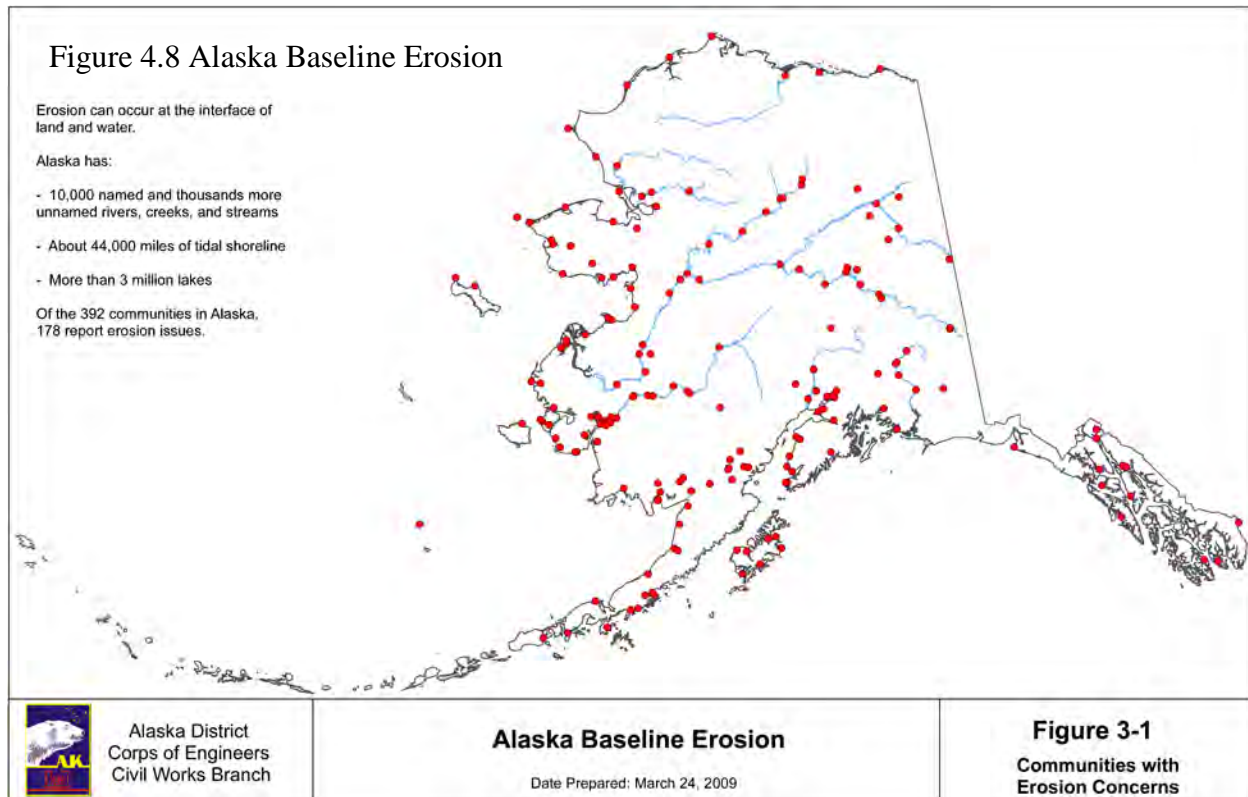


Figure 4.8 - Dozens of communities throughout Alaska where erosion was believed to be causing negative impacts are noted. From USACE Baseline Erosion Study, Figure 5.10.3.

Table 4.16 A. Priority Action Communities for Erosion Control

| Priority Action Communities (26 Communities) | | |
|--|---------------|---------------|
| Akiaka* | Dillingham | Newtok |
| Alakanuk* | Golovin | Nunapitchuk |
| Barrow | Huslia | Port Heiden |
| Chefornak | Kivalina | Saint Michael |
| Chevak | Kotlik | Selawik |
| Clark's Point | Kwigillingok* | Shaktoolik* |
| Cordova/Eyak | Lime Village | Shishmaref |
| Emmonak | McGrath | Unalakleet |
| Deering | Napakiak | |

*Community for which a Detailed Erosion Assessment was developed (USACE).

Table 4.16 B. Monitor Erosion Condition Communities

| Monitor Conditions Communities (69 Communities) | | |
|---|----------------------------|----------------------------|
| Alatna | Galena | Noatak |
| Aleknagik | Gulkana | Nome |
| Aniak ^a | Haines | Nuiqsut |
| Atmautluak | Homer | Old Harbor |
| Bethel | Hooper Bay | Oscarville |
| Big Delta | Hughes | Ouzinkie |
| Brevig Mission | Igiugig | Pile Bay-Williamsport |
| Buckland | Iliamna | Pilot Point |
| Butte | Kaktovik | Point Hope |
| Central | Kenai | Port Graham |
| Chignik Lagoon | Kipnuk ^a | Russian Mission |
| Chiniak | Kongiganak ^a | Savoonga |
| Circle | Kotzebue | Seward |
| Circle View-Stampede Estates | Koyukuk | Shageluk |
| Delta Junction | Kwethluk ^a | Soldotna |
| Diomedes | Levelock | South Naknek |
| Eagle | Lower Kalskag ^a | Sutton-Alpine |
| Eek | McCarthy | Tununak |
| Egegik | Mekoryuk | Tuntutuliak ^a |
| Elim | Nanwalek | Upper Kalskag ^a |
| Evansville | Nelson Lagoon | Valdez |
| False Pass | Nenana | Venetie |
| Fort Yukon | Nightmute | Wales |

^aCommunity for which a Detailed Erosion Assessment was developed (USACE).

Table 4.16 C. Communities with Minimal Erosion Conditions

| Minimal Erosion Communities (83 Communities) | | |
|--|------------------------|---------------|
| Akhiok | Gustavus | Perryville |
| Akiachak | Holy Cross | Point Lay |
| Allakaket | Hyder | Port Alsworth |
| Ambler | Ivanof Bay | Port Lions |
| Anchor Point | Juneau-Douglas | Portage |
| Angoon | Kaltag | Red Devil |
| Anvik | Karluk | Salcha |
| Bettles | Kiana | Sand Point |
| Birch Creek | King Cove | Saint Paul |
| Cantwell | King Island | Sitka |
| Chalkyitsik | Kokhanok | Skagway |
| Chignik Bay | Koyuk | Skwentna |
| Chignik Lake | Larsen Bay | Sleetmute |
| Chistochina | Manley Hot Springs | Stebbins |
| Chitna | Mary's Igloo | Susitna |
| Chuathbaluk | Metlakatla | Talkeetna |
| Coldfoot | Municipality of | Tazlina |
| Copper Center | Napaskiak ^a | Teller |
| Council | New Stuyahok | Togiak |
| Crooked Creek | Ninilchik | Toksook Bay |
| Ekuk | Nondalton | Ugashik |
| Ekwok | Noorvik | Upper Chena |
| Fairbanks | Northway | Wainwright |
| Fox | Northway Village | Wasilla |
| Gakona | Nulato | Willow |
| Gambell | Nunam Iqua | Wiseman |
| Girdwood | Palmer | Yakutat |
| Grayling | Pedro Bay | |

^aCommunity for which a Detailed Erosion Assessment has been developed (USACE).

4.2.10 Dams

Out of the 170 dams in the inventory, 83 are believed to be owned by the State, or have a disputed ownership with a State interest. Thirty five dams are federally owned, and 52 are locally or privately owned. They are listed in Table 4.17 along with their potential hazard classification.

Table 4.17 A. State Owned Dams

| State Owned Dams | | | | | |
|------------------|-------------------------------|---------------------------|--------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| AK00010 | Lake Connell | Ketchikan Gateway Borough | Ketchikan | High | Yes |
| AK00011 | Carlanna Lake | Ketchikan Gateway Borough | Ketchikan | High | Yes |
| AK00013 | Wrangell Upper | SE Island REAA | Wrangell | High | No |
| AK00014 | Wrangell Lower | SE Island REAA | Wrangell | High | Not Required |
| AK00017 | Hess Creek Dam | Yukon Flats REAA | Livengood | High | No |
| AK00018 | Meals Lake Dam | Chugach REAA | Cordova | High | Yes |
| AK00022 | Bettinger Upper Reservoir Dam | Kodiak Island Borough | Kodiak | High | Yes |
| AK00033 | Eklutna Dam | Municipality Of Anchorage | Eklutna Village | High | Yes |
| AK00034 | Lake "O" The Hills | Municipality Of Anchorage | Anchorage | High | Yes |
| AK00060 | Lowell Creek | Kenai Peninsula Borough | Seward | High | No |
| AK00077 | Douglas Island Dam | City & Borough Of | Douglas | High | Yes |

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| State Owned Dams | | | | | |
|------------------|--------------------------|---------------------------|--------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| Juneau | | | | | |
| AK00092 | Alitak Cannery Dam #1 | Kodiak Island Borough | Alitak Cannery | High | No |
| AK00101 | Bridge Creek Dam | Kenai Peninsula Borough | Homer | High | No |
| AK00115 | Middle Stream Lower Dam | Aleutian Region REAA | Atka | High | No |
| AK00116 | Middle Stream Middle Dam | Aleutian Region REAA | Atka | High | No |
| AK00117 | Middle Stream Upper Dam | Aleutian Region REAA | Atka | High | No |
| AK00189 | Lower Fire Lake Dam | Municipality Of Anchorage | Eagle River | High | Yes |
| AK00305 | New Kake Dam | | Kake | High | Yes |
| AK00016 | Petersburg Upper Dam | SE Island REAA | Petersburg | Significant | Yes |
| AK00020 | Pillar Creek Dam No.1.A | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00021 | Pillar Creek Dam No. 2.C | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00029 | Westchester Lagoon Dam | Municipality Of Anchorage | Anchorage | Significant | No |
| AK00032 | Shotter Creek Upper Dam | Chatham REAA | Hoonah | Significant | No |
| AK00049 | Eyak Lake | Chugach REAA | Cordova | Significant | No |

| State Owned Dams | | | | | |
|------------------|--------------------------|---------------------------|--------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| AK00051 | Isatkuag Lagoon Dam | North Slope Borough | Barrow | Significant | No |
| AK00053 | Itasigrook | North Slope Borough | Barrow | Significant | No |
| AK00070 | Pillar Creek Dam No. 2.A | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00071 | Pillar Creek Dam No. 2.B | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00072 | Pillar Creek Dam No.1.B | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00073 | Monashka Creek Dam | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00082 | Roycroft Lake | Kenai Peninsula Borough | Moose Pass | Significant | Yes |
| AK00090 | Alitak Cannery Dam #3 | Kodiak Island Borough | Alitak Cannery | Significant | No |
| AK00093 | Lower Eklutna | Municipality Of Anchorage | Eklutna Village | Significant | No |
| AK00098 | Stover Dam | Kodiak Island Borough | Kodiak | Significant | No |
| AK00120 | Hydaburg Dam | SE Island REAA | Hydaburg | Significant | No |
| AK00166 | Old Harbor City Dam | Kodiak Island Borough | Old Harbor | Significant | No |
| AK00185 | Monashka Creek Dike | Kodiak Island Borough | Kodiak | Significant | Yes |
| AK00201 | Red Dog Tailings Dam | Northwest Arctic Borough | Kivalina | Significant | Yes |

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| State Owned Dams | | | | | |
|------------------|--|------------------------------|--------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| AK00207 | Mahoona Dam | Kodiak Island Borough | Ouzinkie | Significant | No |
| AK00213 | Nixon Fork Tailings Dam | Iditarod REAA | McGrath | Significant | No |
| AK00214 | Cabin Creek Dam | SE Island REAA | Petersburg | Significant | Not Required |
| AK00262 | Beluga Lake Dam | Kenai Peninsula Borough | Homer | Significant | No |
| AK00264 | Akutan Hydro Dam | Aleutians East Borough | Akutan | Significant | No |
| AK00265 | Icy Creek Reservoir Dam | Aleutian Region REAA | Captains Bay | Significant | Yes |
| AK00268 | Humboldt Creek Reservoir Dam | Aleutians East Borough | Sand Point | Significant | No |
| AK00303 | Red Dog Back Dam | Northwest Arctic Borough | Kivalina | Significant | No |
| AK00304 | Pogo R.T.P. Dam | Delta/Greely REAA | Pogo Mine | Significant | Yes |
| AK00306 | Chuniisax Hydro Dam * | Aleutian Region REAA | Atka | Significant | Pending |
| AK00308 | Lower Slate Lake Tailings Dam * | City & Borough Of Juneau | Kensington Mine | Significant | Pending |
| AK00309 | Rock Creek Tailings Storage Facility Dam * | Northwest Arctic Borough | Nome | Significant | Yes |
| AK00311 | Pearl Creek Causeway Dam | Fairbanks North Star Borough | Fairbanks | Significant | Yes |

| State Owned Dams | | | | | |
|------------------|-------------------------------------|---------------------------|-------------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| AK00312 | Kwethluk Wastewater Lagoon Dam* | Lower Kuskokwim REAA | Kwethluk | Significant | Pending |
| AK00019 | Aquaculture Dam | Chugach REAA | San Juan Cannery | Low | Not Required |
| AK00024 | Seldovia Upper Dam | Kenai Peninsula Borough | Seldovia | Low | Not Required |
| AK00028 | Campbell Lake Dam | Municipality Of Anchorage | Anchorage | Low | Not Required |
| AK00044 | Long Lake Dam | City & Borough Of Juneau | Juneau | Low | Not Required |
| AK00061 | Aleut Creek Dam | Aleutian Region REAA | Navy Town | Low | Not Required |
| AK00064 | Kotzebue Water Supply Dam | Northwest Arctic Borough | Kotzebue | Low | Not Required |
| AK00086 | Chiniak Satellite Tracking Sta. Dam | Kodiak Island Borough | (Remote) | Low | Not Required |
| AK00091 | Alitak Cannery Dam #2 | Kodiak Island Borough | Alitak Cannery | Low | Not Required |
| AK00094 | Uyak Cannery Dam | Kodiak Island Borough | Whitney Fidalgo Cannery | Low | Not Required |
| AK00095 | Alitak Cannery Dam #4 | Kodiak Island Borough | Alitak Cannery | Low | Not Required |
| AK00105 | Squaw Harbor Dam | Aleutians East Borough | Squaw Harbor | Low | Not Required |
| AK00106 | West North Lake Dam | Aleutian Region REAA | Adak Naval Base | Low | Not Required |

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4. Hazard Analysis

| State Owned Dams | | | | | |
|------------------|----------------------------------|------------------------------|--------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| AK00107 | East North Lake Dam | Aleutian Region REAA | Adak Naval Base | Low | Not Required |
| AK00108 | Bonny Rose Lake Dam | Aleutian Region REAA | Adak Naval Base | Low | Not Required |
| AK00119 | Cannery Creek Dam | Chugach REAA | Fish Hatchery | Low | Yes |
| AK00122 | New England Fish Co Dam | Aleutians East Borough | Sand Point | Low | Not Required |
| AK00123 | Lake Demarie Dam | Aleutian Region REAA | Adak | Low | Not Required |
| AK00171 | Pillar Creek Dam No. 3 | Kodiak Island Borough | Kodiak | Low | Not Required |
| AK00178 | Ward Cove Cannery Dam | Ketchikan Gateway Borough | Ketchikan | Low | Not Required |
| AK00179 | Neets Creek Dam | Ketchikan Gateway Borough | Fish Hatchery | Low | Not Required |
| AK00184 | Bluff Lake Diversion | Ketchikan Gateway Borough | Fish Hatchery | Low | Not Required |
| AK00200 | Red Dog Water Supply Dam | Northwest Arctic Borough | Kivalina | Low | Yes |
| AK00211 | Fort Knox Water Dam | Fairbanks North Star Borough | Chatineka | Low | Yes |
| AK00212 | Fort Knox Tailings Dam | Fairbanks North Star Borough | Chatineka | Low | Yes |
| AK00260 | Red Dog Mine Water Diversion Dam | Northwest Arctic Borough | Kivalina | Low | Yes |

| State Owned Dams | | | | | |
|------------------|----------------------------|------------------------------|--------------------|---------------------------------|-----------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential Classification | Emergency Action Plan |
| AK00267 | Armin F. Koernig Dike | Chugach REAA | San Juan Cannery | Low | Not Required |
| AK00301 | Two Bull Ridge Pond T5 Dam | Denali Borough | Healy | Low | Not Required |
| AK00302 | Two Bull Ridge Pond T6 Dam | Denali Borough | Healy | Low | Not Required |
| AK00307 | Pond 7 Dam | | | Low | Not Required |
| AK00310 | Walter Creek H.L.P. Dam | Fairbanks North Star Borough | Fort Knox Mine | Low | Not Required |
| AK00401 | C.P.P. Dam | Matanuska-Susitna Borough | Palmer | Low | Not Required |

Table 4.17 A. Dams under State Jurisdiction from 2011 State of Alaska dam inventory
Source: Alaska Dam Inventory, June 2011

NOTES:

- 1) The information presented in the above table is subject to verification and should be used with caution.
- 2) * indicates construction pending.
- 3) Nearby development listed for location purposes only and does not imply any specific level of risk to development

Table 4.17 B. Federally Owned Dams

| Federally Owned Dams | | | | | |
|----------------------|---------------------|--------------------------|--------------------|------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential | Emergency Action |
| AK00002 | Blue Lake Dam | City & Borough Of Sitka | Sitka | High | Yes |
| AK00003 | Salmon Creek Dam | City & Borough Of Juneau | Juneau | High | Yes |
| AK00006 | Ketchikan Lakes Dam | Ketchikan Gateway | Ketchikan | High | Yes |

State of Alaska

Hazard Mitigation Plan 2013

4. Hazard Analysis

| Federally Owned Dams | | | | | |
|----------------------|------------------------------|------------------------------|-----------------------|------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential | Emergency Action |
| AK00027 | Solomon Gulch Dam | Chugach REAA | Valdez | High | Yes |
| AK00085 | Moose Creek Dam/Chena | Fairbanks North Star Borough | Fairbanks | High | Yes |
| AK00099 | Nasa Tracking Station Dam #1 | Fairbanks North Star Borough | Nasa Tracking Station | Unknown | Not Required |
| AK83021 | Solomon Gulch | Chugach REAA | Valdez | High | Yes |
| AK00004 | Annex Creek Dam | City & Borough Of Juneau | (Remote) | Low | No |
| AK00007 | Upper Silvis Dam | Ketchikan Gateway | (Remote) | Low | Yes |
| AK00008 | Lower Silvis | Ketchikan Gateway | (Remote) | Low | Yes |
| AK00009 | Lower Dewey Dam | Chatham REAA | Skagway | Low | No |
| AK00035 | Ship Creek Dam | Municipality Of Anchorage | Anchorage | Low | Not Required |
| AK00036 | Gregory Lake Dam | Municipality Of Anchorage | Elmendorf AFB | Low | Not Required |
| AK00037 | Fawn Lake Dam North | Ketchikan Gateway | Ketchikan | Low | Yes |
| AK00050 | Humpback Creek #3 | Chugach REAA | Cordova | Low | Not Required |
| AK00054 | Purple Lake | Annette Island REAA | Metlakatla | Low | Not Required |
| AK00058 | Lake Osprey Dam | City & Borough Of Sitka | Sitka | Low | Not Required |
| AK00059 | Dewey Forebay | Chatham REAA | Skagway | Low | Not Required |

| Federally Owned Dams | | | | | |
|-----------------------------|------------------------------|------------------------------|---------------------------|-------------------------|-------------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential | Emergency Action |
| AK00074 | Chester Lake | Annette Island REAA | Metlakatla | Low | Not Required |
| AK00076 | Otter Lake Dam | Municipality Of Anchorage | Ft. Richardson | Low | Not Required |
| AK00079 | Jerome Lake Dam | Kenai Peninsula Borough | (Remote) | Low | Not Required |
| AK00103 | Chignik Dam | Lake & Peninsula Borough | Chignik | Low | Not Required |
| AK00153 | Karluk Lagoon Dam | Kodiak Island Borough | Karluk Lagoon | Low | Not Required |
| AK00158 | Nasa Tracking Station Dam #2 | Fairbanks North Star Borough | Nasa Tracking Station | Unknown | Not Required |
| AK00161 | Haines Army Depot Water | Haines Borough | Haines | Low | Not Required |
| AK82401 | Explorer Glacier Pond | Municipality Of Anchorage | Portage | Low | No |
| AK83008 | Terror Lake | Kodiak Island Borough | (Remote) | Low | No |
| AK83009 | Shotgun Creek Div | Kodiak Island Borough | (Remote) | Low | No |
| AK83012 | Green Lake | City & Borough Of Sitka | Sitka | Low | No |
| AK83016 | Bradley Lake Dam | Kenai Peninsula Borough | (Remote) | Low | No |
| AK83022 | Fawn Lake Dam South | Ketchikan Gateway Borough | Ketchikan | Low | Yes |
| AK00001 | Cooper Lake Dam | Kenai Peninsula Borough | Cooper Landing | Significant | Yes |

State of Alaska

Hazard Mitigation Plan 2013

4. Hazard Analysis

| Federally Owned Dams | | | | | |
|----------------------|------------------------|---------------------------|--------------------|------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential | Emergency Action |
| AK00005 | Crystal Lake Dam | SE Island REAA | (Remote) | Significant | Yes |
| AK00012 | Whitman Lake | Ketchikan Gateway Borough | Herring Cove | Significant | Yes |
| AK00039 | Pelican Cove Creek Dam | Chatham REAA | Pelican | Significant | No |
| AK83013 | Swan Lake | Ketchikan Gateway Borough | (Remote) | Significant | Yes |

Table 4.17 B. Source: Alaska Dam Inventory, June 2011

Table 4.17 C. Non-Jurisdictional Dams

| Non-Jurisdictional Dams | | | | |
|-------------------------|-----------------------------|-------------------------|--------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential |
| AK00030 | Big Kitoi | Kodiak Island Borough | Fish Hatchery | Low |
| AK00031 | Indian River | City & Borough Of Sitka | Sitka | Low |
| AK00063 | Shotter Creek Lower Dam | Chatham REAA | Hoonah | Low |
| AK00075 | City Of Angoon Dam | Chatham REAA | Angoon | Low |
| AK00083 | Excursion Inlet Cannery Dam | Chatham REAA | Excursion Inlet | Low |
| AK00084 | Saxman Lower Reservoir | Ketchikan Gateway | Saxman | Low |
| AK00088 | Larson Bay Cannery Dam | Kodiak Island Borough | Larson Bay | Low |
| AK00089 | Port Lions Dam | Kodiak Island Borough | Port Lions | Low |

| Non-Jurisdictional Dams | | | | |
|-------------------------|-------------------------|--------------------------|--------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential |
| AK00096 | Fish Creek Dam | Kenai Peninsula Borough | Seldovia | Low |
| AK00097 | Port Graham Dam #2 | Kenai Peninsula Borough | Port Graham | Low |
| AK00102 | Tin City Dam | Bering Straits REAA | Tin City | Low |
| AK00104 | Port Alexander Dam | City & Borough Of Sitka | Port Alexander | Low |
| AK00109 | Lake Leone Dam | Aleutian Region REAA | Adak Naval Base | Low |
| AK00110 | Adak Log Dam | Aleutian Region REAA | Adak Naval Base | Low |
| AK00112 | Mitchell Creek Dam | Aleutian Region REAA | Adak Naval Base | Low |
| AK00114 | North Stream Lower Dam | Aleutian Region REAA | Atka | Low |
| AK00118 | Atka Power Dam | Aleutian Region REAA | Atka | Low |
| AK00125 | Peter Pan Seafoods | Lake & Peninsula Borough | Chignik | Low |
| AK00126 | False Pass Dam | Aleutians East Borough | False Pass | Low |
| AK00127 | Nurses Creek Dam | Aleutian Region REAA | Adak | Low |
| AK00128 | Akutan Water Supply Dam | Aleutians East Borough | Akutan | Low |
| AK00130 | Akutan Power Dam | Aleutians East Borough | Akutan | Low |
| AK00131 | Rowan Bay | SE Island REAA | (Remote) | Low |

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Hazard Mitigation Plan 2013

4. Hazard Analysis

| Non-Jurisdictional Dams | | | | |
|-------------------------|------------------------------|-------------------------|--------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential |
| AK00133 | Kennel Creek Dam | City & Borough Of Sitka | Sitka | Low |
| AK00134 | Corner Bay Dam | City & Borough Of Sitka | | Low |
| AK00135 | Tenakee Springs Dam | Haines Borough | Tenakee | Low |
| AK00136 | Tenakee Spring School Dam | Haines Borough | Tenakee | Low |
| AK00138 | Port Alexander Cold Storage | City & Borough Of Sitka | Port Alexander | Low |
| AK00142 | Ketchikan Diversion Dam | Ketchikan Gateway | Ketchikan | Low |
| AK00143 | Ketchikan Debris Control Dam | Ketchikan Gateway | Ketchikan | Low |
| AK00145 | Saxman Upper Dam | Ketchikan Gateway | Saxmon | Low |
| AK00146 | Klawock Dam | SE Island REAA | Klawock | Low |
| AK00147 | Nunoo Creek Dam | Chugach REAA | Tatitlek | Low |
| AK00149 | Salt Chuck Mine Dam | SE Island REAA | (Remote) | Low |
| AK00150 | Sheldon Jackson College Dam | City & Borough Of Sitka | Sitka | Low |
| AK00154 | Old Karluk Dam | Kodiak Island Borough | Old Karluk | Low |
| AK00156 | Zachar Bay Fisheries Dam | Kodiak Island Borough | (Remote) | Low |
| AK00157 | Louie Nelson Homestead Dam | Haines Borough | (Remote) | Low |

| Non-Jurisdictional Dams | | | | |
|-------------------------|-------------------------|---------------------------|--------------------|------------------|
| DAM ID Number | Name | Borough REAA | Nearby Development | Hazard Potential |
| AK00159 | Lost Lake Dam | Copper River REAA | (Remote) | Low |
| AK00160 | Port Graham Dam #1 | Kenai Peninsula Borough | Port Graham | Low |
| AK00162 | Klukwan Dam | Haines Borough | Klukwan | Low |
| AK00163 | Ellamar Dam #1 | Chugach REAA | Ellamar | Low |
| AK00164 | Ellamar Dam #2 | Chugach REAA | Ellamar | Low |
| AK00165 | Jim Edwards Dam | Copper River REAA | McCarthy | Low |
| AK00167 | Port Wakefield Dam | Kodiak Island Borough | Port Wakefield | Low |
| AK00168 | Crab Bay Dam #4 | Chugach REAA | Chenega | Low |
| AK00169 | Tatitlek | Chugach REAA | Tatitlek | Low |
| AK00182 | Lake Lucile Dam | Matanuska-Susitna Borough | Wasilla | Low |
| AK00208 | Forks Creek Dam | Ketchikan Gateway | Mountain Point | Low |
| AK00210 | Hawk Inlet Cannery Dam | City & Borough Of Juneau | Hawk Inlet | Low |
| AK00263 | Rainbow Lake Dam | Matanuska-Susitna Borough | Wasilla | Low |
| AK00266 | Icy Lake Dam | Aleutian Region REAA | Captains Bay | Low |
| AK00300 | Kipnuk Water Supply Dam | Lower Kuskokwim | Kipnuk | Low |

Table 4.17 C. Source: Alaska Dam Inventory, June 2011

NOTE: Emergency Action Plans are not required for non-jurisdictional dams.

4.2.11 Hazardous Materials

The State contains a number of thoroughfares over which hazardous substances may be transported. These include the approximate 2,500 miles of highway system, the Alaska Railroad, airports, and marine vessel traffic. All classes of hazardous substances may be transported on these routes. The most common method of transport along the highway system is by tractor trailers. The Alaska Railroad is also a major transporter of hazardous substances. Ocean-going vessels transport hazardous substances into and out of upper Cook Inlet and other coastal communities. Fresh water transport occurs on a smaller scale, yet can be fairly extensive in the Yukon-Kuskokwim Delta during summer months. Air transport is not a common means of transporting hazardous substances into or out of the State. Small quantities of hazardous substances may be transported to airports for subsequent distribution on fixed-wing aircraft. In addition, there are a number of fixed sites within the State where hazardous substances are stored and used. Hazardous substance releases may also occur as a result of other natural hazards, such as earthquakes, fire, floods, and weather extremes.

The U.S. Environmental Protection Agency (EPA) has classified over 300 substances as EHS. Approximately 20 of these chemicals are commonly used in Alaska. Figure 4.9 shows EHS-handling facilities throughout the State. The level A handling facilities are located along the Alaska Oil Pipeline, as the majority of hazardous materials found in the State are used in the production of oil.

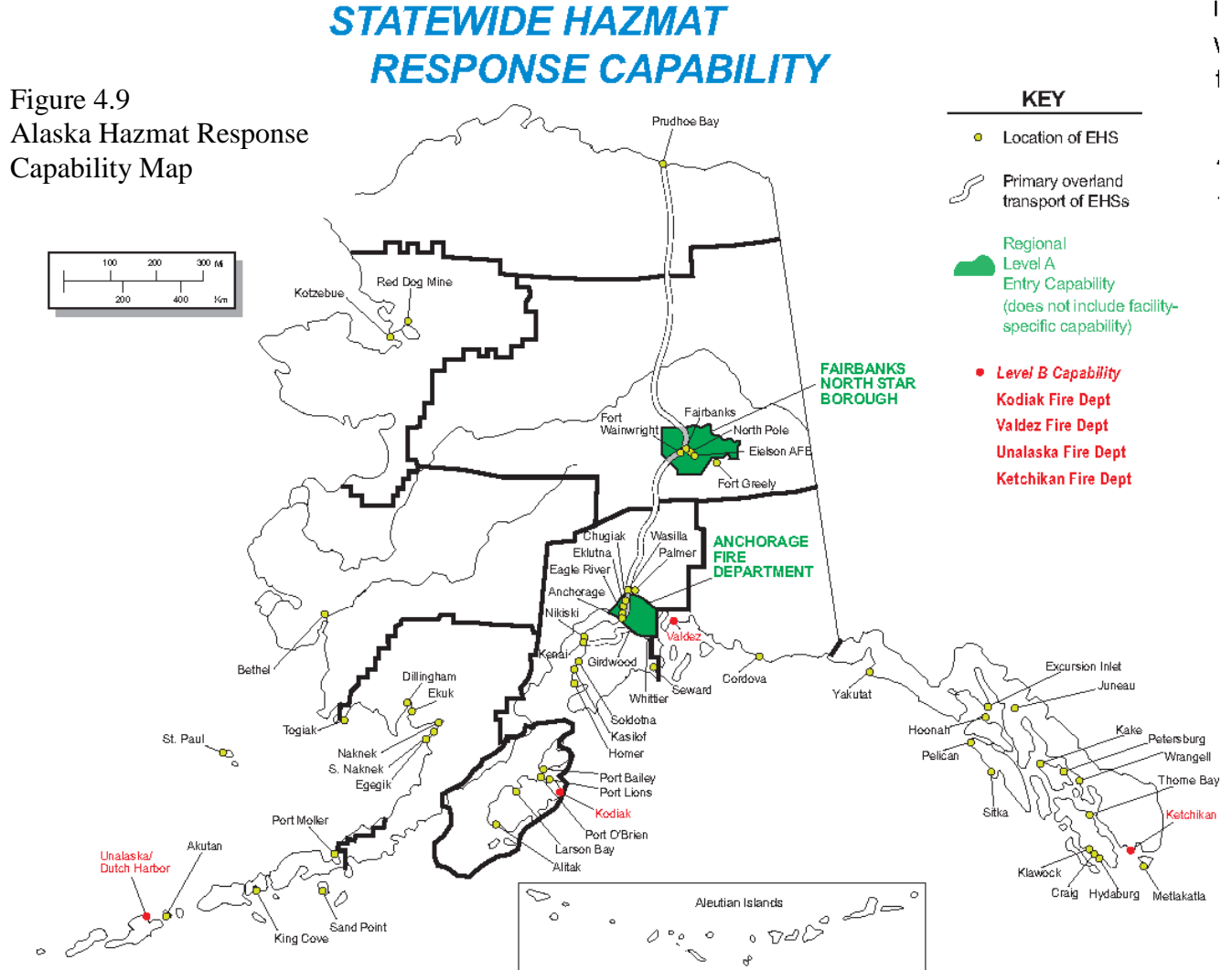


Figure 4.9 Source: DEC Statewide Hazardous Material Response, 2012.

State of Alaska

Hazard Mitigation Plan 2013

4. Hazard Analysis

Figure 4.10 Depicts the Boroughs experiencing the greatest amounts of release by volume expressed in gallons.

Top 10 Releases During FY 2012

Figure 4.10

Top 10 Hazmat Spills



Total Volume by Subarea FY 2012

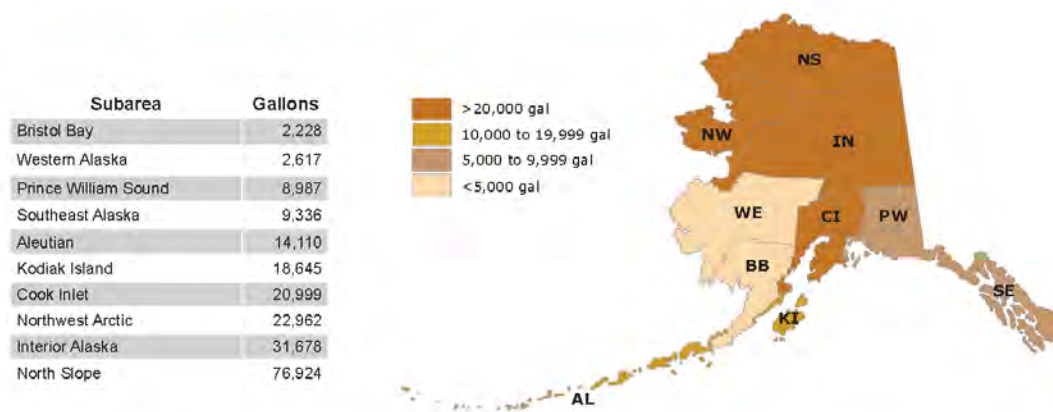


Figure 4.10 Source: ADEC Annual Summary of Oil and Hazardous Substance Spills, Fiscal Year 2012.

The majority of incidents involving hazardous materials occur in unpopulated and undeveloped areas of the State. While there may be considerable risk to the natural habitat, the overall risk to communities varies from low to high, depending upon the volume of hazardous material present and how it is stored.

Figure 4.11

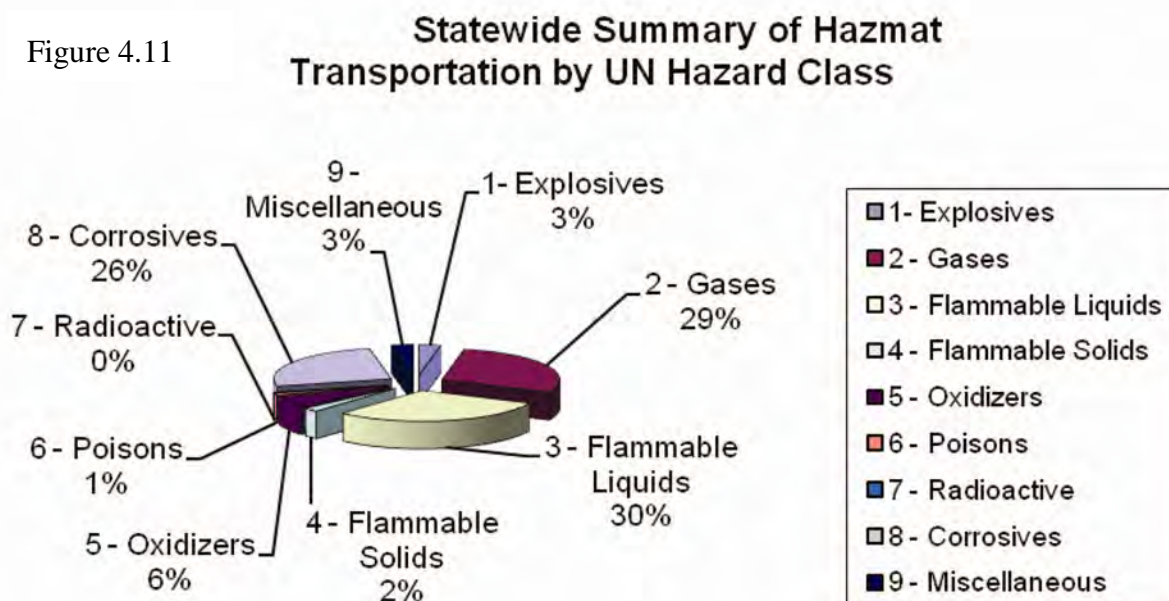


Figure 4.11 Source: DEC Annual Summary of Oil and Hazardous Substance Spills, 2012.

Statewide Hazardous Materials (HAZMAT) Commodity Flow Study

This study was jointly sponsored by DEC, the Alaska Department of Military and Veterans Affairs (DMVA), and Region 10 of the U.S. Environmental Protection Agency (EPA). The study provides a comprehensive hazardous material and hazardous substances transportation commodity flow report for the State, including information on major petroleum product pipelines. The report can be found on the State website.

4.2.12 Terrorism

For purposes of the State Hazard Mitigation Plan, it is recognized every state in the nation is vulnerable to a terrorist attack and any government official or member of the public can be targeted for attack or a victim. At a minimum, prudence dictates the vulnerability to this hazard at least be considered statewide.

Generally, people most at risk to terroristic attacks are those working in government facilities, abortion clinics, animal research, key infrastructure and minorities. Generally, business and facilities generate substantial public attention, controversy, involve minorities or are seen as supported by the government can become targets.

Some of Alaska's communities have transportation infrastructure, utility systems, government buildings, courthouses, abortion clinics, other facilities, or provide services considered vulnerable to terrorist attack.

4.2.13 Technological, Public Health, and Human Caused

The entire population of Alaska is vulnerable to health and human caused hazards. A thorough Vulnerability analysis is not possible at this time due to scant historical records in Alaska, and a lack of data or published technical studies.

4.2.14 Economic

The vulnerability analysis for economic hazards is currently limited to Alaska fisheries. The analysis is based upon State and Federal historical records, and 2012 values for subsistence, sport, and commercial fisheries.

Commercial and Sport Fishing

According to the State of Alaska Department of Fish and Game (ADF&G), the combined economic impact of commercial and sport fishing is over \$7.4 billion and 89,915 full time-equivalent jobs. The commercial fisheries in Alaska are valued at more than \$3 billion alone.

Subsistence Fishing

Subsistence fishing provides Alaska communities irreplaceable wild harvests worth millions of dollars on the open market. On average, the subsistence fisheries harvest provides 26.22 million pounds or about 230 pounds of food per person annually in rural Alaska.

5. Hazard Mitigation Strategy

This section outlines the six-step process for updating a mitigation strategy:

1. Update procedures and authorities for mitigation action implementation.
2. Review NFIP participation.
3. Review mitigation goals.
4. Review mitigation actions.
5. Evaluate completed mitigation actions.
6. Implement the revised Mitigation Action Plan.

State Capability Assessment

For the 2013 SHMP update, the SHMO sent out over 100 mitigation capability assessment surveys (Appendix 14) to:

All Boroughs

12 State Agencies

10 Federal Agencies

All First Class and Home Rule Communities in the Unorganized Borough

All School Districts

Overall Summary of Survey Results

- **Hazard Vulnerability:**
Avalanche, earthquake, fire, and flood are most prolific hazards State-wide.
- **Legal and Regulatory Challenges to Mitigation:**
Complications with multilayered jurisdictions with regard to authority, funding and ownership were also broadly emphasized in several responses. The responses revealed a need for clarification of mandates, guidance, and regulations regarding hazard mitigation.

Summary of Survey Results by Organization

Boroughs (70% response)

LHMP, coastal sirens, and weather stations in place

Mass causality response plans are complete in most boroughs. Others are in development.

FireWise and StormReady programs are active in many communities.

Cooperation and communication between communities is improving from 2010 assessment.

The remoteness and short construction season of many rural communities continues to be an obstacle for mitigation projects.

The higher cost of construction in remote Alaska affects the benefit cost analysis (BCA).

Laws governing streambeds and alluvial fans need clarifying.

Boroughs desire a seismic evaluation of their schools and critical infrastructure.

Boroughs desire improved flood plain maps.

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5. Mitigation Strategy and Goals

The public is involved in mitigation through education programs and borough meetings.
Requests for public comment online are now a common practice.

State Agencies (40% response)

Universities are conducting research in support of State hazard mitigation.

Logistics in Alaska are often challenging and costly, and typically don't survive a BCA.

The availability of experts with requisite skills is limited.

All State agencies have and observe Safety management programs.

Staffing, budget, and peer review are all elusive components of seismic studies.

Federal Agencies (10% response)

Cost-sharing programs are in place for mitigation programs.

Survey programs in place for specific, seasonal hazard types.

Programs include

- Relocation grants (flooding)
- Erosion and vegetation (wildfire)
- Riverbank stabilization
- Retaining walls

Projects require local sponsors or State match.

Sequestration, enacted in 2013, severely limits Federal agency participation in hazard mitigation

First Class and Home Rule Communities in the Unorganized Borough (13% response)

Recognition of National Flood Insurance Program (NFIP) and Community Rating System (CRS) status among communities

Mitigation is sometimes addressed in city codes.

Tsunami sirens are in many coastal communities.

HMGP application process is challenging.

The public is involved in mitigation through public council meetings.

Access to web based applications is severely limited in remote communities.

School Districts (30% response)

New construction is designed according to current building codes (Federal, State, and local) and insurers' requirements.

Buildings are subject to State inspection.

Through HMGP, some communities have installed seismic shut off valves and standby generators in some schools.

New, restrictive legislation has unqualified seismic vulnerability studies and projects for funding (worrisome at schools which also serve as designated shelters).

Districts would like to fund assessments and studies, in addition to brick and mortar projects. Plan development for flood and multi-hazards is underway in some districts. Some mitigation projects involve seismic retrofits for building code compliance. Concerns over instability in heating fuel sourcing (worrisome at schools which also serve as designated shelters) High turnover at partnered agencies has made cooperation and communication challenging. Recent disease outbreaks have necessitated mitigation and response planning for a pandemic. Spill Prevention and Control Countermeasure Plans (SPCC) are present at two schools in one district. Drinking and wastewater agencies work with some districts to ensure clean water in schools. Some districts have a liaison with their Local Emergency Planning Committee (LEPC) representative. Lack of agency partnerships and external assistance is a problem in some districts. Ice jam flooding an annual concern along the Yukon River. Dealing with buried fuel tanks without direction or funding is a concern in some districts.

In some districts mitigation measures are to protect occupants only, not structural integrity of the facilities

State Agencies

Department of Military and Veterans Affairs

Division of Homeland Security and Emergency Management

The State Division of Homeland Security and Emergency Management (DHS&EM) is governed by AS 26.23.10. The Director normally serves as the Governor's Authorized Representative (GAR) and senior Division staff serves as the State Coordinating Officer (SCO) during disasters. The SCO is the State's liaison with the FEMA Federal Coordinating Officer which is assigned by the President as the federal lead for each presidentially declared disaster.

Following a State disaster declaration, State departments and agencies support DHS&EM in disaster response and recovery operations in accordance with the State Emergency Operations Plan.

DHS&EM is the State agency responsible for coordinating statewide emergency preparedness, response, recovery, and mitigation activities among Federal, State, local agencies, and tribal governments. DHS&EM is the primary State agency for funding, administering, and coordinating State mitigation grant programs and projects.

Under the supervision of the SHMO, DHS&EM's Mitigation Section administers the State of Alaska hazard mitigation program which includes: the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation grant program (PDM), Earthquake Programs (including National Earthquake Hazard Reduction Program, Earthquake Assistance to States, the Post

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5. Mitigation Strategy and Goals

Disaster Damage Assessment program and participation in the State Seismic Safety Hazards Commission), Tsunami Programs (including the National Tsunami Hazard Mitigation Program), the Rural Community Alert Systems Program, hazard mitigation planning for the State and local communities, and other mitigation outreach and training. The Mitigation Section provides information, training and eligible grant funding to communities, businesses, educational institutions, local and tribal governments, non-governmental organizations, and private associations. DHS&EM works with several other State agencies and programs, examples are listed below, lengthy description of these and other State, Federal agencies and other organizations are in Appendix 15.

Department of Administration

Division of Risk Management

Department of Commerce, Community and Economic Development (DCCED)

Division of Insurance (DOI)

Division of Community Advocacy and Regional Affairs (DCRA)

Planning and Land Management

Floodplain Management

National Floodplain Insurance Program (NFIP)

Alaska Coastal Management Program

Community Development Block Grant (CDBG)

Local Government Assistance

Department of Education and Early Development (EED)

Department of Environmental Conservation (DEC)

Division of Spill Prevention and Response (SPAR)

Division of Environmental Health (EH)

Drinking Water Program

Division of Air Monitoring & Quality Assurance

Department of Health and Social Services (DHSS)

Division of State Health Planning and Systems Development (HPSD)

Community Health and Emergency Medical Services (CHEMS)

Department of Law

Attorney General's Office

Alaska Department of Natural Resources (DNR)

Division of Geological & Geophysical Surveys (DGGS)

Division of Forestry (DOF)

Department of Public Safety

Division of Alaska State Troopers (AST)

Division of Fire and Life Safety

Fish and Wildlife Safeguard

Department of Transportation and Public Facilities (DOT/PF)

Division of Design & Engineering Services

Alaska Railroad Corporation (ARRC)

University of Alaska Fairbanks Geophysical Institute (UAFGI)

Alaska Satellite Facility (ASF)

Alaska Earthquake Information Center (AEIC)

5.1 Floods

5.1.1 Programs and Strategies

RiverWatch

RiverWatch is a partnership program between DHS&EM and NWS's River Forecast Center (RFC) created to warn communities of impending flooding and for issuing flood watch and warnings. Educating communities about flood preparedness is an important component of the program, which has operated for over three decades. The River Watch partnership relies greatly upon satellite and aerial reconnaissance of the Yukon and Kuskokwim Rivers during spring break up, and pilot observation reports (PIREPS) provided courtesy of the FAA. The State Emergency Operation Center (SEOC) is the primary State emergency management agency for RiverWatch.

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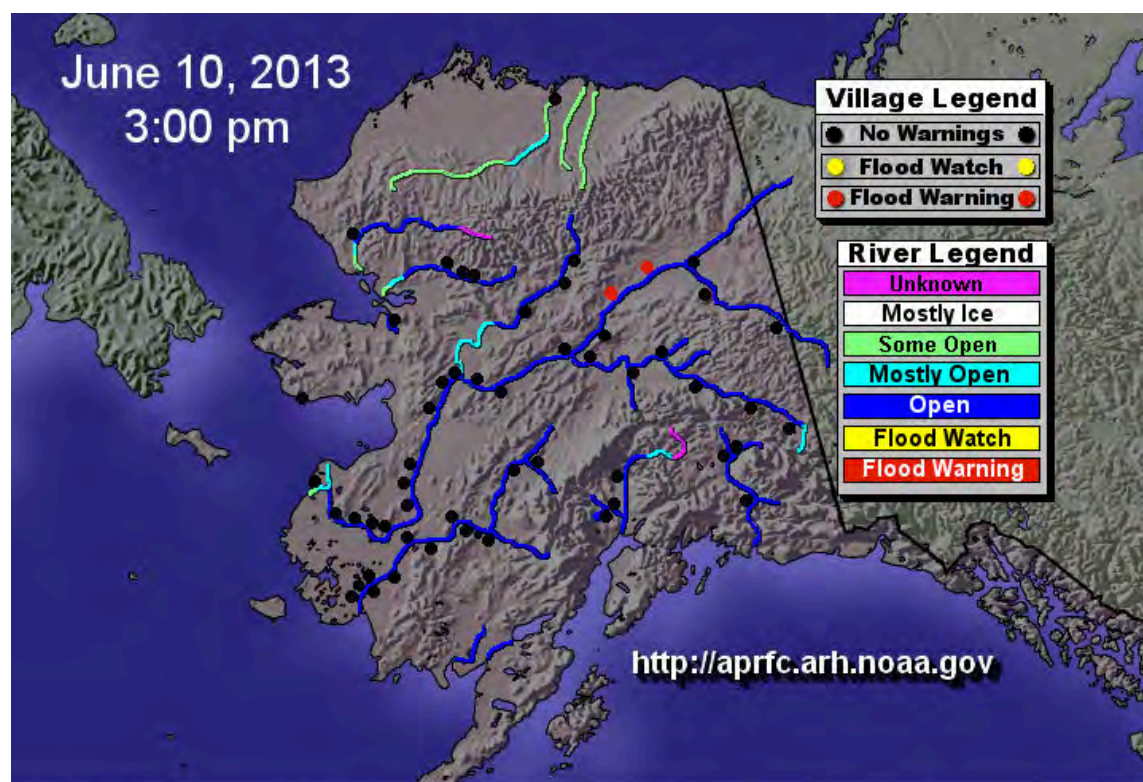


Figure 5.1.1 RiverWatch BreakUp Map From the NOAA Alaska Pacific Region Forecast Office.

DHS&EM Alaska Emergency Response Guide for Small Communities

The DHS&EM Alaska Emergency Response Guide for Small Communities is a planning tool for local government leaders as they prepare for, respond to, and recover from a disaster or emergency in their community. The guide is available at:

http://www.ak-prepared.com/documents/AK_Emergency_Response_Guide%20signed.pdf

Small Community Emergency Response Plan (SCERP)

Designed for a population of 2000 or less, the Small Community Emergency Response Plan (SCERP) is a community specific quick reference guide containing coordinated actionable items in response to an emergency. Contact the DHS&EM Community Plans Team at mva.dhsem.plans@alaska.gov for assistance with this program. The downloadable SCERP toolkit may be found at <http://www.ak-prepared.com/plans/SCERP.htm>.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) offers federally backed flood insurance to communities enforcing local floodplain management ordinances. As of February 2016, there are 32 participating communities in Alaska with over 2,900 NFIP policies in place. These 32 communities encompass nearly 90% of the State's population making flood insurance widely available. Six communities participate in the Community Rating System (CRS) that adjusts the rates paid for flood insurance based on mitigation measures undertaken by the community. These communities are indicated below (*). The NFIP is administered by FEMA and managed by the State of Alaska's Floodplain Coordinator located within DCCED's Division of Community and Regional Affairs (DCRA).

Table 5.1.1

| NFIP Alaska Communities 2016 | |
|--|---------------------------|
| Anchorage Municipality | Kotzebue |
| Aniak | Koyukuk |
| Bethel | Kwethluk |
| Cordova | Lake & Peninsula Borough |
| Delta Junction | Matanuska-Susitna Borough |
| Dillingham | McGrath |
| Emmonak | Nenana |
| Fairbanks North Star Borough | Nome* |
| Fort Yukon | Northwest Arctic Borough |
| Galena | Petersburg |
| Haines Borough | Seward* |
| Homer | Shishmaref |
| Hoonah | Sitka City and Borough |
| Juneau City and Borough | Skagway |
| Kenai Peninsula Borough* | Togiak |
| Ketchikan Gateway Borough* | Valdez* |
| *= Community Rating System (CRS) participant | |

Table 5.1.1 Source: State DCCED/DCRA Flood Management.

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Hazard Mitigation Plan 2013

5. Mitigation Strategy and Goals

FEMA Risk MAP

Alaska's Map Modernization Project concluded in 2010 with the release of updated Flood Insurance Rate Maps (FIRM) in the Municipality of Anchorage, Fairbanks North Star Borough, Matanuska Susitna Borough, Lake & Peninsula Borough, Kenai Peninsula Borough, City and Borough of Juneau, City and Borough of Sitka, City of Seward, Ft Yukon, Aniak, Nome, Shishmaref, Hoonah, Bethel, Emmonak, Homer, and McGrath.

FEMA has transitioned to Risk MAP which integrates mapping, assessment, and planning. The lead State department and division, DCCED/DCRA developed a Mapping Business Plan for the State of Alaska via a Cooperating Technical Partnership (CTP) Agreement with FEMA. An additional CTP agreement with State DHS&EM and FEMA is currently funding the Risk MAP study for the following communities:

Table 5.1.2

| Alaska Community Risk MAP Studies | |
|-----------------------------------|--------------------------------|
| Anchorage Municipality | Ketchikan Gateway Borough |
| Aniak | Kodiak Island Borough |
| Bethel | Kotzebue |
| Cordove | Kwethluk |
| Emmonak | Matanauska Susitna Borough |
| Homer (via KPB Coastal Study) | Seward (via KPB Coastal Study) |
| Juneau City and Borough | Sitka City and Borough |
| Kenai Peninsula Borough | Valdez |

Table 5.1.2 Source: State DCCED/DCRA Alaska Risk MAP Program

Additional information regarding Risk MAP related activities in Alaska are located on the State of Alaska web site at:

<https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/RiskMAP.aspx>

Flood Mitigation Grants

FEMA has the Flood Mitigation Assistance (FMA) grant program managed by the DCCED/DCRA for the State of Alaska.

Administrative Order 175

State of Alaska AO 175 calls for State agencies to consider flooding and erosion issues during the siting and construction phases of State owned and financed construction projects, and adhere to Federal flood damage protection standards in all State development actions (Appendix 18).

Natural Resources Conservation Service Emergency Watershed Protection Program

The NRCS Emergency Watershed Protection (EWP) program is a flood mitigation funding source. EWP funds have been used for several projects in Alaska, including some in which the

State provided a portion of the required non-federal match. For projects within small and impoverished communities, the State may provide a portion or the entire non-federal match. Recent projects include a residential home acquisition and relocation project in the Kenai Peninsula Borough and a flood control project in McGrath.

US Army Corps of Engineers Levee Inspections

The U.S. Army Corps of Engineers (USACE) is responsible for many major flood mitigation projects in Alaska. A new set of maintenance rules have increased the requirements for communities in Alaska with levees. After the 2013 Spring Flood Disaster (DR-4122), the levee in Galena was inspected by USACE through the National Levee Safety Program, initiated in 2007.

Water Watch

The U.S. Geological Survey (USGS) displays current stream flow conditions online through Water Watch at <http://waterwatch.usgs.gov/?m=flood&r=ak&w=map>. "Flood and high flow" maps show the location of stream gages and their corresponding water levels. The real-time data are provisional and have not been reviewed or edited. They may be subject to significant change. During winter months, the flood and high flows appearing on the map in some locations may result from ice effects. Alternative data formats of this map in postscript , GIS coverage, or GIS feature datasets are available.

5.1.2 Hazard Mitigation Successes

Hughes

In 2016 and 2017, the City of Hughes will elevate their community multi-purpose building two feet above base flood elevation at 274 feet NAVD 88, using an adjustable post and gravel pad technique. Hughes City and Tribe will also update their hazard mitigation plan in conjunction with the project. The City will use HMGP funds from 2013 Kenai Peninsula Borough Flood Disaster, DR-4161 for this hazard mitigation project.

Galena

In 2014 and 2015, the Loudon Tribal Council elevated 52 residential homes two feet above the base flood elevation in a mitigation project using HMGP funds from the 2012 September Storm Disaster, DR-4094, and the 2012 Spring Flood Disaster, DR-4122 (Figure 5.1.2). In 2016, the City of Galena will expend the remaining funds from DR-4094 to elevate their multi-purpose facility which houses City Hall, Public Safety, and the City Health Clinic.

Figure 5.1.2



Figure 5.1.2 Source: State DHS&EM, October 2014

Alakanuk

In 2015, the City of Alakanuk elevated three residential homes two feet above the base flood elevation using HMGP funds from the 2011 West Coast Storm disaster, DR-4050.

Quinhagak

In 2015, The City of Quinhagak elevated two homes two feet above the base flood elevation using HMGP funds from the 2012 Kenai Peninsula Borough Winter Storm Disaster, DR-4054 (Figure 5.1.3).

Figure 5.1.3



Figure 5.1.3 Source: LeMay Engineering, September 2014

Sleetmute

In 2014, the City of Sleetmute elevated 7 residential homes two feet above the base flood elevation in a mitigation project using funds from the 2009 Spring Flood Disaster (DR-1843).

Kotlik

In 2014, the City of Kotlik elevated 10 residential homes two feet above the base flood elevation in a mitigation project using funds from the 2009 Spring Flood Disaster, DR-1843. This mitigation effort will substantially reduce the risk of damage and loss during future flood events.

Kenai Peninsula Borough

In 2011, the Kenai Peninsula Borough (KPB) purchased five private homes and one vacant lot in the Old Mill Subdivision of the Seward Bear Creek Flood Service Area (SBCFSA). The homes were demolished and the land returned to open space in perpetuity. Contributors to this project were the KPB, State of Alaska, and the Natural Resource Conservation Service (NRCS).

Utilizing HMGP funds from DR-1843, the KPB contracted a flood study of the Seward Bear Creek Flood Service Area. The study prioritized flood mitigation projects, five of which the DCCED has encumbered for construction as of 2015. An additional \$500,000, also appropriated through DCCED will further fund hazard mitigation projects in the SBCFSA.

Another HMGP grant, courtesy DR-1843, funded construction of an outflow culvert in Lowell

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Point. The culvert relieves transitioning storm water under Beach Drive, preventing washouts.

The US Army Corps of Engineers (USACE) has secured funding to construct an armored revetment in the Salmon Creek Subdivision. The KPB will need to provide the 25% matching funds.

Nenana

In 2009 the sewage lift stations in the City of Nenanna were raised and sealed above the base flood elevation in a mitigation project following the 2008 Tanana Basin Flood Disaster, DR-1796. These lift stations sustained substantial damage during the disaster. The mitigation effort reduces the risk to the City's sewage infrastructure.



Figure 5.1.4 Lift stations installed reducing the risk to Nenana's sewage infrastructure. DHS&EM photos.

Seward

In 1988, the City of Seward adopted a Floodplain Management Ordinance regulating property development within a FEMA designated flood zone. City Code Chapter 15.25, "Floodplain Management", requires subdivisions to document properties within a designated flood zone. The plat map must display the floodplain extents; noting property within a FEMA flood zone.

The State replaced a repetitively damaged home in the Nash Road area adjacent to the City of Seward. The new structure was built on a gravel pad elevated two feet above the base flood elevation (BFE) and included a relocated and elevated septic system. NFIP, FMA, Increased Cost of Compliance (ICC), HMGP, and the owner funded this initiative.

Additional links to FEMA success stories are available in Appendix 17.

5.1.3 Goals, Objectives, and Actions

All Hazards

Goal 1: Foster interagency cooperation and coordination for hazard mitigation activities.

Objective 1.1: Create interagency agreements to facilitate hazard mitigation activities.

Action 1.1.1: Develop interagency agreements to facilitate community relocations.

Lead: DCCED/DCRA, DHS&EM

Support: DOT/PF, ADF&G, NMFS, USGS, USACE, DNR, DEC, EPA

Timeline: 5 years

Progress: As of 2015, DCRA and DHS&EM have combined efforts under a FEMA administered Cooperating Technical Partnership (CTP) grant, to relocate the Village of Newtok.

Action 1.1.2: Develop interagency agreements to facilitate hazard mitigation related projects.

Lead: DCCED

Support: ADF&G, DHS&EM, DEC, DNR, DCCED, and local communities

Timeline: 5 years

Progress: In 2015, the State successfully completed a funding partnership with NRCS to reinforce the riverbank in McGrath.

Goal 2: Increase hazard mitigation funding opportunities for Alaska.

Objective 2.1: Develop a State disaster mitigation grant program to fund projects and planning.

Action 2.1.1: Establish a State disaster related fund for natural hazard mitigation.

Lead: DHS&EM

Support: DCCED

Timeline: 5 years

Progress: As of 2016, DHS&EM has secured authorization for a State funded hazard mitigation program.

Action 2.1.2: Establish a State Hazard Mitigation Program (State HMGP).

Lead: DHS&EM

Support: DCCED

Timeline: 5 years

Progress: As of 2016, DHS&EM has drafted a plan for the State Hazard Mitigation Program.

Objective 2.2: Write an enhanced State Hazard Mitigation Plan for Alaska.

Action 2.2.1: Research the latest requirements for enhanced state mitigation plans.

Lead: DHS&EM

Support: FEMA

Timeline: 2 years

Progress: In 2015, FEMA implemented new enhanced state mitigation planning requirements. During 2016, DHS&EM management are reviewing them with FEMA Region X.

Action 2.2.2: Collaborate with other states on enhanced state mitigation planning.

Lead: DHS&EM

Support: FEMA, R10 states

Timeline: 5 years

Progress: In 2015, DHS&EM collaborated with R10 state mitigation programs on a review and coordinated response to FEMA's new enhanced mitigation plan requirements.

Flood Hazards

High Priority

Goal 1: Reduce flood damage.

Objective 1.1: Support elevating, flood proofing, buying out, or relocating repetitively or substantially damaged structures covered by a flood insurance policy in NFIP participating communities.

Action 1.1.1: Create a prioritized list of potential structures and prepare applications for FEMA funded programs.

Lead: DHS&EM

Support: DCCED, SHMAC, DOT/PF, DEED, DEC

Timeline: 5 years

Progress: DHS&EM has prioritized over 57 structures for elevation and relocation as of January 2016. NFIP communities are including the number of repetitive loss properties in their hazard mitigation plans. All HMPs will contain NFIP data by 2020.

Objective 1.2: Encourage elevating, flood-proofing, buying out, or relocating repetitively or substantially damaged structures in flood prone areas.

Action 1.2.1: Promote development practices to reduce flood risk.

Lead: DHS&EM

Support: DCCED, DOT/PF, DEED, DEC, SHMAC

Timeline: 5 years

Progress: As of 2016, flood mitigation message delivered to over 20 communities during post disaster assessments, outreach activities, and training scenarios.

Action 1.2.2: Promote applications for non-NFIP related grant programs.

Lead: DHS&EM

Support: DCCED, DOT/PF, DEED, DEC, SHMAC

Timeline: 5 years

Progress: Since 2013, DHS&EM has processed non-NFIP related grant applications for 11 different disasters and 3 Pre-Disaster Mitigation grant periods.

Objective 1.3: Relocate high risk villages out of floodplains.

Relocating flood-prone communities will prevent repetitive losses and substantial damages. According to 44 CFR 206.434, participation in a relocation project requires:

- Removing or demolishing vacated residences from flood-prone areas and prohibit re-occupation for perpetuity.
- Allowing only temporary structures, open on all sides (e.g. picnic shelters, kiosks etc.), public restrooms, and other approved facilities.

Action 1.3.1: Support the planning of community relocation sites outside the flood plain.

Lead: DCCED, USACE, DHS&EM

Support: Denali Commission, FEMA, DOT/PF

Timeline: 1 year

Progress: As of 2016, Metarvik site is planned for Newtok's relocation.

Objective 1.4: Reduce development in floodplains.

Action 1.4.1: Encourage the State and communities to purchase flood-prone property and convert to open space for perpetuity.

Lead: DCCED, DHS&EM, NRCS

Support: Local government, State Legislature, Private non-profit organizations, FEMA

Timeline: 5 years

Progress: In 2008 the Sewell subdivision acquisition project converted property to open space.

Action 1.4.2: Encourage land-use planning to reduce development in floodplains.

Lead: DCCED, DHS&EM, Local governments, DOT/PF

Support: State Legislature

Timeline: 5 years

Progress: Post flood disasters, State DHS&EM and FEMA encourage property acquisitions and home relocations and elevations using HMGP funds. Additionally, property owners are referred to "Floodplain Management in Alaska Quick Guide" published in 2003. The document is available online at

https://www.commerce.alaska.gov/web/portals/4/pub/AKQG2003_web.pdf

Action 1.4.3: Develop community planning tools that include sample regulations, land use policies and zoning procedures to reduce development in the floodplain.

Lead: DCCED

Support: DHS&EM, DOT/PF

Timeline: 1 year

Progress: Complete – refer to "Floodplain Management in Alaska Quick Guide"

Objective 1.5: Encourage flood mitigation projects State-wide.

Action 1.5.1: Provide technical support for flood mitigation project grant applications.

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Lead: DHS&EM, DCCED

Support: FEMA

Timeline: 1 year

Progress: DHS&EM provides technical assistance for PDM and HMGP applications.

Action 1.5.2: Encourage flood elevation grant recipients to build a minimum of two feet above the identified base flood elevation (BFE) or highest water mark.

Lead: DHS&EM, DCCED

Support: FEMA

Timeline: 3 years

Progress: Complete - All home elevation projects funded through DHS&EM flood mitigation grant awards are built two feet above the best known BFE or highest water mark.

Action 1.5.3: Encourage projects and studies that increase maximum drainage capacities to handle 100 year floods.

Lead: DHS&EM

Support: ADF&G, DNR, DEC, USACE, USGS, EPA, NMFS

Timeline: 5 years

Progress: Post flood, culvert blowout incidents are reviewed for increased capacity.

Action 1.5.4: Support culvert replacement projects that meet or exceed expected floodwater discharges.

Lead: DOT&PF, Local Communities, DHS&EM

Support: FEMA

Timeline: 2 years

Progress: Culvert projects are discussed with communities and DOT/PF following each flooding disaster and recommended for grant funding.

Objective 1.6: Collect quantitative measurements post flood event to document impact, magnitude, and scope.

Action 1.6.1: Collect imagery, high water marks, and elevation data in flood prone communities

Lead: FEMA, USACE, NRCS, DOT/PF, DNR/DGGS

Support: DHS&EM, DCCED

Timeline: 10 years

Progress: As of 2016, State and federal agencies have revised elevation data in 17 Alaskan communities using disaster related grants and Risk MAP.

Action 1.6.2: Support studies focused upon flood mitigation in Alaska.

Lead: USACE, DCCED, NRCS, FEMA, DNR/DGGS

Support: DHS&EM

Timeline: 5 years

Progress: A small scale study on the Eagle area was completed during disaster

operations under DR-1843. A similar DR 1843 funded study was conducted in the Seward Bear Creek Flood Service Area in 2013.

Goal 2: Implement Risk MAP in flood prone communities throughout Alaska.

Objective 2.1: Increase the coverage and accuracy of flood-prone area mapping.

Action 2.1.1: Implement RISK Map principles in high risk communities.

Lead: DCCED/DCRA, FEMA

Support: DHS&EM, USACE, UAF/GI, DNR/DGGS, DEED, USGS

Timeline: 5 years

Progress: As of 2016, Risk MAP is active in 16 Alaskan communities.

Objective 2.2: Update existing community flood maps.

Action 2.2.1: Update flood hazard maps for Risk MAP areas and produce Flood Insurance Rate Maps (FIRM) in digital format.

Lead: DCCED/DCRA, FEMA

Support: DHS&EM, USACE, UAF/GI, FEMA, DNR/DGGS, DEED

Timeline: 5 years

Progress: As of 2016, FEMA presented preliminary updated FIRMs for 5 communities.

Objective 2.3: Improve methods for estimating the magnitude of potential floods.

Action 2.3.1: Collect annual peak flow and flood hydrograph data at representative streams throughout Alaska.

Lead: DOT/PF

Support: USGS

Timeline: 5 years

Progress:

Action 2.3.2: Update Alaska's flood data in the HAZUS database.

Lead: FEMA

Support: DCCED/DCRA, DHS&EM

Timeline: 5 years

Progress: As of 2016, FEMA has added flood data from Risk MAP studies in five communities into HAZUS.

Medium Priority

Goal 3: Improve forecasting and warning systems.

Objective 3.1: Increase the water discharge, flood, and tidal data available.

Action 3.1.1: Install additional stream and precipitation gauges.

Lead: NWS

Support: DHS&EM, USGS, DCCED, DOT/PF

Timeline: 5 years

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Progress: A tide gauge for the Port of Bethel was completed in 2012 using HMGP funding under DR-1796.

Low Priority

Goal 4: Increase NFIP Participation.

Objective 4.1: Encourage community participation in the NFIP.

Action 4.1.1: Educate Alaska communities about the benefits of the NFIP.

Lead: DCCED

Support: DHS&EM, DNR, DOT/PF

Timeline: 5 years

Progress: As of 2016, 12 Boroughs and 23 communities participate in the NFIP.

Action 4.1.2: Educate Alaska communities about floodplain management.

Lead: DCCED

Support: DHS&EM, DNR, DOT/PF

Timeline: 5 years

Progress: FEMA and DCRA conducted certified floodplain management training and testing in 2015.

Objective 4.2: Encourage residents in NFIP communities to purchase flood insurance as part of their personal risk management.

Action 4.2.1: Promote the benefits and availability of flood insurance in NFIP communities.

Lead: DCCED

Support: DHS&EM

Timeline: 5 years

Progress: Through teleconferencing and site visits, DCRA and FEMA promoted NFIP participation in 17 communities as of 2016.

Objective 4.3: Encourage floodplain management at the lowest governmental level.

Action 4.3.1: Encourage local governments at all levels to develop land use ordinances and policies along with appropriate enforcement powers.

Lead: DCCED/DCRA, DHS&EM

Support: FEMA

Timeline: 5 years

Progress: As of 2016, three local Alaska governments are either sanctioned or suspended for non-compliance with the NFIP.

Goal 5: Increase Community Rating System Participation.

Objective 5.1: Encourage communities and boroughs participating in the NFIP to participate in the Community Rating System (CRS). Participants obtain higher program ratings and reduced flood insurance rates.

Action 5.1.1: Encourage CRS applications from appropriate NFIP communities.

Lead: DCCED, Insurance Servicing Organization (ISO)

Support: Denali Commission, DHS&EM

Timeline: 10 years

Progress: As of 2016, the City of Nome is the sole CRS participant in Alaska.

5.1.4 Acknowledgements

State of Alaska Department of Commerce, Community and Economic Development,
Division of Community and Regional Affairs

USGS Alaska Science Center, Water Resources

Natural Resources Conservation Service Alaska, Emergency Watershed Protection Program

National Oceanic and Atmospheric Administration

National Weather Service Alaska Region River Forecast Center

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5.2 Wildland and Community Fire Conflagration

5.2.1 Programs and Strategies

Alaska Master Cooperative Wildland Fire Management and Stafford Act Response Agreement

The Alaska Department of Natural Resources (DNR), the United States Department of Interior Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), Fish and Wildlife Service (FWS) and National Park Service (NPS), and the United State Forest Service (USFS) have signed a cooperative fire management agreement to share information, personnel, equipment, supplies, services, and funds for wildland fire management activities. This includes prevention, preparedness, communication and education, fuels treatment and hazard mitigation, fire planning, response strategies, tactics and alternatives, suppression, and post-fire rehabilitation and restoration.

Alaska Wildland Fire Coordinating Group

The mission of the Alaska Wildland Fire Coordinating Group (AWFCG) is to provide a forum that fosters cooperation, coordination, collaboration and communication for wildland fire management and related activities in Alaska. The AWFCG plans and implements interagency fire management practices statewide and promotes programs and interagency partnerships. Goals, objectives and membership are documented in the “AWFCG Memorandum of Understanding and Standard Operating Procedures”.

The AWFCG has formed committees and taskforce groups to address specific issues. Long standing committees include Air Quality and Smoke Management, Education and Prevention, Fire Research and Development, Fire Weather, Safety, Operations, and Fuels. A full list of committees and their charters are available online.

Alaska Multi-Agency Coordination Group

The Alaska Multi-Agency Coordination Group (AMAC) is activated when wildland fire activity levels warrant. The AMAC is tasked with the following: incident prioritization; resource allocation; coordination of State and Federal disaster responses; political interfaces; media and agency information; anticipation of future resource needs; and the identification and resolution of issues.

Alaska Interagency Wildland Fire Management Plan

The purpose of “Alaska Interagency Wildland Fire Management Plan” (AIWFMP) is to promote a cooperative, consistent, cost-effective, interagency approach to wildland fire management. Available online, it is the interagency reference for wildfire operational information. Firefighter and public safety is emphasized throughout this plan as the single, overriding priority in fire management activities for agencies. The AWFCG is responsible to review and update, as warranted, the AIWFMP.

Alaska Interagency Coordination Center

The Alaska Interagency Coordination Center (AICC) coordinates statewide tactical resources, logistics support, and predictive services for State and Federal agencies involved in wildland fire management and suppression in Alaska. AICC is located at the Alaska Fire Service (AFS) facility in Fairbanks. AICC is staffed and managed by State and Federal employees who

mobilize interagency personnel and resources to fires statewide.

The AICC website is a comprehensive source of fire-related information such as the Alaska Preparedness Levels, the Daily Situation Report, current and historic fire perimeter maps, media releases, planned prescribed fires, historical fire data, and current weather forecasts.

Community Wildfire Protection Plans

Community Wildfire Protection Plans (CWPP) are collaborative efforts between wildfire suppression agencies, Federal, State and local governments, community groups, and individuals to identify sources of fire risk and prioritize areas for mitigation projects. Completed Alaskan CWPPs are available online at <http://forestry.alaska.gov/fire/cwpp/>. Through collaboration, residents develop a strategy for protecting life, property, and critical infrastructure in the wildland urban interface.

Alaska Firewise

Firewise is a collaborative effort among local, State, Federal and private agencies and organizations to promote fire safety and mitigation in the wildland/urban interface. Communities are eligible to be recognized as a Firewise Community after adopting a Community Wildfire Protection Plan and completing one Firewise project. An Alaska Firewise brochure and other prevention materials are available online.

5.2.2 Hazard Mitigation Successes

1996 Miller's Reach Fire

The 1996 Miller's Reach Fire was one of the worst wildland fires in State history. It involved 37 fire departments, and over 100 different agencies and organizations. In addition, 1,800 fire-fighting and support personnel had responded within the first 48 hours. It took almost 2 weeks to contain the fire which burned 37,336 acres and destroyed 344 structures.

As a result of the Miller's Reach fire, more than \$1.5 million was available for wildland fire mitigation measures. The money funded the following:

- A television public awareness campaign educating residents about creating a defensible space around their homes.
- A wildland fire prevention pilot project educating the public via workshops and community meetings.
- Fuels management project for the City of Houston, creating defensible space around several city owned critical facilities and clearing natural fuels at the Little Susitna River Campground.
- A defensible space demonstration project around the Big Lake Public Safety Building.
- A defensible space static display and kiosk containing photos of fire damage and completed defensible spaces.
- A dry hydrant system which improves firefighter response times and greatly minimizes impact to watershed areas.
- The South Houston Water Supply providing water to a central location for three fire departments.
- Fire breaks within the Matanuska-Susitna Borough, also used as emergency evacuation routes.

- Improved fire tanker access to Castle Park on Prator Lake to decrease response time.
- Steel siding, smoke alarms, carbon monoxide detectors, and a defensible space for the Homesteaders Community Center Building.
- A metal roof for the Mid-Valley Senior Center.
- An automated weather data collection system providing accurate and timely reports of weather patterns for firefighters and the public.
- A Fire Mitigation Officer position to assist the Matanuska-Susitna Borough in fire education and awareness. This position evolved into the State Fire Mitigation Officer position and is funded by a grant.

Horseshoe Lake

The Horseshoe Lake community burned in the 1996 Miller's Reach fire with many residents losing their homes and surrounding forest to wildland fire. Local efforts to mitigate their fire risk have gained the community of Horseshoe Lake recognition as a Firewise Community June 15, 2006 on the 10th anniversary of the Miller's Reach fire.

Anchorage Fire Department

The Anchorage Fire Department Wildfire Mitigation Office supports wildfire mitigation efforts at the urban interface through grants and Federal appropriations. Their mitigation projects are:

Brush disposal at the wood lots.
Firewise home recommendations.
Financial assistance for tree removal.
Fuel reduction projects.
Preparedness presentations and literature.

This program is dependent on grants and federal funding.

Kenai Peninsula Borough Project Impact

Through this program, the Kenai Peninsula Borough hosts wildland fire information sessions and distributes educational materials. A three-mile firebreak was constructed along Funny River Road to provide a safer evacuation route for local residents. Spruce bark beetle killed trees were removed, developing defensible space on 752 lots, which affected three businesses and almost 170 homes. They also established demonstration projects to show homeowners how to create defensible space.

Cohoe

Cohoe is located on the Kenai Peninsula, where the spread of the spruce bark beetle has continued for more than a decade. This infestation is considered the largest in North America and infests around 1 million acres of spruce trees per year. Cohoe's Firewise Board was established June 4, 2006 and Cohoe was first recognized as Firewise USA community in 2007.

Fairbanks North Star Borough

In conjunction with the Alaska Department of Natural Resources, the Fairbanks North Star Borough completed a Borough-wide CWPP and has initiated fuels mitigation projects.

Alaska Firewise Brochure

An update to the Alaska Firewise Brochure was completed in 2009 by the AWFCG. The project was a joint effort of the AWFCG Prevention and Education Committee, the Anchorage Fire Department, and the University of Alaska Fairbanks Cooperative Extension Service.

Alaska Rural Wildland Fire Prevention Video

An Alaska Rural Fire Prevention video was completed in 2010. The 18-minute production presents several interviews with firefighting personnel and members of the rural Alaska community highlight best practices mitigating the risk to wildland fire. It shows residents creating defensible space around their homes and other structures. The video is available on YouTube and search for, “Rural Alaska Fire Prevention Video”.

Tok Wildland Fire Fuel Reduction and Biomass Heating Project

For many years, multiple wildland fires have threatened the community of Tok. In 2008 the community, in conjunction with the State of Alaska Division of Forestry, U. S. Fish and Wildlife Service and the Alaska Gateway School District implemented a program to reduce hazard wildland fire fuels (primarily closed canopy black and white spruce stands) around the high school, selected residential properties and in key areas around the town serving as fire breaks. In conjunction with this fuel reduction project, a biomass boiler heating system was installed in the high school. The boiler burns wood chips from wildland fire fuel reduction projects, substantially reducing the school’s energy costs. In addition, the school uses the project to educate students about the importance of healthy forests, habitat and the ecosystem.

Community Wildfire Protection Plans

The 2003 Healthy Forest Restoration Act (HFRA) directs communities at risk of wildfire to develop a risk assessment and mitigation plan. Community Wildfire Protection Plans (CWPP) are a collaborative effort between wildfire suppression agencies, governments, and members of the community. As of 2016, CWPPs have been developed for the following Alaska jurisdictions:

- Municipality of Anchorage
- Fairbanks North Star Borough
- Matanuska Susitna Borough
- Kenai Peninsula Borough
- 16 Interior Communities

Additional information may be found on the State of Alaska Department of Natural Resources Division of Forestry web site at: <http://forestry.alaska.gov/fire/cwpp/index>.

5.2.3 Goals, Objectives, and Actions

High Priority

Goal 1: Mitigate Alaska’s risk to wildland fire.

Effective mitigation measures include building site preparation, design, fire resistant materials, fuels management, site access, and water supply.

Objective 1.1: Promote the Firewise program and encourage Firewise risk mitigation practices.

Action 1.1.1: Support community based wildland fire mitigation workshops.

Lead: DNR/DOF, local communities

Support: DCCED, DHS&EM, FEMA, NFA, ICC

Timeline: 2 years

Progress: FEMA and DHS&EM have added a Fire Mitigation Assistance Grant (FMAG) addressing the 2015 Sockeye and Card Street wildfires.

Objective 1.2: Support Community Wildfire Protection Plans and Hazard Mitigation Plans.

Action 1.2.1: Provide matching funds for federal planning grants.

Lead: State DHS&EM, DCCED/DCRA, DNR/DOF

Support: SHMAC, State Legislature, Governor

Timeline: 2 years

Progress: Until 2014, the State provided matching funds for federal plan grants.

Action 1.2.2: Provide training for planning process and writing techniques.

Lead: State DHS&EM, DCCED/DCRA, DNR/DOF

Support: DPS, DLA, ICC

Timeline: 2 years

Progress: DHS&EM may offer a mitigation plan writing workshop at the 2016 Spring Disaster Preparedness Workshop.

Objective 1.3 Support Community Wildfire Protection and Hazard Mitigation Projects.

Action 1.3.1: For impoverished communities, provide matching funds for federal hazard mitigation project grants.

Lead: State DHS&EM, DCCED/DCRA, DNR/DOF

Support: SHMAC, State Legislature, Governor

Timeline: 2 years

Progress: State DHS&EM provided matching funds for an erosion mitigation project in 2014. Thus, the precedent exists for future State matching funds addressing federal wildland fire project grants.

Action 1.3.2: For impoverished communities, provide matching funds for USFS/AKDOF Volunteer Fire Assistance grants.

Lead: State DHS&EM, DCCED/DCRA, DNR/DOF

Support: SHMAC, State Legislature, Governor

Timeline: 2 years

Progress: To date, no impoverished community has requested matching funds for the VFA grant.

Goal 2: Implement wild land fire fuel mitigation programs.

Objective 2.1: Support wildland fire hazard fuel mitigation reduction programs.

Action 2.1.1: Provide technical assistance to communities applying for wildland fire fuel mitigation grants.

Lead: DNR/DOF, Local communities, DHS&EM

Support: FEMA, BLM/AFS, DNR/DOF, USFS

Timeline: 2 years

Progress: Complete - this action is conducted during mitigation grant training and upon request.

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Action 2.1.2: Identify, organize, and monitor the various programs responsible for fuel management in the wildland/urban interface.

Lead: DNR/DOF, Local communities, BLM/AFS, DNR/DOF, USFS

Support: FEMA, DHS&EM

Timeline: 5 years

Progress: The State DNR/DOF awarded a USFS sponsored Volunteer Fire Assistance Award to 30 Alaskan communities for wildland fire mitigation in 2015. Details are online at <http://forestry.alaska.gov/fire/vfa>

Medium Priority

Goal 3: Include wildland fire in mitigation planning.

Objective 3.1: Encourage communities susceptible to wildland fire to conduct an urban interface wildland fire hazard assessment and risk analysis.

Action 3.1.1: Provide technical assistance and grant funding to local jurisdictions conducting wildland fire hazard assessments and incorporate the results into their hazard mitigation planning.

Lead: DHS&EM, Local communities

Support: DNR/DOF, BLM/AFS, USFS, USFWS

Timeline: 1 year

Progress: The US Fish and Wildlife Service established a program assisting native communities in Alaska with wildland fire assessments and mitigation projects.

Objective 3.2: Encourage communities to incorporate their wildland fire risk assessments into their community development, hazard mitigation, and emergency plans.

Action 3.2.1: Provide technical assistance integrating wildland fire risk assessments with hazard mitigation and emergency operations plans.

Lead: DHS&EM, DCCED, Local communities

Support: DNR/DOF, BLM/AFS, USFS, USFWS

Timeline: 1 year

Progress: DHS&EM began presenting planning techniques during their bi-annual disaster preparedness conferences in 2014.

5.2.4 Acknowledgements

University of Alaska Fairbanks Alaska Center for Climate Assessment and Policy

The Scenarios Network for Alaska Planning

Natural Resources Conservation Service Alaska

Bureau of Land Management/Alaska Fire Service

Alaska Department of Natural Resources Division of Forestry

5.3 Snow Avalanches

5.3.1 Programs and Strategies

Avalanche Awareness Month

Alaska State Resolution (SCR) 16 proclaims the month of November as “Avalanche Awareness Month”. It promotes further education on recognizing avalanche risks and avalanche response. It also urges schools, community groups, and other public and private agencies to increase public awareness.

Alaska Mountain Safety Center

The Alaska Mountain Safety Center (AMSC) is a non-profit organization specializing in avalanche hazard evaluation, mitigation, forecasting, and education. The AMSC also operates the Alaska Avalanche School which offers field-oriented classes on mountain safety training and avalanche hazard evaluation.

Alaska Avalanche School

The Alaska Avalanche School (AAS) is a non-profit organization specializing in avalanche education. The AAS offers field-oriented classes on mountain safety training and avalanche hazard evaluation.



Southeast Alaska Avalanche Center

Established in 1995, the Southeast Alaska Avalanche Center (SEAAC) is an educational nonprofit corporation providing snow avalanche safety education and information from Yakutat to Ketchikan. The SEAAC conducts a variety of courses for the general public and specific training for emergency services. The programs emphasize urban, highway, snowmobile, snowboard, and heli-ski avalanche safety. SEAAC is working towards developing a regional forecast for Southeast Alaska from Yakutat to Ketchikan and is currently collaborating with other avalanche specialists in the region to compile data. This data will be displayed through the Alaska Avalanche Information Center.

Chugach National Forest Avalanche Information Center

The Chugach National Forest Avalanche Information Center (CNFAIC) opened in 2000. It currently operates as a type II avalanche center under United States Forest Service jurisdiction and the National Avalanche Center. The CNFAIC publishes daily avalanche advisories for the Turnagain Arm Area from mid



November to mid April on its website at <http://www.cnfaic.org/>. The CNFAIC’s mission is to increase avalanche awareness in Alaska through advisories and education. The Center teaches awareness classes and assists in Search and Rescue (SAR) missions as directed by Alaska State Troopers. The Center advises Alaska State Troopers and the National Weather Service in the event an avalanche warning is released.

The Friends of the Chugach National Forest Avalanche Information Center (F-CNFAIC) is a

non-profit corporation, dedicating support and contributions to public educational activities and scientific research. Additionally they conduct avalanche safety fundraising events and deploy volunteers to operate weather stations and observe snow conditions.

Alaska Avalanche Information Center

The Alaska Avalanche Information Center (AAIC) hosts statewide avalanche bulletins, advisories, and relevant avalanche observations from avalanche practitioners in Alaska working under industry standard as defined by the American Avalanche (AAA) and Canadian Avalanche (CAA) Associations. Their avalanche forecasters work for industry, such as recreation, transportation, utilities, mining, and communications. Avalanche forecasts are published on their website at <http://www.alaskasnow.org/>.

City and Borough of Juneau

The City and Borough of Juneau (CBJ) broadcasts a daily avalanche forecast for avalanche prone areas. The CBJ Forecaster teaches avalanche safety and awareness in the community. The CBJ Forecaster also advises and trains several response agencies in the community on avalanche related issues.

5.3.2 Hazard Mitigation Successes

Home Buyout/Relocation Project in Valdez and Cordova

Funding from the Hazard Mitigation Grant Program (HMGP) was used to buy and relocate 24 homes in the cities of Valdez and Cordova. This project removed individuals from a high risk avalanche zone and preserved the land as open space in perpetuity.

Alaska Railroad Avalanche Program

The Alaska Railroad Avalanche Program is a three-year program to improve existing avalanche risk management tools and create new control systems. The program involves improving data acquisition, snow management, explosive delivery support, snow clearing, explosives-control equipment, constructing a central avalanche office, and building a secure gun storage facility in Girdwood.

Chugach Electric

Chugach Electric requires an avalanche safety assessment prior to dispatching any crews to work areas in known avalanche zones during winter.

Avalanche Ordinances

The City and Borough of Juneau adopted an avalanche ordinance in 1987 restricting development in avalanche areas to single family homes built to withstand avalanche impact loads. Any other development requires a conditional use permit. The City and Borough has also purchased some of the vacant lots in the avalanche areas to prevent any further development.

Avalanche Studies

In 2012, the City and Borough of Juneau incorporated a detailed Mt. Juneau Active Avalanche Control Study into their Hazard Mitigation Plan Update.

The Cities of Cordova and Valdez have adopted avalanche district ordinances following the loss of life and destruction of property during the Central Gulf Coast Storm event, December 1999 through February 2000.

Completed Goals, Objectives, and Actions

Goal 2: Improve avalanche warning.

Objective 2.1: Create and disseminate avalanche information.

Action 2.1.1: Establish and fund the Alaska Avalanche Warning Center to provide statewide: avalanche warnings, information about avalanche risks, avalanche forecasts, cataloging of avalanche paths and history, hazardous area identification, mitigation solution, and public education. The center is authorized by Alaska Statute (AS) 18.76.010.

Lead: Governor's Office, State Legislature

Support: DHS&EM, DPS, DOT/PF, DNR

Timeline: 1 year

Progress: Complete – The Alaska Avalanche Information Center (AAIC) is online at <http://www.alaskasnow.org/>. The AAIC (2008) includes the Anchorage Avalanche Center (2012), the Cordova Avalanche Center (2004), the Eastern Alaska Range Avalanche Center (2015), the Haines Avalanche Information Center (2010), the Hatcher Pass Avalanche Center (2010) and the Valdez Avalanche Center (2005).

Action 3.1.1: Support public avalanche awareness workshops. Create and disseminate educational avalanche information.

Lead: DPS, Avalanche centers, Local communities, Local schools, Alaska State Parks

Support: DHS&EM, DNR, DEED

Timeline: Annually during the winter season

Progress: Complete – The AAIC offers annual avalanche workshops using volunteer instructors. The AAIC also annually awards avalanche education scholarships for prospective students. REI also hosts avalanche training seminars.

Action 3.1.3: Support avalanche safety training for snow machine riders, skiers, and climbers.

Lead: DPS, Avalanche centers, Local communities, Alaska State Parks

Support: DHS&EM

Timeline: 1 year

Progress: Complete: The AAIC offers annual avalanche safety training for all backcountry enthusiasts.

5.3.3 Goals, Objectives, and Actions

High Priority

Goal 1: Reduce damage from avalanches.

Objective 1.1: Encourage communities to prohibit development in avalanche areas and relocate existing development.

Action 1.1.1: Support and fund community avalanche risk assessments and incorporate them into community hazard mitigation plans.

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Lead: Local communities, DHS&EM, Avalanche centers

Support: FEMA, DOT/PF, DNR

Timeline: 2 years

Progress: A preliminary study for the downtown area of Juneau was funded using the 2010 DR-1796 HMGP mitigation grant.

Action 1.1.2: Support and fund community avalanche mitigation projects.

Lead: DHS&EM, Local communities, Avalanche centers

Support: DHS&EM, DOT/PF, DNR

Timeline: 2 years

Progress: A preliminary study for downtown Juneau is complete. Mitigation solutions are forthcoming.

Action 1.1.3: Encourage communities to relocate buildings out of the hazard area.

Lead: Local communities, DHS&EM

Support: Avalanche centers DOT/PF, DNR, State Legislature

Timeline: 1 year

Progress: Projects which acquire and relocate structures outside avalanche zones are eligible for FEMA hazard mitigation grants.

Action 1.1.4: Support and fund development of local avalanche zone maps for use in construction and land use planning and zoning.

Lead: Local communities, DHS&EM

Support: FEMA, Avalanche centers DOT/PF

Timeline: 5 years

Progress: Dependent upon funding. As of 2016, there is no progression on this action.

Medium Priority

Goal 2: Improve avalanche warning. Completed in 2015, see **Completed Goals, Objectives, and Actions**

Goal 3: Promote avalanche hazard education and mitigation training.

Objective 3.1: Support statewide avalanche hazard mitigation education and outreach.

Action 3.1.1: Completed in 2015, see **Completed Goals, Objectives, and Actions**

Action 3.1.2: Support a standardized community avalanche warning sign program that clearly communicates avalanche danger areas.

Lead: DOT&PF, DPS, Avalanche centers, Local communities, Alaska State Parks

Support: DHS&EM

Timeline: 5 years

Progress: As of 2016, avalanche warning signs have not been approved for posting in open backcountry areas.

Action 3.1.3: Completed in 2015, see **Completed Goals, Objectives, and Actions**

Action 3.1.4: Support distribution of avalanche safety information through recreational equipment stores.

Lead: Avalanche centers, Alaska State Parks, DNR, US Forest Service, NPS

Support: AAIC

Timeline: 2 years

Progress: Currently the USFS and NPS produce and distribute pamphlets containing avalanche safety tips through their own agencies. Stores may request copies for distribution.

5.3.4 Acknowledgements

City and Borough of Juneau Emergency Management

Alaska Railroad Corporation

Chugach National Forest Avalanche Information Center

State of Alaska Department of Transportation and Public Facilities

State of Alaska Division of Geological and Geophysical Surveys

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5.4 Volcanoes

5.4.1 Programs and Strategies

Alaska Volcano Observatory

Formed in 1988, the Alaska Volcano Observatory, a joint program of USGS, DNR/DGGS, and UAF/GI, is the State's principal agency responsible for assessing, monitoring, and issuing early warnings of volcanic hazards in Alaska. Through the SHMAC, AVO advises the State DHS&EM on volcanic hazards in Alaska.

As of December 2012, AVO maintains real-time seismic monitoring networks on 29 of Alaska's 52 active volcanoes. Data from these networks are recorded and examined for precursory signs of eruptive activity. At least once per day, AVO also examines satellite images of Alaskan, Kamchatkan, and Northern Kurile volcanoes for signs of eruptive activity, ash clouds, or possible precursory ground heating. These methods aid in assessing volcanic activity. Additional monitoring methods, such as direct are available.

AVO regularly disseminates information about the status of volcanoes in Alaska and neighboring Kamchatka. When a volcano is at an elevated alert level or color code, AVO distributes a daily written status report to more than 100 recipients at Federal, State, local agencies, the media, and the public via Internet and fax. They produce a summary of Alaska's volcanic activity each Friday and similarly shared via the Internet, fax, AVO website, and recorded message line. During volcanic crises, or if precursors to eruptive activity are noted, AVO implements their emergency call-down protocol, as well as using Internet and fax outlets to notify authorities, the media, the aviation industry, and the public.

5.4.2 Hazard Mitigation Successes

Alaska Volcano Observatory

AVO scientists are studying explosive eruptive events and episodes of volcanic unrest in Alaska. Their efforts have prevented needless evacuations and reduced risk to the aviation industry. AVO also collaborates with Russian colleagues in Kamchatka and Sakhalin to monitor, track, and disseminate eruption and ash cloud warnings from Russian Far East volcanoes threatening Alaska's air space.

Interagency Plan for Volcanic Ash Episodes

In December, 1989, the aforementioned incident involving KLM flight 867 identified a lapse in communication between the Alaska's aviation industry and the volcanic ash warning system. Following this incident, a consortium of Federal, State, and private sector parties collaborated to improve the early warning system and ash avoidance protocols for the heavily traveled North Pacific airways. The consortium includes USGS, NOAA/NWS, Federal Aviation Administration (FAA), Department of Defense (DOD) United States Air Force (USAF), DHS&EM, the United State Coast Guard (USCG), and the Alaska Department of Environmental Conservation, Division of Air Quality. They selected the Alaska Volcano Observatory as the lead agency and created the Alaska Interagency Plan for Volcanic Ash Episodes (Figure 5.4.1). The plan documents specific responsibilities and protocols for each agency before, during, and after a volcanic event. Since the 1989 KLM ash encounter, no serious ash-aircraft incidents have been reported in Alaska, despite dozens of additional eruptions. This multi-agency early warning and

response program is a model endorsed by the International Civil Aviation Organization and emulated in many volcanically active regions around the world. The plan is updated every two years. The current plan is referenced in Chapter 6, *Resources*.

Volcano Alert Levels Used by USGS Volcano Observatories

Alert Levels are intended to inform people on the ground about a volcano's status and are issued in conjunction with the Aviation Color Code. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption and about potential or current hazards and likely outcomes.

| Term | Description |
|----------|--|
| NORMAL | Volcano is in typical background, noneruptive state or, after a change from a higher level, volcanic activity has ceased and volcano has returned to noneruptive background state. |
| ADVISORY | Volcano is exhibiting signs of elevated unrest above known background level or, after a change from a higher level, volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase. |
| WATCH | Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway but poses limited hazards. |
| WARNING | Hazardous eruption is imminent, underway, or suspected. |

Aviation Color Code Used by USGS Volcano Observatories

Color codes, which are in accordance with recommended International Civil Aviation Organization (ICAO) procedures, are intended to inform the aviation sector about a volcano's status and are issued in conjunction with an Alert Level. Notifications are issued for both increasing and decreasing volcanic activity and are accompanied by text with details (as known) about the nature of the unrest or eruption, especially in regard to ash-plume information and likely outcomes.

| Color | Description |
|--------|---|
| GREEN | Volcano is in typical background, noneruptive state or, after a change from a higher level, volcanic activity has ceased and volcano has returned to noneruptive background state. |
| YELLOW | Volcano is exhibiting signs of elevated unrest above known background level or, after a change from a higher level, volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase. |
| ORANGE | Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway with no or minor volcanic-ash emissions [ash-plume height specified, if possible] |
| RED | Eruption is imminent with significant emission of volcanic ash into the atmosphere likely OR eruption is underway or suspected with significant emission of volcanic ash into the atmosphere [ash-plume height specified, if possible]. |

Figure 5.4.1 Volcano Alert level and Aviation Color Codes used by USGS Volcano Observatories. USGS images.

Augustine Volcano, Cook Inlet, Alaska - 2006

The 2005-2006 eruption of Augustine was the first significant volcanic event in South Central Alaska since the eruption of Mount Spurr in 1992. The region is home to more than half the State's population and has very few evacuation routes.

Based on months of slowly increasing seismicity and deformation, AVO issued a statement of an increased likelihood of eruption 3 days prior to the first phreatic explosion and more than a month prior to an explosion that sent ash to 30,000 feet. AVO utilized a network of geophysical monitoring instruments on the volcano in concert with satellite imagery, airborne gas and thermal surveillance, and other techniques to detect and track more than a dozen explosive, ash producing eruptions threatening communities and air traffic with ash clouds and ash fall. AVO, local, State, and Federal partners including the National Weather Service (NWS), Federal Aviation Administration (FAA) and DHS&EM all monitored events around clock and shared information about the status of the volcano and likely impacts of eruptive events.

A special concern for Augustine is the possibility of a tsunami prompted by partial flank collapse. AVO and NOAA's West Coast and Alaska Tsunami Warning Center (WCATWC) addressed this issue in a pre-eruption press conference and public meetings in Homer early in the eruption sequence. Results of tsunami modeling and wave travel times were posted on websites and included in public statements. AVO and WCATWC developed a protocol to address the unique warning requirements for a potential Augustine tsunami. WCATWC installed a network of 'splash detectors' at Augustine to provide further confirmation of a large wave. This protocol and instrumentation is the first of its kind in the U. S. and serves as a potential example for other volcanoes in oceanic and other settings vulnerable to volcanic tsunami.

Prior to the onset of the eruption, outreach efforts by AVO, NWS, DSH&EM, the Kenai Peninsula Borough Office of Emergency Management, and other agencies contributed to public preparedness including checking of disaster preparedness kits and plans. The NWS developed and maintained a coordinated interagency website. The website broadcast updated warning notices, ash fall advisories and hypothetical ash cloud trajectories every 6 hours.

Redoubt Volcano, Cook Inlet, Alaska - 2009

The 2009 eruption of Redoubt again reminded Alaskans that Cook Inlet is home to several frequently active and potentially dangerous volcanoes. Redoubt Volcano has been relatively quiet following its last sequence of explosive eruptions in 1989-90. Beginning in the summer of 2008, increased volcanic gas and ice melt observed in the summit region, accompanied by an increasing number of deep earthquakes, indicated the volcano was on a potential path to renewed eruption. AVO alerted the public to a possible eruption. After several more months of increasing activity, the volcano began a 3.5 month long period of eruptions scattering ash over South Central communities and sending mudflows down to the Drift River Oil Terminal (Figures 5.4.2 and 5.4.4).

The Drift River Oil Terminal lies at the base of Mt. Redoubt and borders the Cook Inlet (Figure 5.4.3). Due to its location and hazardous contents, the risk to the Drift River Oil Terminal (DROT) was carefully considered. Before the eruption, AVO scientists had discussed scenarios with DROT management. After mudflows surrounded the terminal, the State dispatched an Incident Command Team (ICT) comprised of specialists from the Alaska Department of Environmental Conservation (DEC), the US Coast Guard (USCG), and the Cook Inlet Pipeline Company. This ICT successfully managed offloading the remaining oil, minimizing the threat to

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the environment. AVO and the U.S. Geological Survey provided a scientific expert on mudflows as part of the ICT to provide guidance on the evolving situation.

The Redoubt eruption response is a mitigation success story: no lives were lost, property damage was minimized, and importantly, no oil was released from the Drift River Oil Terminal. The eruption offered another case-study of the importance of geologic understanding of a volcano's history, real-time geophysical monitoring and other routine surveillance, an exercised interagency emergency response process, and public advisement.

Figure 5.4.2 Drift River Oil Terminal

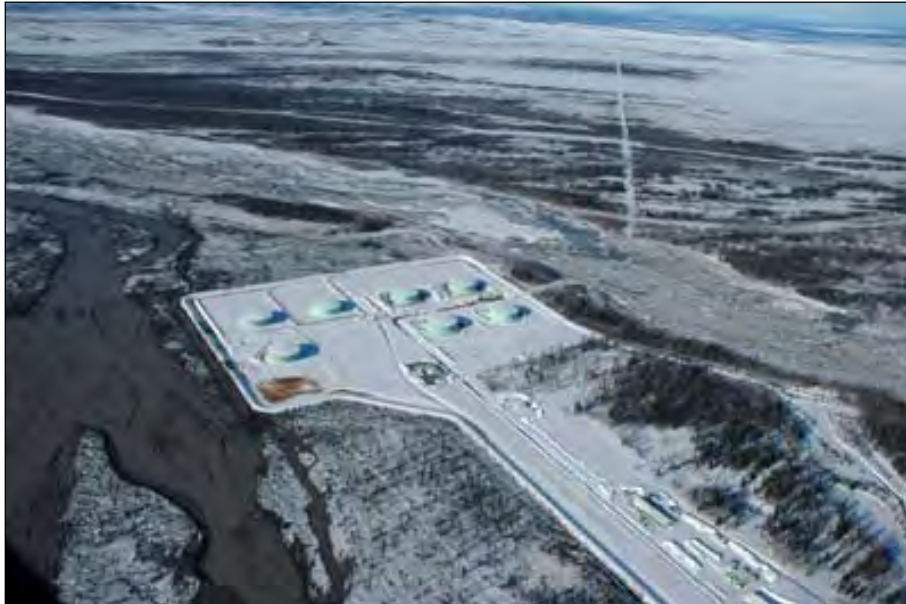


Figure 5.4.2 View of Drift River Oil Terminal on March, 26, 2009. Photo by Game McGimsey, AVO/USGS. Image from the Unified Command; Drift River Terminal Coordination.

Figure 5.4.3 Drift River Valley



Figure 5.4.3 On April 4, 2009, the Advanced Land Imager (ALI) on NASA's Earth Observing-1 satellite captured this image of the Drift River Valley where it connects with Cook Inlet. Image from the NASA Earth Observatory.

Figure 5.4.4 Drift River Oil Terminal East View



Figure 5.4.4 View east of service buildings and fuel station (helipad and runway are covered with debris) at Drift River Oil Terminal on March 23, 2009. Image courtesy of AVO/USGS.

Completed Goals, Objectives, and Actions

Action 1.3.1: Publish Fact Sheets, summary publications, and other materials on recent eruptions and ongoing hazards.

Lead: AVO and its constituent agencies

Support: DSH&EM, ADEC, DHSS, Land management agencies

Timeline: 5 years

Progress: Complete: AVO publishes Fact Sheets on the USGS web site and hard copies available at USGS science centers.

Goal 2: Increase planning for volcanic hazards.

Objective 2.1: Continue revising the Alaska Interagency Plan for Volcanic Ash Episodes every two years and include appropriate agencies.

Action 2.1.1: Include the US Coast Guard in the 2010 revision of the Alaska Interagency Plan for Volcanic Ash.

Lead: AVO, DHS&EM

Support: NWS, DHS&EM, USAF, FAA, USCG, ADEC

Timeline: 2010, then every two years thereafter

Progress: Complete - the latest version was published in 2014 and includes the USCG.

Action 2.1.2: Publish the Alaska Interagency Plan for Volcanic Ash available online.

Lead: AVO

Support: NWS, DHS&EM, USAF, FAA, USCG, ADEC

Timeline: 1 year

Progress: Complete - the Plan is published on the DHS&EM and AVO websites.

Objective 3.2: Improve collection of accurate ash fall reports during eruptions to near real time.

Action 3.2.1: Develop web-based reporting interface for citizens to report ash fall during eruptions.

Lead: AVO

Support: NOAA/NWS

Timeline: 5 years

Progress: Complete: AVO and NOAA/NWS advertise and encourage web based reporting for multiple hazards since 2013.

5.4.3 Goals, Objectives, and Actions

High Priority

Goal 1: Develop and disseminate volcanic hazard preparedness, response and mitigation planning information.

Objective 1.1: Conduct a comprehensive volcano hazard and risk assessment for the Cook Inlet and surrounding areas and incorporate the results into hazard mitigation planning.

Action 1.1.1: Conduct and publish individual volcano hazard and risk assessments in Cook Inlet.

Lead: USGS

Support: DNR/DGGS, UAF/GI

Timeline: Beyond 10 years

Progress: First generation hazard assessments for nearly half of the 52 historically active volcanoes in Alaska are complete or in progress. Dependent on State and Federal funding.

Action 1.1.2: Incorporate updated volcanic hazard assessments in State and local hazard mitigation plans as appropriate.

Lead: DHS&EM, Local communities

Support: AVO

Timeline: 1 year

Progress: Representatives from AVO reviewed and contributed to the 2013 update of the Alaska State Hazard Mitigation Plan and a representative from AVO serves on the SHMAC.

Action 1.1.3: Include updated volcanic hazard assessments in State and local Emergency Response and Operations Plans as appropriate.

Lead: DHS&EM

Support: AVO

Timeline: Volcanic hazard assessments were included in the 2010 State Emergency Operations Plan update.

Objective 1.3: Generate volcano hazard informational products for the public.

Action 1.3.1: Completed in 2010, see **Completed Goals, Objectives, and Actions**

Action 1.3.2: Create and disseminate volcano hazard information products.

Lead: AVO and its constituent agencies

Support: DSH&EM, ADEC, DHSS, Land management agencies

Timeline: 3 years

Progress: The USGS published an update to their interagency ash plan in 2014, http://www.avo.alaska.edu/pdfs/cit3996_2014.pdf.

Objective 1.4: Conduct specific outreach to the Alaskan aviation community regarding the hazards posed by Alaskan and Russian volcanoes.

Action 1.4.1: Disseminate information at military and civilian air shows.

Lead: AVO, NWS, FAA

Support: DHS&EM, Aviation industry, Military aviation

Timeline: 2 years

Progress: Dependent on State and Federal funding

Action 1.4.2: Attend the Alaska State Aviation Trade Show and other public events in Alaska to provide information and training on volcano hazards.

Lead: AVO, NWS, FAA

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Support: DHS&EM, Aviation industry, Military aviation

Timeline: 5 years

Progress: As of 2016, this action has not yet been accomplished.

Objective 1.5: Expand awareness of volcanic hazards to the maritime industry and community.

Action 1.5.1: Expand education, outreach and improved warning dissemination of volcanic hazard information for the public.

Lead: USGS, NOAA

Support: AVO, DNR/DGGS, UAF/GI, USCG

Timeline: 3 years

Progress: NOAA published a web page, “Maritime Impacts of Volcanic Eruptions: A guide for the Prudent Mariner”. The most recent version is May 2015.

Objective 1.6: Disseminate specific information regarding volcanic hazards and mitigation to Alaskan communities at risk to volcanic eruptions.

Action 1.6.1: Conduct outreach and education on volcanic hazards and risk mitigation for the remote communities of the Alaska Peninsula and the Aleutian Islands.

Lead: AVO, DHS&EM

Support: NWS/NOAA

Timeline: 3 years

Progress: As of 2016, this action has not yet been accomplished.

Action 1.6.2: Support volcanic hazard assessments in local community planning.

Lead: AVO, DHS&EM, FEMA

Support: NWS/NOAA

Timeline: 1 year

Progress: The State and FEMA require volcanic hazard assessments in local HMPs where applicable.

Goal 2: Increase planning for volcanic hazards.

Completed in 2013, see **Completed Goals, Objectives, and Actions**

Goal 3: Improve monitoring and response.

Objective 3.1: Expand real time seismic and other geophysical monitoring to high-priority volcanoes in Alaska.

Action 3.1.1: Install, maintain, and repair monitoring equipment on, selected volcanoes

Lead: AVO

Support: USFWS, NPS, village corporations, local governments

Timeline: Funding prioritized by eruptive activity.

Progress: As of 2016, real time seismic monitoring devices have been installed on six high risk volcanoes.

Objective 3.2: Completed in 2013, see **Completed Goals, Objectives, and Actions.**

5.4.4 Acknowledgments

US Geological Survey / Alaska Volcano Observatory
State of Alaska Division of Geological and Geophysical Surveys
National Oceanic and Atmospheric Administration / National Weather Service

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5.5 Earthquakes

5.5.1 Programs and Strategies

Earthquake Simulator

The Earthquake Simulator is a portable unit operated by DHS&EM for earthquake and tsunami outreach activities. Participants occupy the simulator, along with loose and secured items, and experience earthquakes of various magnitudes. It is used to demonstrate methods of securing potential falling objects and furniture in their homes, offices, or work areas and for general disaster preparedness awareness.

Earthquake Resistant Model Home

The Earthquake Resistant Model Home was developed by FEMA and the State of Washington. FEMA provided a duplicate for DHS&EM to display with the Quake Cabin at safety fairs, home shows, and other educational outreach functions. The model home demonstrates earthquake mitigation options such as hardware and bracing options.

Alaska Seismic Hazard Safety Commission

The Alaska Seismic Hazard Safety Commission (ASHSC), with its mixture of public and private Commissioners, has increased public awareness and education with a particular focus on mitigating risk.

One of the major goals of the ASHSC is to insure the seismic safety of Alaska's public schools. In 2009, the Alaska Department of Education and Early Development (DEED) assigned a Department representative to serve as a liaison with the ASHSC. In 2010, through a coordinated effort with DEED, State funding for site specific seismic design and construction inspection was added as an option for new school construction. The ASHSC annual progress reports to the Governor are available online at http://seismic.alaska.gov/annual_reports.php.

Earthquake Hazard Reduction Program

The mission of the earthquake hazard reduction program is to preserve lives through economical rehabilitation of existing structures and constructing safe new structures.

Mitigation projects for seismic retrofits are opportunities to educate the public about seismic hazards and risk reduction.

Training in structural and non-structural seismic mitigation and post-earthquake evaluation is provided annually to specialists in the government and private sector responsible for facilities, building code revisions and retrofit projects.

Alaska Earthquake Center

The Alaska Earthquake Center is a partnership between the University of Alaska Fairbanks Geophysical Institute (UAF/GI) and the USGS. They are directed by the Alaska Legislature (statute 14.40.075) and the many [stakeholders](#) they support with data, products, and outreach. The Alaska Earthquake Center is dedicated to reducing the impacts of earthquakes, tsunamis and volcanic eruptions in Alaska.

They provide definitive [earthquake information](#) to the public, emergency managers, scientists and engineers. This information is derived from the network of [seismic monitoring stations](#)

throughout the state. Their data center is located at the Geophysical Institute on the University of Alaska Fairbanks campus.

- Recommendation for Evaluating Existing Public Schools for Seismic Safety
http://www.dggs.alaska.gov/download/ashsc_meetings_minutes/ASHSC_Announcement_ADEED_Memo.pdf
- Map - Public Schools and Earthquake Hazard in Alaska
http://www.dggs.alaska.gov/download/ashsc_meetings_minutes/ASHSC_Announcement_ADEED_Map.pdf
- Table - Alaska Public Schools Sorted by Probabilistic Peak Ground Accelerations
http://www.dggs.alaska.gov/download/ashsc_meetings_minutes/ASHSC_Announcement_ADEED_List.pdf

5.5.2 Hazard Mitigation Successes

Relocation of Valdez, AK

After the 1964 earthquake, the City of Valdez relocated a few miles west of its original site. The new town site was located on stable alluvial fan deposits and bedrock. These soils withstand earthquake ground shaking better than the saturated silty sands at the former site. The new location had the added benefit of helping protect it from tsunami inundation. This was the first time in US history a community had been completely rebuilt in a new location after an earthquake.

Reconstruction of Seward, AK

The 1964 earthquake also heavily impacted the City of Seward. The waterfront failed as a result of ground motion destroying the city dock and the Alaska Railroad yard and buildings. The rail facilities were not reconstructed and the city dock was relocated. In addition, the high-risk areas near the waterfront were converted to park space and camping facilities.

Success of the Trans-Alaska Pipeline System during the 2002 Denali Fault earthquake

The 2002 Denali fault earthquake did little damage to the Trans-Alaska Pipeline System and resulted in no spillage of oil. This is a direct result of careful geologic and engineering planning prior to constructing the pipeline. The pipeline was constructed to accommodate up to 20 feet of surface offset on the fault using a sliding support system in the fault zone. No oil was spilled and operation of the pipeline resumed within a few days after the earthquake.

Kodiak Island Borough Schools

In 2004 the Kodiak Island Borough (KIB) began an effort to assess and retrofit their public school buildings against seismic hazard. This community initiative project, using local bond, State and FEMA mitigation funds accomplished structural and non-structural seismic retrofits on all the Borough's public school buildings. KIB used the occasion of the multi-year schools retrofit project to raise community awareness about seismic risk and to promote public seismic mitigation and preparedness. KIB's seismic retrofit project is a model for other school district seismic retrofit projects around the State.

Shake Out

“Drop, Cover, and Hold On” is the recommended action to protect oneself from injury during earthquakes. In Alaska, the annual Great Shake Out earthquake drills are opportunities to practice the Drop, Cover, and Hold On action. The drills are conducted on the anniversary of the 1964 Good Friday Earthquake. Detailed information may be found online at https://ready.alaska.gov/Documents/Earthquake%20Safety%20Handout_4%20pages.pdf.

Seismic Mitigation Training

From 2011-2013 DHS&EM facilitated five earthquake courses including Rapid Visual Screening of Building for Potential Seismic Hazards, Earthquake Hazards for Nonstructural Elements and Structural and Non-Structural Seismic Mitigation for Hospitals and Health Care Facilities.

Anchorage

Currently the Municipality of Anchorage uses the 2009 building code amendments adopted in 2011. The land-use guidelines correlate the level of geotechnical investigation with ground failure susceptibility zones.

Also see USGS Scientific Investigations Map 3077 Maps Showing Seismic Landslide Hazards in Anchorage, Alaska (2009)

http://pubs.usgs.gov/sim/3077/downloads/3077_pamphlet_508.pdf

In response to the landslides along Turnagain Arm during the 1964 earthquake, Anchorage established Earthquake Park as open space in perpetuity. Monuments and interpretive signs commemorate the earthquake.

Utilizing federal disaster mitigation funds, the Municipality of Anchorage added seismic retrofits to many of their public and critical facilities, such as the Ben Boeke and Sullivan Arenas.

Unfortunately, examples of unsuccessful mitigation efforts can also be found. After the 1964 earthquake, Anchorage provided incentives for people to move to a less hazardous area. However, with exception to Earthquake Park, they failed to take title of the vacated land. Consequently, the earthquake hazard area was re-developed. In response, the City implemented the highest seismic building code standards for new construction within this zone (in accordance with local amendments to the IBC).

Completed Goals, Objectives, and Actions

Action 6.1.3: Use social media and public networking to educate the public before, during, and after seismic events.

Lead: DHS&EM

Support: ASHSC

Timeline: 3 years

Progress: Complete, as of 2016, most government and private agencies have incorporated social media accounts as a means of disseminating earthquake safety information.

5.5.3 Goals, Objectives, and Actions

High Priority

Goal 1: Maintain the Alaska Seismic Hazards Safety Commission (ASHSC) as an autonomous entity advising the Governor, Legislature and the public on seismic hazard mitigation policy development.

Objective 1.1: Continue the Commission's seismic risk mitigation efforts.

Action 1.1.1: Continue the Commission's statutory existence beyond the current June 2014 "sunset" authorization.

Lead: DNR/DGGS

Support: AEC, DNR, DMVA, FEMA, NOAA, USGS

Timeline: Two years

Progress: The Governor and State Legislature has reauthorized the ASHSC through 2020.

Goal 2: Improve Building Codes

Objective 2.1: Support legislative and executive branch actions to adopt and enforce modern seismic building codes.

Action 2.1.1: Encourage communities to adopt the most current International Building Code (IBC)

Lead: ASHSC, State Legislature

Support: DOT/PF, Anchorage Geotechnical Commission, State Fire Marshal, DHS&EM

Timeline: 10 years

Progress: Seismic structural and non-structural mitigation training for public buildings and hospitals was held in 2009 and 2010 for building officials, inspectors, and project managers. In these courses the instructors emphasize the importance of building codes and IBC adoption.

Action 2.1.2: Require all State facilities be designed and constructed in accordance with the current IBC.

Lead: DOT/PF

Support: ASHSC, State Legislature, State Fire Marshal

Timeline: 10 years

Progress: Disaster specialists of varying disciplines attended seismic structural and non-structural mitigation and post-earthquake evaluation training in October 2012.

Action 2.1.3: Support legislation to require communities use and enforce IBC seismic codes in design and construction as a condition for receiving State and Federal funds.

Lead: ASHSC, DOT/PF

Support: ASHSC, State Legislature, Anchorage Geotechnical Commission, State Fire Marshal, DHS&EM

Timeline: 10 years

Progress: ASHSC considered this as a legislative priority for 2012; now moved to 2014 legislative session.

Action 2.1.4: Encourage all communities to adopt or update to the current IBC for residential construction and provide sufficient resources and incentives to ensure compliance.

Lead: Fire Marshal's Office

Support: ASHSC, State Legislature, Anchorage Geotechnical Commission, State Fire Marshal, AHFC, mortgage lenders

Timeline: 10 years

Progress: Seismic structural and non-structural mitigation training for public buildings and hospitals was held in 2012 for building officials, inspectors, and project managers. The course emphasizes the importance of local and IBC building codes.

Goal 3: Develop incentives and programs promoting earthquake safety in the design, construction and retrofit of structures and critical infrastructure.

Objective 3.1: Promote new methods to improve building safety during earthquakes.

Action 3.1.1: Host workshops for builders to show new construction techniques.

Lead: Fire Marshall's Office, Construction Industry

Support: DCCED, Anchorage Geotechnical Commission, Insurance Industry. AHFC, mortgage lenders

Timeline: Annually

Progress: In 2014 FEMA provided specific building seismic hazard screening and mitigation training. In 2016, FEMA provided a webinar on P807 Seismic evaluation and retrofits.

Objective 3.2: Develop incentives and programs incorporating seismic safety into new building design and construction. Incentives could be property tax and insurance premium reduction, transferable development rights, density bonuses, or waiver of impact fees.

Action 3.2.1: Support the legislative establishment of new programs and provide earthquake hazard information to the public about earthquake risk.

Lead: State Legislature, Local communities

Support: DHS&EM, Governor's Office, DCCED, ASHSC

Timeline: 10 years

Progress: ASHSC has established an education committee with this focus. Plans are underway for a major interagency outreach campaign for the 50 year anniversary of the 1964 earthquake in 2014.

Objective 3.3: Support seismic retrofit projects.

Action 3.3.1: Fund hazard mitigation projects accomplishing seismic retrofits.

Lead: DHS&EM. DEED

Support: FEMA, State Legislature, US Congress

Timeline: Annually

Progress: Contingent upon funding.

Goal 4: Encourage school seismic risk mitigation efforts

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Objective 4.1: Continue earthquake safety education and preparedness in Alaska's schools.

Action 4.1.1: Encourage non-structural mitigation and preparedness activities.

Lead: DEED, DHS&EM

Support: ARC, AEIC, DEED, AST, local communities

Timeline: During each school year

Progress: State Statute 14.33.100 requires public school crisis and response planning which includes post seismic events.

Objective 4.2: Encourage structural and non-structural seismic evaluations of Alaska schools.

Action 4.2.1: Fund structural and non-structural seismic safety evaluations of all schools in Alaska.

Lead: DHS&EM, FEMA, Community insurers

Support: DOT/PF, ASHSC, DEED

Timeline: 1 year

Progress: In 2013, the Anchorage School District and Anchorage Fire Department completed EHRP grants for seismic evaluations.

Action 4.2.2: Fund seismic retrofit projects for Alaska schools.

Lead: DHS&EM, DEED, Community insurers

Support: DOT/PF, ASHSC, DEED

Timeline: 1 year

Progress: In 2014, The Anchorage School District and Anchorage Fire Department completed HMGP grants for non-structural seismic retrofits.

Action 4.2.3: Encourage seismic safety reviews of new schools designs and construction in Alaska.

Lead: DOT/PF, ASHSC, DEED

Support: DHS&EM, DEED, Community Insurers, State Fire Marshal

Timeline: As funding becomes available

Progress: In 2010 DEED added specific seismic construction review as an option in new school construction grants.

Medium Priority

Goal 5: Improve earthquake detection

Objective 5.1: Develop a real-time preliminary damage assessment capability.

Action 5.1.1: Deploy modern seismic instrumentation in critical facilities, infrastructure, and major transportation arteries.

Lead: AEIC, DOT/PF

Support: UAFGI, USGS, DNR/DGGS, UAA, Advanced National Seismic Safety (ANSS)

Timeline: 10 years

Progress: As of 2016, this action is yet unfunded.

Objective 5.2: Record and evaluate the seismic response of built infrastructure for

opportunities to improve design and construction.

Action 5.2.1: Expand the number and locations of modern free-field and built environment seismic recording instruments.

Lead: AEIC, UAA

Support: USGS, ASHSC,

Timeline: 10 years

Progress: As of 2016, this action is yet unfunded.

Action 5.2.2: Expand the number and locations of modern strong motion and broadband seismic recording instruments in “low-noise” installations throughout Alaska.

Lead: AEIC

Support: USGS, ASHSC, DHS&EM

Timeline: 10 years

Progress: As of 2016, this action is yet unfunded.

Goal 6: Earthquake Preparedness

Objective 6.1: Promote statewide earthquake preparation and response training.

Action 6.1.1: Conduct earthquake preparation and response training.

Lead: DHS&EM

Support: ARC, ASHSC, FEMA

Timeline: 5 years

Progress: Alaska Shield, A combined federal and state earthquake response exercise was conducted in 2014. In 2015, The State Legislature established March 27 as the “Great Alaska Earthquake Remembrance Day” in perpetuity.

Action 6.1.2: Update the Department of Education and Early Development and State school districts with the most current earthquake education materials.

Lead: DEED

Support: DHS&EM ARC, ASHSC, University of Alaska

Timeline: 5 years

Progress: In 2009 ASHSC added a DEED representative to their school’s committee to provide statewide coordination of this effort.

Action 6.1.3: Completed in 2016, see **Completed Actions**

Goal 7: Identify earthquake sources

Objective 7.1: Provide a publicly accessible map of active earthquake faults in Alaska.

Action 7.1.1: Identify and map active earthquake faults in Alaska.

Lead: DNR/DGGS

Support: Alaska Earthquake Center (AEC), USGS, ASHSC

Timeline: As fault data is updated

Progress: DNR/DGGS released an updated interactive map of active earthquake faults in 2013. It is available online at <http://maps.dggs.alaska.gov/qff/#-17900000:9100000:3>

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Goal 8: Seismic Mapping, Hazard Identification and Mitigation Planning

Objective 8.1: Promote developing large-scale area earthquake-hazard maps.

Action 8.1.1: Create and update seismic hazard area maps in Alaska.

Lead: DNR/DGGS

Support: DHS&EM, AEC, USGS, FEMA

Timeline: 10 years

Progress: Dependent on additional funding.

Objective 8.2: Promote the development and use of scientific seismic scenarios for planning, zoning and response.

Action 8.2.1: Develop training seismic scenarios for Alaska communities.

Lead: DHS&EM, FEMA,

Support: ASHSC, DNR/DGGS, AEC, USGS, NEHRP, Earthquake Engineering Research Institute (EERI)

Timeline: 5 years

Progress: FEMA and State developed the Alaska Shield earthquake exercise in 2014.

Objective 8.3: Facilitate earthquake-hazard map development.

Action 8.3.1: Coordinate the sharing of earthquake information between the insurance, construction, and mortgage banking industries.

Lead: DHS&EM, ASHSC

Support: DCCED, AHFC, Division of Insurance (DOI), Builders, Lenders

Timeline: Annually

Progress: The ASHSC and DOI participate in the SHMAC. Additionally, the DOI attends two ASHSC meetings each year for coordination.

Goal 9: Encourage advanced earthquake science education in Alaska.

Objective 9.1: Support earthquake sciences education in Alaska's Universities.

Action 9.1.1: Encourage the University of Alaska to develop and offer advanced earthquake science degrees.

Lead: University of Alaska (UA)

Support: ASHSC

Timeline: 1 year

Progress: UA currently offers a M.S. degree in Geophysics with an emphasis in seismology.

5.5.4 Acknowledgements

US Geological Survey

State Seismologist for Alaska

State of Alaska Division of Geological and Geophysical Surveys

NOAA National Weather Service West Coast & Alaska Tsunami Warning Center

Alaska Seismic Hazards Safety Commission

Natural Resources Conservation Service

5.6 Tsunamis and Seiches

5.6.1 Programs and Strategies

NOAA Tsunami Warning System

NOAA provides tsunami warning guidance to the United States and many other countries. Two warning centers comprise the national tsunami warning system: The National Tsunami Warning Center (NTWC) in Palmer, Alaska and the Pacific Tsunami Warning Center (PTWC) in Ewa Beach, Hawai'i.

The NTWC was established in Palmer, Alaska in 1967 in response to the Good Friday Earthquake. State and Federal officials recognized the need for timely and accurate tsunami warnings for the coastal communities in Alaska.

Today the center's area of responsibility (AOR) has increased to include Canadian provinces and all US coastal states, except Hawaii.

Tsunami forecasts are initially based on seismic data, sea level observations, historical data, and forecast models. Regional warnings are issued within five minutes of earthquake origin time for any coastal earthquake in the NTWC's AOR over magnitude 7. Warnings outside the NTWC's AOR are issued after coordination with the PTWC. The NTWC also issues information for non-tsunami generating earthquakes.

The National Tsunami Hazard Mitigation Program (NTHMP) is a collaborative Federal and State effort to preserve life and property along US coastlines from tsunami inundation events. Initially the US agencies included NOAA, FEMA, USGS, and the State Emergency Management Agencies of Alaska, California, Hawaii, Oregon and Washington. The Eastern and Gulf states joined the program in 2005 and all other coastal U.S. states and territories joined in 2006. The NTHMP funds public outreach, tsunami inundation map development, mitigation, and hazard assessment programs, such as Deep-ocean Assessment and Reporting of Tsunamis (DART).

A DART system consists of a seafloor bottom pressure recording system (BPR) capable of detecting tsunamis as small as one centimeter, and a moored surface buoy for real-time communication (Figure 5.6.1). The information is transmitted via satellite link to ground stations, which relay it to NOAA's Tsunami Warning System.

The DART buoys are capable of recording a tsunami soon after generation and before being distorted by near-coast influences. They are located in regions with a history of destructive tsunamis, providing early detection and data acquisition critical to real-time forecasts (Figure 5.6.2).

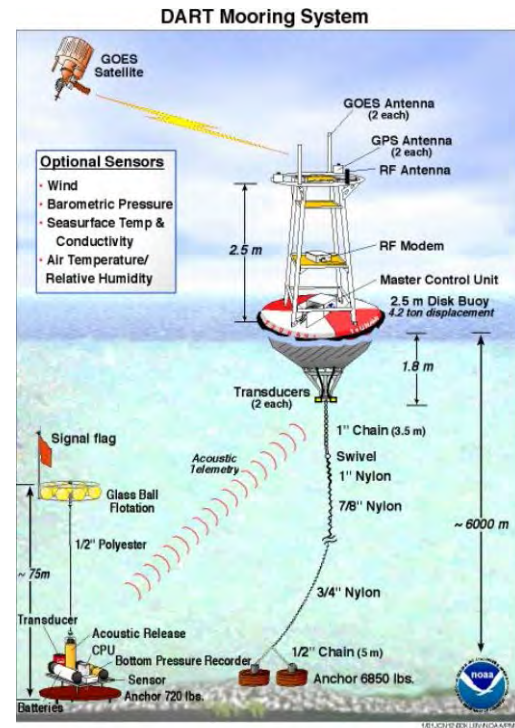


Figure 5.6.1 DART Mooring System. NOAA

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Figure 5.6.2 NOAA DART Locations

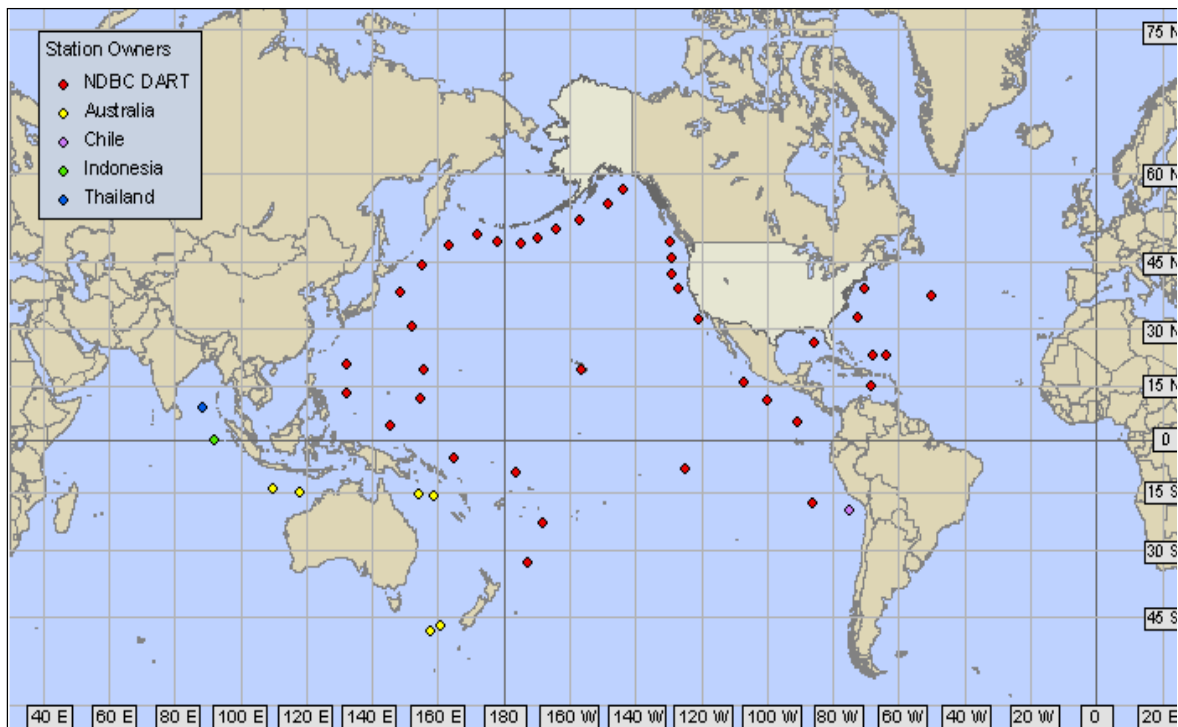


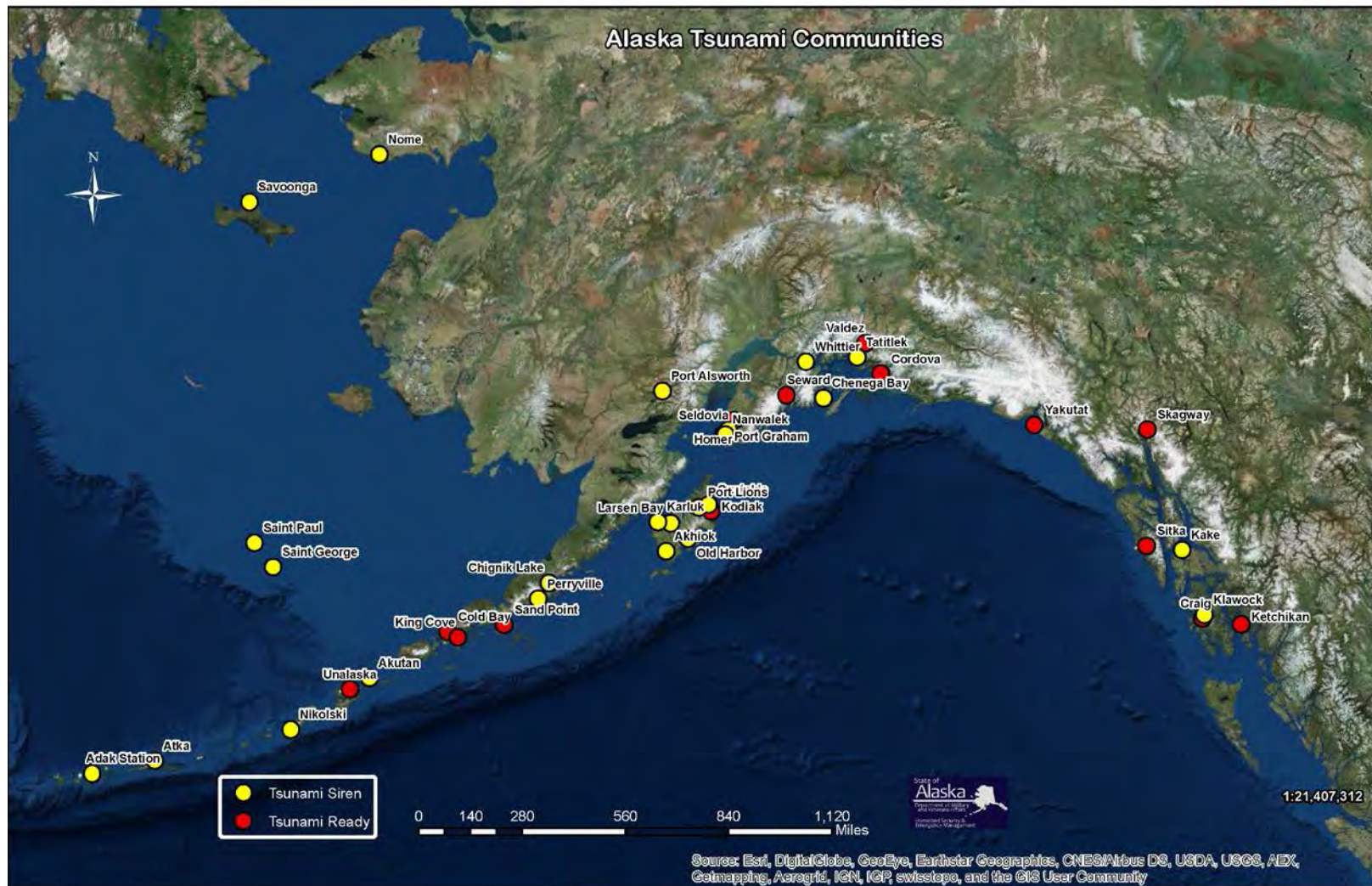
Figure 5.6.2 DART Locations from NOAA.

TsunamiReady Communities

The TsunamiReady Community program promotes tsunami hazard preparedness as an active collaboration among Federal, State and local emergency management agencies, the public, and the NWS tsunami warning system. This collaboration supports better and more consistent tsunami awareness and mitigation efforts among communities at risk. The main goal is improved public safety during tsunami emergencies. Before a community can be declared TsunamiReady, it must meet established criteria.

Seward was the first community in Alaska to complete all requirements of the, NWS and DHS&EM Community TsunamiReady Program. In 2010 Homer, Sitka, and Kodiak were also designated TsunamiReady. The communities of Cold Bay and King Cove became TsunamiReady in 2012 (Figure 5.6.3).





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Tsunami Inundation Mapping Program

Alaska is developing tsunami inundation maps for communities along the Gulf of Alaska as part of the National Tsunami Hazard Mitigation Program. Detailed maps of historical tsunami inundation are essential determining evacuation routes and long-term planning for vulnerable coastal communities. Inundation maps for 14 communities are complete and available to the public through the University of Alaska Fairbanks (UAF) Geophysical Institute's Alaska Earthquake Center (AEC) website:

<http://www.aec.alaska.edu/tsunami/>.

This site is undergoing transformation to a new URL:

<http://earthquake.alaska.edu/tsunamis/atom>

Also available on the UAF/AEC website are Alaska communities participating in tsunami inundation mapping and a link to TsunamiReady communities.

The Alaska Department of Natural Resources Division of Geological & Geophysical Surveys (AKDNR/DGGS) has published a series of tsunami hazard maps, reports, ESRI shapefile data, and metadata on its website:

- Tsunami inundation maps of Fox Island communities, including Dutch Harbor and Akutan, Alaska (RI 2015-5)
<http://dggs.alaska.gov/pubs/id/29414>
- Tsunami hazard maps of the Homer and Seldovia areas (RI 2005-2)
<http://www.dggs.alaska.gov/pubs/pubs?reqtype=citation&ID=14474>
- Tsunami hazard maps of the Kodiak area (RI 2002-1)
<http://www.dggs.alaska.gov/pubs/pubs?reqtype=citation&ID=2860>
- Tsunami inundation maps of Whittier and western Passage Canal, Alaska
<http://dggs.alaska.gov/pubs/id/23244>
- Tsunami inundations maps of Seward and northern Resurrection Bay (RI 2010-1)
<http://www.dggs.alaska.gov/pubs/pubs?reqtype=citation&ID=21001>

University of Alaska Tsunami Warning and Environmental Observatory for Alaska

The University of Alaska Fairbanks Tsunami Warning and Environmental Observatory for Alaska Fairbanks (TWEAK) is a recently established program to collect tsunami information and oceanographic data. Its efforts are focused on the following areas:

Tsunami Research

Tsunami source evaluation

Tsunami inundation modeling

Super computer support for tsunami codes

Coastal Digital Elevation Map (DEM) development

Earthquake detection and warning with seismology

5.6.2 Hazard Mitigation Successes

Test of the Alaska Tsunami Warning System and Tsunami Awareness Week

Annually, Alaska dedicates the anniversary week of the March 1964 Good Friday Earthquake as The Great Alaska Shake-Out and Tsunami Awareness Week, emphasizing tsunami and earthquake mitigation, safety, and preparedness. NOAA's National Weather Service and DHS&EM, in cooperation with community emergency management agencies and the Alaska Broadcasters Association, conduct a statewide live-code test of the tsunami warning communications system on the Wednesday of the anniversary week. This test uses the actual tsunami warning alert tones and public emergency broadcast system (live code) to verify the full warning communications system. Local communities, the State, school districts, and the public use this week and the Wednesday statewide test to conduct earthquake and tsunami drills, exercises, education, and warning system tests. The public participates by monitoring NOAA Weather Radio All Hazards, commercial radio, or local television for the emergency alert system message. This multi-agency cooperative test also provides an opportunity for public comment through a web based form or through local National Weather Service offices.

Installation of Tsunami Warning Signs

Tsunami warning signs were installed in Kodiak, Sitka, Sand Point, Seward, Homer, Valdez and Yakutat. During the summer of 2010, installation was underway in Whittier and Dutch Harbor. In addition, the Alaska Department of Parks and Recreation installed signs in Shoup Bay, a remote area frequented by hikers and kayakers, which was inundated up to 220 feet in 1964. This project continues for coastal areas of the State with tsunami risk (Figure 5.6.4).



Tsunami Warning Sirens

State of Alaska

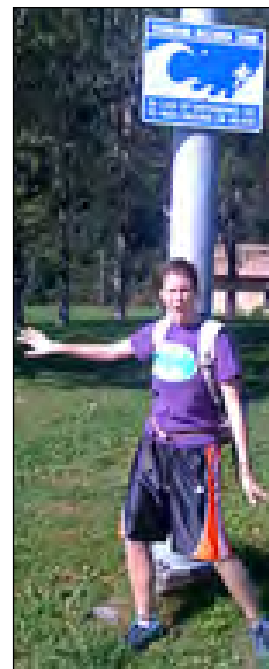
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As of March 2016, there are tsunami sirens in 38 communities throughout Alaska (Figure 5.6.4). Installation and maintenance continues via an annual NOAA grant and State matching funds.

Education and Outreach

An ongoing cooperative effort by State, local and Federal partners has targeted school children in coastal communities with tsunami education emphasizing moving to high ground during significant earthquakes or tsunami warnings. This effort included a special project for school curriculum development and teacher training, called the Alaska Tsunami Education Program (ATEP), using tsunami-related lesson plans to educate students in science while at the same time teaching them what to do in the event of a tsunami. The success of this type of program was seen in the 2009 Samoa tsunami. Just a few months prior to the tsunami, residents of Western Samoa were taught to “head to high ground” when they feel a strong earthquake. According to Guy Urban of the NTRC, this training, “sunk in to some people and it likely saved some of their lives... some who felt the quake did just that, ran to high ground.”



*Figure 5.6.4
Tsunami Evacuation
Route and Tsunami
Hazard Zone signs*

5.6.3 Goals, Objectives, and Actions

High Priority

Goal 1: Public Education and Outreach

Objective 1.1: Encourage all tsunami-threatened coastal communities to participate in the DHS&EM Tsunami Program.

Action 1.1.1: Conduct community outreach and discuss available mitigation partnerships, benefits, and grant opportunities.

Lead: DHS&EM, NOAA

Support: AEIC, DOT/PF, local jurisdictions

Timeline: Annually

Progress: State DHS&EM and NOAA conducted tsunami workshops for Alaska communities for years 2013 – 2016. Workshops are planned for years 2016 – 2019 to address warning, evacuation, recovery, and mitigation.

Action 1.1.2: Provide tsunami hazard and evacuation signs for at risk communities. The sign program requires communities to complete a Tsunami Hazard Plan (or annex to existing Emergency Operations or Comprehensive Plans), identify Tsunami Evacuation Routes, and agree to place tsunami awareness signs in their community.

Lead: DHS&EM

Support: NOAA, DOT/PF, local jurisdictions

Timeline: 5 years

Progress: Tsunami evacuation signs have been installed in 25 Alaskan communities as of 2016.

Action 1.1.3: Install tsunami warning sirens in communities at risk for tsunami.

Lead: DHS&EM

Support: AEIC, NOAA, Local jurisdictions

Timeline: 5 years

Progress: Tsunami warning sirens have been installed in 38 Alaskan communities as of 2016. The sirens are live code tested annually.

Action 1.1.4: Create and distribute tsunami outreach and education materials. Place special emphasis on schools and tourist businesses, and visitor centers.

Lead: DHS&EM, Local jurisdictions

Support: NOAA, UAF/GI – AEC, DGGS, ASHSC

Timeline: Annually

Progress: Outreach materials are produced and distributed annually. DHS&EM installed interactive tsunami kiosks at local Visitor Centers from 2013 to 2016. More kiosks are planned for distribution in 2017.

Action 1.1.5: Conduct statewide tests of the tsunami warning system annually.

Lead: DHS&EM

Support: AEC, NOAA, Local jurisdictions

Timeline: 1 year

Progress: Live code tests of the tsunami warning system in Alaska are conducted annually, coinciding with the anniversary of the 1964 Good Friday earthquake and tsunami.

Objective 1.2: Tsunami Ready - Encourage all tsunami high risk communities to participate in the NWS/DHS&EM TsunamiReady Program.

The TsunamiReady Program requires communities to complete redundant communication capability and outreach activities for TsunamiReady Community Certification.

Action 1.2.1: Assist all tsunami communities towards TsunamiReady certification.

Lead: NTWC, DHS&EM, NOAA, ASHSC, AEC

Support: Local jurisdictions

Timeline: 10 years

Progress: 14 Alaskan communities are certified TsunamiReady as of 2016 (Figure 5.6.3).

Action 1.2.2: During the third year of their TsunamiReady certification, contact TsunamiReady communities and support them through the renewal process.

Lead: NTWC, DHS&EM, NOAA

Support: Local jurisdictions, ASHSC

Timeline: Annually

Progress: The next scheduled TsunamiReady update is 2017.

Goal 2: Assess tsunami risk and mitigation opportunities for coastal Alaskan communities.

Objective 2.1: Research and model the tsunami risk for vulnerable coastal communities.

Action 2.1.1: Develop tsunami inundation maps for tsunami-threatened communities statewide.

Lead: AEC, DNR/DGGS, USGS

Support: NTWC, NOAA, DHS&EM, ASHSC, FEMA, NPS

Timeline: 10 years

Progress: 14 of 78 coastal communities have completed tsunami inundation maps. This process is funded by the NTHMP.

Action 2.1.2: Obtain bathymetric data for accurate tsunami inundation mapping.

Lead: NOAA

Support: DHS&EM, AEC, DNR/DGGS, NTWC, NOAA, ASHSC

Timeline: 10 years

Progress: As of 2015, NOAA has obtained bathymetry data for areas shown in Figure 5.6.5.

Action 2.1.3: Obtain coastal ground elevation datasets for accurate tsunami inundation mapping.

Lead: NTHMP

Support: DHS&EM, AEC, DNR/DGGS, USGS, NTWC, NOAA, FEMA, ASHSC

Timeline: 10 years, subject to available funds.

Progress: Ground elevation datasets for Alaska are stored within the State DNR/DGGS Geospatial Repository online at <http://maps.dggs.alaska.gov/elevationdata/#-15049490:7024344:5>. As of 2016, elevation datasets exist for much of South East Alaska. Future collections may include communities along the Aleutian Islands.

Action 2.1.4: Identify, locate and characterize tsunami sources in Alaska.

Lead: NTHMP

Support: DHS&EM, AEC, DNR/DGGS, USGS, NTWC, NOAA, FEMA, ASHSC

Timeline: 10 years

Progress: In November 2015, the USGS documented evidence of prehistoric tsunamis in the Aleutian Arc occurring every 300-340 years, and discovered previously unknown tsunami sources along the Aleutian megathrust fault system.

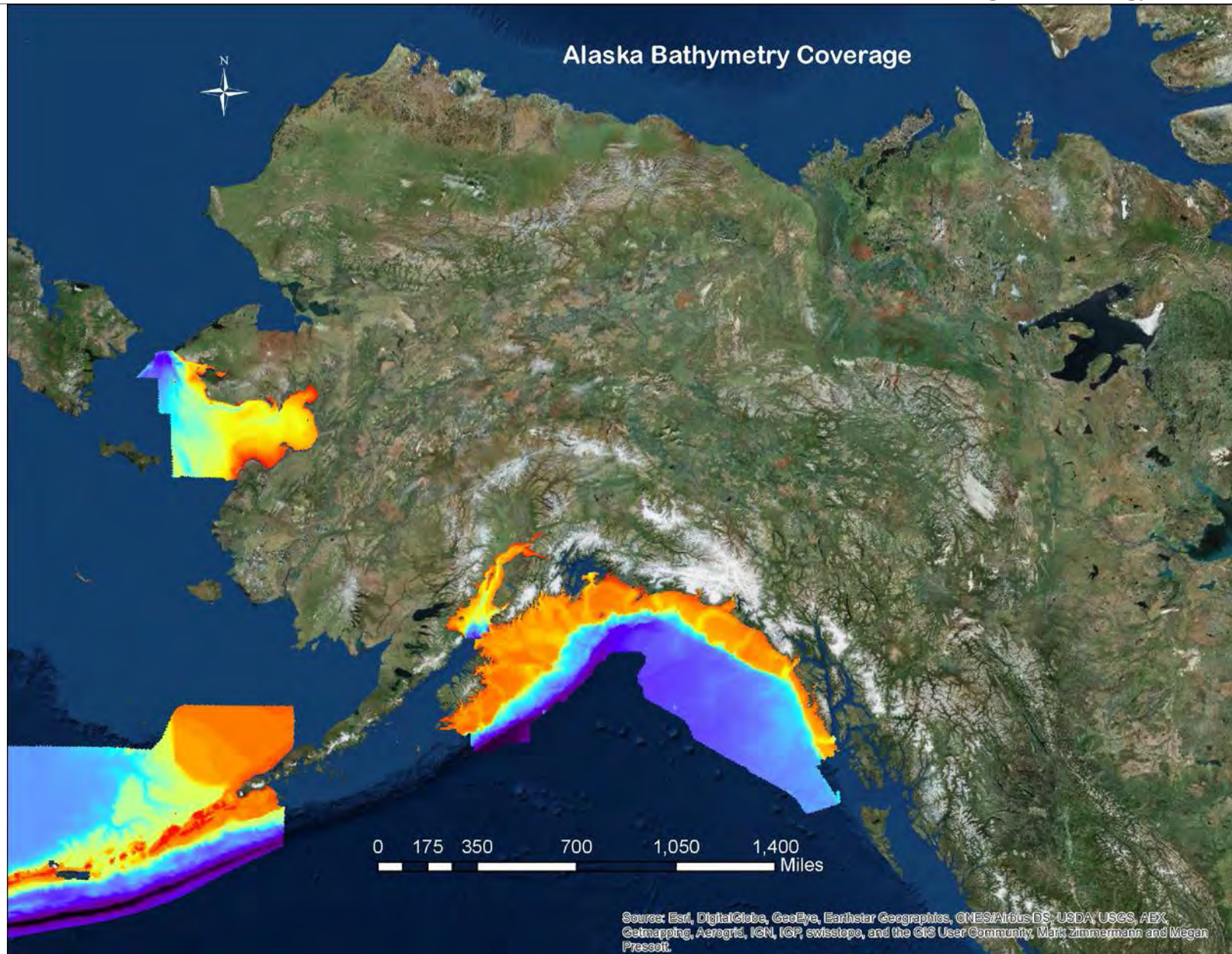
Action 2.1.5: Encourage communities to document tsunami risk areas in land-use plans, zoning and evacuation plans.

Lead: State DHS&EM, NOAA

Support: AEC, DNR/DGGS, NTWC, NOAA, ASHSC

Timeline: 2 years

Progress: Complete. Training is included as part of technical assistance for local hazard mitigation planning and part of the tsunami operations workshops.



Goal 3: Actively mitigate tsunami risk.

Objective 3.1: Continue State and Federal advocacy partnerships such as the National Tsunami Hazard Mitigation Program (NTHMP).

Action 3.1.1: Continue the State of Alaska participation on the NTHMP through a DHS&EM and UAF/GI AEIC partnership while advocating for continued Congressional funding of the NTHMP.

Lead: DHS&EM, AEC

Support: ASHSC, DNR/DGGS

Timeline: Annually

Progress: DHS&EM in 2013-2016 served on both the NTHMP coordination committee and mitigation sub-committee.

Objective 3.2: Research and implement rapid tsunami forecasting methods.

Action 3.2.1: Collaborate with researchers studying the implementation of near-real-time moment tensor inversion and extension of earthquake source inversion procedures for rapid tsunami forecasting.

Lead: AEC

Support: University of California Berkley, NOAA

Timeline: 5 years

Progress: Dependent on additional funding.

Action 3.2.2: Continue development of a “GPS shield technique” for tsunami early warning.

Lead: AEC

Support: NOAA

Timeline: 10 years

Progress: Dependent on additional funding.

5.6.4 Acknowledgements

State Seismologist for Alaska

State of Alaska Division of Geological and Geophysical Surveys

NOAA National Weather Service National Tsunami Warning Center

Alaska Seismic Hazards Safety Commission

Natural Resources Conservation Service

5.7 Severe Weather

5.7.1 Programs and Strategies

StormReady

StormReady, a nationwide program supported in Alaska by the National Weather Service (NWS) and DHS&EM, assists communities with storm preparedness. The program encourages communities to take a proactive approach to improving local hazardous weather operations by providing emergency officials with clear guidelines (Figure 5.7.1). To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center.
- Have more than one way to receive severe weather forecasts and warnings.
- Be able to alert the public.
- Create a method to monitor local weather conditions.
- Promote the importance of public readiness through community seminars.
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.
- Demonstrate a capability to disseminate warnings.



Figure 5.7.1 StormReady sign posted in an Alaskan community. DHS&EM photo.

StormReady guidelines vary with community size. StormReady in Alaska is administered through the local National Weather Service Offices in Juneau, Anchorage, and Fairbanks. Specific StormReady guidelines, links, and applications are in Chapter 6, *Resources*.

National Weather Service and the U.S. Coast Guard Operation Weather Blanket Project

The NWS and the U.S. Coast Guard (USCG) 17th District formed a partnership in December 2000 to improve the dissemination of weather information throughout the Southeast, Prince William Sound, and Kodiak regions of Alaska. The partnership combines NWS forecasting with Coast Guard VHF-FM communication towers named high sites for their strategic location on mountain peaks. The project continuously broadcasts NWS forecasts from 25 USCG high sites resulting in a 300% increase in coverage area.

5.7.2 Hazard Mitigation Successes

Matanuska-Susitna Borough School Roof Strapping

Several schools and public safety buildings in the Matanuska-Susitna (Mat-Su) Borough experienced roof damage during a storm in March 2003. Subsequently the Borough installed a HMPG funded roof strapping system on five public schools.

Anchorage School District Exterior Fastening System

A new wind resistant exterior fastening system was installed on the roof parapet at Ursa Minor Elementary School following the windstorm in March 2003.

5.7.3 Goals, Objectives, and Actions

High Priority

Goal 1: Conduct public awareness campaigns.

Objective 1.1: Conduct special statewide outreach/awareness activities, such as Lightning Safety Awareness Week, Winter Weather Awareness Week, and Flood Awareness Week.

Action 1.1.1: Host a minimum of four outreach events each year.

Lead: NWS, DHS&EM

Support: DCCED, DEC, DOT/PF

Timeline: 5 years

Progress: DHS&EM conducted two Disaster Preparedness Conferences in 2015.

Goal 2: Improve NOAA weather radio/communications.

Objective 2.1: Expand public awareness of NOAA Weather Radio (NWR) for continuous weather broadcasts and warnings.

Action 2.2.1: Add more weather stations and high sites to the NWR network.

Lead: NWS

Support: DHS&EM

Timeline: 5 years

Progress: A new NOAA weather transmitter was installed in the City of Nenana in 2009.

Objective 2.2: Encourage local communities to employ redundant methods of receiving weather warnings and disseminating those warnings throughout the community.

Action 2.2.1: Encourage communities to register with NOAA for warnings via FAX, E-Mail, radio, telephone and to transmit to public in redundant methods.

Lead: DHS&EM

Support: NWS

Timeline: 5 years

Progress: Information was added to DHS&EM public outreach in 2013.

Goal 3: Improve weather monitoring and warning networks.

Objective 3.1.1: Train volunteers in the use of all-season storm spotter networks.

Action 3.1.1: Host workshops in communities.

Lead: NWS

Support: DHS&EM, local communities

Timeline: 5 years

Progress: Spotters are recruited through the Riverwatch program, but not yet trained or networked in 2016.

Objective 3.2: Expand weather monitoring networks through partnerships with other agencies.

Action 3.2.1: Conduct outreach activities with other agencies.

Lead: NWS

Support: DSH&EM and local communities

Timeline: 10 years

Progress: As of 2012, NOAA is partnered with State DHS&EM and is seeking other partnerships.

Goal 4: Improve building construction.

Objective 4.1: Encourage weather resistant building construction materials and practices.

Action 4.1.1: Encourage education and training on the value and use of weather resistance building construction.

Lead: NWS, Building industry, and local communities

Support: DHS&EM

Timeline: 5 years

Progress: Since 2012, information is presented in multiple formats and forums.

Goal 5: Expand the StormReady and TsunamiReady programs in Alaska.

Objective 5.1: Complete joint, NOAA/NWS/State, community visits to encourage Storm Ready and Tsunami Ready qualification.

Action 5.1.1: Complete a minimum of two community visits per year in support of Tsunami Ready and Storm Ready certification.

Lead: NWS, DHS&EM

Support: Local communities

Timeline: 5 years

Progress: Between 2010 and 2015, NOAA & DHS&EM visited at least two communities each year in support of Storm and Tsunami Ready programs.

Action 5.1.2: Complete a minimum of two community visits as year in support of TsunamiReady and/or StormReady certification.

Lead: NWS and DHS&EM

Support: Local communities

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Timeline: 5 years

Progress: Since 2016 the following communities are StormReady:

- Anchorage
- Anchorage School District
- Wasilla
- McGrath
- Juneau
- Nome
- the entire Iditarod Trail

Since 2016 the following communities are both StormReady and TsunamiReady:

- Seward
- Kodiak
- Homer
- Sitka
- Valdez
- Sand Point
- Yakutat

5.7.4 Acknowledgements

NOAA National Weather Service Alaska Region

Natural Resources Conservation Service

US Coast Guard

5.8 Ground Failure

5.8.1 Programs and Strategies

Alaska Permafrost Observatory (APO)

The Alaska Permafrost Observatory (APO) is dedicated to comprehensive, long-term observation of permafrost temperatures in Alaska. The APO deploys sensors for timely detection of changes in permafrost temperature and forecasting areas of permafrost degradation.

Currently the University of Alaska Fairbanks (UAF) has a network of 45 borehole sites throughout Alaska, some of which are equipped with air and shallow soil temperature and moisture sensors, data loggers, and automatic climate stations with snow depth sensors (Figure 5.8.1). Individual permafrost observatories (sites) were established in the late 1970s and early 1980s by the Geophysical Institute, UAF, along the Trans-Alaska Pipeline route and at select locations in Alaska. Measurements are made annually in most of the boreholes (typically 60 to 80 m depth). Some sites record soil temperatures hourly to 1 m year round. As a result, more than 20 years of permafrost data have been obtained along a transect spanning the entire range of permafrost zones in Alaska.



Figure 5.8.1 Individual Alaska Permafrost Observatories (APO) map.

National Resources Conservation Service Alaska Soil Survey Information

National Resources Conservation Service (NRCS) Alaska Soil Survey Information assists landowners and communities in selecting the best sites for their homes, infrastructure, and farmland. Their surveys map physical and chemical properties, and reveal potential uses and limitations of each soil.

5.8.2 Hazard Mitigation Successes

Juneau

Break-away, sacrificial walls on the lower floors of the Marine View Building allow mass movements to pass through. Another building was built into the hillside directing mass movements over its roof.

Anchorage Ground Failure Map

Harding-Lawson Associates developed maps for the Municipality of Anchorage revealing areas susceptible to seismically induced ground failure. DGGS published the map in 1997. Also see USGS Scientific Investigations Map 3077 Maps Showing Seismic Landslide Hazards in Anchorage, Alaska (2009) http://pubs.usgs.gov/sim/3077/downloads/3077_pamphlet_508.pdf.

Completed Goals, Objectives, and Actions

Action 3.2.1: Include ground failure/landslide hazards in mitigation planning to identify appropriate properties for acquisition.

Lead: local communities

Support: DHS&EM, DNR

Timeline: 5 years

Progress: Complete, All local hazard mitigation plans since 2010 include ground failure vulnerability assessments.

5.8.3 Goals, Objectives, and Actions

High Priority

Goal 1: Map Hazard Areas

Objective 1.1: Identify and map areas prone to ground failure.

Action 1.1.1: Develop maps of landslides and landslide-prone areas in urban areas.

Lead: USGS and DGGS

Support: DOT/PF, AKRR, and DHS&EM

Timeline: 5 years

Progress:

Objective 1.2: Combine maps with the historical records of landslides.

Action 1.2.1: Develop an inventory of landslide events.

Lead: DGGS

Support: USGS

Timeline: 10 years

Progress:

Medium Priority

Goal 2: Improve land-use practices within the State

Objective 2.1: Encourage construction practices which mitigate soil instability.

Action 2.1.1: Provide education and training demonstrating improved construction practices.

Lead: DCCED

Support: DHS&EM, DGGs, and Local communities

Timeline: 5 years

Progress: Agencies are actively conducting community outreach visits and mitigation training.

Objective 2.2: Encourage land-use planners to consider landslide zones.

Action 2.2.1: Encourage the State and local communities to enact land use regulations addressing ground failure hazards in known areas.

Lead: DCCED

Support: DNR/DGGs

Timeline: 5 years

Progress:

Goal 3: Reduce property damage and casualties from ground failure

Objective 3.1: Reinforce structures located upon ground failure and landslide prone areas.

Action 3.1.1: Include ground failure/landslide hazards in the risk and vulnerability assessment done in mitigation planning so that at risk facilities, structures, and roadways are identified.

Lead: Local communities, DOT/PF, DNR/DGGs, and Risk Management

Support: DHS&EM

Timeline: 2-5 years

Progress: This action was included on the agenda in local mitigation planning workshops held in spring 2013.

Action 3.1.2: Obtain funding for the mitigation of landslide prone structures, facilities and roadways.

Lead: DCCED, DOT/PF

Support: DHS&EM, FEMA, DNR/DGGs, State Risk Management

Timeline: 2-5 years

Progress: Subject to available funds.

Objective 3.2: Remove properties in high ground failure/landslide hazard areas from development.

Action 3.2.1: Completed in 2010, see **Completed Goals, Objectives, and Actions**

Action 3.2.2: Fund community acquisition of property in ground failure/landslide areas.

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Lead: local communities, DHS&EM, FEMA

Support: DOT/PF, DNR/DGGS

Timeline: 5 years

Progress: Subject to available funds.

Objective 3.3: Control and stabilize landslides where appropriate and cost-effective.

Action 3.3.1: Support and fund landslide mitigation projects.

Lead: USACE and DNR/DGGS

Support: DHS&EM and FEMA

Timeline: 5 years

Progress: Subject to available funds.

Objective 3.4: Identify areas vulnerable to subsidence and determine mitigation solutions.

Action 3.4.1: Identify permafrost areas

Lead: DGGS, UAF

Support: USGS

Timeline: 5 years

Progress: Subsidence areas are identified in local mitigation plans.

Action 3.4.2: Support building practices reducing damage from permafrost.

Lead: Local communities, and ICC

Support: Building construction industry

Timeline: 3 years

Progress: Dependent on additional funding and the results of cold weather construction research in progress at UAF.

5.8.4 Acknowledgements

State of Alaska Division of Geological and Geophysical Surveys (DGGS)

University of Alaska Fairbanks (UAF)

Natural Resources Conservation Service (NRCS)

5.9 Erosion

5.9.1 Programs and Strategies

State of Alaska Erosion Management Policy

This is a general State policy addressing erosion control methods. It requires non-structural alternative investigations before implementing erosion control structures.

Administrative Order 175 (AO 175)

Issued by Governor Tony Knowles in 1998, AO 175 requires State agencies to include flooding and erosion during site evaluations and design of State owned and financed construction projects (Appendix 18).

Alaska Climate Change Impact Mitigation Program

The Alaska Climate Change Impact Mitigation Program (ACCIMP) was established by Alaska's Twenty-Fifth Legislature to provide technical assistance and funding to communities imminently threatened by climate-related natural hazards such as erosion, flooding, storm surge, and thawing permafrost. This DCCED/DCRA managed program assists communities to plan for their protection and eventual relocation by conducting hazard impact assessments and awarding community planning grants. Information is available online at:

<https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/ACCIMP.aspx>

DHS&EM Alaska Emergency Response Guide for Small Communities

The DHS&EM Alaska Emergency Response Guide for Small Communities is a planning tool for local government leaders as they prepare for, respond to, and recover from a disaster or emergency in their community. The guide is available at:

http://www.ak-prepared.com/documents/AK_Emergency_Response_Guide%20signed.pdf

Alaska Coastal Protection Project

The Alaska Community Coastal Protection Project focuses on the Alaska Cities and Native Villages of Kivalina, Shaktoolik, and Shishmaref. These three locations are in imminent threat to coastal flooding and erosion. Additionally, the only way to evacuate these communities is by boat or small airplane.

Kivalina

In response to growing concerns about the community's safety at the national level, Congress appropriated funds for the USACE to construct a 2,000 foot beach revetment project out of imported rip-rap. The project was completed in the summer of 2010. In June 2014, the evacuation "Route Reconnaissance Study, Evacuation and School Access Road – Kivalina, Alaska" was completed. The study recommended an eight mile route from Kivalina to the new planned school, on Kisimigiutquq Hill. Eventually, the community may relocate there.

Shishmaref

Shishmaref determined their risk to advancing coastal erosion required action and established an Erosion and Relocation Coalition comprised of governing members from the City, Indian Reservation Act (IRA) Council, and Shishmaref Native Corporation Board of Directors. The coalition developed a plan to assist the community, State, Federal, and other agencies with identifying needs for an orderly relocation to a less hazard prone area. A study of potential relocation sites was published in 2011, and it concluded none of the four chosen sites were

suitable for relocation. Currently, multiple agencies are assisting Shishmaref with site selection and funding for temporary mitigation project alternatives.

Shaktoolik

Currently the community is focusing on resiliency, although that may change to relocation in the near future. In 2014, the community gathered beached driftwood into a protective seawall. Other area projects:

- AVEC & ANTHC – A wind to heat water plant project
- AVEC & Renewable Energy Grant – Tank farm upgrade
- Norton Bay Water Policy Council – Long-range climate change plan
- EPA drinking water standards – New insulation on the water tanks (2015); upgrade water plan and equipment (design December, work 2016)
- Community-wide water/wastewater PER; sewer lines – relocate leach fields; redundancy at pump house.
- New housing and VPSO housing

Newtok Planning Group

Established in 2006 by administrative order and led by the DCCED/DCRA, the Newtok Planning Group is a multi-agency partnership invested in the relocation of Newtok to the newly planned site of Mertarvik (Figure 5.9.1). The Village of Newtok is in imminent threat of erosion from the adjacent Ninglick River, which is also a tidal river. Very high tides and sea storms routinely push the Ninglick River over its banks, flooding the community with brackish water and degrading the permafrost. Years of erosion assessments concluded the community must relocate as soon as possible. The Newtok Planning Group coordinates their resources and schedules, obtains funding, and solves problems associated with community relocation.

5.9.2 Hazard Mitigation Successes

US Army Corps of Engineers Alaska Baseline Erosion Assessment

In April 2005, the US Army Corps of Engineers (USACE), Alaska District, conducted a congressionally funded State-wide Baseline Erosion Assessment (BEA). The assessment determined the average annual rate of erosion and modeled future erosion advances in high risk communities. Upon completion of the BEA in March 2009, the USACE prepared a technical report for Federal, State, Tribal, and local stakeholders to assist in the development of erosion mitigation strategies (Chapter 6, *Resources*).

Innovative Readiness Training Program

In 2008, the Newtok Planning Group received a five year commitment from the military Innovative Readiness Training (IRT) Program. The IRT gives quality services to remote communities using military personnel. The IRT completed critical projects for the relocation effort to Mertarvik:

- 2010 – Constructed a road from the barge landing to the Mertarvik site.
- 2011 – Dug a quarry and laid the foundation for the evacuation center.
- 2013 – Finished four storage buildings

Figure 5.9.1
Mertarvik Village Site
2014



Figure 5.9.1 Source: Patrick LeMay, PE, LeMay Engineering

Newtok Relocation Strategic Management Plan

The Village of Newtok made the decision to relocate in 1994 due to a severe erosion threat. The village acquired a title to an appropriate new village site in 2003. By 2006, Newtok had partnered with State and Federal agencies and regional organizations to form the Newtok Planning Group. Construction continues at the site, to include an emergency evacuation shelter, the design of which was funded through the Alaska Climate Change Impact Mitigation Program. The Newtok Planning Group developed a strategic relocation management plan in 2012, which may serve as a model for future community relocations. More information may be found at:

<https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/NewtokPlanningGroup.aspx>

Nome Seawall

Construction on the Nome Seawall began in 1949 and was completed in 1951. The finished seawall was 3,350 feet long, 60 feet wide at its base, and narrowed to 16 feet wide at top. It stands 18 feet above the mean sea tide. The seawall was constructed with granite boulders and were trucked 13 miles from the Cape Nome quarry costing over \$1 million.

Kenai Riverbank Restoration

Partnered with the Kenai River Center (also known as the Donald E. Gilman River Center), the Kenai Riverbank Restoration project has sponsored construction of lighted walkways and fencing of vulnerable stream banks. Additionally, they have sponsored legislation controlling access to fishing areas and limiting the size, loads, and hull design of motorboats. This was coupled with an extensive public education program. During the last two decades the Kenai Riverbank Restoration project has stabilized several stream banks along the Russian and Kenai Rivers.

Alaska Rail Road Embankment Armoring

The Alaska Rail Road (AKRR) is the only rail road company in Alaska and is a critical component of the State's infrastructure. The AKRR is also a strategic asset for the entire nation as it supplies key military installations. The Alaska Rail Road routinely utilizes HMGP and PDM funds to mitigate their risk to natural hazards and improve railroad service (Figure 5.9.2).

McGrath Riverbank Stabilization

From 2012 through 2014, the Natural Resource Conservation Service (NRCS), with funding support from State DHS&EM, stabilized a large section of riverbank bordering the City of McGrath. The Kuskokwim River had eroded the bank into the access road bed and was encroaching upon structures. Using a cut stone foundation and rip-rap, NRCS stabilized nearly one-half mile of riverbank (Figure 5.9.3).

Figure 5.9.2 Rip Rap Riverbank Armoring



Figure 5.9.2 Armoring on sections of river bank along the Alaska Railroad. DHS&EM Photo.



Figure 5.9.3
McGrath Riverbank Stabilization
2014

Figure 5.9.3 Source: Brett Nelson, PE, NRCS, 2014

Alaska Climate Change Impact Mitigation Program

In 2008, Alaska's 25th Legislature established the Alaska Climate Change Impact Mitigation Program (ACCIMP). Administered by the DCCED/DCRA, ACCIMP funded the immediate planning needs of communities imminently threatened by erosion, flooding, storm surge, and thawing permafrost. ACCIMP administered community planning grants for six imperiled communities: Shishmaref, Kivalina, Newtok, Koyukuk, Unalakleet and Shaktoolik. It also administered grants for Hazard Impact Assessments in the communities of Kipnuk and Atmautluak. The ACCIMP is subject to available funds. Details may be found at

<https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/ACCIMP/CommunityPlanningGrants.aspx>

U.S. Army Corp of Engineers (USACE) ERDC-Coastal and Hydraulics Laboratory Wave Information Studies (WIS) Alaskan 20-yr Wind and Wave Hindcast Study

Long-term wind and wave climates play a critical role to the USACE. The estimates of the wind speed, direction, and accompanying wave characteristics along a coastline are used for design, planning, and the execution of site specific projects of the USACE in Alaska.

Completed Actions

Action 3.1.1: Prepare a statewide community erosion assessment and prioritize at risk communities and infrastructure.

Lead: USACE

Support: DCCED/DCRA, FEMA, DHS&EM, Denali Commission, SHMAC

Timeline: Completed

Progress: The USACE completed Statewide baseline and detailed erosion assessments with partnership from DCRA and ACCIMP in 2009.

5.9.3 Goals, Objectives, and Actions

High Priority

Goal 1: Identify erosion prone areas

Objective 1.1: Identify erosion prone areas in communities and their erosion rates, including long and short term, maximum and the causes. Incorporate this information into hazard mitigation planning.

Action 1.1.1: Support and fund local community erosion studies and incorporate them into their hazard mitigation planning.

Lead: DNR/DGGS, DCCED, and USACE

Support: NRCS, DHS&EM

Timeline: 5 years

Progress: DHS&EM began incorporating USACE baseline erosion studies into mitigation planning in 2013.

Goal 2: Reduce damage from riverine and coastal erosion.

Objective 2.1: Remove structures and facilities from areas at high risk from erosion.

Action 2.1.1: Support and fund the relocation of structures and facilities from areas that have been identified as high risk for erosion.

Lead: DHS&EM, DOT/PF, DCCED

Support: Denali Commission, local communities, and FEMA

Timeline: 5 years

Progress: This action is partially funded through HMGP funds.

Objective 2.2: Restore community beaches and dunes as natural barriers to coastal erosion

Action 2.2.1: Encourage the retention and planting of natural vegetation in coastal areas.

Lead: USACE, NRCS, DEC

Support: DNR, Denali Commission, Local communities, FEMA, DOT/PF, and EPA

Timeline: 5 years

Progress: As of 2016, the Cities of Barrow and Hughes are seeking grant funding for planned natural and man-made coastal erosion barriers.

Objective 2.3: Retain and restore vegetation as a natural barrier to riverine erosion.

Action 2.3.1: Encourage the retention and planting of natural vegetation in riverine areas.

Lead: Local communities, DNR

Support: USACE, NRCS, DCCED

Timeline: 5 years

Progress: As of 2016, the USACE has repaired a levy in Galena with natural materials.

Goal 3: Improve and preserve river bank vegetation

Objective 3.1: Create habitat protection corridors and restore damaged habitat.

Action 3.1.1: Completed in 2009, see **Completed Actions**

Action 3.1.2: Encourage local action and education

Lead: local communities, ADF&G Division of Habitat.

Support: DHS&EM, DEC, DNR, DCCED

Timeline: 5 years

Progress: The importance of riverbank vegetation is emphasized during community visits.

Action 3.1.3: Provide habitat tax credits for property owners who improve stream/river habitat or maintain a vegetative buffer adjacent to streams or rivers.

Lead: Local Communities, State and Federal tax authorities.

Support: DHS&EM, DEC, DNR, DCCED

Timeline: 5 years

Progress: As of 2016, no funding or administrative will exists.

5.9.4 Acknowledgements

State of Alaska Division of Geological and Geophysical Surveys

Natural Resources Conservation Service

US Army Corps of Engineers

5.10 Dams

5.10.1 Programs and Strategies

Guidelines for Cooperation with the Alaska Dam Safety Program

The DNR published “Guidelines for Cooperation with the Alaska Dam Safety Program” update in 2005. This document is a compendium of information regarding the Alaska Dam Safety Program and includes recommendations for minimum standards based on the hazard potential classification for dam design, construction, and operation, including hydrologic and seismic evaluations, construction quality assurance, and emergency action planning.

Hazard Potential Classification and Jurisdictional Review

The question of the hazard potential classification and the jurisdictional status of existing and proposed dams recur on a regular basis. A dam was once a Class (III) low hazard potential dam could become a Class I (high) hazard potential dam if development occurs in the dam break inundation zone. The hazard potential classification must be defined in advance to determine design and construction standards for proposed new dams. The Dam Safety and Construction Unit developed the Hazard Potential Classification and Jurisdictional Review form to address this question on a consistent basis. Since 2007, 25 dams have been reviewed, including 18 existing dams, and 7 proposed new structures.

Alaska Dam Rehabilitation Projects

Planning is in process to replace the deteriorated spillway at the Lake O’ the Hills Dam in Anchorage dam rehabilitation was completed at the Lower Fire Lake Dam in Eagle River (using HMGP funds through DHS&EM), Nixon Fork Dam near McGrath, Pillar Creek Dam Complex near Kodiak, Cabin Creek Dam near Petersburg, Itasigrook Dam in Barrow and Westchester Lagoon Dam in Anchorage. The replacement of the dam which failed in Kake in 2000 was completed in 2007. Two defunct, high hazard dams in Kodiak have been removed. The continued dam inspection and rehabilitation work in the State will continue to ensure the highest degree of safety for the residents of Alaska.

Tangible Benefits of Dam Safety

- Long service life on capital investments due to regular inspections and maintenance.
- A reduced risk of loss due to catastrophic failures of a dam.
- Public safety of parties not directly involved with operation of dam.
- Independent review of technical issues associated with the facility.
- Reduced insurance premiums as a result of favorable ratings from the National Flood Insurance Program.

Intangible Benefits of Dam Safety

- The image of responsibility associated with the support of and compliance with a properly developed and administered dam safety program.

5.10.2 Hazard Mitigation Successes

Alaska Dam Safety Program

By 1984, the State of Alaska recognized the need for a dam safety program within the Department of Natural Resources. Consequently, the legislature passed the Alaska Dam Safety Act in 1987, and in 1989, dam safety regulations were promulgated under Article 3 of 11 AAC 93. An extensive revision of the regulations became effective in 2004. These statutes and regulations establish the current basis of the Alaska Dam Safety Program (ADSP).

The purpose of the ADSP is to protect lives and property from the risks created by impounding water behind dams. The Dam Safety and Construction Unit in the Water Resources Section of the Division of Mining, Land, and Water is solely responsible for administering this program. Dams and their reservoirs represent a technological hazard that can be effectively mitigated through various measures developed to focus attention on the safety of the dam, assuming the appropriate financial resources are available.

Alaska Statute 46.17 authorizes the Department to employ a qualified, professional engineer to “supervise the safety of dams and reservoirs” in Alaska. The State Dam Safety Engineer is responsible for regulating State dams based primarily on height, storage volume, and hazard potential classification. Federally owned or operated dams and dams regulated by the Federal Energy Regulatory Commission (FERC) are specifically exempt from State jurisdiction.

The ADSP mitigates the risk of dam failure using a regulatory permitting process for the construction, operation, repair, modification, removal, and abandonment of dams. Additionally, the DNR supervises periodic safety inspections and emergency action planning for dams. If necessary, the State Dam Safety Engineer is authorized to seek legal injunctions through the Attorney General’s office or, in an emergency, to enter property and take whatever action is deemed necessary to “protect life and property from the risks posed by the dam’s operation or potential failure”.

Completed Goals, Objectives, and Actions

Goal 3: Fully staff the Dam Safety and Construction Unit

Objective 3.1: Add an Engineering Assistant to the program

Action 3.1.1: Hire an Engineering Assistant

Lead: DNR, Dam Safety and Construction Unit

Support: DNR, Legislature, Regulatory Commission of Alaska

Timeline: 5 years

Completed: Assistant Dam Safety Engineer was hired in 2009

5.10.3 Goals, Objectives, and Actions

High Priority

Goal 1: Improve information, data collection, and compliance.

Objective 1.1: Obtain accurate vulnerability information for the Class I and Class II State jurisdiction dams.

Action 1.1.1: Obtain vulnerability information for one Class I and Class II State jurisdiction dam every year.

Lead: DNR, Dam Safety and Construction Unit

Support: DNR and dam owners

Timeline: 20 years

Progress: Dependent on additional funding.

Action 1.1.2: Convert existing dam inundation maps into an electronic format suitable for Geographical Information System / Geospatial Information Technology (GIS/GIT) use and application to mitigation planning.

Lead: DNR, Dam Safety and Construction Unit

Support: DNR, dam owners, and DHS&EM

Timeline: 10 years

Progress: Dependent on additional funding.

Objective 1.2: Obtain current Periodic Safety Inspections and EAPs for all Class I and II dams under State jurisdiction.

Alaska dam safety regulations require all dams under State jurisdiction to have a current periodic safety inspection and Class I and Class II dams to have current EAPs. As of March 2016 64% of State jurisdiction dams have a current periodic safety inspection, and 29% of Class I and Class II State jurisdiction dams have current EAPs.

Action 1.2.1: Contact dam owners without a current periodic safety inspection or EAP and establish a timeline for them to provide current information.

Lead: DNR, Dam Safety and Construction Unit

Support: Dam owners

Timeline: 10 years

Progress: Due and overdue notices are sent out annually.

Goal 2: Improve agency response capability to dam related emergency.

Objective 2.1: Update the Dam Safety Program Guide

Action 2.1.1: Develop a schedule for updating the Dam Safety Program Guide

Lead: DNR, Dam Safety and Construction Unit

Support: FEMA and DHS&EM

Timeline: 2 years

Progress: As of 2016, no formal schedule has been adopted.

Goal 3: Fully staff the Dam Safety and Construction Unit

Completed in 2009, see **Completed Goals, Objectives, and Actions**

Goal 4: Increase public awareness about dam safety.

Objective 4.1: Continue to conduct outreach/awareness activities

The concept of dam safety in Alaska currently suffers from relative obscurity from a public awareness perspective. Many Alaskans are not aware of the Alaska Dam Safety Program.

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Action 4.1.1: Continue to promote public awareness of dam safety

Lead: DNR, Dam Safety and Construction Unit

Support: FEMA, ASDSO, DHS&EM

Timeline: 5 years

Progress: Advertisements for the Alaska Dam Safety Program have been placed in the Alaska Business Monthly-Mining Edition through 2010.

Goal 5: Improve Interagency Communication

Objective 5.1: Improve communication between Federal, State and local agencies.

Action 5.1.1: Continue to participate in the State Hazard Mitigation Advisory Committee

Lead: DHS&EM

Support: DNR, Dam Safety and Construction Unit

Timeline: 5 years

Progress: SHMAC meetings were held quarterly in 2012 and 2013, then annually from 2014 through 2016.

Goal 6: Dam Rehabilitation

Objective 6.1: Rehabilitate the dams with known or suspected deficiencies.

From the October 2003 report, “The Cost of Rehabilitating Our Nation’s Dams”, the rehabilitation cost was estimated at \$18,729,120 for 21 high hazard potential dams in Alaska.

Action 6.1.1: Identify and fund dam rehabilitation projects.

Lead: DNR, Dam Safety and Construction Unit

Support: DHS&EM, FEMA, ASDSO

Timeline: 5 years

Progress: As of 2016, rehabilitation projects are complete at the Lake O’ the Hills Dam in Anchorage, the Vortac Lake Dam in Kotzebue, and the Wrangell Dam Complex in Wrangell.

5.10.4 Acknowledgements

State of Alaska Department of Natural Resources

FEMA

5.11 Hazardous Materials

5.11.1 Programs and Strategies

DEC Prevention and Emergency Response Program

Oil and hazardous substance handling can pose a significant threat to Alaska's economy and environment. The State's social and economic history has been altered by oil development and expanding chemical use since the discovery and development of the Kenai and Cook Inlet oil and gas fields in the 1950's and 60's. Alaskans have long recognized the need for protecting our natural resources and prudent oil and hazardous substances management and have developed the laws to ensure it will happen. These laws prohibit the discharge of oil or hazardous substances, require prompt reporting when a spill does occur, and mandate containment, control, removal, and proper disposal of all waste materials. Under existing State and Federal law, the spiller is responsible for cleanup.

The Alaska Department of Environmental Conservation (DEC) is tasked with carrying out these laws. The Prevention and Emergency Response Program (PERP) within the Division of Spill Prevention and Response (SPAR) is responsible for ensuring prevention of spills and response to spills that do occur. To make sure spills get cleaned up, Alaskans have established the Oil and Hazardous Substance Release Prevention and Response Fund, which pays for State and local government cleanup costs. The Department is mandated by statute to seek cost recovery from the spiller to reimburse the fund.

The mission of DEC's Prevention and Emergency Response Program is to protect public safety, health, and the environment by preventing and mitigating the effects of oil and hazardous substance releases and ensuring their cleanup through government planning and rapid response. The program is Alaska's primary response organization for emergency response to oil and hazardous substance releases. The Program's goals are to protect public health and the environment from the direct or indirect effects of spills, guard the safety of persons involved, undertake or confirm satisfactory cleanup and mitigation of spill impacts and damage restoration, and recover State-incurred costs to the Oil and Hazardous Substance Release Prevention and Response Fund.

Prevention

The prevention program's goal is to make the system safer. In an ideal situation, all oil and hazardous substance spills could be prevented; however, this is not always the case. Spill prevention is achieved by eliminating human and mechanical failure to the greatest extent possible, using the best technology and practices, and having back-up safety systems in place. PERP staff works with industry and the public to identify and implement ways to prevent spills. PERP maintains a comprehensive spill database and produces periodic spill summaries which detail source, cause, type, amount, and other information for all reported spills. Timely and accurate spill information allows staff to track the spill frequency and causes, and target specific areas for spill prevention initiatives.

Research in oil and hazardous substance spill prevention and response technologies is an important factor in preventing and mitigating the effects of spills. PERP staff work with key players throughout the international oil-spill research community to conceive, discuss, and identify projects will enhance the ability of the State and industry to prevent and respond to oil spills. DEC works with its Alaska stakeholders to identify and prioritize projects will provide the

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greatest benefit to all Alaskans. Research in the fields of cleanup technology, non-mechanical response options, fate and effects of spilled oil, contingency planning and preparedness, training, spill-management systems and spill prevention has been proposed or conducted in cooperation with citizens' groups, industry oil-spill response cooperatives, other State and Federal agencies, and academic institutions.

Preparedness

The preparedness program's goal is to, "make industry and government's ability to prepare and respond to spills better (sic)." DEC receives over 2,000 oil and hazardous substance release reports each year. A field visit or follow-up assistance is required for roughly 40% of all reported spills. PERP staff may initiate and sustain ongoing response activities for 50-100 significant incidents in any given year. The majority of spill reports are made during normal working hours to the nearest DEC team. DEC also has a callout system for receiving spill reports, mobilizing and responding to a significant spill at any time and any location in the State. DEC maintains a toll-free 24-hour spill reporting number (Figure 5.11.1).

The State is divided into three DEC Area Response Teams based in Anchorage, Fairbanks, and Juneau, with field units in Bethel, Kenai, Ketchikan, North Slope, and Valdez (Figure 5.11.2). Each Area Response Team has a pre-designated State On-Scene Coordinator (SOSC).



REPORT ALL

**OIL AND HAZARDOUS
SUBSTANCE SPILLS**

ALASKA LAW REQUIRES REPORTING OF ALL SPILLS

During normal business hours
contact the nearest DEC Area Response Team office:

| | | |
|--------------------------------------|------------------|----------------------------------|
| Central Area Response Team: | Anchorage | phone: 269-3063 fax: 269-7648 |
| Northern Area Response Team: | Fairbanks | phone: 451-2121 fax: 451-2362 |
| Southeast Area Response Team: | Juneau | phone: 465-5340 fax: 465-2237 |

Outside normal business hours, call: 1-800-478-9300

 Alaska Department of Environmental Conservation
Division of Spill Prevention and Response

rev April 2006

The poster includes a map of Alaska with three regions highlighted: Northern Alaska, Central Alaska, and Southeast Alaska. A small logo in the bottom left corner depicts a person in a hard hat and safety gear.

Figure 5.11.1 Oil Spill reporting information for Alaska.

Figure 5.11.2 State On-Scene Coordinator Response Boundaries

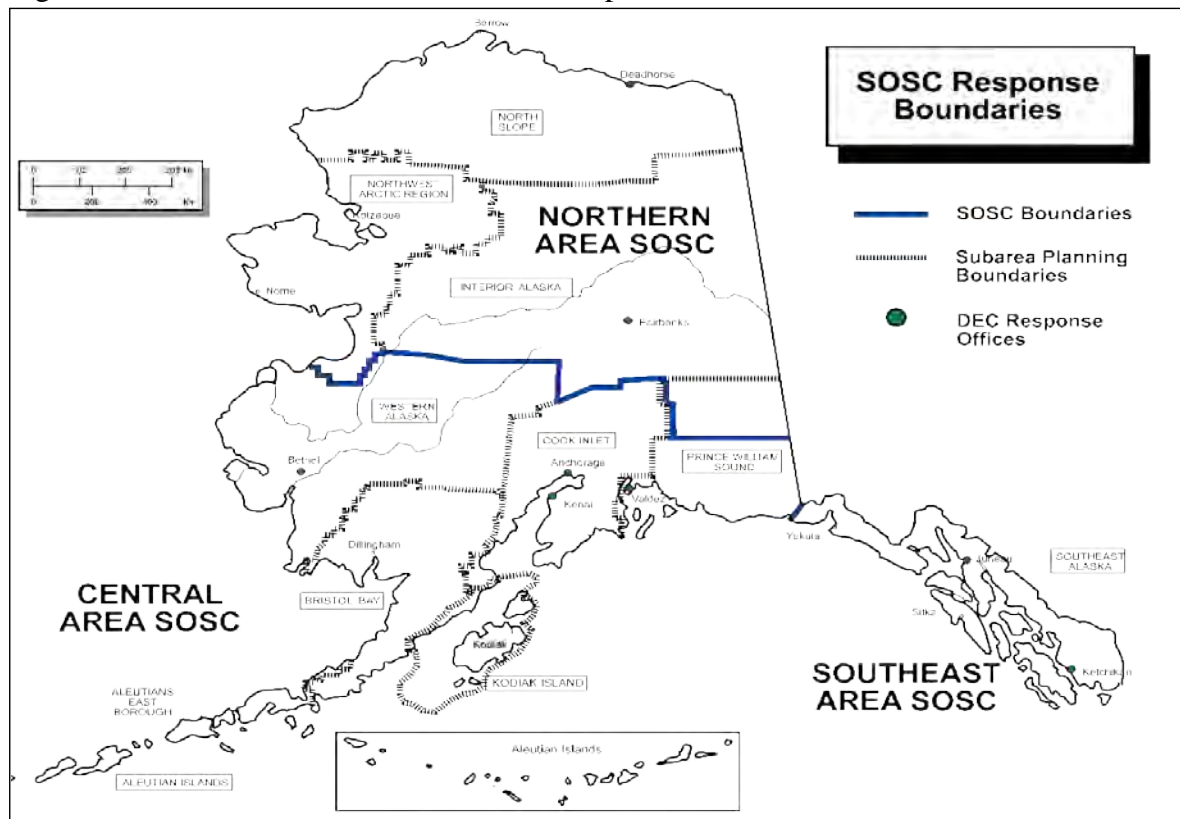


Figure 5.11.2 State On-Scene Coordinator (SOSC) Response boundaries in Alaska.

Area Response Teams have expertise and resources to combat a spill and also work in coordination with other State, local, and Federal officials. DEC response teams are trained to assess the hazard and determine what actions should be taken for either oil or hazardous substance spills. Industry and government-led drills and exercises are a critical component of response readiness. After-action spill response and training drill reviews are undertaken to identify areas for further improvement.

Federal Program

The U.S. Environmental Protection Agency (EPA) has an Office of Solid Waste and Emergency Response (OSWER) is charged with protecting public health and the environment from toxic waste and chemical accident risks.

OSWER provides policy, guidance, and direction for:

- Safely managing waste
- Preparing for, and preventing chemical and oil spills, accidents, and emergencies
- Cleaning up and reusing contaminated property

OSWER provides technical assistance to all government levels to establish programs that safeguard our air, water, and land from the uncontrolled spread of waste.

5.11.2 Hazard Mitigation Successes

Goal: "Preventing Pollution and Reducing Risk in Communities, Homes, Workplaces, and Ecosystems" states that:

"Pollution prevention and risk management strategies aimed at eliminating, reducing, or minimizing emissions and contamination will result in cleaner and safer environments in which all Americans can reside, work, and enjoy life. EPA will safeguard ecosystems and promote the health of natural communities that are integral to the quality of life in this nation."

Goal: "Better Waste Management, Restoration of Contaminated Waste Sites, and Emergency Response," states that:

"America's wastes will be stored, treated, and disposed of in ways that prevent harm to people and to the natural environment. EPA will work to clean up previously polluted sites, restoring them to uses appropriate for surrounding communities, and respond to and prevent waste-related or industrial accidents."

Completed Goals, Objectives, and Actions

Action 1.2.1: Obtain long term funding for the Local Emergency Planning Committee (LEPC) and Hazardous Material Emergency Preparedness (HMEP) programs.

Lead: DHS&EM, ADEC

Support: EPA, and USCG

Timeline: 2 years

Complete: LEPC and HMEP grants are administered annually and regular community based LEPC meetings are held throughout the State since 2010.

5.11.3 Goals, Objectives, and Actions

High Priority

Goal 1: Reduce the unauthorized discharge of oil and hazard materials.

Objective 1.1: Enhance Statewide Hazmat Response Team capabilities.

Action 1.1.1: Conduct Statewide Hazmat Response Work Group meetings and promote active dialogue amongst work group members on issues such as exercises/training, equipment, lessons learned, and other key components.

Lead: ADEC

Support: Statewide Hazmat Response Team members

Timeline: 5 years

Progress: The workgroup meets annually and participated in Alaska Shield 2014.

Action 1.1.2: Conduct Statewide Hazmat Response symposiums and exercises.

Lead: ADEC

Support: Statewide Hazmat Response Team members

Timeline: 2 years

Progress: ADEC conducted the Alaska Shield 2014 and 2016 Hazmat symposiums and field exercises.

Objective 1.2: Encourage improved training, education, planning and safety in the production, use and transportation of oil and hazardous substances.

Action 1.2.1: Obtain long term funding for the Local Emergency Planning Committee

Completed in 2010, see **Completed Actions**

5.11.4 Acknowledgements

State of Alaska Department of Environmental Conservation (ADEC)

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5.12 Terrorism

5.12.1 Programs and Strategies

Anti-Terrorism All-Hazard Advisory Council of Alaska

The Anti-Terrorism All-Hazard Advisory Council of Alaska (ATAACA) enlists members from Federal, State, local agencies, and the private sector. In response to a credible terrorist threat or attack, or to a civil emergency with statewide impact, the ATAACA will:

- Provide timely and accurate information to authorities.
- Maintain public trust and confidence.
- Develop Media Action Plans to deliver complete, consistent, and accurate information to the public.
- Facilitate interagency security and law enforcement planning to enhance public safety and security.
- Conduct public and private critical infrastructure protection planning and execution.
- Coordinate multiple agency efforts.
- Coordinate allocation of limited resources.
- When federal presence is established under the National Response Framework, assist response and recovery efforts.

Alaska Partnership for Infrastructure Protection

The Alaska Partnership for Infrastructure Protection (APIP) is a public-private partnership established to better integrate critical infrastructure owners/operators with the all-hazards emergency preparedness process. APIPs members include all sectors with an emphasis on interoperability process improvements. APIP is a full partner within the municipal, state, and federal emergency preparedness process.

Security and Vulnerability Assessment Team

The DHS&EM Security and Vulnerability Assessment (SVA) Team assists Alaska communities with identifying and mitigating security losses. This unique team is comprised of specialists from the Alaska Department of Homeland Security and Emergency Management (DHS&EM), providing a broad spectrum of experience and expertise. The SVA Team's major functions are:

To maintain the State of Alaska Critical Infrastructure list (CI). The Team, in consultation with CI owner/operators, also divides each CI entity into its critical functions.

Conduct critical infrastructure vulnerability assessments and recommend solutions for reducing CI vulnerabilities.

Conduct critical security and vulnerability analyses of the State's critical support systems, such as energy, transportation, food, and medical industries. These analyses establish criticality rankings; identify critical components; highlight intra-sector as well as inter-sector dependencies; and outline contingency plans for reconstituting services.

Assist jurisdictions and State agencies with CI grant applications and management, such as Port Security and Buffer Zone Protection grants.

Disseminate State and national level information to appropriate agencies and industries.

Alaska Information Analysis Center

Located in the FBI Field Office in Anchorage, the Alaska Information Analysis Center (AKIAC) is responsible for coordinating terrorism and law enforcement information in Alaska and is the State's primary center in the Information Sharing Environment (ISE). Partners in the AKIAC are Alaska's Department of Homeland Security, Public Safety, Federal Bureau of Investigation and the Federal Department of Homeland Security. AKIAC responsibilities are:

- Produce and disseminate intelligence, bulletins, and assessments.
- Analyze suspicious activity reports in support of investigations.
- Respond to requests for information (RFI) and request for service (RFS) from AKIAC members and customers.
- Collaborate with Federal, State, and local agencies to produce joint products.
- Coordinate and facilitate regional training opportunities in support of the AKIAC mission.
- Identify patterns and trends.
- Coordinate and de-conflict information between members and customers.

5.12.2 Hazard Mitigation Successes

In 2007, Port of Anchorage officials invited the State of Alaska's SVA Team to assess the Port's Critical Infrastructure. The Port's senior leadership needed a critical assessment of the facility's importance to the State of Alaska's infrastructure. The Team met with Port officials and interviewed key personnel regarding port functions, capabilities, and internal components critical to port operations.

As a result of the SVA team's vulnerability assessment, the Port of Anchorage applied for and received a 2007 Department of Homeland Security Port Security Infrastructure Protection Program project grant. The project consolidated temporary security facilities into an official port security command and control center opening in April of 2008.

Completed Goals, Objectives, and Actions

Objective 1.3: Partner with industry and utility groups to identify and minimize the vulnerability of privately owned infrastructure.

Action 1.3.1: Form a committee of industry officials.

Lead: DHS&EM

Support: SHMAC members

Timeline: 5 years

Complete: The Alaska Partnership for Infrastructure Protection (APIP) was formed in 2004 and meets monthly to discuss mitigation strategy.

5.12.3 Goals, Objectives, and Actions

High Priority

Goal 1: Identify potential terrorism vulnerability to the State.

Objective 1.1: Identify potential terrorist targets and determine vulnerability.

Action 1.1.1: Prioritize structures in State with respect to vulnerability.

Lead: DHS&EM

Support: SHMAC members

Timeline: 5 years

Progress: As of 2016, The State security and vulnerability team are building the State of Alaska Critical Infrastructure list (CI).

Objective 1.2: Identify and prioritize corrective actions to include building retrofits, relocating government operations, and developing redundant systems.

Action 1.2.1: Assess the vulnerability of potential terrorist targets.

Lead: DHS&EM SVA Team

Support: Department of Public Safety

Timeline: 5 years

Progress: The State security and vulnerability team and Department of Public Safety are conducting vulnerability assessments with support from government and industry specialists.

Medium Priority

Goal 2: Promote anti-terrorism training

Objective 2.1: Provide the appropriate level of training for government employees, public safety, and emergency services personnel.

Action 2.1.1: Identify a timeline for training completion

Lead: DHS&EM

Support: ADEC and EPA

Timeline: 5 years

Progress: In 2016, the DHS&EM enrolled in computer security and data management training.

Objective 2.2: Develop and implement instructional programs for treating chemical, biological, and radiological injuries.

Action 2.2.1: Research current programs addressing NBC agent injury prevention and treatment.

Lead: *DHHS*

Support: *DHS&EM*

Timeline: 5 years

Progress: As of 2016, no progress on this action

5.12.4 Acknowledgements

State of Alaska Department of Public Safety

Environmental Protection Agency

Department of Homeland Security

State of Alaska Department of Environmental Conservation

State of Alaska

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5. Mitigation Strategy and Goals

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5.13 Technological, Public Health, and Human Caused

5.13.1 Programs and Strategies

Alaska State-wide Emergency Management Response Exercises

Approximately every three years the DHS&EM conduct an emergency response exercise designed to increase statewide emergency response capabilities. See Success Stories below for recent Exercise information.

Fueling Safety Program

The Ted Stevens Anchorage International Airport Fire Department in 2005 became the first airport in the State to receive certification to teach the Federal Aviation Administration's (FAA) Supervisor Fueling Safety Program.

In accordance with 14 CFR Part 139, the FAA requires an airport maintain certain operational and safety standards as a condition of having an Airport Operating Certificate. The intent of the course is to ensure that supervisory fueling personnel recognize the importance of aircraft fueling safety and are equipped to instruct in the principles that will ensure safety during refueling operations at airports. Under Part 139, recurrent fire safety training is required of all airport fueling personnel and supervisors must have completed an authorized aviation fuel training course in fire safety.

AS 26.05.100 Alaska State Defense Force

A State militia, known as the Alaska State Defense Force, may be organized through voluntary enlistments under regulations as to discipline and training may be prescribed by the Governor. During the time the Alaska National Guard or the Alaska Naval Militia, or any part of either of them, is not available to the State by reason of active Federal service, or the National Guard or Naval Militia requires augmentation to perform its State mission, the Governor may activate the Alaska State Defense Force.

5.13.2 Hazard Mitigation Successes

Alaska Shield 2010 (April 26 - May 1)

The statewide exercise combined the State of Alaska's Alaska Shield exercise, National Guard's Vigilant Guard exercise and Joint Task Force Alaska's Arctic Edge exercise. The combined exercise scenario involves an earthquake affecting Southcentral Alaska and communities as far away as Unalaska. During a significant earthquake, people, infrastructure and supply chains will be affected. This exercise demonstrated Alaska's capability to respond to those challenges. Planning for Alaska Shield 2010 began immediately following Alaska Shield 2007. More than 4,000 participants from 51 organizations took part in this exercise.

Alaska Shield 2014

Alaska Shield 2014 was a Joint National Exercise Program sponsored by United States Northern Command (USNORTHCOM) and FEMA in conjunction with National Guard Bureau (NGB).

The program provides State and federal agencies an opportunity to improve cooperation and relationships with their regional civilian, military, and federal partners in preparation for emergencies and catastrophic events.

The Alaska National Guard conducts Vigilant Guard 14 as a linked DSCA exercise in

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conjunction with Alaska Shield/Arctic Edge from 27 Mar through 2 Apr 2014 to employ National Guard forces from the Region in support of the State of Alaska, demonstrating joint capabilities to assist in: preventing loss of life; alleviating suffering; lesson major property damage or destruction; restoring essential facilities, services, and civil control during a major seismic event. On order, conduct operations with DoD forces as directed throughout the exercise.

The State Security Office

The State Security Office (SSO) was created in October 2005 in response to a serious security incident in January of that year. The SSO resides within the Enterprise Technology Services (ETS) Division of the Department of Administration.

The fulltime mission of the SSO is to provide the strategic direction and leadership, develop and establish policy and procedure, and provide the administrative, technical and physical solutions that ensure the confidentiality, integrity and availability of the information, and systems used in the delivery of services to the citizens of Alaska.

103rd Weapons of Mass Destruction-Civil Support Team

The team is composed of command and control, operations, entry, logistics, communication and medical/analytical sections. Ninety percent of the team is HazMat Technician and Emergency Medical Technician (EMT) certified. There are over 14 different specialties within the team giving the Local Incident Commander tremendous assets to draw upon as needed. The team assists in assessing the incident site and makes recommendations for mitigating the loss of life or property.

During the aftermath of Katrina a team from the 103rd CST traveled to the greater surrounding area to assist local, State and Federal agencies with hazard identification and support. The team split into smaller groups and the knowledge of members effectively supported officials. Additionally, the training and skills of the team are used throughout the State for necessary military support during an emergency disaster to:

- Assess a suspected chemical biological, radiological, or event in the support of the Local Incident Commander.
- Advise civilian responders regarding appropriate actions in planning for and responding to Weapons of Mass Destruction (WMD) incidents.
- Facilitate expeditious arrival of additional State and Federal assets: to help save lives, prevent property damage and ease suffering.

5.13.3 Goals, Objectives, and Actions

High Priority

Goal 1: Examine the possible locations of civil disorder events.

Objective 1.1: Identifying facilities and locations of potential civil disorder so that appropriate security mitigation actions can be taken.

Action 1.1.1: Survey State facilities using criteria that ranks their potential for experiencing civil disorder.

Lead: DPS

Support: DHS&EM and local communities

Timeline: 5 years

Progress: The DHS&EM Security and Vulnerability Assessment (SVA) team maintains a database of State critical facilities created in 2010.

Goal 2: Promote Community Specific Health Mitigation Statewide.

Objective 2.1: Create a statewide forum for sharing public health mitigation knowledge.

Action 2.1.1: Support cooperative health mitigation conferences, training, and website technologies that enable community specific information sharing.

Lead: DHHS

Support: DHS&EM

Timeline: 3 years

Progress: Coordinated with community outreach. Conferences and training subject to available outreach funds.

5.13.4 Acknowledgements

State of Alaska Department of Public Safety

State of Alaska Department of Administration

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5.14 Economic

5.14.1 Programs and Strategies

Currently, there are no programs or strategies designed for mitigating economic disasters in Alaska fisheries.

5.14.2 Hazard Mitigation Successes

1999-2000 Operation Renew Hope

Successive years of low salmon returns led to creation of a formalized mechanism, named Operation Renew Hope to deliver emergency economic relief to residents in Alaska affected by the fishery disaster. Coastal Alaska from Bristol Bay to the Seward Peninsula and the Yukon River drainage were included in the disaster area.

Operation Renew Hope was established to deliver immediate, short-term financial assistance to families and individuals throughout the disaster area. Operation Renew Hope had three major parts. First, approximately \$1 million in State emergency response funds were used to purchase and deliver frozen chum salmon and U.S. Department of Agriculture surplus foods. Emergency funds were also used to hire staff and administer the relief efforts and provide community outreach assistance. Second, \$380,000 was granted to the DOT/PF for brush-clearing activities around runways at 30 rural airports within the disaster region. The brush clearing was primarily done by local hires, providing short-term jobs for 150 villagers living in the Yukon, Kuskokwim, and Norton Sound areas. Third, the State secured a \$1 million, five-year Federal grant from the Federal Highway Administration to recruit, train, and employ rural residents interested in road construction and related transportation careers.

5.14.3 Goals, Objectives, and Actions

Mitigation goals, objectives, and actions will be developed in successive updates of this plan.

5.14.4 Acknowledgements

Alaska Department of Fish and Game

Alaska Department of Commerce, Community, and Economic Development

6. Resources

6.1 Hazard Mitigation Funding

In the State of Alaska, funding for mitigation planning and projects is available through multi-agency appropriations, grants and contracts.

6.1.1 State Mitigation Funding

Direct State Disaster Mitigation Funding

While the State of Alaska has Public Assistance and Individual Assistance programs under State declared disasters, it does not have a State disaster mitigation program. However, there have been a few occasions in which the Governor and/or Legislature have elected to identify and fund mitigation work through the State Disaster Relief Fund (DRF). These actions were taken under discretionary authority and no permanent State mitigation program was established.

State Provision of Non-Federal Match to Federal Mitigation Programs

Many federal mitigation programs require a local match of non-federal funds. The match required varies with the program regulations and community being granted funds. There are several mitigation programs in which the State of Alaska provides the entire non-federal match for local communities resulting in 100% funds being granted to the community for mitigation. These programs, described in detail below, include the Public Assistance (also called 406 mitigation) and Hazard Mitigation Grant Program (HMGP) which are funded under federally declared disasters. The matching funds are paid through the State DRF. Therefore, while these programs are listed below under “Federal mitigation programs” for convenience, the State provides substantial funding for these programs, sometimes in the millions of dollars. On occasion the State has likewise provided a portion of the non-Federal match for National Resource Conservation Service (NRCS) projects.

Division of Homeland Security and Emergency Management Disaster Relief Fund

The State of Alaska provides State funding for Public Assistance (PA) and Individual Assistance (IA) in State declared disasters and cost share funds for federally declared disasters through the State Disaster Relief Fund.

Community Development Block Grants

DCCED awards these grants to fund community projects and planning activities, improving health, safety and essential community services.

Alaska Regional Development Organizations

The Alaska Regional Development Organizations (ARDORs) funds cooperative economic development.

Rural Development Assistance Mini-Grants

These grants partially fund plan development, feasibility engineering studies, and capital projects. Mini-grants are awarded by the State Legislature.

Unincorporated Community Grants

These grants are awarded by the State Legislature to unincorporated communities and nonprofits for a wide range of projects and programs.

6.1.2 Federal Mitigation Funding

There are several Federal agencies and programs funding mitigation projects in the State of Alaska. Mitigation grants are administered through the DHS&EM as the grantee to local communities functioning as sub-grantees with the State providing the required matching funds for HMGP. Table 6.1 is an overview of grant programs and their eligible programs.

| Table 6.1 FEMA 2013 HMA Eligible Activities | | | |
|--|-------------|------------|------------|
| Activities | HMGP | PDM | FMA |
| 1. Mitigation Projects | √ | √ | √ |
| Property Acquisition and Structure Demolition | √ | √ | √ |
| Property Acquisition and Structure Relocation | √ | √ | √ |
| Structure Elevation | √ | √ | √ |
| Mitigation Reconstruction | | | |
| Dry Floodproofing of Historic Residential | √ | √ | √ |
| Dry Floodproofing of Non-residential Structures | √ | √ | √ |
| Minor Localized Flood Reduction | √ | √ | √ |
| Structural Retrofitting of Existing Buildings | √ | √ | |
| Non-Structural Retrofitting of Existing Buildings and Facilities | √ | √ | |
| Safe Room Construction | √ | √ | |
| Infrastructure Retrofit | √ | √ | |
| Soil Stabilization | √ | √ | |
| Wildfire Mitigation | √ | √ | |
| Post-disaster Code Enforcement | √ | | |
| 5% Initiative Projects | √ | | |
| 2. Hazard Mitigation Planning | √ | √ | √ |
| 3. Management Costs | √ | √ | √ |

Table 6.1 Source: FEMA Hazard Mitigation Assistance, July 2013.

FEMA administers Hazard Mitigation Assistance (HMA) grants through Congressional authorization of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 2000 as amended (DMA 2000). While many features of the HMA grants overlap, such as the benefit cost analysis (BCA) requirement, each grant program has specific features. Detailed guidance for these grants is provided by FEMA at <http://www.fema.gov/library/viewRecord.do?id=3649>.

406 Public Assistance Mitigation

FEMA Public Assistance repair projects are eligible for additional mitigation funds through (406 PA mitigation). Section (406) of the Stafford Act stipulates the mitigation project must relate directly to the disaster damages.

Hazard Mitigation Grant Program

In contrast, whenever there is a presidentially declared disaster in the State of Alaska, FEMA offers mitigation grant funds based on a percentage of the overall Federal share of disaster costs (15% in 2013). This program, called the Hazard Mitigation Grant Program (HMGP), was created in 1988 by the Stafford Act, Section 404 (404 mitigation) and allows HMGP funds to be used anywhere in the State if it is stipulated in the State disaster declaration to the President. While HMGP is funded through a presidentially declared disaster, HMGP funds are not used to repair disaster damage but to reduce future disaster losses through mitigation projects and planning.

The process and criteria used to guide State level HMGP project selection and prioritization is included in the Selection and Prioritization Process of Hazard Mitigation Assistance (HMA) Applications (Appendix 6). HMGP applications are reviewed by the SHMO, the SHMAC, and approved by the Governor's Disaster Policy Cabinet (DPC).

There are substantial FEMA eligibility and program requirements for communities applying for HMGP. Some of those requirements are detailed in the Benefit Cost Analysis (Appendix 5). These requirements include environmental and historical considerations including the Endangered Species Act, the Historic Preservation Act, Floodplain Management, and National Environmental Policy Act. Contact the State Hazard Mitigation Officer for assistance with HMGP applications.

FEMA administers HMGP funding by percentage according to use. Currently, states may use 5 % of the HMGP funds on "initiative projects", such as studies and warning systems. Likewise, states may use 7 % of HMGP funds on hazard mitigation planning. Funds from multiple disasters cannot be combined and one funding percentage category cannot be combined with another.

Program Eligibility

Generally, organizations applying for HMGP grants must have a State and FEMA approved mitigation plan within their jurisdiction. Eligible organizations include:

- 1. Government Entities and Organizations**

The State, local communities, and certain tribal government entities are eligible.

Eligible State agencies are those with responsibility for natural resources, geological hazards, public works, infrastructure regulation, or construction, floodplain management, parks and recreation, and community development.

Communities applying for HMGP grants need an approved mitigation plan in place. However there is a special exception allowing the plan to be completed within one year of the grant.

Federally recognized tribal organizations and Alaska Native villages are often eligible, however FEMA has determined Alaska native corporations with ownership vested in private individuals are not eligible.

- 2. Private Non-Profit Entities**

Organizations with Federal tax exempt status under Section 501(c), (d), or (e), or qualifying as a non-profit organization under State law may be eligible. Eligibility requires the organization participates with the appropriate local or state mitigation plan and the organizations own and operate facilities falling into one of the following categories:

- Medical: Hospitals and other outpatient, rehabilitation, or long-term care facilities
- Custodial Care: Nursing homes and congregate living facilities including those for aging or disabled persons
- Educational: Elementary and secondary schools and institutions of higher education.
- Emergency: Fire departments, ambulance, and other rescue services.
- Utility: Telephone companies, power companies, sewage treatment plants, etc.
- Others: Governmental type services open to the public including museums, zoos, community centers, libraries, homeless shelters, senior citizen centers, and rehabilitation centers.

Program Monitoring and Closeout

As the grantee for HMGP funds and PDM funds, DHS&EM is responsible for implementation of HMGP through the SHMO. The Administrative procedures are coordinated with FEMA and the HMGP Administrative Plan is reviewed and updated annually. HMGP requirements include submission of quarterly and final “close out” narrative and financial reports, revealing overall progress towards accomplishing SHMP strategies and goals.

Federal Unmet Needs Program

Unmet Needs is a program activated in specific disasters based upon a Congressional determination there are unmet needs following a disaster. Mitigation funds may be available for jurisdictions receiving an unmet needs allocation. Mitigation projects are specified in the Unmet Needs allocation. The Unmet Needs funds up to 75% of an approved project.

Pre-Disaster Mitigation Grant Program

The FEMA Pre-Disaster Mitigation (PDM) grant program funds mitigation projects and planning for State, local, and eligible tribal organizations.

The PDM program is annual, subject to Congressional appropriation, and nationally competitive. PDM sets aside a minimum monetary amount for each State and offers any remaining funds for national competition. Congress controls the PDM program and may award PDM funds in lieu of any competitive application process.

The State is the grantee of PDM funds and communities are the sub-grantees. Grant awards are a 75 % Federal/25 % applicant cost share match. Communities identified as “small and impoverished” (Appendix 10) are eligible for 90 % Federal and 10% applicant match. The State of Alaska does not pay the applicant match for the PDM program.

Flood Mitigation Assistance

The Flood Mitigation Assistance Program (FMA) provides pre-disaster grants to State and local governments for planning and flood mitigation projects. Created by the National Flood Insurance Reform Act of 1994, its goal is to reduce or eliminate the long-term risk of flood damage to insured structures. FMA provides an annual amount of \$10,000 for planning and \$100,000 for projects. Distributions of remaining funds are based upon the number of NFIP policies, repetitive loss structures, and other factors contributing to a disaster resistant community. Residential and non-residential properties may apply for FMA grants through their NFIP community and are required to have NFIP insurance to be eligible. FMA grant funds may be used to develop the flood portions of hazard mitigation plans or to do flood mitigation projects. FMA grants are funded 75% Federal and 25% applicant.

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

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

The FMA program is available only to communities participating in the NFIP. In the State of Alaska, the Department of Commerce, Community, and Economic Development (DCCED) manages this program. Refer to Table 6.2A and Table 6.2B for RFC and SRL data.

Table 6.2 A. Repetitive Flood Claim Communities

| Area | Community | Total Payments \$ | Losses | Properties | As of Date |
|------------------------------|------------------------------|-------------------|--------|------------|------------|
| Anchorage Borough | Anchorage, Municipality of | 12,096.72 | 2 | 1 | 06/30/2013 |
| Bethel Census Area | Aniak, City of | 119,068.30 | 12 | 4 | 06/30/2013 |
| Bethel Census Area | Bethel, City of | 24,040.18 | 3 | 1 | 06/30/2013 |
| Bethel Census Area | Kwethluk, City of | 14,600.57 | 2 | 1 | 06/30/2013 |
| Fairbanks North Star Borough | Fairbanks North Star Borough | 463,475.14 | 36 | 14 | 06/30/2013 |
| Juneau Borough | Juneau, City and Borough of | 27,025.80 | 5 | 2 | 06/30/2013 |
| Kenai-Cook Borough | Kenai peninsula Borough | 98,402.59 | 4 | 2 | 06/30/2013 |
| Nome Census Area | Nome, City of | 15,591.82 | 2 | 1 | 06/30/2013 |
| Valdez-Cordova Census Area | Valdez, City of | 34,859.96 | 3 | 1 | 06/30/2013 |

Table 6.2 B. Severe Repetitive Loss Communities

| Area | Community | Total Payments \$ | Losses | Properties | As of Date |
|------------------------------|------------------------------|-------------------|--------|------------|------------|
| Fairbanks North Star Borough | Fairbanks North Star Borough | 46,942.38 | 5 | 1 | 06/30/2009 |

Table 6.2 Source: DCCED A. Alaska Repetitive Loss Data by Community. B. Alaska Severe Repetitive Loss Data by Community as of May 2013.

Increased Cost of Compliance

Increased Cost of Compliance Program (ICC) coverage is available on NFIP policies written or renewed on or after June 1, 1997. The ICC is designed to help flood insurance policy holders take the steps required to reduce future flood damage to their homes or businesses by bringing their home or business into compliance with their community's floodplain ordinance. ICC coverage may be used to offset some of the costs associated with flood mitigation projects and the non-Federal match.

Federal Hazard Mitigation Programs

FEMA

Earthquake Hazards Reduction State Assistance Program

In 2012 and 2013 the State of Alaska received funds through the FEMA Earthquake Hazards Reduction State Assistance Program (EHRSA). These funds were awarded through FEMA to States with earthquake hazards based upon specific Congressional authorization and are designed to support State earthquake program activities. Out of the total Congressional allocation, a

State of Alaska

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portion of the funds are awarded to each state based upon a FEMA earthquake risk calculation. FEMA intends to continue this program subject to Congressional appropriation. The State of Alaska has used EHRSA funds to support earthquake active fault mapping and earthquake/tsunami education outreach displays. The SHMO manages and administers these funds.

Hazard Mitigation Technical Assistance Program

Through the Hazard Mitigation Technical Assistance Program (HMTAP), FEMA creates technical products for Federal, State, and local community use. FEMA administers HMTAP contracts with State advisement. HMTAPs continue to be a potential tool to accomplish specific, clearly defined mitigation planning work as identified by the SHMO.

Department of Commerce National Oceanic and Atmospheric Administration

National Tsunami Hazard Mitigation Grant Program

The National Tsunami Hazard Mitigation Grant Program (NTHMP) combines Federal and State partners involved in mitigating tsunami risk. This NOAA directed program includes Federal partners from the USGS, FEMA and NSF, and States with tsunami risk. The State of Alaska serves as a member of the Coordination Committee for the NTHMP and is the grantee for NTHMP funds allocated to Alaska. In Alaska, NTHMP funds are combined with State managed projects, local community sub-grants, and intra-state reimbursable services agreements (RSAs) for tsunami hazard mapping, outreach and warning systems. See Appendix 6 for the project selection process and prioritization criteria. In Alaska, the NTHMP is managed through the SHMO.

Remote Community Alert Systems Program

The Remote Community Alert Systems Program (RCASP) funds multi-hazard warning communication systems for remote communities with limited 911 services, cell phone access, and communications capability. Where appropriate, the State directly manages the project (Unincorporated community in the Unorganized Borough) or sub-grants the funds. To date funds have been used to install multi-hazard community warning sirens. In Alaska the RCASP is managed through the SHMO.

Small Business Administration

Business Physical Disaster Loans are for available for businesses and non-profit organizations in the area of a declared Federal disaster or Small Business Administration (SBA) declared disaster. SBA often sends representatives on federally declared disasters to present their disaster loan program.

Department of Agriculture

Natural Resource Conservation Service

Emergency Watershed Protection Program

The Natural Resource Conservation Service (NRCS) is responsible for the Emergency Watershed Protection (EWP) program. EWP provides financial and technical assistance to remove debris from streams, protect destabilized stream banks, establish cover on critically eroding lands, establish conservation practices, and purchase flood plain easements.

Department of Defense

U.S. Army Corps of Engineers

The U. S. Army Corps of Engineers (USACE) has accomplished many, extensive hazard mitigation studies and projects in Alaska, including the 2009 Kivalina community seawall and the Chena River flood control project in the Fairbanks North Star Borough. Funding for USACE projects and studies is dependent on Congressional appropriation and program requirements.

Additional Federal Agencies

Department of Agriculture

U.S. Forest Service

Department of Commerce

National Oceanic & Atmospheric Administration – See above under NTHMP and RCASP.

National Weather Service

Office of Coastal Resource Management

Department of Defense

USACE Army Corps of Engineers - National Flood Proofing Committee

Department of Health, Education & Welfare

Center for Disease Control (CDC)

Department of Housing & Urban Development

Community Development Block Grant

HOME Investment Partnerships Program

Department of the Interior

U.S. Geological Survey

U.S. Fish & Wildlife Service

Bureau of Land Management

Bureau of Indian Affairs

Environmental Protection Agency

Department of Transportation

Federal Highway Administration

Federal Aviation Administration

National Trust for Historic Preservation

Additional Mitigation Grant Resources

Information about other grant programs may be found in these sources:

- FEMA Disaster Assistance: A Guide to Recovery Programs
- <http://www.ready.gov/library/viewRecord.do?id=2152&fromSearch=fromsearch>

- FEMA Apply for Assistance <http://www.ready.gov/assistance/index.shtm>
- FEMA Federal Mitigation <http://www.ready.gov/government/mitigation.shtm>
- Earthquake Engineering Research Institute's Federal Mitigation Programs, Activities, and Initiatives <http://www.eeri.org/mitigation/files/resources-for-success/00028.pdf>
- Catalog of Federal Domestic Assistance
The online Catalog of Federal Domestic Assistance Programs (CFDA) is a compendium of all available Federal programs, projects, services, and for the American public. These programs provide grants, loans, loan guarantees, services, information, scholarships, training, insurance, etc., to millions of Americans every day. <https://www.cfda.gov/>
- Federal Programs Offering Non-structural Flood Recovery and Floodplain Management Alternatives. This publication provides information about Federal programs supporting non-structural approaches to floodplain management.
<http://www.ready.gov/floods>

6.2 General Reference Materials

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6.3.1 Chapter 1. Introduction

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http://www.ak-prepared.com/plans/documents/Alaska_Emergency_Response_Plan.pdf

Figures

Figure 1.2. From the State of Alaska Division of Community and Regional Affairs (DCRA).
http://www.commerce.state.ak.us/dca/commdb/CF_Plans.cfm

Figure 1.3. Alaska Regional Educational Attendance Areas (REAA) and Boroughs map modified from <http://www.eed.state.ak.us/Facilities/pdf/doe2008map.pdf>

Figure 1.4. Location of Alaska relative the contiguous 48-state on North America Shaded Relief map by USGS education Map catalog online
<http://education.usgs.gov/common/resources/mapcatalog/topography.html>

Figure 1.5.1. Alaska Land Management and Ownership Map and
Figure 1.5.2. Alaska Land Management and Ownership Map Key from
http://plats.landrecords.info/images/who_owns_alaska_poster.jpg

Figure 1.6. State of Alaska Road Map from State of Alaska Office of Economic Development webpage http://www.dced.state.ak.us/oed/student_info/learn/roadmap.htm

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Figure 1. 7. State of Alaska National Highway System Map April, 2006

http://www.dot.state.ak.us/stwdplng/mapping/dataproducts/NHS_MapSet2006final.pdf

Figure 1.8. DOT/PF Public Airports in Alaska January, 2010

<http://www.dot.state.ak.us/stwdplng/mapping/dataproducts/airports-jan2010.pdf>

Figure 1.9. Alaska State Ferry Map <http://www.travelalaska.com/Transportation/ferrymap.aspx>

Tables

Table 1.1. The populations statistics are from the state of Alaska Department of Labor Population Estimates Vintage 2009 Estimates Table 2.1 Population of Alaska by Labor Market Area, Borough and Census Area, 1990-2009 access at

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The area data is from the Division of Community and Regional Affairs (DCRA) Communities Database online. http://www.commerce.state.ak.us/dca/commdb/CF_CUSTM.htm

Section 1.6 General Facts

U.S. Census Bureau People USA QuickFacts

<http://quickfacts.census.gov/qfd/states/00000.html>

Alaska's Department of Labor Population

<http://laborstats.alaska.gov/?PAGEID=67&SUBID=115>

State of Alaska Office of Economic Development

http://www.commerce.state.ak.us/oed/student_info/learn/aboutgeography.htm

Bering Glacier Portal (<http://www.beringglacier.org>)

City of Sitka <http://cityofsitka.com>

Section 1.7 Land Transportation

DOT/PF Public Mileage

<http://www.dot.state.ak.us/stwdplng/highwaydata/pub/cprm/2008cprm.pdf>

U.S. Department of Transportation Federal Highway Administration Highway Statistics

<http://www.fhwa.dot.gov/policyinformation/statistics/2008/>

For more information:

Alaska Department of Transportation and Public Facilities Transportation Data Services Highway DataPort

<http://www.dot.state.ak.us/stwdplng/highwaydata/index.shtml>

Section 1.8 Air Transportation

Statewide Library Electronic Doorway (SLED) <http://sled.alaska.edu/akfaq/aksuper.html>

DOT/PF Ted Stevens Anchorage International Airport Statistics

<http://dot.alaska.gov/anc/business/airServiceDevelopment/statistics/index.shtml>

FAA 2008 Passenger Boarding and All-Cargo Data

http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/

Section 1.9 Waterborne Transportation

Alaska Marine Highway System <http://www.dot.state.ak.us/amhs/index.shtml>

NOAA Fisheries Service http://www.noaanews.noaa.gov/stories2009/20090722_ports.html

State of Alaska Department of Commerce website

http://www.commerce.state.ak.us/oed/student_info/learn/facts.htm

Section 1.12 Cost of Living

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6.3.2 Chapter 2. Planning Process

Section 2.1. State Coordination

DHS&EM Hazard Mitigation

<http://ready.alaska.gov/plans/mitigation/mitigati.htm>

State Emergency Coordination Center

http://ready.alaska.gov/community_services/

DHS&EM Plans and Preparedness (Emergency Operations Plan, Continuity of Operations Plan)

<http://ready.alaska.gov/plans/>

Alaska Local Hazard Mitigations Plans online

<http://www.commerce.state.ak.us/dcra/planning/nfip/mitigation.htm>

Section 2.2 People Involved in Planning

Alaska Seismic Hazards Safety Commission (ASHSC)

http://www.seismic.alaska.gov/seismic_hazards_safety_commission.htm

Sub-Section 2.2.6 State & Small and Impoverished Community Hazard Mitigation Planning
Vintage 2012 [Population] Estimates

Place Estimates 2000-2012

<http://laborstats.alaska.gov/?PAGEID=67&SUBID=171>

6.3.3 Chapter 3. Hazard Profiles

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http://www.commerce.state.ak.us/dcra/planning/AKLM/AKLM_home.cfm

Local Community Mitigation Plans

<http://commerce.alaska.gov/dnn/dcra/Home.aspx>

Section 3.1 Floods

General

FEMA Federal Programs Offering Non-structural Flood Recovery and Floodplain Management Alternatives

http://www.fema.gov/hazard/flood/pubs/non_fema1.shtm

Figures

Figure 3.1.1 Lowell Point Road alluvial fan Seward, AK. Image from the Kenai Peninsula Borough

<http://www.borough.kenai.ak.us/emergency/Flood/Flood09/pics/album/slides/Lowell%20Point%20Road%20at%20Outfall%20of%20Diversion%20Tunnel%201.html>

Figure 3.1.4 Kenai River Ice Jam Flooding. Image from the Kenai Peninsula Borough.

http://www.borough.kenai.ak.us/emergency/Flood_07/Kenai%20River%20Ice%20Jam%202007/album/slides/1.26.07%202.html

Figure 3.1.7 An enlarged eastward-looking view of a small section of the Hubbard Glacier terminus outburst on August 14, 2002 creating the second largest glacial lake outburst worldwide in historical times. USGS photo from

http://ak.water.usgs.gov/glaciology/hubbard/photos/eastward_detail.htm

Figure 3.1.8 Skilak Glacier Dammed Lake, Alaska. NOAA image from

http://aprfc.arh.noaa.gov/general/skilak_image1.html

Types of Flooding

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USGS Newsroom: Second-Largest Glacial Flood Worldwide in Historic Times Occurs as Russell Lake Glacier Dam Ruptures

<http://www.usgs.gov/newsroom/article.asp?ID=356>

USGS Advancing Glacier Coming Close to Blocking Fiord Near Yakutat, Alaska

<http://www.usgs.gov/newsroom/article.asp?ID=373>

Photos: <http://www.usgs.gov/features/glaciers.html>

USGS 2002 Russell Fiord Closure and Russell Lake Outburst

<http://ak.water.usgs.gov/glaciology/hubbard/photos/index.htm>

Historical Flood Events

2007 Ice Jam Flooding

Kenai River Center Kenai Peninsula Borough 2007 Ice Jam Flood Event

<http://www.borough.kenai.ak.us/Kenairivercenter/Agencies/floodplain/2007Floods.htm>

Kenai Peninsula Borough OEM Kenai River Flooding & Ice Jams 2006-2007

<http://www.borough.kenai.ak.us/emergency/KR/Kenai%20River.htm>

2009 Spring Flooding on the Yukon River (DR-1843)

National Park Service Yukon-Charley Rivers National Preserve

2009 Eagle Flood

<http://www.nps.gov/yuch/2009-eagle-flood.htm>

Alaska DOT/PF Eagle / Yukon River Ice Jam Disaster Event

<http://www.dot.alaska.gov/nreg/eagle/>

Section 3.2 Wildland and Community Fire Conflagration

General

Alaska Division of Forestry Resource Programs <http://forestry.alaska.gov/resources.htm>

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<http://www.gi.alaska.edu/ScienceForum/ASF13/1338.html>

Figures

Figure 3.2.1 July 2013 Stuart Creek Wildland-Urban Interface Fire, Pleasant Valley, AK.

<http://fire.ak.blm.gov/incinfo/aklgfire.php>

Figure 3.2.2 Alaska Fire Management Zone Map by Agency from the Alaska Interagency Command Center Fire Information <http://fire.ak.blm.gov/incinfo/aklgfire.php>

Figure 3.2.3 Alaska Fire Management Zone Map from the Alaska Interagency Command Center Fire Information. Key to zone codes is in Table 5.3.1. <http://fire.ak.blm.gov/incinfo/aklgfire.php>

Figure 3.2.4 Fire Management Options 2013 from the Alaska Interagency Command Center is updated annually and available at <http://fire.ak.blm.gov/predsvcs/maps.php>

Tables

Table 3.2.1 Modified Interagency Fire Dispatch Centers from p. C-12 of the, 2013 Statewide Master Agreement with Exhibits

http://fire.ak.blm.gov/content/aicc/asma/2010%20Master_Agreement_with%20exhibits.pdf

Fire Management Options in Alaska

Alaska Statewide Master Agreement <http://fire.ak.blm.gov/administration/asma.php>

Alaska Interagency Wildland Fire Management Plan

<http://fire.ak.blm.gov/administration/awfcg.php>

Section 3.3 Snow Avalanches

General

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McClung, David & Schaerer, Peter. (1993) *The Avalanche Handbook*. Seattle: The Mountaineers.

Mears, A.I. (1992). *Snow-Avalanche Hazard Analysis for Land-Use Planning and Engineering*. Denver: Colorado Geological Survey.

Avalanche.org

<http://www.avalanche.org/>

Alaska DNR Department of Parks and Outdoor Recreation Avalanches

<http://dnr.alaska.gov/parks/safety/avalanch.htm>

Center for Snow and Avalanche Studies

<http://www.snowstudies.org/index.html>

Figures

Figure 3.3.2 Natural Avalanche Buries Thane Road Photo Courtesy of Mike Janes of Alaska Avalanche Specialists on City and Borough of Juneau Emergency Management website. Used with permission.

<http://www.juneau.org/avalanche/imageview.php?UID=26>

Figure 3.3.3 Avalanche damage to power lines and infrastructure. Photo from Alaska Electric Light and Power

<http://www.akavalanches.com/>

Figure 3.3.4 Map illustrating Juneau Urban Snow Avalanche Paths, 2005 from the City and Borough of Juneau

<http://www.juneau.org/avalanche/images/DowntownJuneauMapBIGWEB.jpg>

Hackett, S. W. and H. S. Santeford. (1980). Avalanche Zoning in Alaska in the Journal of Glaciology, v. 26, no. 94.

Section 3.4 Volcanoes

General

USGS Volcano Hazards Program

Fact Sheets

<http://www.avo.alaska.edu/downloads/classresults.php?pregen=fs>

and

<http://volcanoes.usgs.gov/publications/factsheets.php>

Photo Glossary of Volcanic Terms

<http://volcanoes.usgs.gov/images/pglossary/index.php>

Smithsonian Institution – Global Volcanism Program (GVP)

<http://www.volcano.si.edu/>

Figures

Figure 3.4.1 Eruption plume from Okmok volcano, August 3 2008. This photo was taken from Fort Glenn, Bering Pacific Ranch, on the eastern flanks of the volcano. Image courtesy of the AVO/UAF-GI.

<http://www.avo.alaska.edu/image.php?id=15392>

Figure 3.4.3 Orange colloidal iron-oxides along the shore of Mother Goose Lake, August 2005. Image courtesy of the Paul Tickner on AVO website.

<http://www.avo.alaska.edu/image.php?id=4262>

Figure 3.4.4 April 4, 2009 lahar/flood features in Drift River valley. Note prominent tree scars, and diffuse mud line that is up to 1 meter higher than the tree scars. Deposit at base of trees is the April 4 lahar deposit. AVO/USGS image.

<http://www.avo.alaska.edu/image.php?id=18367>

Figure 3.4.6 Volcanic ash fell onto Kodiak Island, ~ 100 mi east of the origin of the 1912 eruption. Shown here, decades later, this ash fall remains as an ~1 ½ foot thick unit under just a few centimeters of post-1912 organics. Image courtesy of AVO/USGS.

<http://www.avo.alaska.edu/image.php?id=13227>

Figure 3.4.7 Novarupta ash fall compared to that from recent Alaskan eruptions. Image courtesy of USGS. <http://www.avo.alaska.edu/pdfs/usgsfs075-98.pdf>

Figure 3.4.8 Volcanoes of the Aleutian Arc and Wrangell Volcanic Field, current in 2008. Appendix B. p. 45 from, Madden, John, Murray, T.L., Carle, W.J., Cirillo, M.A., Furgione, L.K., Trimpert, M.T., and Hartig, Larry (signatories), 2008, Alaska interagency operating plan for volcanic ash episodes, 52 p.

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http://www.avo.alaska.edu/pdfs/cit3996_2008.pdf

Figure 3.4.10 Plate 1 from the Redoubt preliminary volcano--hazard assessment, as an 11x17 sheet instead of a full map-sized plate. Figure from: Waythomas, C. F., Dorava, J. M., Miller, T. P., Neal, C. A., and McGimsey, R. G., 1998, Preliminary volcano-hazard assessment for Redoubt Volcano, Alaska: U.S. Geological Survey Open-File Report OF 98-0857, 40 p. Image courtesy of AVO/USGS.

<http://www.avo.alaska.edu/pdfs/redoubt.hazards.plate.pdf>

Figure 3.4.11 Volcano Alert level and Aviation Color Codes used by USGS Volcano Observatories.

<http://www.avo.alaska.edu/image.php?id=13192>

and

<http://www.avo.alaska.edu/image.php?id=13193>

Figure 3.5.13 View of Drift River Oil Terminal on March, 26, 2009. . Photo by Game McGimsey, AVO/USGS. Image from the Unified Command; Drift River Terminal Coordination http://www.dec.state.ak.us/spar/perp/response/sum_fy09/090324201/gallery/090324201_gal_02/pages/090324201_p018.htm

Figure 3.5.14 On April 4, 2009, the Advanced Land Imager (ALI) on NASA's Earth Observing-1 satellite captured this image of the Drift River Valley where it connects with Cook Inlet. Image from the NASA Earth Observatory <http://earthobservatory.nasa.gov/IOTD/view.php?id=37800>

Figure 3.5.15 View east of service buildings and fuel station (helipad and runway are covered with debris) at Drift River Oil Terminal on March 23, 2009. AVO/USGS image.

<http://www.avo.alaska.edu/image.php?id=16992>

Hazard Characteristics

Alaska Volcano Observatory

<http://www.avo.alaska.edu/>

USGS Fact Sheet 075-98 Can Another Great Volcanic Eruption Happen in Alaska?

Webpage <http://pubs.usgs.gov/fs/fs075-98/>

PDF <http://pubs.usgs.gov/fs/fs075-98/>

Katmai National Park and Preserve

<http://www.nps.gov/katm/index.htm>

Types of Volcanoes

USGS Cascades Volcano Observatory Volcano Types "Quick Reference"

http://vulcan.wr.usgs.gov/Glossary/VolcanoTypes/volcano_types_quick_reference.html

USGS Cascades Volcano Observatory Types of Volcanoes

http://vulcan.wr.usgs.gov/Glossary/VolcanoTypes/volcano_types.html

Volcano Hazards

General

USGS Fact Sheet 002-97 What Are Volcano Hazards?

Webpage <http://pubs.usgs.gov/fs/fs002-97/>

PDF <http://pubs.usgs.gov/fs/fs002-97/fs002-97.pdf>
Spanish PDF <http://pubs.usgs.gov/fs/fs144-00/fs144-00.pdf>

Volcanic Ash, Bombs and Ash Clouds
USGS Fact Sheet 027-00 Volcanic Ash—A “Hard Rain” of Abrasive Particles
Webpage <http://pubs.usgs.gov/fs/fs027-00/>
PDF <http://pubs.usgs.gov/fs/fs027-00/fs027-00.pdf>

USGS Volcanic Ash What it can do and how to minimize damage
<http://volcanoes.usgs.gov/ash/>

International Volcano Health Hazard Network’s (IVHHN)
<http://www.ivhhn.org/>

The Health Hazards of Volcanic Ash
and Guidelines on Preparedness Before, During and After an Ashfall
http://www.ivhhn.org/index.php?option=com_content&view=article&id=55&Itemid=61

Alaska Volcano Observatory
Event Specific Information: Okmok - 2008
<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Okmok&eruptionid=604&page=basics>

Pyroclastic Flows and Surges and Lava Domes
USGS Fact Sheet 075-98 Can Another Great Volcanic Eruption Happen in Alaska?
Webpage <http://pubs.usgs.gov/fs/fs075-98/>
PDF <http://pubs.usgs.gov/fs/fs075-98/>

Volcanic Gases / Acidification
2005 Volcanic activity in Alaska, Kamchatka, and the Kurile Islands: Summary of events and response of the Alaska Volcano Observatory
<http://pubs.usgs.gov/sir/2007/5269/pdf/sir20075269.pdf>

Alaska Volcano Observatory
Event Specific Information: Chiginagak - 2005
<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Chiginagak&eruptionid=535&page=basics>

Historic Volcanic Activity in Alaska

USGS Fact Sheet 030-97 Volcanic Ash – Danger to Aircraft in the North Pacific
Webpage <http://pubs.usgs.gov/fs/fs030-97/>
PDF <http://pubs.usgs.gov/fs/fs030-97/fs030-97.pdf>

Historic Volcanic Activity in Alaska

Alaska Volcano Observatory About Alaska’s Volcanoes
<http://www.avo.alaska.edu/volcanoes/about.php>

USGS Fact Sheet 075-98 Can Another Great Volcanic Eruption Happen in Alaska?
Webpage <http://pubs.usgs.gov/fs/fs075-98/>
PDF <http://pubs.usgs.gov/fs/fs075-98/>

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Alaska Volcano Observatory

Event Specific Information:

Augustine – 1986

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Augustine&eruptionid=411&page=basics>

Augustine – 2005

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Augustine&eruptionid=547&page=basics>

Augustine - 1883

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Augustine&eruptionid=332&page=basics>

Redoubt 1989

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Redoubt&eruptionid=442&page=basics>

Alaska interagency operating plan for volcanic ash episodes (2008)

http://www.avo.alaska.edu/pdfs/cit3996_2008.pdf

Redoubt Volcano, Cook Inlet, Alaska - 2009

Alaska Volcano Observatory

Event Specific Information: Redoubt - 2009

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Redoubt&eruptionid=610&page=basics>

Alaska Department of environmental Conservation

Unified Command: Drift River Terminal Coordination

http://www.dec.state.ak.us/spar/perp/response/sum_fy09/090324201/090324201_index.htm

Section 3.5 Earthquakes

General

Alaska earthquake Information Center (AEIC)

<http://www.aeic.alaska.edu/>

USGS Earthquake Hazards Program

<http://earthquake.usgs.gov/>

NOAA West Coast and Alaska Tsunami warning Center (WC/ATWC)

<http://wcatwc.arh.noaa.gov/>

Figures

Figure 3.5.1 Seismicity in Alaska regions for 2010-2013. From the Alaska Earthquake Information Center (AEIC).

Figure 3.5.2 To accommodate the projected fault movement and intense earthquake shaking from a magnitude 8.0 quake, the zigzagging Trans-Alaska Oil Pipeline, where it crosses the Denali Fault, is supported on Teflon shoes that are free to slide on long horizontal steel beams.

<http://pubs.usgs.gov/fs/2003/fs014-03/pipeline.html>

Figure 3.5.3 Location of Castle Mountain fault in south central Alaska, and previous USGS maps along the fault.

<http://pubs.usgs.gov/of/2001/of01-504/>

Figure 3.5.5 Earthquakes in Alaska from the USGS

<http://geopubs.wr.usgs.gov/open-file/of95-624/>

Tables

Table 3.5.1 Relationship of the Levels of Modified Mercalli Intensity and Magnitude

The table gives intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes. USGS Magnitude / Intensity Comparison

http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

Seismic History in Alaska

Alaska Earthquake Information Center

<http://www.aeic.alaska.edu/>

USGS Earthquake Hazard Program largest earthquakes in the United States

http://earthquake.usgs.gov/earthquakes/states/10_largest_us.php

The Great Alaskan Earthquake Good Friday 1964

USGS Historic Earthquakes Prince William Sounds, AK 1964

http://earthquake.usgs.gov/earthquakes/states/events/1964_03_28.php

AEIC The Great Alaska Earthquake of 1964

http://www.aeic.alaska.edu/quakes/Alaska_1964_earthquake.html

WC/ATWC The Great Alaskan Earthquake and Tsunamis of 1964

<http://wcatwc.arh.noaa.gov/64quake.htm>

Andreanof Islands 1957

USGS Historic Earthquakes Andreanof, Island Alaska 1957

http://earthquake.usgs.gov/earthquakes/states/events/1957_03_09.php

AEIC July 2006 Andreanof Islands Earthquakes

http://www.aeic.alaska.edu/quakes/andreanof_islands_2006.html

University of Washington Earth and Space Science (ESS) 1957 Aleutian Tsunami

<http://www.ess.washington.edu/tsunami/general/historic/aleutian57.html>

The Denali Earthquake 2002

AEIC M 7.9 Denali fault earthquake of November 3, 2002

http://www.aeic.alaska.edu/Denali_Fault_2002/

USGS Fact Sheet 014-03 Rupture in South-Central Alaska – The Denali Fault Earthquake of 2002

Webpage <http://pubs.usgs.gov/fs/2003/fs014-03/>

PDF <http://pubs.usgs.gov/fs/2003/fs014-03/fs014-03.pdf>

Alaska Division of Geological and Geophysical Surveys

Denali fault Earthquake Information

http://www.dggs.dnr.state.ak.us/?menu_link=engineering&link=denali_fault

Statewide

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AEIC Queen Charlotte – fair-weather fault system

http://www.aeic.alaska.edu/maps/QueenCharlotteFairweather_fault.html

USGS Historic Earthquakes Lituya Bay, Alaska 1958

http://earthquake.usgs.gov/earthquakes/states/events/1958_07_10.php

University of Southern California (USC) Tsunami Research Group 1958 Lituya Bay Tsunami

<http://www.usc.edu/dept/tsunamis/alaska/1958/webpages/index.html>

Section 3.6 Tsunamis & Seiches

General

Lander, J. F. (1996). *Tsunamis Affecting Alaska 1737-1996*. Boulder: US Department of Commerce.

National Tsunami Hazard Mitigation Program (2001). *Designing for Tsunamis: Seven Principles for Planning and Designing for Tsunami Hazards*.

[http://www.oes.ca.gov/Operational/OESHome.nsf/PDF/Tsunamis,%20Designing%20for%20/\\$file/DesignForTsunamis.pdf](http://www.oes.ca.gov/Operational/OESHome.nsf/PDF/Tsunamis,%20Designing%20for%20/$file/DesignForTsunamis.pdf)

USGS Circular 1187 Surviving a Tsunami – Lessons Learned from Chile, Hawaii and Japan

<http://pubs.usgs.gov/circ/c1187/>

Atwater, B. and others (2005). *The Orphan Tsunami of 1700 Japanese Clues to a Parent Earthquake in North America*. USGS Professional Paper 1707.

<http://pubs.usgs.gov/pp/pp1707/>

NOAA Center for Tsunami Research

<http://nctr.pmel.noaa.gov/state/nrc/index.html>

Figures

Figure 3.6.1 Close-up view of tsunami damage along the waterfront at Kodiak. USGS photo.

http://earthquake.usgs.gov/earthquakes/states/events/1964_03_28_pics.php

Figure 3.6.2 Alaska 1964 Good Friday earthquake and tsunami damage, Seward, AK. From the NOAA Photo Library <http://www.photolib.noaa.gov/htmls/cgs02068.htm>

Figure 3.6.3 Aerial image of Valdez, Alaska, showing the extent of inundation along the coastline following the tsunami generated by an earthquake on March 27, 1964. A slice of the delta, approximately 1,220 m long and 183 m wide, slid into the sea and carried the dock area and portions of the town with it. Photo credit the Dept. of Interior & NOAA.

<http://www.noaanews.noaa.gov/stories2005/s2409.htm>

Figure 5.7.4 DART Mooring System. NOAA. http://www.tsunami.noaa.gov/tsunami_story.html

Figure 5.7.5 DART Locations from NOAA <http://www.oar.noaa.gov/news/2008/dart.html>.

Types of Tsunami

Volcanic Tsunami

Alaska Volcano Observatory

Event Specific Information: Augustine - 1883

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcane=Augustine&eruptionid=332&page=basics>

USGS Hawaiian Volcano Observatory September 4, 2008 Volcano Watch - Summer explosive eruptions in Alaska keep scientists and airlines on edge

http://hvo.wr.usgs.gov/volcanowatch/2008/08_09_04.html

Historical Tsunamis

1964 Earthquake Tsunami

Also see the links above in 5.6 Earthquakes

USGS Historic Earthquakes Prince William Sound, Alaska Largest Earthquake in Alaska Damage Photos

http://earthquake.usgs.gov/earthquakes/states/events/1964_03_28_pics.php

USGS Alaska Earthquake History

<http://earthquake.usgs.gov/earthquakes/states/alaska/history.php>

NOAA News: OFFICIALS TEST ALASKA TSUNAMI WARNING SYSTEM FOR THE FIRST TIME "Live" Warnings Part of Tsunami Awareness Week

<http://www.noaanews.noaa.gov/stories2005/s2409.htm>

1958 Lituya Bay Tsunami

WC/ATWC July 10, 1958 Southeastern Alaska Tsunami - Lituya Bay Narrative

http://wcatwc.arh.noaa.gov/web_tsus/19580710/narrative1.htm

1946 Unimak Island Tsunami

University of Washington Earth and Space Sciences 946 Aleutian Tsunami

<http://www.ess.washington.edu/tsunami/general/historic/aleutian46.html>

USGS Historic Earthquakes Unimak Island 1956

http://earthquake.usgs.gov/earthquakes/states/events/1946_04_01.php

USC Tsunami Research Group 1946 Aleutian Tsunami

<http://www.usc.edu/dept/tsunamis/alaska/1946/webpages/index.html>

1994 Skagway Tsunami

WCA/TWC November 4, 1994 Southeastern Alaska Tsunami - Skagway Narrative

http://wcatwc.arh.noaa.gov/web_tsus/19941104/narrative1.htm

Section 3.7 Severe Weather

General

Alaska Weather and Climate Highlights

<http://ine.uaf.edu/accap/awch/index.htm>

The Alaska Climate Research Center

<http://climate.gi.alaska.edu/>

Climate Central

<http://climatecentral.org>

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Figures

Figure 3.7.3 At Eielson Air Force Base, Alaska lighting strikes during a thunderstorm, June 17, 2007. Photo credit U.S. Air Force Airman 1st Class Jonathan Scholl.

<http://www.eielson.af.mil/photos/mediagallery.asp?galleryID=2480&?id=-1&page=1&count=24>

Figure 3.7.4 A Surfbird protects its eggs from hail on the Alaska Peninsula. Photo from USGS.

http://alaska.usgs.gov/science/biology/shorebirds/photo_gallery.html.

Figure 3.7.5 In Shaktoolik, the natural barrier between the homes and the ocean has diminished from coastal storms in 2003, 2004 and 2005. Photo from DCRA.

<http://www.dced.state.ak.us/dca/ACCIMP.htm>

Figure 3.7.6 October 20, 2004- The Biggest Storm to Hit Nome in 30 years. Photo from DCRA.

http://www.dced.state.ak.us/dcra/photos/comm_list.cfm?error=1&CFID=3977208&CFTOKEN=29789598

Figure 3.7.7 The ice-inundated Barrow coast line during an ivu event. Photo credit US Army Corps of Engineers Alaska District.

http://www.erdc.usace.army.mil/pls/erdcpub/www_org_info.show_page?f_id=3416045&f_parent=55174

Hazard Characteristics

Climate Change

Alaska Climate Change Impact Mitigation Program (ACCIMP)

<http://www.dced.state.ak.us/dca/ACCIMP.htm>

Section 3.8 Ground Failure

General

USGS Landslide Types and Processes (2004)

<http://pubs.usgs.gov/fs/2004/3072/fs-2004-3072.html>

UAF Geophysical Institute Permafrost Laboratory

<http://permafrost.gi.alaska.edu>

Figures

Figure 3.8.1 Permafrost Map of Alaska from the University of Alaska Fairbanks

http://www.lter.uaf.edu/gis/gis_data.cfm

Mass Movements

Complex Mass Movement

Alaska Railroad Corporation News Releases

Passenger Service Scheduled for Whittier after Rock Slide

http://alaskarailroad.com/Portals/6/pdf/pr/2009_04_13_Rls.pdf

http://alaskarailroad.com/Portals/6/pdf/pr/2009_04_13_Rls2.pdf

http://alaskarailroad.com/Portals/6/pdf/pr/2009_04_14_Rls.pdf

http://alaskarailroad.com/Portals/6/pdf/pr/2009_04_14_Rls2.pdf

http://alaskarailroad.com/Portals/6/pdf/pr/2009_04_21_Rls.pdf

http://alaskarailroad.com/Portals/6/pdf/pr/2009_04_23_Rls.pdf

Seasonally Frozen Ground and Permafrost

NOAA Arctic theme page Arctic Change Land Permafrost
<http://www.arctic.noaa.gov/detect/land-permafrost.shtml>

Ground Failure in Alaska

USGS Scientific Investigations Map 3077 Maps Showing Seismic Landslide Hazards in Anchorage, Alaska (2009)
http://pubs.usgs.gov/sim/3077/downloads/3077_pamphlet_508.pdf

Warming Could Mean Major Thaw For Alaska Permafrost

<http://www.climatecentral.org/news/warming-could-mean-major-thaw-alaska-permafrost-19917>

Section 3.9 Erosion

Figures

Figure 3.9.1 This cabin fell into the Beaufort Sea, along Alaska's Arctic coast, in a region where some coastlines retreated more than 24 meters (80 feet) in 2007. USGS photo.

<http://earthobservatory.nasa.gov/Features/SeaIce/page3.php>

Figure 3.9.2 Drew Point, 2004. Coastal erosion of mud-rich permafrost along Beaufort Sea coastline. Cliff height is ~3–4 m. Waves undercut permafrost and cause block slumping (center of photo). Photograph depicts no sand beach present to protect permafrost

http://energy.usgs.gov/alaska/ak_coastalerosion_images.html

Figure 3.9.3 Dozens of communities throughout Alaska where erosion was believed to be causing negative impacts are noted. From USACE Baseline Erosion Study, Figure 3-1.

http://www.climatechange.alaska.gov/docs/iaw_USACE_erosion_rpt.pdf

Hazard Characteristics

Natural Resource Management

USGS Documents Alaska Coastal Erosion
<http://www.usgs.gov/newsroom/article.asp?ID=1701>

Riverine Erosion in Alaska

USGS Matanuska River Bank Erosion Project
<http://ak.water.usgs.gov/MatSu/mrbe/index.php>

Section 3.10 Dams

Dams in Alaska

Alaska Dam Safety Program
<http://dnr.alaska.gov/mlw/water/dams/>

Section 3.11 Hazardous Materials

Hazard Characteristics

Statewide Hazardous Materials (HAZMAT) Commodity Flow Study
http://www.ak-prepared.com/serc/acrobat_docs/hazmat_flow_study.pdf

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Air Quality

Alaska DEC Division of Air Quality

<http://www.dec.state.ak.us/air/>

Drinking Water Supply System

Alaska DEC Division of Environmental Health Drinking Water Program

<http://www.dec.state.ak.us/eh/dw/>

Wastewater Disposal System

Alaska DEC Division of Water Wastewater Discharge Authorization

<http://www.dec.state.ak.us/water/wwdp/index.htm>

Section 3.12 Terrorism

Examples of Terrorism

The 9/11 Commission Report

<http://www.9-11commission.gov/report/911Report.pdf>

The Oklahoma Department of Civil Emergency Management After Action Report Alfred P. Murrah Federal Building Bombing 19 April 1995 in Oklahoma City, Oklahoma

<http://www.ok.gov/OEM/documents/Bombing%20After%20Action%20Report.pdf>

Section 3.13 Technological, Public Health, and Human-Caused

General

Nevada Hazard Mitigation Plan http://dem.state.nv.us/Hazard_Mitigation.shtml

Kansas Hazard Mitigation Plan

[http://www.kansas.gov/kdem/EMSWeb/pdf/mitigation/Kansas State Hazard Mitigation Plan Draft 2010.pdf](http://www.kansas.gov/kdem/EMSWeb/pdf/mitigation/Kansas_State_Hazard_Mitigation_Plan_Draft_2010.pdf)

Missouri Hazard Mitigation Plan <http://sema.dps.mo.gov/State%20HMP%20-%20Enhanced.pdf>

Hazard Characteristics

Technological and Cyber Threats

State Security Office

http://doa.alaska.gov/ets/security/sso_liaisons.html

Public Health Emergencies

Influenza (H1N1, H5N1 and Pandemic)

State of Alaska Division of Public Health, Pandemic Influenza website materials and other sources identified

<http://www.pandemicflu.alaska.gov/>

USGS Alaska Science Center Avian Influenza

http://alaska.usgs.gov/science/biology/avian_influenza/

Mass Transportation Accidents

Visitor Statistics

Alaska Office of Tourism Development
Tourism Research

Alaska Visitor Statistics Program V
<http://www.commerce.state.ak.us/oed/toubus/research.htm>

Air Statistics

Ted Stevens Anchorage International Airport
Airport Information; Airport Statistics
<http://www.dot.state.ak.us/anc/business/airServiceDevelopment/statistics/index.shtml>

Airport Police & Fire
<http://www.dot.state.ak.us/anc/business/policefire/index.shtml>

Rail Statistics

Alaska railroad Corporation Fact Sheet
<http://alaskarailroad.com/AboutARRC/FactSheet/tabid/452/Default.aspx>

Section 3.14 Economic

Understanding Alaska: People, Economy, and Resources Institute of Social and Economic Research at the University of Alaska Anchorage, May 2006.
http://www.iser.uaa.alaska.edu/Publications/UA_summ06.pdf

U.S. Department of Commerce Press Release, Commerce Secretary Gary Locke Announces "Fishery Failure" Determination for Alaska Chinook Salmon January 15, 2010
<http://www.commerce.gov/news/press-releases/2010/01/15/commerce-secretary-gary-locke-announces-fishery-failure-determination>

6.3.4 Chapter 4 Hazard Analysis

Population

Table 4.3 Press Release Labor Department Releases State, Borough and Place 2012 Populations by the Alaska Department of Labor and Workforce Development on January 26, 2010
<http://labor.state.ak.us/news/2012/news10-07.pdf>

Table 4.4 Breakdown of Property Values by Use Values Reflected are Actual Assessed (in millions). Data from Alaska Taxable for the years 2007, 2008 and 2009 from the State of Alaska Department of Commerce, Community and Economic Development.
<http://www.dced.state.ak.us/dca/osa/pub/07Taxable.pdf>
<http://www.dced.state.ak.us/dca/osa/pub/087Taxable.pdf>
<http://www.dced.state.ak.us/dca/osa/pub/09Taxable.pdf>

Table 4.5 Historical Summary of Property Tax Rates - Mill Rates. Data from Alaska Taxtable for 2009 from the State of Alaska Department of Commerce, Community and Economic Development.
<http://www.dced.state.ak.us/dca/osa/pub/09Taxable.pdf>

Table 4.8 Hazards Vulnerability Assessments by Borough and REAA TBD. State employee information is from the State of Alaska Workforce Profile Fiscal Year 2009.
http://doa.alaska.gov/dop/fileadmin/dop_home/pdf/dopannualreport.pdf

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State Facilities

Alaska Department of Transportation and Public Facilities

<http://www.dot.state.ak.us/>

Alaska Department of Administration

<http://doa.alaska.gov/drm/>

Mt. Edgecumbe High School

<http://www.mehs.educ.state.ak.us/>

University of Alaska

<http://www.alaska.edu/>

Alaska Department of Education and Early Development

<http://www.eed.state.ak.us/home.html>

Association of Alaska School Boards

<http://aasb.org/>

University of Alaska 2012 Facilities Inventory, Statewide Planning and Budget, 2012

<http://www.alaska.edu/facilities/2009FacilityInventoryFINAL.pdf>

State of Alaska Workforce Profile Fiscal Year 2012

http://doa.alaska.gov/dop/fileadmin/dop_home/pdf/dopannualreport.pdf

State of Alaska Department of Transportation & Public Facilities Highway DataPort

<http://www.dot.state.ak.us/hdpapp/forms/Reports.html?categoryId=1.+HDP+Route+Log/List+Query+Reports>

Section 4.2 Wildland and Community Fire Conflagration

Fire Management Options in Alaska

Alaska Interagency Wildland Fire Management Plan

<http://fire.ak.blm.gov/administration/awfcg.php>

Section 4.4 Volcanoes

Alaska Volcano Observatory Volcano Hazard Assessments

<http://www.avo.alaska.edu/downloads/classresults.php?pregen=haz>

Alaska interagency operating plan for volcanic ash episodes (2008)

http://www.avo.alaska.edu/pdfs/cit3996_2008.pdf

USGS Fact Sheet 2006-3139 U.S. Geological Survey's Alert Notification System for Volcanic Activity

<http://pus.usgs.gov/fs/2006/3139/>

Section 4.5 Earthquakes

Figures

Figure 4.5A. Peak Ground Acceleration with 10% probability of exceedance in 50 years from USGS Mapped Ground Motion Hazard Values from Revision of Time-Independent Probabilistic Seismic Hazard Maps from Alaska, USGS OFR 2007-1043, Figure 11A, p.25.

http://pubs.usgs.gov/of/2007/1043/pdf/of07-1043_508.pdf

Figure 4.5B. Time-independent probabilistic seismic hazard map for Alaska portraying peak ground acceleration with 10% probability of exceedance in 50 years from the USGS hazard Mapping Images and Data. Maps were produced assuming firm rock soil conditions at 760 m/sec.

<http://earthquake.usgs.gov/hazards/products/ak/2007/maps/>

USGS Mapped Ground Motion Hazard Values from Revision of Time-Independent Probabilistic Seismic Hazard Maps from Alaska, USGS OFR 2007-1043, Figure 11A, p.25.

http://pubs.usgs.gov/of/2007/1043/pdf/of07-1043_508.pdf

USGS hazard Mapping Images and Data. Maps were produced assuming firm rock soil conditions at 760 m/sec.

<http://earthquake.usgs.gov/hazards/products/ak/1999/data/>

Section 4.8 Ground Failure

Figures

Figure 4.7 Individual Alaska Permafrost Observatories (APO) map from

http://www.gi.alaska.edu/snowice/Permafrost-lab/projects/projects_active/proj_processes.html

Brown, J., O.J. Ferrians Jr., J.A. Heginbottom, and E.S. Melnikov. 1998. revised February 2001. Circum-Arctic map of permafrost and ground-ice conditions. Boulder, CO: National Snow and Ice Data Center/World Data Center for Glaciology. Digital Media.

<http://nsidc.org/data/ggd318.html>

Section 4.9 Erosion

USACE Baseline Erosion Assessment

<http://www.poa.usace.army.mil/AKE/Home.html>

6.3.5 Chapter 5 Mitigation Strategies and Goals

Public Education

Department of Homeland Security and Emergency Management (DHS&EM)

<http://www.ak-prepared.com/>

Kenai Peninsula Borough Be Prepared

<http://www.borough.kenai.ak.us/emergency/prepared/emergency.htm>

Municipality of Anchorage Emergency Watch

A Neighborhood Preparedness Program

<http://www.muni.org/Departments/OEM/Prepared/Pages/EmergencyWatch.aspx>

DGGS Guide to geologic hazards in Alaska

http://www.dggs.dnr.state.ak.us/index.php?menu_link=engineering&link=geohazards&sub_link=hazards

Section 5.1 Floods

Existing Programs and Strategies

RiverWatch http://aprhc.arh.noaa.gov/index_rivs.php

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DHS&EM Alaska Emergency Response Guide for Small Communities

2010 Alaska Emergency Response Guide for Small Communities

PDF http://www.ak-prepared.com/documents/AK_Emergency_Response_Guide%20signed.pdf

National Flood Insurance Program (NFIP)

[State of Alaska NFIP Information]

<http://www.dced.state.ak.us/dca/planning/nfip/communities.htm>

Natural Resources Conservation Service Emergency Watershed Protection Program

<http://www.nrcs.usda.gov/programs/ewp/>

WaterWatch <http://waterwatch.usgs.gov/?m=flood&r=us&w=flood%2Cmap/>

Hazard Mitigation Successes

Flood Map Modernization Project and FEMA RISKMap

State of Alaska Floodplain Management Links

<http://www.commerce.state.ak.us/dcra/planning/nfip/links.htm>

Section 5.2 Wildland and Community Fire Conflagration

Programs and Strategies

Alaska Wildland Fire Coordinating Group

AWFCG Memorandum of Understanding and Standard Operating Procedures and

Alaska Interagency Wildland Fire Management Plan

<http://fire.ak.blm.gov/administration/awfcg.php>

And Committees and their charters http://fire.ak.blm.gov/administration/awfcg_committees.php

Alaska Interagency Coordination Center (AICC) <http://fire.ak.blm.gov/aicc.php>

Community Wildfire Protection Plans (CWPP) <http://forestry.alaska.gov/fire/cwpp/>

Alaska FireWise / FireWise Communities/USA <http://forestry.alaska.gov/fire/firewise.htm>

Hazard Mitigation Successes

Anchorage Fire Department

<http://www.muni.org/Departments/Fire/Wildfire/Pages/programreports.aspx>

And Municipality of Anchorage Fire Department Wildfire Mitigation

<http://www.muni.org/departments/fire/wildfire/pages/default.aspx>

Alaska FireWise Brochure

[in D. Brochures and Education Materials]

<http://fire.ak.blm.gov/administration/awfcg.php>

Alaska Rural Wildland Fire Prevention Video

http://dnr.alaska.gov/shared/mediareleases/dsp_media_release.cfm?id=1385&title=Rural%20Alaska%20Fire%20Prevention%20Video

Tok Wildland Fire Fuel Reduction and Biomass Heating Project

<http://forestry.alaska.gov/pdfs/08TokFireMitigationSchoolProject.pdf>

Figures

Figure 5.3.6 Douglas after the fire, March 9, 1911. Alaska State Library PCA 01-959.

<http://www.juneau.org/history-old/dglphoto.php>

Community Fire Conflagration Hazard Description and Characterization

The Chicago Fire [of 1871] Chicago Historical Society

<http://www.chicagohs.org/history/fire.html>

The 1906 San Francisco Earthquake and Fire - National Archives-Pacific Region (San Francisco)

<http://www.archives.gov/exhibits/sf-earthquake-and-fire/>

Programs and Strategies

Education and Prevention

Division of Fire and Life Safety

<http://www.dps.state.ak.us/fire/>

Section 5.3 Snow Avalanches

Programs and Strategies

Alaska Mountain Safety Center and Alaska Avalanche School

<http://www.alaskaavalanche.com/Site/Homepage.html>

Chugach National Forest Avalanche Information Center <http://www.cnfaic.org/>

Alaska Avalanche Information Center <http://www.alaskasnow.org/>

City and Borough of Juneau

City and Borough of Juneau Urban Avalanche Advisory

<http://www.juneau.org/avalanche/>

Figures

Figure 5.11 Alaska Land Cover Data from the USGS EROS Alaska Field Office Alaska

Geospatial Data Clearing House

http://agdc.usgs.gov/data/usgs/erosafo/ak_lcc/ak_lcc.html

Section 5.4 Volcanoes

Programs and Strategies

Alaska Volcano Observatory <http://www.avo.alaska.edu/>

Kamchatka Volcanic Emergency response Team (KVERT)

<http://www.avo.alaska.edu/activity/kvert.php>

Hazard Mitigation Successes

Augustine Volcano, Cook Inlet, Alaska - 2006

Alaska Volcano Observatory

Event Specific Information: Augustine - 2005

<http://www.avo.alaska.edu/volcanoes/volcact.php?volcname=Augustine&eruptionid=547&page>

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=basics

2006 Volcanic activity in Alaska, Kamchatka, and the Kurile Islands: Summary of events and response of the Alaska Volcano Observatory

<http://pubs.usgs.gov/sir/2008/5214/pdf/sir20085214.pdf>

Alaska Volcano Observatory <http://www.avo.alaska.edu/>

Section 5.5 Earthquakes

Existing Programs and Strategies

Outreach

Alaska Seismic Hazard Safety Commission (ASHSC)

http://www.seismic.alaska.gov/seismic_hazards_safety_commission.htm

Science and Planning Initiatives

USGS Did You Feel It?

<http://earthquake.usgs.gov/earthquakes/dyfi/>

Municipality of Anchorage Geotechnical Advisory Commission (GAC)

<http://www.muni.org/Departments/Planning/Pages/Boards.aspx#GAC>

Alaska Coastal Management Program (ACMP)

<http://dnr.alaska.gov/coastal/acmp/>

USGS Did You Feel It?

<http://earthquake.usgs.gov/earthquakes/dyfi/>

Public School Structural Mitigation Initiatives

Recommendation for Evaluating Existing Public Schools for Seismic Safety

http://www.dggs.alaska.gov/download/ashsc_meetings_minutes/ASHSC_Announcement_ADEE_D_Memo.pdf

Map - Public Schools and Earthquake Hazard in Alaska

http://www.dggs.alaska.gov/download/ashsc_meetings_minutes/ASHSC_Announcement_ADEE_D_Map.pdf

Table - Alaska Public Schools Sorted by Probabilistic Peak Ground Accelerations

http://www.dggs.alaska.gov/download/ashsc_meetings_minutes/ASHSC_Announcement_ADEE_D_List.pdf

Hazard Mitigation Successes

Are you prepared for the Next Big Earthquake in Alaska?

http://www.aEIC.alaska.edu/html_docs/nextbigeq.html

Alaska Seismic Hazard Safety Commission (ASHSC)

http://www.seismic.alaska.gov/seismic_hazards_safety_commission.htm

Local Emergency Planning Committees (LEPC)

http://www.ak-prepared.com/serc/lepc_home.htm

USGS Scientific Investigations Map 3077 Maps Showing Seismic Landslide Hazards in Anchorage, Alaska (2009)

http://pubs.usgs.gov/sim/3077/downloads/3077_pamphlet_508.pdf

Section 5.6 Tsunamis and Seiches

Programs and Strategies

NOAA Tsunami Warning System

NOAA Tsunami Warnings & Forecasts http://www.tsunami.noaa.gov/warnings_forecasts.html

NOAA Deep-ocean Assessment and Reporting of Tsunami (DART)

<http://nctr.pmel.noaa.gov/Dart/>

West Coast and Alaska Tsunami Warning Center (WC/ATWC) <http://wcatwc.arh.noaa.gov/>

Pacific Tsunami Warning Center (PTWC) <http://www.weather.gov/ptwc/>

U.S. National Tsunami Hazard Mapping Program (NTHMP) <http://nthmp.tsunami.gov/>

TsunamiReady Communities

TsunamiReady <http://www.tsunamiready.noaa.gov/>

Alaska Tsunami Inundation Mapping Program <http://www.aeic.alaska.edu/tsunami/>

Tsunami hazard maps of the Homer and Seldovia areas (RI 2005-2)

<http://www.dggs.alaska.gov/pubs/pubs?reqtype=citation&ID=14474>

Tsunami hazard maps of the Kodiak area (RI 2002-1)

<http://www.dggs.alaska.gov/pubs/pubs?reqtype=citation&ID=2860>

Tsunami inundations maps of Seward and northern Resurrection bay ((RI 2010-1)

<http://www.dggs.alaska.gov/pubs/pubs?reqtype=citation&ID=21001>

Hazard Mitigation Successes

Test of the Alaska Tsunami Warning System and Tsunami Awareness Week

Tsunami Warning System Test 2010 [participation feedback] <http://www.tsunami.gov/test>

Education and Outreach

Alaska Tsunami Education Program <http://www.aktsunami.com/>

Section 5.7 Severe Weather

Programs and Strategies

Storm Ready <http://www.stormready.noaa.gov/>

National Weather Service and the U.S. Coast Guard "Operation Weather Blanket" Project

NWS/USCG Weather Blanket Network (2007)

<http://www.nws.noaa.gov/directives/sym/pd03021007a032004curr.pdf>

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Section 5.8 Ground Failure

Programs and Strategies

Alaska Permafrost Observatory (APO)

http://www.gi.alaska.edu/snowice/Permafrost-lab/projects/projects_active/proj_processes.html

National Resources Conservation Service Alaska Soil Survey Information

<http://www.ak.nrcs.usda.gov/soils/index.html>

USGS Landslide Hazards Program

<http://landslides.usgs.gov/advisories/>

Section 5.9 Erosion

Programs and Strategies

State of Alaska Erosion Management Policy

http://www.commerce.state.ak.us/dca/nfip/pub/NFIP_Policy.pdf

DHS&EM Alaska Emergency Response Guide for Small Communities 2010 PDF

http://www.akprepared.com/documents/AK_Emergency_Response_Guide%20signed.pdf

Hazard Mitigation Successes

US Army Corps of Engineers Alaska Baseline Erosion Assessment

<http://www.poa.usace.army.mil/AKE/Home.html>

Shishmaref Relocation Strategic Plan

Shishmaref Erosion and Relocation Coalition

<http://www.shishmarefrelocation.com/index.html>

Newtok Planning Group / Newtok Relocation Strategic Management Plan

A Brief History of the Settlement of Newtok and Village Relocation Efforts

http://www.commerce.state.ak.us/dca/planning/pub/Newtok_History4.pdf

Kenai Riverbank Restoration

http://www.kenairivercenter.org/General/KRC_Riverbank.html

Streambed Revegetation and Protection Guide for Alaska, Revised 2005

Lessons Learned: <http://www.sf.adfg.state.ak.us/SARR/restoration/techniques/lessons.cfm>

Erosion Control: <http://www.sf.adfg.state.ak.us/SARR/restoration/techniques/erosion.cfm>

Alaska Climate Change Impact Mitigation Program

<http://www.dced.state.ak.us/dca/ACCIMP.htm>

Section 5.10 Dams

Hazard Mitigation Successes

Guidelines for Cooperation with the Alaska Dam Safety Program

http://dnr.alaska.gov/mlw/water/dams/AK_Dam_Safety_Guidelines062005.pdf

Section 5.11 Hazardous Materials

Programs and Strategies

ADEC Prevention and Emergency Response Program

<http://www.dec.state.ak.us/spar/perp/>

Preparedness

<http://www.dec.state.ak.us/spar/preparedness.htm>

Response

<http://www.dec.state.ak.us/spar/perp/index.htm>

Alaska Incident Management System (AIMS)

<http://www.dec.state.ak.us/spar/preparedness.htm#aims>

and AIMS Guide http://www.akrrt.org/aim/aim_toc.shtml

Alaska DEC Spill tactics for Alaska Responders (STAR)

<http://www.dec.state.ak.us/spar/perp/star/index.htm>

Alaska Commercial Fisheries Water Quality Sampling Methods and Procedures Manual

http://www.dec.state.ak.us/spar/perp/wq/wq_manual.htm

Geographic Response Strategies for Alaska

<http://www.dec.state.ak.us/spar/perp/grs/home.htm>

Place of Refuge for Alaska

<http://www.dec.state.ak.us/spar/perp/ppor/home.htm>

Tundra Treatment Guidelines

http://www.dec.state.ak.us/spar/perp/r_d/ttman/tt_man.htm

In Situ Burning Guidelines for Alaska

http://www.akrrt.org/ISB_GuidelinesRev1/Final/Final-2008.pdf

Statewide Hazardous Material Response

Alaska DEC Statewide Hazardous Material Response booklet

<http://www.dec.state.ak.us/spar/perp/docs/hazmat.pdf>

Alaska Statewide Hazardous Materials Response Team

Alaska DEC Hazmat Response Team

<http://www.dec.state.ak.us/spar/perp/hazmat.htm>

and http://www.dec.state.ak.us/spar/perp/docs/hmrt_feb05.pdf

State Emergency Response Commission (SERC)

<http://www.ak-prepared.com/serc/default.htm>

Federal Program

EPA Office of Solid Waste and Emergency Response (OWSNER)

<http://www.epa.gov/oswer/>

Section 5.12 Terrorism

Programs and Strategies

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Security and Vulnerability Assessment Team

The Division of Homeland Security and Emergency Management Security and Vulnerability Assessment (SVA) Team

<http://ready.alaska.gov/security/>

5.13 Technological, Public Health, and Human Caused

Hazard Mitigation Successes

Alaska Shield 2010 (April 26 - May 1)

Exercise Division of Homeland Security and Emergency Management Exercise Team

<http://ready.alaska.gov/homelandsecurity/exercise/exercise.htm>

SOA DMVA Alaska Shield, Vigilant Guard Arctic Edge Prepares Alaska for Disaster

<http://www.ak-prepared.com/documents/Press%20Release%20-%20Alaska%20Shield%20-%20Vigilant%20Guard%20-%20Arctic%20Edge.pdf>

The State Security Office

http://doa.alaska.gov/ets/security/sso_liaisons.html

6.3.6 Chapter 6 Additional Resources

Local Community Mitigation Plans are listed on the DCCED web site at:

<http://www.commerce.state.ak.us/dca/planning/nfip/mitigation.htm>

The USACE Baseline Erosion Assessment is available at

<http://www.poa.usace.army.mil/AKE/Home.html>

The Alaska Municipal Land Management Handbook was produced in 2009 by DCRA and is available on the State web site:

http://www.commerce.state.ak.us/dcra/planning/AKLM/AKLM_home.cfm

See USACE Alaska Baseline Erosion Assessments

<http://www.poa.usace.army.mil/AKE/Home.html>

Federal Programs

Federal Emergency Management Agency Programs

Hazard Mitigation Assistance (HMA) Grants

FY 2010 Hazard Mitigation Assistance (HMA) Unified Guidance

Including: HMGP, PDM, FMA, RFC and SRL for Federal FY 2012

<http://www.fema.gov/library/viewRecord.do?id=3649>

State of Alaska website on Hazard Mitigation Grant Program (HMGP)

<http://ready.alaska.gov/plans/mitigation/hmgp.htm>

State of Alaska website on Flood Hazard Mitigation

<http://www.commerce.state.ak.us/dca/planning/nfip/nfip.htm>

Department of Agriculture

Natural Resource Conservation Service (NRCS) Alaska

<http://www.ak.nrcs.usda.gov/programs/index.html>

U. S. Forest Service Alaska

<http://www.fs.fed.us/r10/>

Department of Commerce

National Oceanic & Atmospheric Administration (NOAA)
National Weather Service (NWS) Alaska Regional Headquarters

<http://www.arh.noaa.gov/>

Office of Coastal Resource Management

<http://coastalmanagement.noaa.gov/>

Department of Defense

Army Corps of Engineers (USACE) Alaska

<http://www.poa.usace.army.mil/hm/default.htm>

National Flood Proofing Committee <http://www.nwo.usace.army.mil/nfpc/>

Department of Health, Education & Welfare

Center for Disease Control (CDC) Alaska

<http://www.cdc.gov/niosh/contact/im-alaska.html>

Department of Housing & Urban Development (HUD) Alaska

<http://portal.hud.gov/portal/page/portal/HUD/states/alaska>

Community Development Block Grant

<http://portal.hud.gov/portal/page/portal/HUD/recovery/programs/community>

HOME Investment Partnerships Program

<http://www.hud.gov/offices/cpd/affordablehousing/programs/home/>

Department of the Interior Alaska Region

<http://www.doi.gov/oepe/anchorage.html>

U.S. Geological Survey Alaska Science Center <http://alaska.usgs.gov/>

U.S. Fish & Wildlife Service <http://alaska.fws.gov/>

Bureau of Land Management <http://www.blm.gov/ak/st/en.html>

Bureau of Indian Affairs <http://www.bia.gov/WhoWeAre/RegionalOffices/Alaska/index.htm>

Environmental Protection Agency

<http://yosemite.epa.gov/r10/homepage.nsf/webpage/Alaska%27s+Environment?OpenDocument>

Department of Transportation

Federal Highway Administration <http://www.fhwa.dot.gov/akdiv/index.htm>

Federal Aviation Administration

http://www.faa.gov/about/office_org/headquarters_offices/arc/ro_center/index.cfm?file_name=contact_us_alaska

National Trust for Historic Preservation

<http://www.preservationnation.org/>

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State of Alaska Programs

Department of Commerce, Community & Economic Development (DCCED)

Community Development Block Grants

<http://commerce.alaska.gov/dnn/dcra/Home.aspx>

Alaska Regional Development Organizations (ARDORs)

This program is designed to encourage regional, cooperative economic development and is funded annually through State and federal funds.

<http://commerce.alaska.gov/dnn/ded/Home.aspx>

Additional Mitigation Grant Resources

FEMA Disaster Assistance: A Guide to Recovery Programs

<http://www.fema.gov/library/viewRecord.do?id=2152&fromSearch=fromsearch>

FEMA Apply for Assistance <http://www.fema.gov/assistance/index.shtm>

FEMA Federal Mitigation <http://www.fema.gov/government/mitigation.shtm>

Catalog of Federal Domestic Assistance

<https://www.cfda.gov/>

Appendix 5 – Benefit Cost Analysis

FEMA custom BCA software and training

<http://www.bchelpline.com/>

Appendix 10 – Small and Impoverished Communities

Alaska's Department of Labor Population

<http://laborstats.alaska.gov/?PAGEID=67&SUBID=115>

Appendix 14 – Capability Assessment Questionnaires

Federal 44 CFR 201.4 DMA 2000 legislation (<http://www.fema.gov/pdf/help/fr02-4321.pdf>).

State of Alaska

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Appendices

2013



Yukon River 2013 Ice Jam Flooding in Galena, AK

Department of Military and Veterans Affairs

Prepared By

Division of Homeland Security and Emergency Management

October 2013

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Agency plans and forms included in the State Hazard Mitigation Plan (SHMP) were current at the time of production but are subject to change during the three year SHMP life. See the Division of Homeland Security and Emergency Management web site:
<http://www.ready.alaska.gov/> for the most current documents.

Appendix 1 - Acronyms

| | |
|--------|---|
| AAA | American Avalanche Association |
| AAIC | Alaska Avalanche Information Center |
| AAS | Alaska Avalanche School |
| ACMP | Alaska Coastal Management Program |
| ACCIMP | Alaska Climate Change Impact Mitigation Program |
| ACCRA | American Chamber of Commerce Researchers Association |
| ADF&G | Department of Fish and Game (State of Alaska) |
| ADOI | Alaska Division of Insurance |
| ADSP | Alaska Dam Safety Program |
| AEIC | Alaska Earthquake Information Center |
| AEL&P | Alaska Electric Light and Power Company |
| AEMS | Alaska Emergency Management System |
| AGDC | Alaska Geospatial Data Committee |
| AFS | Alaska Fire Service |
| AGL | Above Ground Level |
| AHS | Alaska Hydrologic Survey |
| AICC | Alaska Interagency Command Center (fire) |
| AIMS | Alaska Incident Management System |
| AIWFMP | <i>Alaska Interagency Wildland Fire Management Plan</i> |
| AKIAC | Alaska Information Analysis Center |
| ALCOM | Alaskan Command |
| AMAC | Alaska Multi-Agency Coordination Group |
| AMSC | Alaska Mountain Safety Center |
| ANC | Ted Stevens International Airport (Anchorage, AK) |
| ANILCA | Alaska National Interest Lands Conservation Act |
| ANSS | Advanced National Seismic System |
| AOR | Area of Responsibility |
| APIP | Alaska Partnership for Infrastructure Protection |
| APO | Alaska Permafrost Observatory |
| ARC | American Red Cross |
| ARCS | Alaska Rural Communication Service |
| ARDORs | Alaska Regional Development Organizations |
| ARRC | Alaska Rail Road Corporation (AKRR) |
| AS | Alaska Statute |
| ASC | Alaska Science Center (USGS) |
| ASF | Alaska Satellite Facility |
| ASHSC | Alaska Seismic Hazard Safety Commission |
| AST | Alaska State Troopers |
| ATAACA | Anti-Terrorism All-Hazard Advisory Council of Alaska |
| AVEC | Alaska Village Electric Cooperative |
| AVO | Alaska Volcano Observatory |
| AWFCG | Alaska Wildfire Fire Coordinating Group |
| BCA | Benefit Cost Analysis |
| BEA | Baseline Erosion Assessment |
| BFE | Base Flood Elevation |

| | |
|--------|--|
| BIA | Bureau of Indian Affairs (US) |
| BLM | Bureau of Land Management |
| BPR | Bottom Pressure Recording |
| CAA | Canadian Avalanche Association |
| CAP | Community Assistance Program |
| CBJ | City and Borough of Juneau |
| CDBG | Community Development Block Grant |
| CDC | Center for Disease Control (US) |
| CFDA | Catalog of Federal Domestic Assistance Programs |
| CFR | Code of Federal Regulations |
| CGIF | Chugach National Forest (USFS Protection Area – fire) |
| CHEMS | Community Health and Emergency Medical Services (State of Alaska) |
| CI | Critical Infrastructure |
| CIAP | Coastal Impact Assistance Program |
| CIP | Capital Improvement Programs |
| CNF | Chugach National Forest |
| CNFAIC | Chugach National Forest Avalanche Information Center |
| COOP | Continuity of Operations |
| CRS | Community Rating System and Valdez/Copper River (DNR Protection Area – fire) |
| CSRA | Community Spill Response Agreements |
| CTP | Cooperating Technical Partnership |
| CWPP | Community Wildfire Protection Plans |
| CVFD | Chugiak Volunteer Fire Department (Alaska) |
| CY | Calendar Year |
| DART | Deep-ocean Assessment and Reporting of Tsunamis |
| DAS | Department of Administration and Delta Area (DNR Protection Area – fire) |
| DC | Department of Corrections |
| DCA | Division of Community Advocacy (State of Alaska) |
| DCBD | Division of Community & Business Development (State of Alaska) |
| DCCED | Department of Commerce, Community and Economic Development (State) |
| DCI | Disaster Cost Index |
| DCRA | Division of Community and Regional Affairs (State of Alaska) |
| DEC | Department of Environmental Conservation (State of Alaska) |
| DEED | Department of Education and Early Development (State of Alaska) |
| DFLS | Division of Fire and Safety (State of Alaska) |
| DGC | Division of Governmental Coordination (State of Alaska) |
| DGGS | Division of Geologic and Geophysical Surveys (State of Alaska) |
| DHS&EM | Division of Homeland Security and Emergency Management (State of Alaska) |
| DHSS | Department of Health and Social Services (State of Alaska) |
| DLAW | Department of Law (State of Alaska) |
| DMA | Disaster Mitigation Act of 2000 |
| DMVA | Department of Military and Veterans Affairs (State of Alaska) |
| DNR | Department of Natural Resources (State of Alaska; aka ADNR) |
| DOA | Department of Agriculture (U.S.) and Department of Administration (State) |
| DOD | Department of Defense (U.S.) |

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Appendix 1 - Acronyms

| | |
|----------|--|
| DOF | Division of Forestry (State of Alaska) |
| DOI | Department of the Interior (U.S.) |
| DOJ | Department of Justice (U.S.) |
| DOT/PF | Department of Transportation and Public Facilities (State of Alaska) |
| DPC | Governor's Disaster Policy Cabinet (State of Alaska) |
| DPS | Department of Public Safety (State of Alaska) |
| DR | Disaster (FEMA) |
| DRO | diesel range organics |
| DROT | Drift River Oil Terminal |
| DRU | Disaster Resistant University |
| EAP | Emergency Action Plan (dams) |
| EAS | Emergency Alert System |
| EED | Department of Education and Early Development (State of Alaska) |
| EH | Environmental Health (State of Alaska) |
| EHS | Extremely Hazardous Substances |
| EMPG | Emergency Management Program Grant |
| EMT | Emergency Medical Technician |
| EOP | Emergency Operations Plan |
| EPA | Environmental Protection Agency (U.S.) |
| EPCRA | Emergency Planning and Community Right-To-Know Act |
| ERP | Emergency Response Plan |
| ESF | Emergency Support Function |
| ESFLG | Emergency Support Function Leaders Group |
| ETS | Enterprise Technology Services |
| EWP | Emergency watershed Protection (Program) (NRCS) |
| °F | degrees Fahrenheit |
| FAA | Federal Aviation Administration |
| FAS | Fairbanks Area (DNR Protection Area – fire) |
| F-CNFAIC | Friends of the Chugach National Forest Avalanche Information Center |
| FCO | Federal Coordinating Officer |
| FEMA | Federal Emergency Management Agency |
| FERC | Federal Energy Regulatory Commission |
| FGDC | Federal Geospatial Data Clearinghouse |
| FHA | Federal Highway Administration |
| FIA | (Federal) Flood Insurance Authority |
| FIRM | Flood Insurance Rate Map |
| FMA | Flood Mitigation Assistance (Program) |
| FNSB | Fairbanks North Star Borough |
| FTE | Full-time Equivalent |
| FWS | Fish and Wildlife Service (U.S.) |
| GAD | Galena Zone (AFS Protection Area – fire) |
| GAR | Governor's Authorized Representative |
| GIS | Geographic Information System |
| GOES | Geostationary Operational Environmental Satellite |
| HMA | Hazard Mitigation Assistance (Grants) |
| HMGP | Hazard Mitigation Grant Program |

| | |
|-------|---|
| HNS | Haines (DNR Protection Area – fire) |
| HPSD | Division of State Health Planning and Systems Development |
| HS | Hazardous Substances |
| HUD | Department of Housing and Urban Development (U.S) |
| HVA | Hazard and Vulnerability Analysis |
| IA | Individual Assistance |
| IBC | International Building [Fire and Mechanical] Code |
| ICC | Increased Cost of Compliance (Program) |
| ICS | Incident Command System |
| ICT | Incident Command Team |
| IHCA | Interagency Hydrology Committee for Alaska |
| IRA | Indian Reservation Act |
| IRMA | Insulated Roof Membrane Assemblies |
| ISE | Information Sharing Environment |
| JFO | Join Field Office |
| KIB | Kodiak Island Borough |
| KPB | Kenai Peninsula Borough |
| KW | Kilowatt |
| lbs | pounds |
| LEPC | Local Emergency Planning Committee |
| M | Magnitude (earthquake); Million (\$) |
| MID | Military Zone (AFS Protection Area – fire) |
| MOA | Municipality of Anchorage |
| mph | miles per hour |
| MSB | Matanuska-Susitna Borough (aka Mat-Su) |
| MSS | Anchorage/Matsu Area (DNR Protection Area – fire) |
| NAWAS | National Warning System |
| NFIP | National Flood Insurance Program |
| NHS | National Highway System |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic & Atmospheric Administration |
| NOS | National Ocean Service |
| NPRA | National Petroleum Reserve Alaska |
| NPS | National Park Service |
| NRCS | National resources Conservation Service |
| NRP | National Response Plan |
| NTHMP | National Tsunami Hazard Mitigation Program |
| NWAB | North-west Arctic Borough |
| NWS | National Weather Service |
| OEM | Office of Emergency Management |
| OSWER | Office of Solid Waste and Emergency Response |
| PA | Public Assistance |
| PERP | Prevention and Emergency Response Program |
| PDM | Pre-Disaster Mitigation (Grants) |
| PNP | Public Non-Profit |
| PMEL | Pacific Marine Environmental Laboratory |

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Appendix 1 - Acronyms

| | |
|--------|---|
| PTWC | Pacific Tsunami Warning Center |
| REAA | Regional Educational Attendance Area |
| REC | Rural Electric Cooperatives |
| RFC | Repetitive Flood Claims (Grant Program) and River Forecast Center (NWS) |
| RFI | request for information |
| RFS | request for service |
| RISC | Regional Interagency Steering Committee |
| RRT | Regional Response Team |
| SAR | Search and Rescue |
| SARA | Superfund Amendments and Reauthorization Act |
| SBA | Small Business Administration |
| SCA | State Coordinating Officer |
| SCBA | self-contained breathing apparatus |
| SCR | Senate Concurrent Resolution (State of Alaska) |
| SEAAC | Southeast Alaska Avalanche Center |
| SECC | State Emergency Coordination Center |
| SERC | State Emergency Response Commission |
| SHMAC | State Hazard Mitigation Advisory Committee |
| SHMO | State Hazard Mitigation Officer |
| SHMP | State Hazard Mitigation Plan |
| SI/GVP | Smithsonian Institute/Global Volcanism Program |
| SLED | Statewide Library Electronic Doorway |
| SME | Subject Matter Expert |
| SOSC | State On-Scene Coordinator (oil spill) |
| SOA | State of Alaska |
| SPAR | [Division of] Spill Prevention and Response |
| SPCC | Spill Prevention and Control Countermeasure |
| SRC | Senate Concurrent Resolution |
| SRL | Severe Repetitive Loss (Grant Program) |
| SSO | State Security Office |
| STAR | Spill Tactics for Alaska Responders (Manual) |
| SVA | Security and Vulnerability Assessment |
| SWS | Southwest Area (DNR Protection Area – fire) |
| TAD | Tanana Zone (AFS Protection Area – fire) |
| TAS | Tok Area (DNR Protection Area – fire) |
| TIME | Tsunami Inundation Mapping Effort |
| TNF | Tongass National Forest (USFS Protection Area – fire) |
| TPH | total petroleum hydrocarbons |
| TSA | Transportation Security Administration |
| UA | University of Alaska |
| UAA | University of Alaska Anchorage |
| UAF | University of Alaska Fairbanks |
| UAF/GI | University of Alaska Fairbanks Geological Institute |
| UAS | University of Alaska Southeast |
| USACE | United States Army Corps of Engineers |
| USAF | United States Air Force |

| | |
|---------|---|
| USCG | United States Coast Guard |
| USFA | United States Fire Administration |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| UYD | Upper Yukon Zone (AFS Protection Area – fire) |
| VMT | Vehicle Miles Traveled |
| VOC | volatile organic compounds |
| VPSO | Village Public Safety Officer |
| WC/ATWC | West Coast/Alaska Tsunami Warning Center |
| WMD | Weapons of Mass Destruction |
| WP | Warning Point |
| WUI | Wildland Urban Interface (fire) |
| Y-K | Yukon-Kuskokwim |

Appendix 2 - Definitions

| | |
|--------------------------------|---|
| Aufeis | When new ice continues to form on top of older ice. Ice-forming situations occur wherever there are continuous sources of water and freezing temperatures. |
| Alluvial Fan | Area of deposition where steep mountain drainages empty into valley floors. Flooding in these areas often includes characteristics that differ from those in riverine or coastal areas. |
| Alluvial Fan Flooding | Flooding that occurs on the surface of an alluvial fan (or similar landform) that originates at the apex of the fan and is characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and unpredictable flow paths. |
| Anabatic Wind | Any wind blowing up an incline; the opposite to katabatic wind. |
| Avalanche | Mass of snow and ice falling suddenly down a mountain slope and often taking with it earth, rocks and rubble of every description. |
| Borough | The basic large unit of local government in Alaska in the organized Boroughs. Large land areas of Alaska are not in organized Boroughs and therefore fall under State jurisdiction as the Unorganized Borough |
| Caldera | A caldera is a large, usually circular depression at the summit of a volcano formed when magma is withdrawn or erupted from a shallow underground magma reservoir. |
| Chinook | A warm down-slope wind. |
| Community Rating System | An NFIP program that provides incentives for NFIP Communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of policyholders in these communities are reduced. |

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| Community | Any State, area or political subdivision thereof, or any Indian tribe or tribal entity that has the authority to adopt and enforce statutes for areas within its jurisdiction. |
| Critical Facility | Facilities that are critical to the health and welfare of the population and are especially important during and after a hazard event. Critical facilities include, but are not limited to, shelters, hospitals, and fire stations. |
| Daylight | The exposure of strata by a cut whose angle is steeper than that of the underlying beds. Such exposure increases the likelihood of landsliding. |
| Dam | A structure built across a waterway to impound water. |
| Development | Any manmade change to improved or unimproved real estate including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials. |
| Economic Disaster | State Definition Used: “When the annual income to workers in the designated area drops below the average annual income for the base period for workers in the designated area and the drop in income is of such magnitude that the average family income of all residents of the designated area as determined by the DCCED is below the poverty guidelines issued by the Federal Department of Health and Human Services, adjusted by the DCCED to reflect subsistence economic patterns and appropriate cost-of-living differentials; the availability of alternate employment shall be considered in determining whether an economic disaster has occurred under this paragraph. |
| Earthquake | A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the earth’s tectonic plates. |
| Earthquake Swarm | A collection of earthquakes that occur in the same area in a relatively short amount of time. There is no identifiable main shock. |

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| Elevation | The raising of a structure to place it above flood waters on an extended support structure. |
| Emergency Operations Plan | A document that describes how people and property will be protected in disaster and disaster threat situations; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies, and other resources available for use in the disaster; and outlines how all actions will be coordinated. |
| Erosion | The wearing away of the land surface by running water, wind, ice, or other geological agents. |
| Federal Disaster Declaration | See Presidential Disaster Declaration |
| Federal Emergency Management Agency (FEMA) | A federal agency created in 1979 to provide a single point of accountability for all Federal activities related to hazard mitigation, preparedness, response, and recovery. |
| Flash Flood | A flood event occurring with little or no warning where water levels rise at an extremely fast rate. |
| Flood | A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land. |
| Floodplain | A "floodplain" is the lowland adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 10-year flood. The 100-year floodplain by the 100-year flood. |
| Flood frequencies | Frequencies are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. The frequency is the chance of a flood occurring during a given timeframe. It is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance and the 10-year flood has a 10% chance of occurring in any given year. |

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| Fumarole | Fumaroles are vents from which volcanic gas escapes into the atmosphere. Fumaroles may occur along tiny cracks or long fissures, in chaotic clusters or fields, and on the surfaces of lava flows and thick deposits of pyroclastic flows. They may persist for decades or centuries if they are above a persistent heat source or disappear within weeks to months if they occur atop a fresh volcanic deposit that quickly cools. |
| Geographic Information System | A computer software application that relates physical features of the earth to a database that can be used for mapping and analysis. |
| Governing Body | The legislative body of a governmental unit including an assembly of a borough or the council of a city. |
| Groin | A narrow, elongated coastal engineering structure built on the beach perpendicular to the trend of the beach. |
| Hazard | A source of potential danger or adverse condition. |
| Hazard Mitigation | Any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards. (44 CFR Subpart M 206.401) |
| Hazard Mitigation Grant Program | The program authorized under section 404 of the Stafford Act, which may provide funding for mitigation measures identified through the evaluation of natural hazards conducted under §322 of the Disaster Mitigation Act 2000. |
| Hazard and Vulnerability Analysis | The identification and evaluation of all the hazards that potentially threaten a jurisdiction and analyzing them in the context of the jurisdiction to determine the degree of threat that is posed by each. |
| Infrastructure | The public services of a community that have a direct impact to the quality of life. Infrastructure refers to communication technology such as phone lines or Internet access, vital services such as public water supply and sewer treatment facilities, and includes an area's transportation system, regional dams or bridges, etc. |

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| Interferometry | A method employing the interference of electromagnetic radiation to make highly precise measurements of the angle between the two rays of light. |
| Inundation | In reference to tsunamis, the maximum horizontal distance inland reached by the wave. |
| Jökulhlaup | A sudden flood-like release of water from a glacier. (Glacier outburst flooding) |
| Katabatic wind | Any wind blowing down an incline; the opposite to anabatic wind. |
| Knot | A unit of measurement equally 1 nautical mile per hour. This is roughly 1.15 statute miles per hour or 1.852 kilometers per hour. |
| Lahar | Lahar is an Indonesian word for a rapidly flowing mixture of rock debris and water that originates on the slopes of a volcano. Lahars are also referred to as volcanic mudflows or debris flows. They form in a variety of ways, chiefly by the rapid melting of snow and ice by pyroclastic flows, intense rainfall on loose volcanic rock deposits, breakout of a lake dammed by volcanic deposits, and as a consequence of debris avalanches. |
| Landslide | Downward movement of a slope and materials under the force of gravity. |
| Lava dome | Lava domes are rounded, steep-sided mounds built by very viscous magma. Such magmas are typically too viscous (resistant to flow) to move far from the vent before cooling and crystallizing. Domes may consist of one or more individual lava flows. |
| Littoral | Of or pertaining to the shore, especially of the sea. |
| Local Government | Any Borough, municipality, city, township, public authority, school district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency, or instrumentality of a |

local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity, for which an application for assistance is made by a State or political subdivision of a State.

Magma

Molten rock originating from the Earth's interior.

Municipality

A political subdivision incorporated under the laws of the state that is a home rule or general law city, a home rule or general law borough, or a unified municipality.

Natural Disaster

Any natural catastrophe, including any hurricane, tornado, storm, high water, wind, driven water, tsunami, earthquake, volcanic eruption, landslide, snowstorm, fire, or drought. (44 CFR Subpart M 206.401)

Orthophoto

An aerial photo that has been corrected to eliminate the effects of camera tilt and relief displacement. The ground geometry is recreated as it would appear from directly above each and every point.

Overlay zone

Overlay zones (overlay districts) create a framework for conservation or development of special geographical areas. In a special resource overlay district, overlay provisions typically impose greater restrictions on the development of land, but only regarding those parcels whose development, as permitted under the zoning, may threaten the viability of the natural resource. In a development area overlay district, the provisions may impose restrictions as well, but also may provide zoning incentives and waivers to encourage certain types and styles of development. Overlay zone provisions are often complemented by the adoption of other innovative zoning techniques, such as floating zones, special permits, incentive zoning, cluster development and special site plan, or subdivision regulations, to name a few.

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| Period | In reference to tsunami, the length of time between two successive peaks or troughs. May vary due to complex interference of waves. Tsunami periods generally range from 5 to 60 minutes. |
| Planning | The act or process of making or carrying out plans; the establishment of goals, policies and procedures for a social or economic unit. |
| Preparedness | The steps taken to decide what to do if essential services break down, developing a plan for contingencies, and practicing the plan. Preparedness ensures people are ready for a disaster and will respond to it effectively. |
| Presidential Disaster Declaration | The formal action by the President to make a State eligible for major disaster or emergency assistance under the Robert T. Stafford Relief and Emergency Assistance Act, Public Law 93-288, as amended. |
| Pyroclastic | Pertaining to fragmented rock material formed by a volcanic explosion or ejection from a volcanic vent. |
| Pyroclastic Flow | Lateral flow of a turbulent mixture of hot gases and unsorted pyroclastic material (volcanic fragments, ash, etc.) that can move at high speeds. |
| Recovery | The long-term activities beyond the initial crisis period and emergency response phase of disaster operations that focus on returning all systems in the community to a normal status or to reconstitute these systems to a new, less vulnerable condition. |
| Response | Those activities and programs designed to address the immediate and short-term effects of the onset of an emergency or disaster. |
| Retrofit | The strengthening or changing of structures or facilities to mitigate disaster risks. |
| Rift Zone | A rift zone is an elongate system of crustal fractures associated with an area that has undergone extension (the ground has spread apart). |

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| Risk | <p>The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition causing injury or damage. Risk is often expressed in relative terms such as a high, moderate or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It can also be expressed in terms of potential monetary losses associated with the intensity of the hazard.</p> |
| Riverine | <p>Relating to, formed by, or resembling rivers (including tributaries), streams, creeks, brooks, etc.</p> |
| Riverine Flooding | <p>Flooding related to or caused by a river, stream, or tributary overflowing its banks due to excessive rainfall, snowmelt, or ice.</p> |
| Run-up | <p>In reference to tsunامي, the maximum vertical height of a tsunami in relation to sea level.</p> |
| Seiche | <p>An oscillating wave (also referred to as a seismic sea wave) in a partially or fully enclosed body of water. May be initiated by long period seismic waves, wind and water waves, or a tsunami.</p> |
| Stafford Act | <p>1) The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended. 2) The Stafford Act provides an orderly and continuing means of assistance by the Federal Government to State, local, and tribal governments in carrying out their responsibilities to alleviate the suffering and damage which result from disaster.</p> |
| State Disaster Declaration | <p>A disaster emergency shall be declared by executive order or proclamation of the Governor upon finding that a disaster has occurred or that the occurrence or the threat of a disaster is imminent. The State of disaster emergency shall continue until the governor finds that the threat or danger has passed or the disaster has been dealt with to the extent emergency conditions no longer exist and terminates the state of disaster emergency by executive order or proclamation.</p> <p>Along with other provisions, this declaration allows</p> |

the governor to utilize all available resources of the State as reasonably necessary, direct and compel the evacuation of all or part of the population from any stricken or threatened area if necessary, prescribe routes, modes of transportation, and destinations in connection with evacuation and control ingress and egress to and from disaster area.

It is required before a Presidential Disaster Declaration can be requested.

State Hazard Mitigation Officer (SHMO)

The SHMO is the representative of State government who is the primary point of contact with FEMA, other State and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.

Storm Surge

Rise in the water surface above normal water level on open coast due to the action of wind stress and atmospheric pressure on the water surface.

Tectonic Plate

Rigid, thin segments of the earth's lithosphere may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries cause seismic activity.

Tephra

Tephra is a general term for fragments of volcanic rock and lava regardless of size are blasted into the air by explosions or carried upward by hot gases in eruption columns or lava fountains. Tephra includes large dense blocks and bombs, and small light rock debris.

Topography

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

Tribal Government

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

Tsunami

A sea wave produced by submarine earth movement

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

Vent

Vents are openings in the Earth's crust from which molten rock and volcanic gases escape onto the ground or into the atmosphere. Vents may consist of a single circular-shaped structure, a large elongated fissure and fracture, or a tiny ground crack.

Vulnerability

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

Wildfire / Wildland Fire

An uncontrolled fire that spreads through vegetative fuels, exposing and possibly consuming structures.

Zoning Ordinance

An ordinance under the State or local government's police powers divides an area into districts and, within each district, regulates the use of land and buildings, height, and bulk of buildings or other structures, and the density of population.

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Hazard Mitigation Plan 2013

Appendix 3 – SHMP Review Forms

Appendix 3 – Annual Evaluation and Progress SHMP Review Form**State Hazard Mitigation Plan
Annual Evaluation Form**

For annual distribution to the State Hazard Mitigation Advisory Committee. Completed forms will be used to revise the State Hazard Risk Mitigation Plan.

Please complete this checklist and attach any additional information.

| Evaluation Item | Yes | No | Narrative Comments |
|--|------------|-----------|---------------------------|
| Do the overall State mitigation goals and objectives need revision? | | | |
| Do the overall State mitigation goals and objectives still meet State priorities? | | | |
| Are the goals and objectives for each hazard section still applicable? | | | |
| Have any of the hazard mitigation goals, objective or measures been completed or are there substantial progress in achieving them that should be recorded? | | | |
| Does current information or “lessons learned” suggest that existing goals, objectives or measures need to be reprioritized for implementation? | | | |
| Is there any update needed of the hazard sections based upon recent disaster losses, new research or additional information? | | | |
| Are there any new hazards that should be added to the plan? | | | |
| Are there any new or revised resources, agencies or programs that can be added to the plan as possible supporters of mitigation efforts? | | | |
| What have been this year’s challenges with mitigation planning and project implementation, i.e. technical, political, and legal, etc? | | | |
| What have been the mitigation successes this year and can they be recorded for “success stories” that show effective mitigation work that might be applied elsewhere in the State? | | | |
| What mitigation policies, procedures and long range plans have been amended or added this year? | | | |

**State Hazard Mitigation Plan
Annual Progress Report**

| Evaluation Item | Yes | No | Narrative / Comments |
|--|------------|-----------|-----------------------------|
| Any you aware of any completed mitigation goals, objectives or measures? | | | |
| Do you have any new short term measures to propose? | | | |
| Do the overall State mitigation goals and objectives need revision? | | | |
| Have any of the hazard mitigation goals, objective or measures been completed or are there substantial progress in achieving them that should be recorded? | | | |
| Does current information or “lessons learned” suggest that existing goals, objectives or measures need to be reprioritized for implementation? | | | |
| Is there any update needed of the hazard sections based upon recent disaster losses, new research or additional information? | | | |
| Are there any new hazards that should be added to the plan? | | | |
| Are there any new or revised resources, agencies or programs that can be added to the plan as possible supporters of mitigation efforts? | | | |
| What have been this year’s challenges with mitigation planning and project implementation, i.e. technical, political, and legal, etc? | | | |
| Are there any actions where your organization should no longer be the lead agency? | | | |
| Should your organization be added or removed from being a support agency for any actions? | | | |
| Does your organization have any new mitigation programs? | | | |
| Does your organization have any new grant/funding programs used for mitigation? | | | |
| Any mitigation successes this year? | | | |
| Any new or amended mitigation policies this year? | | | |

Appendix 4 - State Hazard Mitigation Advisory Committee (SHMAC)

| Name/Title | | Agency |
|-----------------------|--|--|
| STATE AGENCIES | | |
| 1 | State Hazard Mitigation Officer | Alaska Division of Homeland Security and Emergency Management (DHS&EM) |
| 2 | Mitigation Specialists | DHS&EM |
| 3 | State Flood Plain Coordinator | Department of Commerce, Community & Economic Development (DCCED), Division of Community & Economic Advocacy (DCRA) – National Flood Insurance program (NFIP) |
| 4 | State RiskMap Coordinator | Department of Commerce, Community & Economic Development (DCCED), Division of Community & Economic Advocacy (DCRA) |
| 5 | Director of Insurance | DCCED, Division of Insurance (DOI) |
| 6 | Insurance Market Analyst | DCCED, DOI Market Conduct Section |
| 7 | Environmental Program Specialist Disaster Response Coordinator | Department of Environmental Conservation (DEC), Division of Spill Prevention and Response (SPAR) |
| 8 | Planner II | Department of Health & Social Services (DHSS) |
| 9 | Habitat Biologist | Department of Natural Resources (DNR), Office of Habitat Management & Permitting |
| 10 | Deputy Director | DNR, Division of Geologic and Geophysical Survey (DGGS) |
| 11 | Director | DNR Division of Mining, Land, and Water Management |
| 12 | Division Director | DNR Coastal/Oceans Management |
| 13 | Dam Safety Engineer | DNR Division of Mining, Land & Water/Dam Safety and Construction Unit |
| 14 | Acting Director | DNR Office of Project Management & Permitting |
| 15 | Fire/Resource Tech | DNR Division of Forestry (DOF) |
| 16 | National Fire Plan Coordinator | U.S. Forest Service / DOF |
| 17 | Risk Manager | Department of Administration (DOA), Division of Risk Management |
| 18 | Director, State Fire Marshall | Department of Public Safety (DPS), Division of Fire Prevention |
| 19 | Com-Trans. Management Program Coord. | Department of Transportation and Public Facilities (DOT&PF) |
| 20 | School Finance Specialist II/Senior Safety Officer | Department of Education & Early Development (DEED) |
| 21 | Assistant Attorney General | Department of Law (DOL), Civil Division, Governmental Affairs Section, Office of the Governor |

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| 22 | Emergency Preparedness | University of Alaska (UA) – Statewide Office of Risk Managements |
| 23 | State Seismologist | University of Alaska Fairbanks (UAF)– Geophysical Institute (GI) |
| 24 | Micro/Network Tech II | DEED Education Support Services |
| 25 | Chairman | Alaska Seismic Safety Hazard Commission |
| 26 | Building Plans Examiner | Department of Public Safety |
| 27 | Building Plans Examiner | Department of Public Safety Fire/Life Safety Ops (FMO) |
| 28 | Director, Division of Habitat | Department of Fish and Game |

LOCAL ORGANIZATIONS

| | | |
|----|-------------------------------------|---|
| 29 | Fire Chief | City of Seward |
| 30 | Planner | Municipality of Anchorage |
| 31 | Director | Mat-Su Borough, Department of Emergency Services |
| 32 | Director | Kodiak Island Borough (KPB) Community Development |
| 33 | Emergency Management Coordinator | KPB Office of Emergency Management |
| 34 | Community & Fiscal Projects Manager | KPB Community and Fiscal Projects |

TRIBAL REPRESENTATIVES

| | | |
|----|-------------------------------|--------------------------|
| 35 | Environmental Health Director | Tanana Chiefs Conference |
|----|-------------------------------|--------------------------|

FEDERAL AGENCIES

| | | |
|----|---|--|
| 36 | AMAC Coordinator | Alaska Fire Service (AFS) / Bureau of Land Management (BLM), Alaska Multi-Agency Coordination Group (AMAC) |
| 37 | Research Geologist | U.S. Geological Survey (USGS), Volcano Hazards Center, Alaska Volcano Observatory (AVO) |
| 38 | Branch Chief for Hydrologic Data and Monitoring | USGS, Alaska Science Center (ASC) |
| 39 | Regional Warning and Coordination Meteorologist | National Oceanographic and Atmospheric Administration (NOAA) |
| 40 | Regional Climate Scientist | NOAA National Weather Service (NWS) |
| 41 | Assistant State Conservationist-Operations and | National Resource Conservation Service (NRCS) |

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Hazard Mitigation Plan 2013

Appendix 4 - SHMAC

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| | Design Engineer | |
| 42 | Chief, Civil Works Branch Engineering Division | U. S. Army Corps of Engineers (USACE) |
| 43 | Director and Geophysicist | NOAA West Coast and Alaska Tsunami Warning Center (WC/ATWC) |

ADDITIONAL COORDINATION

| | | |
|----|--|---|
| 44 | Director Risk Services | Alaska Municipal League - Joint Insurance Association (AML-JIA) |
| 45 | Legislative Audit Anchorage and Director of Programs | Denali Commission |
| 46 | Geologist | Carver Geologic Inc. |
| 47 | Manager | Chugach Electric Association Division Budget and Reporting |
| 48 | Representative | Alaska Railroad Corporation (ARRC) |

Figure 1 is the SHMAC contact list for 2013:

SHMAC 2013 - Contact Group

Figure 1 SHMAC Contact List

| Name | E-mail |
|------------------------|--------------------------------------|
| Alan Wien | alan.wien@alaska.gov |
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| Mark Spafford | mspafford@denali.gov |
| Mike West | mewest@alaska.edu |

State of Alaska

Hazard Mitigation Plan 2013

Appendix 4 - SHMAC

| SHMAC 2013 - Contact Group | |
|---|------------------------------------|
| File Contact Group Insert Format Text Review | |
| Save & Close Delete Forward Members Notes Add Members Remove Member Update Now E-mail Meeting Categorize Follow Up Private Zoom | |
| Name: SHMAC 2013 | |
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| Timothy W Fisher | timothy.fisher@alaska.gov |

State Hazard Mitigation Advisory Committee Meeting and Public Participation Log October 2010-August 2013

| Date | Event Title | attendance | contacted |
|--------------------|--|------------|----------------------|
| November 1, 2010 | 2010 SHMP posted on DHS&EM website | | |
| July 19, 2012 | SHMAC Teleconference: Discussed key milestones of 2013 SHMP update | 18 | 53 |
| August 28, 2012 | Emailed SHMAC and LEPC Section 2 Mitigation Strategy and Appendix 7 SOP Procedures and Disaster Mitigation Strategies for update/comment | | 53 |
| August 30, 2012 | SHMAC Teleconference : Discussed SHMP update review processes | 24 | 53 |
| September 17, 2012 | Emailed SHMAC Section 3Planning, Monitoring and Maintenance and Appendix 5 SHMAC List for update/comment | | 53 |
| September 27, 2012 | SHMAC Teleconference: Discussed status of SHMP update | | 53 |
| October 25, 2012 | Emailed SHMAC Section 4 Hazard Vulnerability Analysis for update/comment | - | 53 |
| November 1, 2012 | SHMAC Teleconference: Discussed status of SHMP update | | 53 |
| December 26, 2012 | Emailed SHMAC Section 5.1 Alaska Hazards and Assessment for update/comment | - | 53 |
| December 27, 2012 | Emailed SHMAC Section 5.2 Alaska Hazards and Assessment-Floods for update/comment | | 53 |
| January 23, 2013 | Emailed SHMAC Meeting: Provided SHMAC status of SHMP update | | |
| February 12, 2013 | SHMAC Teleconference: Discussed status of SHMP update | | |
| March 21, 2013 | SHMAC Teleconference: Discussed status of SHMP update | | |
| April 4, 2013 | Mitigation workshop at Spring Preparedness Conference: SHMP presentation | 34 | 70 |
| April 9, 2013 | Emailed SHMAC and LEPC Section 5.3 wildfire Conflagration and 5.4 Snow Avalanches for update/comment | | 53 |
| May 10, 2013 | SHMAC and LEPC reviews collected | | |
| June 26, 2013 | Consultation with SHMAC reps regarding HVA | 30 | 53 |
| July 6, 2013 | HVA corrections submitted to SHMAC for final review | 30 | 53 |
| August 2013 | SHMP 2013 update draft available on DHS&EM website for general, public comment | | |
| August 2013 | SHMP 2013 update draft available for comment to: LEPC APIP ASHSC SHMAC | | 21 67 11 53 |
| | | | |
| | | | |

Appendix 5 – Benefit Cost Analysis

How to Determine Cost-Effectiveness of Mitigation Projects

Project cost effectiveness is one criterion used in prioritizing mitigation projects. To assist applicants in determining project cost effectiveness, FEMA implemented a benefit cost analysis (BCA) for HMGP and PDM project applications. The basic requirement of the BCA is that the benefit of the mitigation project must equal or exceed the cost, a benefit cost ratio (BCR) of 1:1 or greater. Over several years, FEMA developed a set standard values for use in BCA and custom software that establishes mitigation benefits and calculates the BCR. Benefit cost analysis submitted to FEMA to justify mitigation funding requires substantial documentation of project costs and benefits. FEMA provides the custom BCA software and training online at <http://www.bchelpine.com/>. An overview of the BCA process for a mitigation projects follows.

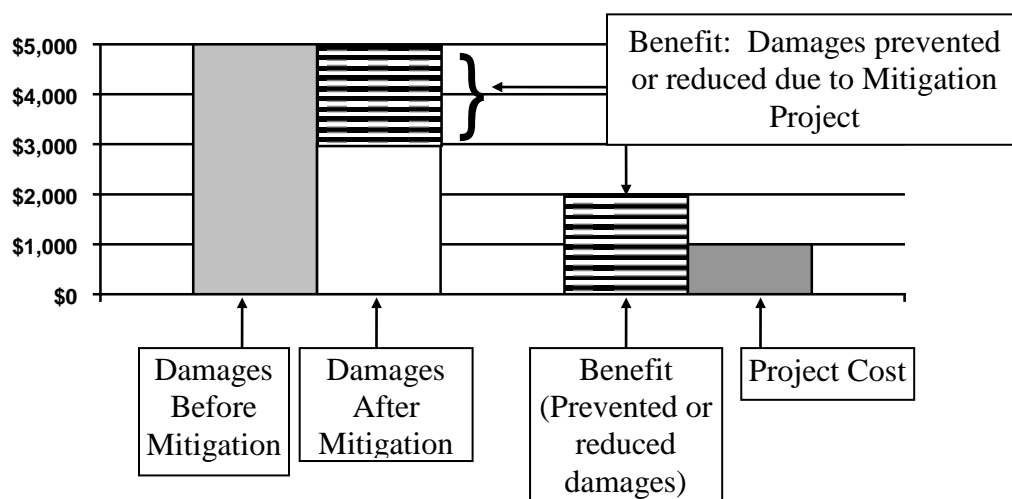


Figure 6.1. FEMA Basic Benefit-Cost Model. For more information about FEMA's Benefit-Cost Modules, please contact the FEMA Region X Mitigation Division at 425-487-4600.

It is important to understand that benefit-cost analysis is basically the same for each type of hazard mitigation project. The only differences are the types of data that are used in the calculations, depending on whether the project is for floods, earthquakes, or other natural hazards. For example, whereas the depth of flooding is used to estimate damage for flood mitigation projects, the severity of ground shaking is used to estimate damage for earthquake mitigation projects.

Calculating the Benefit-Cost Ratio

In the graph above, cost-effectiveness is determined by comparing the project cost of \$1,000, to the value of damages prevented post mitigation, which is \$2,000. Since the dollar-value of benefits exceeds the project's cost, the project is cost-effective. This relationship is depicted numerically by dividing the benefits by the costs, resulting in a benefit-cost ratio (BCR). The BCR is simply a way of stating whether benefits exceed project costs, and by how much. To derive the BCR divide the benefits by the cost ($\$2,000 \div \$1,000$). If the result is 1.0 or greater, then the project is cost-effective. In this instance, the BCR is 2.0, which far exceeds the 1.0 level. On the other hand, if the cost of the project is \$2,000 and the benefits are only \$1,000, the project would have a BCR of 0.50 ($\$1,000 \div \$2,000$) and would not be cost-effective.

By conducting a benefit-cost analysis, you determine one of two things: either the project is cost-effective ($BCR > 1.0$) or it is not ($BCR < 1.0$). If the project is cost-effective, then no further work or analysis needs to be done; there is no third step other than to move the project to the next phase in the approval process. If, however, the project is not cost-effective, then it is generally not eligible for FEMA mitigation grant funding.

There are four key elements to all benefit-cost analyses of hazard mitigation projects:

1. An estimate of damages and losses before mitigation
2. An estimate of damages and losses after mitigation
3. An estimate of the frequency and severity of the hazard causing damages (e.g. floods), and
4. The economic factors of the analysis (i.e. discount rate and mitigation project useful lifetime)

These four key elements and their relationships to one another are detailed in the following example.

Consider a 1,500 square foot, one-story, single family residence located in the Acorn Park subdivision along Squirrel Creek. A proposed mitigation project will elevate the structure four feet at a cost of \$20,000. Whether this project is cost-effective depends on the damages and losses from flooding without the mitigation project; the effectiveness of the mitigation project in reducing those damages and losses; the frequency that the house is flooded and the depth of the flood water; and, the mitigation project's useful lifetime.

If the pre-mitigation damages are frequent and/or severe, then the project is more likely to be cost-effective. Even minor damage that occurs frequently can exceed, over the life of a project, the up-front costs of implementing a mitigation measure. On the other hand, if the building in the example above only flooded once, then it may not be cost-effective to elevate, unless the damages were significant in relation to the value of the structure and its contents.

Appendix 6

Standard Operating Procedures and Disaster Mitigation Strategies

Introduction

This appendix captures the following procedures and strategies the Alaska state hazard mitigation team uses in their operations:

1. Alaska Mitigation Goals and Objectives
2. Local Hazard Mitigation Planning Five Year Plan
3. Mitigation Selection Process
4. Community Warning System Selection Criteria
5. HMGP Procedure, Approach SOP's
6. Federal Disaster JFO Mitigation Strategies

Alaska Mitigation Goals and Objectives

Primary Goals

1. Minimize loss of life and injuries
2. Minimize damages
3. Restore public services
4. Seek mitigation solutions that are effective in Alaska

Mitigation Objectives

1. Save lives and reduce injuries
2. Prevent or reduce property damage
3. Maintain critical facilities in functional order
4. Assist local communities with preparing a Local Hazard Mitigation Plan
5. Protect infrastructure from damage
6. Minimize social dislocation and stress
7. Protect legal liability of government and public officials
8. Reduce economic losses

Mitigation Measures

1. Protective

To protect a structure or facility from damage during a hazard event or minimize the damage

- Structural/Community Protective Works
- Retrofitting or Rehabilitation
- Elevation, Proofing
- Protection of Critical Facilities

2. Preventive

Measures potentially limit the exposure to hazards. Preventive mitigation tools include:

- Land-Use Planning

- Zoning
- National Flood Insurance Program (NFIP)
- Subdivision Regulations
- Preservation of Open Space
- Acquisition, Relocation
- Building Codes
- Capital Improvement Programs

3. Educational

Educating people about hazards and what can be done to protect themselves and their property is an important component to any mitigation strategy.

- Outreach
- Technical Assistance
- Disclosure Requirements
- Understanding Hazards Warning Systems
- Hazard Mapping
- Hazard Mitigation Planning

**Local Hazard Mitigation Planning 5 Year
State Planning Projection**

Considerations for plan development

- Community interest in mitigation planning and projects
- History or risk of disaster damage (Disaster Cost Index, Hazard & Risk Assessments, State Hazard Mitigation Plan, DHS&EM Experience)

State of Alaska

Hazard Mitigation Plan 2013

Appendix 6 – Standard Operating Procedures

| 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------|------------------|----------------|-------------------|----------------|------------------|
| 1. Minto | 1. Diomedes | 1. Chuathbaluk | 1. Healy | 1. Nikolai | 1. Koliganek |
| 2. Venetie | 2. White | 2. Gustavus | 2. Hyder | 2. Shageluk | 2. Tetlin |
| UPDATES | Mountain | 3. Houston | 3. Koliganek | 3. Aleknagik | UPDATES |
| 1. Koyukuk | 3. Goodnews | UPDATES | UPDATES | UPDATES | 1. Galena/Louden |
| 2. Kwethluk | Bay | 1. Angoon | 1. Akiachak | 1. Brevig | 2. Atmautluak |
| 3. Nome | UPDATES | 2. Bristol Bay | 2. Alakanuk | Mission | 3. Shaktoolik |
| 4. Nulato | 1. Bethel | 3. Chevak | 3. Brevig | 2. Chefornek | 4. Kongiganak |
| 5. Allakaket | 2. Fort Yukon | 4. Delta | Mission | 3. Circle | 5. Kwigillingok |
| 6. Saint | 3. Hughes | Junction | 4. Cordova | 4. Eagle | 6. Tununak |
| Marys | 4. Kaltag | 5. Glennallen | 5. Fairbanks | 5. Eek | 7. Ketchikan |
| 7. Allakaket | 5. Nenana | 6. Hydaburg | 6. Holy Cross | 6. Elim | 8. Kivalina |
| 8. Alatna | 6. Ruby | 7. Kake | 7. Juneau | 7. Emmmonak | 9. Kluti Kaah |
| 9. McGrath | 7. Teller | 8. Klawock | 8. Kipnuk | 8. Gulkana | 10. Chitina |
| 10. Kodiak | 8. Aleutians | 9. New | 9. Kotlik | 9. Kenai | 11. Golovin |
| 11. Denali | East | Stuyahok | 10. Lower | Peninsula | 12. Grayling |
| 12. NW | 9. Pilot Station | 10. Quinhagak | Kalskag | 10. Kotzebue | 13. Hooper Bay |
| Arctic | 10. Anchorage | 11. Savoonga | 11. Upper | 11. Koyuk | 14. Lake & Pen |
| 13. Petersburg | 11. Homer | 12. Tanana | Kalskag | 12. Marshall | 15. Merkoryuk |
| 14. Ruby | 12. Kachemak | 13. Thorne Bay | 12. Mat-Su | 13. Napaskiak | 16. Nightmute |
| 15. Sitka | 13. Kenai | 14. Wasilla | 13. Chuathbaluk | 14. Mountain | 17. Tuntutuliak |
| 16. Skagway | 14. Seward | | 14. Saint Michael | Village | 18. Unalakleet |
| 17. Wrangell | 15. Soldotna | | 15. Scammon Bay | 15. Sleetmute | 19. Wales |
| 18. Valdez | 16. Seldovia | | 16. Stebbins | 16. Toksook | |
| 19. Nunam | | | 17. Tanacross | Bay | |
| Iqua | | | | 17. Whittier | |

Tribal Entities and Local Hazard Mitigation Planning

Funding Priorities and Policy for Mitigation Planning:

1. Planning Initiatives

- Mitigation planning will be done primarily through PDM
 - State managed will be funded through a state contract paid for through PDM (75% FEMA and 25% State match). This will follow the five year list for community planning.
- School Districts in the Organized Boroughs are included in their Borough mitigation plans.
- School Districts within the Unorganized Borough are included in the State Hazard Mitigation Plan.
- Individual schools are included in their respective local hazard mitigation plans.

2. Grant Funding for Mitigation Plan Studies

- Studies intended to identify mitigation actions will be prioritized for grant funding.

State LEPC's and Mitigation Planning:

State Local Emergency Planning Committees (LEPC's) assist with local hazard mitigation planning through:

- Providing a forum for the annual reviews of local mitigation plans within their jurisdictions

- Providing a forum for review and input when communities within their jurisdictions are undertaking hazard mitigation planning.
- Providing a forum for review and input when communities within their jurisdictions are undertaking their required five year hazard mitigation plan update.

Governor's Disaster Policy Cabinet

The Governor's Disaster Policy Cabinet (DPC) originated in the State Emergency Operations Plan on May 6, 1994 and was activated September 20, 1995. Its mission is to advise the Governor on topics involving the State's Emergency Management System. The members of the DPC are the Commissioners of the following Departments, or as noted:

- Military and Veterans Affairs (Chair)
- Environmental Conservation
- Natural Resources
- Public Safety
- Transportation and Public Facilities
- Administration
- Community and Economic Development
- Health and Social Services
- Law
- Office of Management and Budget (Director)
- Governor's Office (Representative)

Other departments or agencies participate as required based on the nature of event.

State Reviews of Local Mitigation Plans

Community hazard mitigation plans submitted to DHS&EM, will be reviewed within two weeks from receipt. Following DHS&EM review, the plan will either be returned to the community for revision or forwarded to FEMA for their review.

Selection and Prioritization Process of Hazard Mitigation Assistance (HMA) Applications

General Selection Criteria

The following general criteria are used by the State Hazard Mitigation Officer (SHMO) in selecting and prioritizing applications for hazard mitigation financial assistance.

- Consistency with the goals and priorities established in the State Hazard Mitigation Plan
- Consistency with the goals and priorities established in the applicant's local Hazard Mitigation Plan
- History or risk of disaster losses in the community based upon the Alaska Disaster Cost Index, hazard and risk assessments, the State Hazard Mitigation Plan and DHS&EM experience.
- The project's role in mitigating losses to critical facilities and infrastructure

- The community's interest in mitigation planning and long-term mitigation actions.
- The jurisdiction's grant compliance history.
- The community's population, level of government and ability to take independent mitigation actions.

Grant Specific Selection Process

The specific selection and prioritization process used for each grant program follows.

Disaster funded, Hazard Mitigation Grant Program (HMGP)

State Mitigation team members will travel to disaster areas and search for mitigation opportunities (406 and 404/HMGP).

Following the federal disaster declaration, an announcement of HMGP funding opportunity is distributed statewide to local jurisdictions and State agencies. The HMGP announcement includes information on the HMGP, requirements for submission of an "Intent to Apply" form, application instructions, and application deadlines.

Applicant briefings on the HMGP are held in the declared disaster area in conjunction with the Public Assistance (PA) briefings. HMGP briefings are provided to other potential applicants around the State when requested. Potential applicants with previously identified mitigation projects in their local hazard mitigation plans are recruited to produce HMGP applications with State assistance.

Submitted "Intent to Apply" forms are screened by the State mitigation staff for applicant and project eligibility, and feasibility. The State mitigation staff assists each eligible applicant with project development while ineligible projects are guided to other resources.

Complete HMGP applications are forwarded to the State Hazard Mitigation Advisory Committee (SHMAC) for review. The SHMAC is briefed on each project application and discusses their mitigation approach and priority based upon their knowledge and the State Hazard Mitigation Plan. The SHMAC then ranks each project application for funding priority. Funding priority is used when the amount of eligible project applications exceed the amount of the available funds.

The SHMO submits the prioritized project application list to the Governor's Disaster Policy Cabinet (DPC) for approval. The DPC reviews the application ranking and approves their funding based on State priorities.

The SHMO submits the approved applications to FEMA for funding.

Non-Disaster Hazard Mitigation Assistance (HMA) Grants including the Pre-Disaster Mitigation grant program (PDM)

Following the opening of the FEMA HMA application period, an announcement of PDM funding opportunity is distributed statewide to local jurisdictions and State agencies. The PDM announcement includes information on the PDM, requirements for submission of an "Intent to Apply" form, application instructions, and application deadlines.

The State conducts PDM briefings upon request. Potential applicants with previously identified mitigation projects in their local hazard mitigation plans are recruited to produce PDM applications and provided with technical assistance in application development.

Submitted "Intent to Apply" forms are screened by the State mitigation staff for applicant and

project eligibility, and feasibility. The State mitigation staff assists each eligible applicant with project development while ineligible projects are guided to other resources.

The SHMO then submits each of the PDM sub-grant applications in the overall State PDM grant application to FEMA for funding under the HMA program.

NOAA (Department of Commerce) funded Grants

Applications for funding through NOAA grants are evaluated based upon the general selection criteria listed above and specific grant program guidance.

State Hazard Mitigation Grants

Applications for State hazard mitigation grants are evaluated based upon the general selection criteria listed above and the specific grant program guidance. Priority is given to projects that are deemed effective mitigation by the SHMO but that are not eligible for funding under the FEMA grant requirements.

Alaska Local Community Warning Siren System Plan April 2009

A. Tsunami Community Selection Criteria

1. Distant Tsunami Threat as determined by UAFIGI and WC/ATWC

Rationale

The greatest need for a warning system exists in the event of a distant / off-shore seismic event which creates a wave that travels from a distance to inundate on-shore (distant tsunami). In this case the earthquake generating the tsunami may be felt lightly or not at all. In this case the only warning of an impending tsunami will be from WC/ATWC. In contrast, in a locally produced tsunami, the earthquake is felt in the community and that earthquake must serve as the primary tsunami warning as the time to wave impact can be very short.

Order of Community Selection

- High distant tsunami threat
- Medium distant tsunami threat
- Low tsunami threat

2. Population at risk - density and profiles

Rationale

Communicating the warning is critical to effective tsunami evacuation and communities that are spread out and/or have significant numbers of tourists have greater difficulty in communicating warnings. “Spread out” communities are determined by using available community maps and DCCED data. “Significant numbers of tourists” are determined by using DCCED data, community data and DHS&EM staff knowledge.

System type

While cohesive communities, rural, isolated communities may be served by a simple siren warning system, communities with significant tourist populations are best served by a warning system that enables voice and multi-tone alerts.

3. Current warning system – operational and effectiveness

Rationale

Communities in high threat areas that have warning systems that do not work or do not provide community coverage.

B. Non –Tsunami “Remote Community” Selection Criteria

1. Community Threat that would be diminished by installation of a warning system:

Rationale

The greatest need for a warning system exists in the event of a no-notice or short notice community hazard.

Hazards for Community Selection

- Community Fire
- Ice jam release flooding
- Wildland Fire
- Dam or rapid inundation flooding
- Hazardous Materials Release (HAZMAT)

2. Funding for warning system unlikely through another source and community size makes local funding unrealistic

Note

An annual community warning system survey was initiated in the winter of 2009. The results of the survey are used to assess community siren system needs. (See attached)

| Warning Siren System Status and Future Plan | | | | |
|--|-----------------------|---------------|----------------------|------------------|
| Community | Primary Hazard | Status | Funding Year | Funded by |
| Chignik Bay | Distant Tsu | Complete | Installed 2005 | NTHMP |
| Perryville | Distant Tsu | Complete | Installed 2005 | NTHMP |
| KPB/Homer (5 sites) | Distant Tsu | Complete | Installed 2007 -2008 | HMGP |
| KPB/Nanwalek | Distant Tsu | Complete | Installed 2008 | HMGP |
| KPB/Port Graham | Distant Tsu | Complete | Installed 2008 | HMGP |
| KPB/Seldovia | Distant Tsu | Complete | Installed 2008 | HMGP |
| KPB/Seward (6 sites) | Distant/Local Tsu | Complete | Installed 2008 | HMGP |
| Valdez (2 sites) | Distant/Local Tsu | Complete | Installed 2007 | NTHMP |
| Valdez (7 sites) | Distant/Local Tsu | Complete | Installed 2009 | SHSP |
| Kenai Pen Borough | Tsunami | Complete | Operational 2008 | NTHMP |
| Cordova | Distant Tsu | Complete | Installed June 2009 | NTHMP |
| Sand Point | Distant Tsu | Complete | Installed June 2009 | NTHMP |
| Sitka | Distant Tsu | Complete | Installed April 2009 | NTHMP |
| Sitka (9 sites) | Distant Tsu | Complete | Installed April 2009 | SHSP |
| Yakutat | Distant Tsu | Complete | Installed June 2009 | NTHMP |
| Whittier | Distant Tsu | Complete | Installed June 2009 | NTHMP |
| St. Paul | Distant Tsu | Complete | 2008 | RCASP |
| King Cove | Distant Tsu | Complete | 2007, 2008 | NTHMP |
| Port Alsworth – L&P | All Hazard | Complete | 2009 | RCASP |
| Akutan | Distant Tsu | Complete | 2009 | NTHMP |

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Appendix 6 – Standard Operating Procedures

| | Cold Bay | Distant Tsu | Complete | 2009 | NTHMP |
|---|-------------------|----------------|-----------|------|-------|
| Warning Siren System Status and Future Plan | | | | | |
| Community | Primary Hazard | Status | Funded by | | |
| Chignik Bay | Distant Tsu | Installed 2006 | NTHMP | | |
| Perryville | Distant Tsu | Installed 2006 | NTHMP | | |
| KPB/Homer (5 sites) | Distant Tsu | Installed 2008 | HMGP | | |
| KPB/Nanwalek | Distant Tsu | Installed 2008 | HMGP | | |
| KPB/Port Graham | Distant Tsu | Installed 2008 | HMGP | | |
| KPB/Seldovia | Distant Tsu | Installed 2008 | HMGP | | |
| KPB/Seward (6 sites) | Distant/Local Tsu | Installed 2008 | HMGP | | |
| Valdez (2 sites) | Distant/Local Tsu | Installed 2007 | NTHMP | | |
| Valdez (7 sites) | Distant/Local Tsu | Installed 2009 | SHSP | | |
| Kenai Pen Borough | Tsunami | Installed 2009 | NTHMP | | |
| Cordova | Distant Tsu | Installed 2009 | NTHMP | | |
| Sand Point | Distant Tsu | Installed 2009 | NTHMP | | |
| Sitka | Distant Tsu | Installed 2009 | NTHMP | | |
| Sitka (9 sites) | | Installed 2009 | SHSP | | |
| Yakutat | Distant Tsu | Installed 2009 | NTHMP | | |
| Whittier | Distant Tsu | Installed 2009 | NTHMP | | |
| St. Paul | Distant Tsu | Installed 2010 | RCASP | | |
| King Cove | Distant Tsu | Installed 2010 | NTHMP | | |
| Port Alsworth – L&P | All Hazard | Installed 2010 | RCASP | | |
| Akutan | Distant Tsu | Installed 2010 | NTHMP | | |
| Cold Bay | Distant Tsu | Installed 2010 | NTHMP | | |
| Atka | Distant Tsu | Installed 2010 | RCASP | | |
| Nikolski | Distant Tsu | Installed 2010 | RCASP | | |
| Adak | Distant Tsu | Installed 2010 | RCASP | | |
| Savoonga | All Hazard | Installed 2010 | RCASP | | |
| Old Harbor – KIB | Distant Tsu | Installed 2010 | NTHMP | | |
| Akhiok - KIB | Distant Tsu | Installed 2010 | RCASP | | |
| Ouzinkie – KIB | Distant Tsu | Installed 2010 | RCASP | | |
| Larsen Bay - KIB | Distant Tsu | Installed 2011 | RCASP | | |

| | | | |
|------------------|-----------------------|----------------|------------------|
| Karluk - KIB | Distant Tsu | Installed 2011 | NTHMP |
| Kake | Tsunami | Installed 2010 | NTHMP |
| Port Lions | Distant Tsu | Installed 2012 | NTHMP |
| Community | Primary Hazard | Status | Funded by |
| Saint George | Distant Tsu | Funded | NTHMP |
| Gustavus | Distant Tsu | Funded | NTHMP |
| Craig | Distant Tsu | Funded | NTHMP |
| Metlakatla | Distant Tsu | | |
| Port Alexander | Distant Tsu | TBD | |
| Elfin Cove | Distant Tsu | TBD | |
| Kassan | | | |
| Ketchikan | | TBD | |
| Klawock | | Funded | |
| Tatitlek | | | |
| Chenega | | | |
| | | | |

HMGP Procedure & Schedule after a Disaster

Schedule

- 60 days following the disaster declaration, have an “overview” SHMAC that covers the disaster, HMGP dates and overall State priorities.
- Four months after the disaster declaration, publicize the availability of HMGP funds:
- Six months after the disaster declaration, “Intent to Apply” forms for HMGP funding are due:
- Within one month following the “Intent to Apply” form due date, offer BCA training to potential applicants.
- Seven months following the disaster declaration, have a “lock-in report” SHMAC that reviews the HMGP funding available under the disaster.
- Nine months following the disaster declaration, HMGP applications are due:
- Three weeks following the HMGP application deadline, have a SHMAC to review and prioritize applications.
- Three weeks following the SHMAC have a DPC to review and authorize the HMGP applications
- Eleven months following the disaster, submit the HMGP applications to FEMA

Community affected by disaster

- Fund new hazard mitigation plan or plan update for community: (HMGP 7% for planning)
- Develop 2-5 hazard mitigation projects for the community: (FEMA)
- Apply HMGP funds to incomplete PA and 406 Mitigation projects.

Federally Declared Disaster JFO Mitigation Strategies

Future Mitigation Strategies for Federally Declared Disasters

State Mitigation Planning and Hazard Analysis

1. Produce Level 2 or above HAZUS studies for the disaster area including seismic, flood, etc.
2. Capture spatial data and attributes from disaster sites including:
 - High water marks
 - Seismic faulting
 - First floor elevation determination
 - Ownership of infrastructure and facilities
3. Review and assess any previous mitigation projects in the affected communities:
 - Project location (address, GPS lat / long)
 - Project description
 - Project funding mechanism
 - Project effectiveness

Community Outreach

1. With the Preliminary Damage Assessment (PDA) and all IA and PA teams, send appropriate education and outreach materials including:
 - Fact sheets appropriate to the disaster including:
 - Flood – mold mitigation instructions
 - Power interruption – CO and generator safety
 - Success stories
 - Rebuilding / mitigation instructions specific to the disaster hazard.
 - Hazard mitigation guides including Flood, Seismic and Landslide
2. Seek JFO reproduction of:
 - Spenser and the Volcano book
 - James and the Wildfire book
3. Produce radio, TV, multimedia and web based Public Service Announcements (PSA's) and mitigation materials for Alaska communities in the disaster area:
 - How to rebuild your damaged home to prevent future damage from a similar event.
 - Mitigation success stories

Mitigation Training and Education

1. Request training for the State mitigation team and communities (as appropriate) in the following mitigation tools:
 - NEMIS
 - Benefit Cost Analysis (BCA)
 - Mitigation Planning workshop for updating mitigation plans
2. Request a “Flood management 101” course for State staff and community participants that includes:
 - Basics of flood plain terminology
 - Flood plain map reading
 - Basics of flood plain management
 - Basics of hydraulics and hydrology (H&H) including what is needed in the scope of work for an effective H&H study

Coordination with FEMA PA

1. Require a copy of all FEMA PA project worksheets with actual or potential 406 mitigation to be provided to the State mitigation team.
2. Require that, FEMA PA 406 mitigation projects be written up with enough detail to produce a 404 (HMGP) mitigation project if the 406 portion is not funded.
3. Capture data on facilities and infrastructure in the disaster area including:
 - Ownership: (i.e. who owns the road: State, Community, BIA, etc.)
 - Location: (address and GPS Lat/long)
 - Photos:
 - Descriptions
4. Require FEMA PA staff to be alert for potential 404 mitigation project opportunities and when found to write them up fully for project application including:
 - Scope of work
 - Cost estimate
 - Photos labeled with exactly what the damage in the area was and what mitigation is needed.
 - GPS (Lat / Long)
 - Measurements
 - Project details, description, etc.
5. Develop a report sheet for instructions and to capture the information
6. Ask that FEMA JOF Mitigation staff produce a binder and electronic files, prior to the JFO closing, with all the information relating to and requested by mitigation from PA

including:

- Each actual and potential 406 and 404 mitigation project listed
 - Each project listing should include the full details equal to the items listed in # 3 above
- Critical facility and infrastructure data

Mitigation Project Development

1. Ask that FEMA JOF produce a mitigation project handbook / CD's / MSWord forms and training customized for Alaska that includes:
 - Project templates for specific hazards
 - Sample applications
 - Procedures and resources for developing:
 - The scope of work
 - The project budget
 - The required project and BCA documentation
 - Environmental and historical permitting and clearances
 - Project engineering

Ask that the JFO develop a customized Alaskan boardwalk mitigation strategy that includes:

- The best methods for boardwalk mitigation (new wood-like materials, etc)
 - Methods for clearing the environmental and historical requirement
2. Ask that the JFO research and document potential methods for FEMA mitigation funding of seismic assessments leading to mitigation projects in public schools.
 3. Ask that the FEMA JOF provide for the full HMA grant application development for any repetitive loss properties in the declared disaster areas including:
 - Completing AW-501 forms
 - All items listed under #1
 4. Ask that the JFO update and produce current project applications for any community mitigation projects that were previously studied and developed but not funded.

Severe Weather Related Disaster

1. Request a JFO produced “point paper” on avalanche that covers the following topics:
 - What other States are doing to mitigate against avalanche risk including :
 - Avalanche mitigation projects
 - Outreach and training
 - Forecasting
 - How HMGP funding has been used for avalanche mitigation projects.

Appendix 7 – Alaska Seismic Hazard Safety Commission

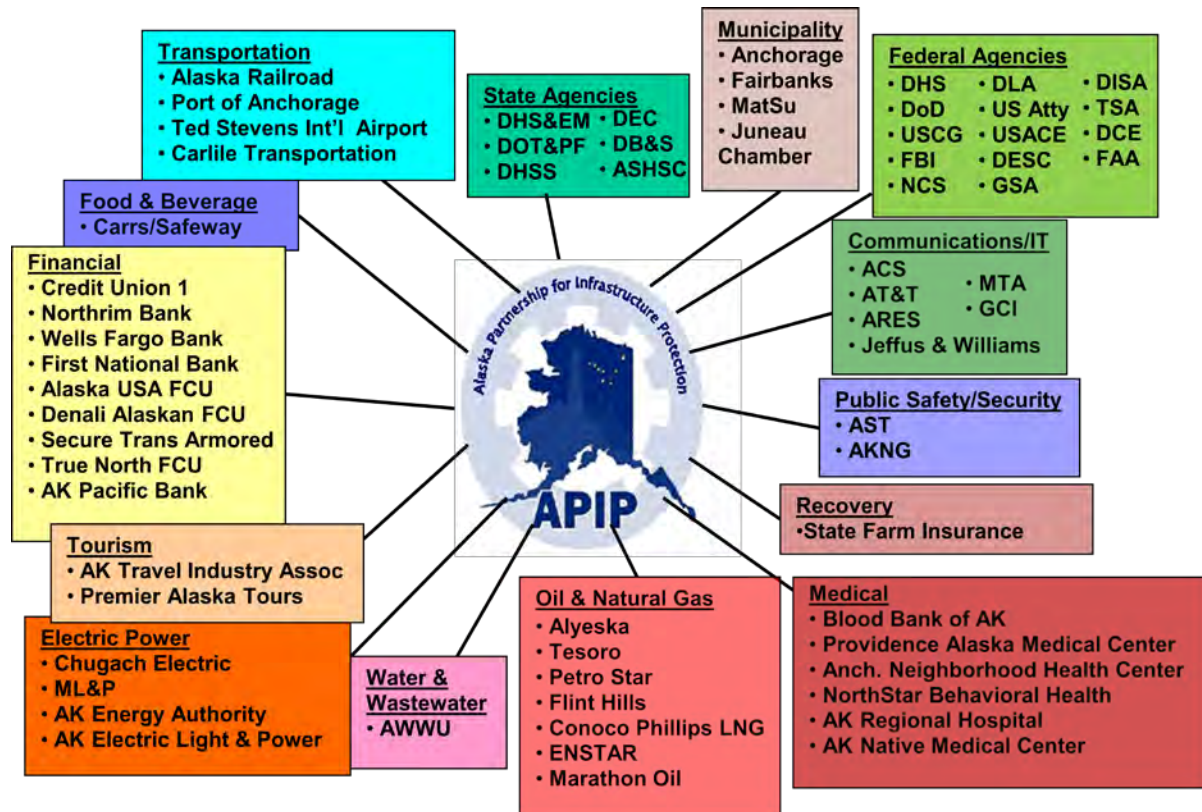
- Public, Chair, R&M Consultants
- Public, CH2M / Hill
- Public, Carver Geologic Inc.
- Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys (DNR/DGGS)
- Department of Military and Veterans Affairs/Division of Homeland Security (DMVA/DHS&EM) State Hazard Mitigation Officer
- UAF/GI, State Seismologist
- Local Official, City of Valdez
- Local Official, Kodiak Island Borough
- Local Official, City and Borough of Sitka
- Federal, US Coast Guard (USCG)
- Insurance Industry, State Farm Insurance Co.

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Appendix 8 – APIP

Appendix 8 - Alaska Partnership for Infrastructure Protection



Appendix 9 – Clarification of 44 CFR Part 201 Mitigation Plan requirements for communities within the unorganized Borough in Alaska

The following document from FEMA Region 10 provides Hazard Mitigation Planning guidance for unincorporated communities within Alaska's Unorganized Borough.

MC



FEMA

July 8, 2008

MEMORANDUM FOR: Mark Carey
Director
Mitigation Division
FEMA Region X

FROM: *David I. Maurstad*
David I. Maurstad
Director
Mitigation Division

SUBJECT: Clarification of 44 CFR Part 201 Mitigation Plan
requirements for communities within the unorganized
Borough in Alaska

This memorandum provides clarification on the hazard mitigation plan requirements for the unincorporated communities and Alaskan Indian Reorganization Act villages located within Alaska's Unorganized Borough. This supersedes the November 17, 2006 memorandum "Clarification of 44 CFR Part 201 Mitigation Plan requirements for communities within the unorganized Borough in Alaska."

Since these communities do not have governing nor adoption authority as required by 44 CFR Part 201, the State of Alaska may act on their behalf for the purposes of this regulation. By State statute, the State of Alaska is the governing body for these communities and native villages. Therefore, the unincorporated entities in the Unorganized Borough may be included in the adopted State Mitigation Plan as entities of the State or may participant in a Local Mitigation Plan, which is adopted by the State.

In the first option, the State must develop an annex to their State Mitigation Plan that specifically covers these communities and villages. The State of Alaska may use the concept of "other State agencies" and "multi-jurisdictional plans" in developing this annex. At a minimum the annex must: 1) include all entities covered by the plan, 2) demonstrate local participation, 3) identify any risks unique to each entity, and 4) propose mitigation actions applicable to each entity.

In the second option, an unincorporated entity in the Unorganized Borough may participate in a single jurisdictional or multi-jurisdictional Local Mitigation Plan, which must be adopted by the State of Alaska. In this case, the plan must: 1) demonstrate local

Appendix 10- Small and Impoverished Communities

See following tables.

Note

- Except where noted, source information is provided by DCCED.
- 2009 SOA DOL Estimate from Alaska's Department of Labor Population
<http://laborstats.alaska.gov/?PAGEID=67&SUBID=115>
 - * Population from DCCED Community Database
- Population, Per Capita Income, % Unemployment will be updated during the 2011 annual review when 2010 US Census data is available

The State of Alaska (SOA) does not have an official definition of "rural". This classification is for program purposes only and is not intended to represent the SOA or any of its Departments in any official capacity.

Eligibility

| ELIGIBLE Community (all yellow headers) | Incorporation Type | Census Area | <u><=3,000</u> 2009 SOA DOL Estimate | <u><=\$29020.8</u> 2000 Census Per Capita Income | <u>4.4%>=5.4%</u> 2000 Census % Unemployed | Eligible Based on 2009 Pop & Required Thresholds |
|--|-----------------------|-------------|---|---|--|---|
| Eligible Communities are in Yellow Header Table | | | | | | |
| Not Eligible Communities are in Blue Header Table | | | | | | |

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Appendix 10 – Small and Impoverished Communities

| ELIGIBLE Community (all yellow headers) | Incorporation Type | Census Area | 2009 SOA DOL Estimate | 2000 Census Per Capita Income | 2000 Census Unemployed (x by 100 to get %) | Eligible Based on 2009 Pop & Required Thresholds |
|--|----------------------------------|-------------------------------|--|--|---|---|
| Akhiok | 2nd Class City | Kodiak Island | 51 | 8472 | 0.1429 | Yes |
| Akiachak | Unincorporated | Bethel | 645 | 8321 | 0.255 | Yes |
| Akiak | 2nd Class City | Bethel | 346 | 8326 | 0.1648 | Yes |
| Akutan | 2nd Class City | Aleutians East | 846 | 12259 | 0.8389 | Yes |
| Alakanuk | 2nd Class City | Wade Hampton | 686 | 6884 | 0.2147 | Yes |
| Alatna | Unincorporated | Yukon- Koyukuk | 22 | 14109 | 0.1429 | Yes |
| Aleknagik | 2nd Class City | Dillingham | 229 | 10973 | 0.2159 | Yes |
| Aleutians East Borough | 2nd Class Borough | Aleutians East | 2778 | 18421 | 0.4142 | Yes |
| Allakaket | 2nd Class City | Yukon- Koyukuk | 137 | 10912 | 0.3913 | Yes |
| Ambler | 2nd Class City | Northwest Arctic | 261 | 13712 | 0.2788 | Yes |
| Anaktuvuk Pass | 2nd Class City | North Slope | 287 | 15283 | 0.3333 | Yes |
| Andreafsky | Unincorporated, in St. Mary's | Wade Hampton | 140 | 12161 | 0.1493 | Yes |
| Angoon | 2nd Class City | Skagway- Hoonah- Angoon | 442 | 11357 | 0.1295 | Yes |
| Aniak | 2nd Class City | Bethel | 485 | 16550 | 0.1311 | Yes |
| Anvik | 2nd Class City | Yukon- Koyukuk | 75 | 8081 | 0.275 | Yes |
| Arctic Village | Unincorporated | Yukon- Koyukuk | 139 | 10761 | 0.1667 | Yes |
| Atmautluak | Unincorporated | Bethel | 296 | 8501 | 0.1083 | Yes |
| Atkasuk | 2nd Class City | North Slope | 201 | 14732 | 0.0571 | Yes |
| Beaver | Unincorporated | Yukon- Koyukuk | 58 | 8441 | 0.1791 | Yes |
| Bristol Bay Borough | 2nd Class Borough | Bristol Bay | 967 | 22210 | 0.1048 | Yes |
| Buckland | 2nd Class City | Northwest Arctic | 432 | 9624 | 0.338 | Yes |
| Cantwell | Unincorporated | Denali | 200 | 22615 | 0.1103 | Yes |
| Central | Unincorporated | Yukon- Koyukuk | 96 | 22593 | 0.1379 | Yes |
| Chefornak | 2nd Class City | Bethel | 475 | 8474 | 0.1194 | Yes |
| Chenega Bay | Unincorporated | Valdez- Cordova | 71 | 13381 | 0.1481 | Yes |
| Chevak | 2nd Class City | Wade Hampton | 945 | 7550 | 0.1507 | Yes |
| Chickaloon | Unincorporated | Matanuska- Susitna | 277 | 14755 | 0.2418 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|---------------|----------------|---------------------------------|------|--------|------------|----------|
| Chignik | 2nd Class City | Lake & Peninsula | 48 | 16166 | 0.3519 | Yes |
| Chignik Lake | Unincorporated | Lake & Peninsula | 105 | 13843 | 0.0857 | Yes |
| Chistochina | Unincorporated | Valdez-Cordova | 95 | 12362 | 0.4118 | Yes |
| Chitina | Unincorporated | Valdez-Cordova | 117 | 10835 | 0.3269 | Yes |
| Circle | Unincorporated | Yukon-Koyukuk | 99 | 6426 | 0.24 | Yes |
| Clark's Point | 2nd Class City | Dillingham | 61 | 10989 | 0.1071 | Yes |
| Coffman Cove | 2nd Class City | Prince of Wales-Outer Ketchikan | 152 | 23249 | 0.1048 | Yes |
| Cold Bay | 2nd Class City | Aleutians East | 84 | 20037 | 0.3333 | Yes |
| Copper Center | Unincorporated | Valdez-Cordova | 475 | 15152 | 0.2683 | Yes |
| Copperville | Unincorporated | Valdez-Cordova | 131 | 21733 | 0.1429 | Yes |
| Cordova | Home Rule City | Valdez-Cordova | 2126 | 25256 | 0.0686 | Yes |
| Covenant Life | Unincorporated | Haines | 89 | 14325 | 0.0625 | Yes |
| Craig | 1st Class City | Prince of Wales-Outer Ketchikan | 1400 | 20176 | 0.0899 | Yes |
| Crooked Creek | Unincorporated | Bethel | 131 | 6495 | 0.42 | Yes |
| Cube Cove | Unincorporated | Skagway-Hoonah-Angoon | 0 | 27920 | 0.06 | Yes |
| Deering | 2nd Class City | Northwest Arctic | 118 | 11000 | 0.1698 | Yes |
| Diamond Ridge | Unincorporated | Kenai Peninsula | 860 | 23864 | 0.0996 | Yes |
| Dillingham | 1st Class City | Dillingham | 2264 | 21537 | 0.0711 | Yes |
| Dot Lake | Unincorporated | Southeast Fairbanks | 37 | 19406 | 0.4 | Yes |
| Eagle | 2nd Class City | Southeast Fairbanks | 61 | 20221 | 0.1429 | Yes |
| Eagle Village | Unincorporated | Southeast Fairbanks | 54 | 13886 | 0.5667 | Yes |
| Eek | 2nd Class City | Bethel | 282 | 8957 | 0.1791 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|-----------------|----------------------------|-----------------------|------|--------|------------|----------|
| Egegik | 2nd Class City | Lake & Peninsula | 73 | 16352 | 0.2759 | Yes |
| Ekwok | 2nd Class City | Dillingham | 109 | 11079 | 0.2 | Yes |
| Elfin Cove | Unincorporated | Skagway-Hoonah-Angoon | 25 | 15089 | 0.2308 | Yes |
| Elim | 2nd Class City | Nome | 288 | 10300 | 0.2602 | Yes |
| Emmonak | 2nd Class City | Wade Hampton | 774 | 9069 | 0.2305 | Yes |
| Excursion Inlet | Unincorporated | Haines | 11 | 18188 | 0.5 | Yes |
| Eyak | Unincorporated, in Cordova | Valdez-Cordova | 107 | 18241 | 0.1026 | Yes |
| Ferry | Unincorporated | Denali | 36 | 18323 | 0.6087 | Yes |
| Fort Yukon | 2nd Class City | Yukon-Koyukuk | 585 | 13360 | 0.1799 | Yes |
| Gakona | Unincorporated | Valdez-Cordova | 202 | 18143 | 0.1486 | Yes |
| Galena | 1st Class City | Yukon-Koyukuk | 564 | 22143 | 0.0874 | Yes |
| Gambell | 2nd Class City | Nome | 666 | 8764 | 0.1948 | Yes |
| Game Creek | Unincorporated | Skagway-Hoonah-Angoon | 16 | 11221 | 0.0769 | Yes |
| Goodnews Bay | 2nd Class City | Bethel | 237 | 6851 | 0.1324 | Yes |
| Grayling | 2nd Class City | Yukon-Koyukuk | 177 | 7049 | 0.2 | Yes |
| Gulkana | Unincorporated | Valdez-Cordova | 244 | 13548 | 0.3889 | Yes |
| Gustavus | 2nd Class City | Skagway-Hoonah-Angoon | 451 | 21089 | 0.1403 | Yes |
| Haines | Unincorporated | Haines | 1624 | 22505 | 0.1355 | Yes |
| Haines Borough | Home Rule Borough | Haines | 2286 | 22090 | 0.1366 | Yes |
| Healy | Unincorporated | Denali | 1002 | 28225 | 0.0885 | Yes |
| Healy Lake | Unincorporated | Southeast Fairbanks | 10 | 18128 | 0.1786 | Yes |
| Holy Cross | 2nd Class City | Yukon-Koyukuk | 187 | 8542 | 0.2821 | Yes |
| Hoonah | 1st Class City | Skagway-Hoonah-Angoon | 764 | 16097 | 0.2055 | Yes |
| Hooper Bay | 2nd Class City | Wade Hampton | 1158 | 7841 | 0.3727 | Yes |
| Hughes | 2nd Class City | Yukon-Koyukuk | 79 | 10194 | 0.1429 | Yes |
| Huslia | 2nd Class City | Yukon-Koyukuk | 265 | 10983 | 0.1826 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|--------------------------|-------------------|---------------------------------|------|--------|------------|----------|
| Hydaburg | 1st Class City | Prince of Wales-Outer Ketchikan | 340 | 11401 | 0.313 | Yes |
| Hyder | Unincorporated | Prince of Wales-Outer Ketchikan | 87 | 11491 | 0.4667 | Yes |
| Kake | 1st Class City | Wrangell-Petersburg | 497 | 17411 | 0.2485 | Yes |
| Kaktovik | 2nd Class City | North Slope | 286 | 22031 | 0.1522 | Yes |
| Kaltag | 2nd Class City | Yukon-Koyukuk | 172 | 9361 | 0.299 | Yes |
| Kasaan | 2nd Class City | Prince of Wales-Outer Ketchikan | 56 | 19744 | 0.2 | Yes |
| Kasigluk | Unincorporated | Bethel | 567 | 7194 | 0.2131 | Yes |
| Kiana | 2nd Class City | Northwest Arctic | 374 | 11534 | 0.1161 | Yes |
| King Cove | 1st Class City | Aleutians East | 744 | 17791 | 0.0644 | Yes |
| King Salmon | Unincorporated | Bristol Bay | 383 | 26755 | 0.0886 | Yes |
| Kipnuk | Unincorporated | Bethel | 671 | 8589 | 0.3398 | Yes |
| Kivalina | 2nd Class City | Northwest Arctic | 410 | 8360 | 0.2545 | Yes |
| Klawock | 1st Class City | Prince of Wales-Outer Ketchikan | 782 | 14621 | 0.1565 | Yes |
| Klukwan | Unincorporated | Skagway-Hoonah-Angoon | 72 | 11612 | 0.4483 | Yes |
| Kokhanok | Unincorporated | Lake & Peninsula | 184 | 7732 | 0.1136 | Yes |
| Koliganek | Unincorporated | Dillingham | 182 | 13242 | 0.1316 | Yes |
| Kotlik | 2nd Class City | Wade Hampton | 618 | 7707 | 0.2437 | Yes |
| Koyuk | 2nd Class City | Nome | 358 | 8736 | 0.3458 | Yes |
| Koyukuk | 2nd Class City | Yukon-Koyukuk | 105 | 11342 | 0.2308 | Yes |
| Kwethluk | 2nd Class City | Bethel | 723 | 6503 | 0.1576 | Yes |
| Kwigillingok | Unincorporated | Bethel | 365 | 7577 | 0.2844 | Yes |
| Lake & Peninsula Borough | Home Rule Borough | Lake & Peninsula | 1547 | 15361 | 0.1431 | Yes |
| Lake Louise | Unincorporated | Matanuska-Susitna | 100 | 11056 | 0.4167 | Yes |
| Larsen Bay | 2nd Class City | Kodiak Island | 79 | 16227 | 0.1026 | Yes |
| Lower Kalskag | 2nd Class City | Bethel | 251 | 7654 | 0.4205 | Yes |
| Lutak | Unincorporated | Haines | 38 | 20928 | 0.1429 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|--------------------|--|---------------------------------|------|--------|------------|----------|
| Manley Hot Springs | Unincorporated | Yukon-Koyukuk | 81 | 21751 | 0.1 | Yes |
| Manokotak | 2nd Class City | Dillingham | 438 | 9294 | 0.1373 | Yes |
| Marshall | 2nd Class City | Wade Hampton | 414 | 9597 | 0.1852 | Yes |
| McCarthy | Unincorporated | Valdez-Cordova | 51 | 16045 | 0.8 | Yes |
| McGrath | 2nd Class City | Yukon-Koyukuk | 322 | 21553 | 0.1043 | Yes |
| McKinley Park | Unincorporated | Denali | 168 | 27255 | 0.1474 | Yes |
| Mekoryuk | 2nd Class City | Bethel | 174 | 11957 | 0.1979 | Yes |
| Mendeltna | Unincorporated | Valdez-Cordova | 57 | 11289 | 0.3333 | Yes |
| Mentasta Lake | Unincorporated | Valdez-Cordova | 120 | 11274 | 0.28 | Yes |
| Metlakatla | Unincorporated, Indian Reservation (Federal) | Prince of Wales-Outer Ketchikan | 1330 | 16140 | 0.2085 | Yes |
| Minto | Unincorporated | Yukon-Koyukuk | 191 | 9640 | 0.4085 | Yes |
| Mosquito Lake | Unincorporated | Haines | 235 | 16415 | 0.25 | Yes |
| Mountain Village | 2nd Class City | Wade Hampton | 782 | 9653 | 0.3077 | Yes |
| Naknek | Unincorporated | Bristol Bay | 516 | 21182 | 0.0938 | Yes |
| Napakiak | 2nd Class City | Bethel | 337 | 7319 | 0.2231 | Yes |
| Naukatik Bay | Unincorporated | Prince of Wales-Outer Ketchikan | 118 | 15949 | 0.2909 | Yes |
| Nelchina | Unincorporated | Valdez-Cordova | 51 | 10743 | 0.15 | Yes |
| Nelson Lagoon | Unincorporated | Aleutians East | 60 | 27596 | 0.4615 | Yes |
| New Allakaket | Unincorporated | Yukon-Koyukuk | 37 | 5578 | 0.3846 | Yes |
| New Stuyahok | 2nd Class City | Dillingham | 519 | 7931 | 0.092 | Yes |
| Newhalen | 2nd Class City | Lake & Peninsula | 162 | 9447 | 0.3125 | Yes |
| Newtok | Unincorporated | Bethel | 355 | 9514 | 0.2463 | Yes |
| Nightmute | 2nd Class City | Bethel | 264 | 9396 | 0.1604 | Yes |
| Nikolai | 2nd Class City | Yukon-Koyukuk | 87 | 11029 | 0.3793 | Yes |
| Noatak | Unincorporated | Northwest Arctic | 486* | 9659 | 0.2535 | Yes |
| Nondalton | 2nd Class City | Lake & Peninsula | 186 | 8411 | 0.3733 | Yes |
| Noorvik | 2nd Class City | Northwest Arctic | 628 | 12020 | 0.1956 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|-------------------|----------------|---------------------|------|--------|------------|----------|
| Northway | Unincorporated | Southeast Fairbanks | 88 | 16429 | 0.1351 | Yes |
| Northway Junction | Unincorporated | Southeast Fairbanks | 60 | 16440 | 0.0625 | Yes |
| Northway Village | Unincorporated | Southeast Fairbanks | 76 | 10300 | 0.3182 | Yes |
| Nuiqsut | 2nd Class City | North Slope | 402 | 14876 | 0.0881 | Yes |
| Nulato | 2nd Class City | Yukon-Koyukuk | 240 | 8966 | 0.4194 | Yes |
| Nunam Iqua | 2nd Class City | Wade Hampton | 156 | 6725 | 0.4068 | Yes |
| Nunapitchuk | 2nd Class City | Bethel | 539 | 8364 | 0.1718 | Yes |
| Old Harbor | 2nd Class City | Kodiak Island | 193 | 14265 | 0.2297 | Yes |
| Ouzinkie | 2nd Class City | Kodiak Island | 170 | 19324 | 0.1163 | Yes |
| Perryville | Unincorporated | Lake & Peninsula | 122 | 20935 | 0.1111 | Yes |
| Pilot Point | 2nd Class City | Lake & Peninsula | 66 | 12627 | 0.0769 | Yes |
| Pilot Station | 2nd Class City | Wade Hampton | 577 | 7311 | 0.3212 | Yes |
| Pitkas Point | Unincorporated | Wade Hampton | 113 | 10487 | 0.25 | Yes |
| Platinum | 2nd Class City | Bethel | 57 | 7632 | 0.2727 | Yes |
| Point Hope | 2nd Class City | North Slope | 705 | 16641 | 0.2571 | Yes |
| Port Alexander | 2nd Class City | Wrangell-Petersburg | 61* | 14767 | 0.0938 | Yes |
| Port Graham | Unincorporated | Kenai Peninsula | 137 | 13666 | 0.2237 | Yes |
| Port Heiden | 2nd Class City | Lake & Peninsula | 83 | 20532 | 0.1667 | Yes |
| Quinhagak | 2nd Class City | Bethel | 680 | 8127 | 0.1544 | Yes |
| Rampart | Unincorporated | Yukon-Koyukuk | 12 | 12439 | 0.3182 | Yes |
| Red Devil | Unincorporated | Bethel | 44 | 5515 | 0.3636 | Yes |
| Ruby | 2nd Class City | Yukon-Koyukuk | 149 | 9544 | 0.2361 | Yes |
| Russian Mission | 2nd Class City | Wade Hampton | 363 | 8358 | 0.217 | Yes |
| Saint Mary's | 1st Class City | Wade Hampton | 553 | 15837 | 0.1134 | Yes |
| Saint Michael | 2nd Class City | Nome | 446 | 10692 | 0.2124 | Yes |
| Saint Paul | 2nd Class City | Aleutians West | 459 | 18408 | 0.1498 | Yes |
| Sand Point | 1st Class City | Aleutians East | 1001 | 21954 | 0.3079 | Yes |
| Savoonga | 2nd Class City | Nome | 721 | 7725 | 0.3736 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|------------------|----------------|---------------------------------|------|--------|------------|----------|
| Scammon Bay | 2nd Class City | Wade Hampton | 528 | 7719 | 0.128 | Yes |
| Selawik | 2nd Class City | Northwest Arctic | 849 | 8170 | 0.3434 | Yes |
| Seldovia | 1st Class City | Kenai Peninsula | 241 | 23669 | 0.1042 | Yes |
| Seldovia Village | Unincorporated | Kenai Peninsula | 166 | 21396 | 0.1045 | Yes |
| Shageluk | 2nd Class City | Yukon-Koyukuk | 97 | 7587 | 0.2742 | Yes |
| Shaktoolik | 2nd Class City | Nome | 231 | 10491 | 0.2766 | Yes |
| Shishmaref | 2nd Class City | Nome | 606 | 10487 | 0.1643 | Yes |
| Shungnak | 2nd Class City | Northwest Arctic | 270 | 10377 | 0.2752 | Yes |
| Silver Springs | Unincorporated | Valdez-Cordova | 178 | 23464 | 0.0862 | Yes |
| Skagway | 1st Class City | Skagway-Hoonah-Angoon | 865 | 27700 | 0.141 | Yes |
| Slana | Unincorporated | Valdez-Cordova | 102 | 20019 | 0.4694 | Yes |
| Sleetmute | Unincorporated | Bethel | 71 | 8150 | 0.2759 | Yes |
| South Naknek | Unincorporated | Bristol Bay | 68 | 13019 | 0.2414 | Yes |
| Stebbins | 2nd Class City | Nome | 605 | 8249 | 0.226 | Yes |
| Stevens Village | Unincorporated | Yukon-Koyukuk | 64 | 7113 | 0.3889 | Yes |
| Stony River | Unincorporated | Bethel | 48 | 5469 | 0.381 | Yes |
| Sutton-Alpine | Unincorporated | Matanuska-Susitna | 1407 | 20436 | 0.0742 | Yes |
| Talkeetna | Unincorporated | Matanuska-Susitna | 894 | 23695 | 0.1442 | Yes |
| Tanacross | Unincorporated | Southeast Fairbanks | 203 | 9429 | 0.5714 | Yes |
| Tanana | 1st Class City | Yukon-Koyukuk | 251 | 12077 | 0.2366 | Yes |
| Tatitlek | Unincorporated | Valdez-Cordova | 83 | 13014 | 0.0789 | Yes |
| Tazlina | Unincorporated | Valdez-Cordova | 207 | 23992 | 0.1282 | Yes |
| Teller | 2nd Class City | Nome | 261 | 8618 | 0.1471 | Yes |
| Tenakee Springs | 2nd Class City | Skagway-Hoonah-Angoon | 104 | 20483 | 0.1373 | Yes |
| Tetlin | Unincorporated | Southeast Fairbanks | 169 | 7371 | 0.4688 | Yes |
| Thorne Bay | 2nd Class City | Prince of Wales-Outer Ketchikan | 424 | 20836 | 0.146 | Yes |
| Togiak | 2nd Class City | Dillingham | 820 | 9676 | 0.2684 | Yes |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|----------------|-------------------|---------------------|------|--------|------------|----------|
| Tok | Unincorporated | Southeast Fairbanks | 1429 | 18521 | 0.1799 | Yes |
| Toksook Bay | 2nd Class City | Bethel | 596 | 8761 | 0.1531 | Yes |
| Tonsina | Unincorporated | Valdez-Cordova | 78 | 13390 | 0.28 | Yes |
| Trapper Creek | Unincorporated | Matanuska-Susitna | 444 | 18247 | 0.0809 | Yes |
| Tuluksak | Unincorporated | Bethel | 471 | 7132 | 0.16 | Yes |
| Tuntutuliak | Unincorporated | Bethel | 384 | 7918 | 0.1466 | Yes |
| Tununak | Unincorporated | Bethel | 330 | 7653 | 0.1981 | Yes |
| Tyonek | Unincorporated | Kenai Peninsula | 166 | 11261 | 0.2727 | Yes |
| Unalakleet | 2nd Class City | Nome | 725 | 15845 | 0.1457 | Yes |
| Upper Kalskag | 2nd Class City | Bethel | 223 | 7859 | 0.1209 | Yes |
| Venetie | Unincorporated | Yukon-Koyukuk | 185 | 7314 | 0.3623 | Yes |
| Wainwright | 2nd Class City | North Slope | 551 | 16710 | 0.2184 | Yes |
| Wales | 2nd Class City | Nome | 148 | 14877 | 0.1892 | Yes |
| White Mountain | 2nd Class City | Nome | 202 | 10034 | 0.1875 | Yes |
| Whittier | 2nd Class City | Valdez-Cordova | 159 | 25700 | 0.1589 | Yes |
| Willow Creek | Unincorporated | Valdez-Cordova | 157 | 18242 | 0.16 | Yes |
| Wrangell | Home Rule City | Wrangell-Petersburg | 1892 | 21851 | 0.0848 | Yes |
| Yakutat | Home Rule Borough | Yakutat | 608 | 22579 | 0.0776 | Yes |

| NOT ELIGIBLE Community (all blue headers) | Incorporation Type | Census Area | 2009 SOA DOL Estimate | 2000 Census Per Capita Income | 2000 Census % Unemployed | Eligible Based on 2009 Pop & Required Thresholds |
|---|--------------------|---------------------|-----------------------|-------------------------------|--------------------------|--|
| Adak | 2nd Class City | Aleutians West | 165 | 31747 | 0.0755 | No |
| Afognak | Unincorporated | Kodiak Island | 0* | NO DATA | 0 | No |
| Alcan Border | Unincorporated | Southeast Fairbanks | 26 | 21938 | 0 | No |
| Aleneva | Unincorporated | Kodiak Island | 67 | 3707 | 0 | No |
| Alpine | Unincorporated | North Slope | 0 | 0 | 0 | No |
| Anchor Point | Unincorporated | Kenai Peninsula | 1772 | 18668 | 0.1337 | No |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|---------------------|--------------------------------|---------------------|--------|---------|------------|----------|
| Anchorage | Unified Home Rule Municipality | Anchorage | 290588 | 25287 | 0.0676 | No |
| Anderson | 2nd Class City | Denali | 275 | 23837 | 0.1019 | No |
| Atka | 2nd Class City | Aleutians West | 71 | 17079 | 0 | No |
| Attu Station | Unincorporated | Aleutians West | 15 | 26964 | 0 | No |
| Barrow | 1st Class City | North Slope | 4119 | 22902 | 0.1274 | No |
| Bear Creek | Unincorporated | Kenai Peninsula | 2009 | 20947 | 0.0745 | No |
| Belkofski | Unincorporated | Aleutians East | 0 | 0 | 0 | No |
| Beluga | Unincorporated | Kenai Peninsula | 24 | 0 | 0 | No |
| Bethel | 2nd Class City | Bethel | 5803 | 20267 | 0.0895 | No |
| Bettles | 2nd Class City | Yukon-Koyukuk | 19 | 19586 | 0 | No |
| Big Delta | Unincorporated | Southeast Fairbanks | 840 | 14803 | 0.2472 | No |
| Big Lake | Unincorporated | Matanuska-Susitna | 3331 | 19285 | 0.1352 | No |
| Bill Moore's Slough | Unincorporated | Wade Hampton | 0 | NO DATA | 0 | No |
| Birch Creek | Unincorporated | Yukon-Koyukuk | 31 | 5952 | 0 | No |
| Brevig Mission | 2nd Class City | Nome | 358 | 7278 | 0.0244 | No |
| Buffalo Soapstone | Unincorporated | Matanuska-Susitna | 738 | 18021 | 0.0729 | No |
| Butte | Unincorporated | Matanuska-Susitna | 3255 | 22522 | 0.0888 | No |
| Chalkyitsik | Unincorporated | Yukon-Koyukuk | 60 | 11509 | 0 | No |
| Chase | Unincorporated | Matanuska-Susitna | 35 | 16000 | 0 | No |
| Chicken | Unincorporated | Southeast Fairbanks | 23 | 65400 | 0 | No |
| Chignik Lagoon | Unincorporated | Lake & Peninsula | 73 | 28940 | 0 | No |
| Chiniak | Unincorporated | Kodiak Island | 48 | 22211 | 0 | No |
| Chisana | Unincorporated | Valdez-Cordova | 9 | 0 | 0 | No |
| Chuathbaluk | 2nd Class City | Bethel | 98 | 10100 | 0.0536 | No |
| Chuloonawick | Unincorporated | Wade Hampton | 0 | NO DATA | 0 | No |
| Clam Gulch | Unincorporated | Kenai Peninsula | 166 | 17983 | 0.2692 | No |
| Cohoe | Unincorporated | Kenai Peninsula | 1332 | 19059 | 0.1633 | No |
| Coldfoot | Unincorporated | Yukon-Koyukuk | 13 | 42620 | 0 | No |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|----------------|-------------------|----------------|--------|--------|------------|----------|
| College | Unincorporated | Fairbanks | 12552 | 23381 | 0.0974 | No |
| Cooper | Unincorporated | North Star | | | | |
| Landing | Unincorporated | Kenai | 344 | 24795 | 0 | No |
| Council | Unincorporated | Peninsula | | | | |
| | | Nome | 8 | NO | 0 | No |
| | | | | DATA | | |
| Crown Point | Unincorporated | Kenai | 77 | 17498 | 0.3846 | No |
| | | Peninsula | | | | |
| Delta Junction | 2nd Class City | Southeast | 1128 | 19171 | 0.1163 | No |
| | | Fairbanks | | | | |
| Deltana | Unincorporated | Southeast | 2355 | 18446 | 0.1275 | No |
| | | Fairbanks | | | | |
| Denali | Home Rule | Denali | 1838 | 26251 | 0.1157 | No |
| Borough | Borough | | | | | |
| Diomedes | 2nd Class City | Nome | 117 | 9944 | 0.0217 | No |
| Dot Lake | Unincorporated | Southeast | 37 | 7476 | 0 | No |
| Village | | Fairbanks | | | | |
| Douglas | Unincorporated,in | Juneau | 4890 | NO | 0 | No |
| | Juneau | | | DATA | | |
| Dry Creek | Unincorporated | Southeast | 87 | 7779 | 0 | No |
| | | Fairbanks | | | | |
| Eagle River- | Unincorporated,in | Anchorage | 29869+ | NO | 0 | No |
| Chugiak | Muni of Anch. | | | DATA | | |
| Edna Bay | Unincorporated | Prince of | 49 | 58967 | 0 | No |
| | | Wales-Outer | | | | |
| | | Ketchikan | | | | |
| Eielson AFB | Unincorporated | Fairbanks | 2896 | 11512 | 0.0775 | No |
| | | North Star | | | | |
| Eklutna | Unincorporated,in | Anchorage | 384 | 29375 | 0.0583 | No |
| | Muni of Anch. | | | | | |
| Ekuk | Unincorporated | Dillingham | 0 | 25000 | 0 | No |
| Ester | Unincorporated | Fairbanks | 2034 | 29155 | 0.0442 | No |
| | | North Star | | | | |
| Evansville | Unincorporated | Yukon- | 32 | 15745 | 0 | No |
| | | Koyukuk | | | | |
| Fairbanks | Home Rule City | Fairbanks | 32506 | 19814 | 0.1088 | No |
| | | North Star | | | | |
| Fairbanks | 2nd Class | Fairbanks | 93779 | 21553 | 0.0911 | No |
| North Star | Borough | North Star | | | | |
| Borough | | | | | | |
| False Pass | 2nd Class City | Aleutians East | 41 | 21465 | 0 | No |
| Farm Loop | Unincorporated | Matanuska- | 1313 | 20880 | 0.027 | No |
| | | Susitna | | | | |
| Fishhook | Unincorporated | Matanuska- | 3337 | 20042 | 0.0655 | No |
| | | Susitna | | | | |
| Flat | Unincorporated | Yukon- | 0 | 0 | 0 | No |
| | | Koyukuk | | | | |
| Fort Greely | Unincorporated | Southeast | 413 | 12368 | 0.0317 | No |
| | | Fairbanks | | | | |
| Four Mile | Unincorporated | Yukon- | 39 | 28466 | 0.1364 | No |
| Road | | Koyukuk | | | | |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|---------------|--------------------|-------------|-------|--------|------------|----------|
| Fox | Unincorporated | Fairbanks | 390 | 22689 | 0.0573 | No |
| Fox River | Unincorporated | North Star | | | | |
| | | Kenai | 604 | 7963 | 0.0395 | No |
| Fritz Creek | Unincorporated | Peninsula | | | | |
| | | Kenai | 1818 | 18937 | 0.1335 | No |
| Funny River | Unincorporated | Peninsula | | | | |
| | | Kenai | 796 | 22648 | 0.2305 | No |
| Gateway | Unincorporated | Peninsula | | | | |
| | | Matanuska- | 4068 | 24548 | 0.074 | No |
| | | Susitna | | | | |
| Georgetown | Unincorporated | Bethel | 3 | 0 | 0 | No |
| Girdwood | Unincorporated,in | Anchorage | 1817+ | NO | 0 | No |
| | Muni of Anch. | | | DATA | | |
| Glacier View | Unincorporated | Matanuska- | 246 | 14855 | 0 | No |
| | | Susitna | | | | |
| Glennallen | Unincorporated | Valdez- | 473 | 17084 | 0.0502 | No |
| | | Cordova | | | | |
| Golovin | 2nd Class City | Nome | 154 | 13281 | 0.0351 | No |
| Halibut Cove | Unincorporated | Kenai | 27 | 89895 | 0 | No |
| | | Peninsula | | | | |
| Hamilton | Unincorporated | Wade | 0 | NO | 0 | No |
| | | Hampton | | DATA | | |
| Happy Valley | Unincorporated | Kenai | 561 | 19377 | 0.1667 | No |
| | | Peninsula | | | | |
| Harding-Birch | Unincorporated | Fairbanks | 287 | 24443 | 0.113 | No |
| Lakes | | North Star | | | | |
| Hobart Bay | Unincorporated | Skagway- | 1 | 34900 | 0 | No |
| | | Hoonah- | | | | |
| | | Angoon | | | | |
| Hollis | Unincorporated | Prince of | 193 | 17278 | 0.0308 | No |
| | | Wales-Outer | | | | |
| | | Ketchikan | | | | |
| Homer | 1st Class City | Kenai | 5551 | 21823 | 0.0895 | No |
| | | Peninsula | | | | |
| Hope | Unincorporated | Kenai | 151 | 9079 | 0.1333 | No |
| | | Peninsula | | | | |
| Houston | 2nd Class City | Matanuska- | 1664 | 17213 | 0.1767 | No |
| | | Susitna | | | | |
| Igiugig | Unincorporated | Lake & | 48 | 13172 | 0 | No |
| | | Peninsula | | | | |
| Iliamna | Unincorporated | Lake & | 91 | 19741 | 0 | No |
| | | Peninsula | | | | |
| Ivanof Bay | Unincorporated | Lake & | 0 | 21983 | 0 | No |
| | | Peninsula | | | | |
| Jakolof Bay | In Kenai Peninsula | Kenai | 0* | NO | 0 | No |
| | Borough | Peninsula | | DATA | | |
| Juneau | Unified Home Rule | Juneau | 30661 | 26719 | 0.0535 | No |
| | Municipality | | | | | |
| Kachemak | 2nd Class City | Kenai | 430 | 21030 | 0.0448 | No |
| | | Peninsula | | | | |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|---------------------------|-------------------|---------------------|-------|------------|------------|----------|
| Kaguyak | Unincorporated | Kodiak Island | 0* | NO DATA | 0 | No |
| Kalifornsky | Unincorporated | Kenai Peninsula | 7495 | 23898 | 0.0916 | No |
| Kanatak | Unincorporated | Kodiak Island | 14571 | NO DATA | 0 | No |
| Karluk | Unincorporated | Kodiak Island | 38 | 13736 | 0 | No |
| Kasilof | Unincorporated | Kenai Peninsula | 536 | 21211 | 0 | No |
| Kenai | Home Rule City | Kenai Peninsula | 7115 | 20789 | 0.1244 | No |
| Kenai Peninsula Borough | 2nd Class Borough | Kenai Peninsula | 53578 | 20949 | 0.1144 | No |
| Kenny Lake | Unincorporated | Valdez-Cordova | 412 | 13121 | 0.0377 | No |
| Ketchikan | Home Rule City | Ketchikan Gateway | 7503 | 22484 | 0.0817 | No |
| Ketchikan Gateway Borough | 2nd Class Borough | Ketchikan Gateway | 12984 | 23994 | 0.0765 | No |
| King Island | Unincorporated | Nome | 0* | NO DATA | 0 | No |
| Knik River | Unincorporated | Matanuska-Susitna | 631 | 19104 | 0.2114 | No |
| Knik-Fairview | Unincorporated | Matanuska-Susitna | 13824 | 20895 | 0.1345 | No |
| Kobuk | 2nd Class City | Northwest Arctic | 122 | 9845 | 0 | No |
| Kodiak | Home Rule City | Kodiak Island | 6626 | 21522 | 0.0498 | No |
| Kodiak Island Borough | 2nd Class Borough | Kodiak Island | 13860 | 22195 | 0.0518 | No |
| Kodiak Station | Unincorporated | Kodiak Island | 1321 | 14234 | 0.0606 | No |
| Kongiganak | Unincorporated | Bethel | 465 | 9881 | 0.035 | No |
| Kotzebue | 2nd Class City | Northwest Arctic | 3154 | 18289 | 0.098 | No |
| Kupreanof | 2nd Class City | Wrangell-Petersburg | 24 | 26651 | 0 | No |
| Lake Minchumina | Unincorporated | Yukon-Koyukuk | 17 | 26780 | 0 | No |
| Lakes | Unincorporated | Matanuska-Susitna | 8388 | 23485 | 0.0696 | No |
| Lazy Mountain | Unincorporated | Matanuska-Susitna | 1446 | 22789 | 0.1078 | No |
| Levelock | Unincorporated | Lake & Peninsula | 88 | 12199 | 0 | No |
| Lime Village | Unincorporated | Bethel | 19 | 0 | 0 | No |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|---------------------------|--------------------------|---------------------------------|-------|---------|------------|----------|
| Livengood | Unincorporated | Yukon-Koyukuk | 24 | 21215 | 0 | No |
| Lowell Point | Unincorporated | Kenai Peninsula | 76 | 45790 | 0.1707 | No |
| Mary's Igloo | Unincorporated | Nome | 0 | NO DATA | 0 | No |
| Matanuska-Susitna Borough | 2nd Class Borough | Matanuska-Susitna | 84314 | 21105 | 0.103 | No |
| Meadow Lakes | Unincorporated | Matanuska-Susitna | 7319 | 17295 | 0.0972 | No |
| Meyers Chuck | Unincorporated | Prince of Wales-Outer Ketchikan | 16 | 31660 | 0 | No |
| Miller Landing | Unincorporated, in Homer | Kenai Peninsula | 0 | 19587 | 0.1628 | No |
| Moose Creek | Unincorporated | Fairbanks North Star | 729 | 17980 | 0.0893 | No |
| Moose Pass | Unincorporated | Kenai Peninsula | 189 | 28147 | 0 | No |
| Mud Bay | Unincorporated | Haines | 178 | 24720 | 0.0256 | No |
| Nanwalek | Unincorporated | Kenai Peninsula | 226 | 10577 | 0.0506 | No |
| Napaimute | Unincorporated | Bethel | 0 | NO DATA | 0 | No |
| Napaskiak | 2nd Class City | Bethel | 428 | 8162 | 0.0294 | No |
| Nenana | Home Rule City | Yukon-Koyukuk | 353 | 17334 | 0.2377 | No |
| Nikiski | Unincorporated | Kenai Peninsula | 4465 | 20129 | 0.1567 | No |
| Nikolaevsk | Unincorporated | Kenai Peninsula | 315 | 10390 | 0.2348 | No |
| Nikolski | Unincorporated | Aleutians West | 33 | 14082 | 0 | No |
| Ninilchik | Unincorporated | Kenai Peninsula | 824 | 18463 | 0.1798 | No |
| Nome | 1st Class City | Nome | 3468 | 23402 | 0.1096 | No |
| North Pole | Home Rule City | Fairbanks North Star | 2200 | 21426 | 0.121 | No |
| North Slope Borough | Home Rule Borough | North Slope | 6798 | 20540 | 0.1494 | No |
| Northwest Arctic Borough | Home Rule Borough | Northwest Arctic | 7366 | 15286 | 0.1555 | No |
| Ohogamiut | Unincorporated | Wade Hampton | 0 | NO DATA | 0 | No |
| Oscarville | Unincorporated | Bethel | 109 | 5825 | 0 | No |
| Paimiut | Unincorporated | Wade Hampton | 2 | 0 | 0 | No |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|-----------------|----------------|---------------------------------|------|------------|------------|----------|
| Palmer | Home Rule City | Matanuska-Susitna | 5532 | 17203 | 0.1084 | No |
| Pauloff Harbor | Unincorporated | Aleutians East | 0* | NO DATA | 0 | No |
| Paxson | Unincorporated | Valdez-Cordova | 16 | 26071 | 0 | No |
| Pedro Bay | Unincorporated | Lake & Peninsula | 48 | 18419 | 0 | No |
| Pelican | 1st Class City | Skagway-Hoonah-Angoon | 122 | 29347 | 0.0795 | No |
| Petersburg | Home Rule City | Wrangell-Petersburg | 2973 | 25827 | 0.1028 | No |
| Petersville | Unincorporated | Matanuska-Susitna | 6 | 43200 | 0.5 | No |
| Pleasant Valley | Unincorporated | Fairbanks North Star | 765 | 18633 | 0.0846 | No |
| Point Baker | Unincorporated | Prince of Wales-Outer Ketchikan | 11 | 12580 | 0 | No |
| Point Lay | Unincorporated | North Slope | 234 | 18003 | 0.04 | No |
| Point MacKenzie | Unincorporated | Matanuska-Susitna | 273 | 23227 | 0 | No |
| Pope-Vannoy | Unincorporated | Lake & Peninsula | 5 | 4325 | 0 | No |
| Landing | Unincorporated | Lake & Peninsula | 118 | 21716 | 0.0492 | No |
| Port Alsworth | Unincorporated | Nome | 23 | 35286 | 0 | No |
| Port Clarence | Unincorporated | Kodiak Island | 200 | 17492 | 0.0421 | No |
| Port Lions | 2nd Class City | Prince of Wales-Outer Ketchikan | 72 | 12057 | 0 | No |
| Port Protection | Unincorporated | Kodiak Island | 0* | NO DATA | 0 | No |
| Port William | Unincorporated | Dillingham | 7 | 8010 | 0 | No |
| Portage Creek | Unincorporated | Kenai Peninsula | 65 | 18904 | 0.1159 | No |
| Primrose | Unincorporated | North Slope | 3 | 19880 | 0 | No |
| Prudhoe Bay | Unincorporated | Northwest Arctic | 33 | 34438 | 0 | No |
| Red Dog Mine | Unincorporated | Kenai Peninsula | 35 | 23225 | 0.0144 | No |
| Ridgeway | Unincorporated | Aleutians West | 111 | 21131 | 0.038 | No |
| Saint George | 2nd Class City | Kenai Peninsula | 855 | 16306 | 0.1524 | No |
| Salamatof | Unincorporated | Fairbanks North Star | 985 | 22616 | 0.0486 | No |
| Salcha | Unincorporated | | | | | |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|-------------------------|--------------------------------|---------------------------------|------|---------|------------|----------|
| Saxman | 2nd Class City | Ketchikan Gateway | 434 | 15642 | 0.2562 | No |
| Seward | Home Rule City | Kenai Peninsula | 2609 | 20360 | 0.1718 | No |
| Shemya Station | Unincorporated | Aleutians West | 27* | NO DATA | 0 | No |
| Sitka | Unified Home Rule Municipality | Sitka | 8267 | 23622 | 0.0778 | No |
| Skwentna | Unincorporated | Matanuska-Susitna | 73 | 23995 | 0 | No |
| Soldotna | 1st Class City | Kenai Peninsula | 4021 | 21740 | 0.0891 | No |
| Solomon | Unincorporated | Nome | 0 | 0 | 0 | No |
| Sterling | Unincorporated | Kenai Peninsula | 5348 | 20741 | 0.097 | No |
| Sunrise | Unincorporated | Kenai Peninsula | 19 | 56000 | 0 | No |
| Susitna | Unincorporated | Matanuska-Susitna | 16 | 17356 | 0 | No |
| Takotna | Unincorporated | Yukon-Koyukuk | 53 | 13143 | 0 | No |
| Tanaina | Unincorporated | Matanuska-Susitna | 7407 | 23967 | 0.0926 | No |
| Telida | Unincorporated | Yukon-Koyukuk | 3 | 0 | 0 | No |
| Thom's Place | Unincorporated | Wrangell-Petersburg | 6 | 16086 | 0 | No |
| Tolsona | Unincorporated | Valdez-Cordova | 26 | 10000 | 0 | No |
| Twin Hills | Unincorporated | Dillingham | 74 | 16856 | 0 | No |
| Two Rivers | Unincorporated | Fairbanks North Star | 663 | 24351 | 0.0417 | No |
| Ugashik | Unincorporated | Lake & Peninsula | 15 | 12530 | 0 | No |
| Umkumiute | Unincorporated | Bethel | 0+ | NO DATA | 0 | No |
| Unalaska | 1st Class City | Aleutians West | 3662 | 24676 | 0.134 | No |
| Unga | Unincorporated | Aleutians East | 0* | NO DATA | 0 | No |
| Valdez | Home Rule City | Valdez-Cordova | 3475 | 27341 | 0.062 | No |
| Wasilla | 1st Class City | Matanuska-Susitna | 7245 | 21127 | 0.1116 | No |
| Whale Pass | Unincorporated | Prince of Wales-Outer Ketchikan | 60 | 24041 | 0 | No |
| Whitestone Logging Camp | Unincorporated | Skagway-Hoonah-Angoon | 9 | 21810 | 0.0357 | No |

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| Community | Incorporation | Census Area | Pop | Income | Unemployed | Eligible |
|--------------|----------------|-------------------|------|------------|------------|----------|
| Willow | Unincorporated | Matanuska-Susitna | 2218 | 22323 | 0.1172 | No |
| Wiseman | Unincorporated | Yukon-Koyukuk | 16 | 8211 | 0 | No |
| Womens Bay | Unincorporated | Kodiak Island | 740 | 27746 | 0.0543 | No |
| Woody Island | Unincorporated | Kodiak Island | 0* | NO DATA | 0 | No |
| Y | Unincorporated | Matanuska-Susitna | 1057 | 15437 | 0.2425 | No |

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Appendix 11 - State Hazard Mitigation Plan (SHMP) 2013 Update Schedule & Changes

| ASSIGNMENT | REVIEWER | AGENCY | ASSIGNED (2013) | NOTES |
|--|-----------|--------|-----------------------|--|
| SHMP Electronic Files set up | Mit. | DHS&EM | 1/8 | Organize digital files for SHMP update, drafts, etc. |
| Electronic 2013 SHMP “master draft” created | Mit. | DHS&EM | 1/11 | Produce working digital “master” draft of 2010 SHMP as repository of updated material |
| Draft SHMP revision timeline and assignments through Oct 2013 reviewed | Mit. | DHS&EM | 1/8 | <ul style="list-style-type: none"> Schedule, timeline, “milestones” established with program manager. Amend as necessary through October to accomplish goal of adopted State Plan by October 15, 2013 |
| Initial State Crosswalk review of 2010 SHMP | Mit. | DHS&EM | 1/11 | Discuss results, approach with SHMO and adjust revision timeline and assignments as needed |
| Begin collecting all 2013 update documents | Mit. | DHS&EM | 1/11 | Create, receive, research, track, amend, and incorporate all revised portions of the 2013 SHMP |
| Update / Verify SHMAC contact list | Mit. | DSH&EM | 1/11 | Verify, update and revise the SHMAC email / contact list for currency and accuracy as needed |
| Produce SHMAC teleconference agendas / documents | Mit. | DHS&EM | 11/1/2012 – 8/12/2013 | <ul style="list-style-type: none"> Agendas and documents for review for all scheduled SHMAC telcons in coordination with HMGP SHMAC needs Set up telcon phone lines, etc. |
| 1 Introduction | | | | |
| Introduction / Alaska Background Information | Mit. | DHS&EM | 3/8 | <ul style="list-style-type: none"> State demographics source 2010 Census and 2012 estimates. Add Debris Management Plan to chart Revised all maps Added Statewide utilities/infrastructure descriptions and maps |
| Executive Summary | Mit./SHMO | DHS&EM | 3/8 | |

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Appendix 11 - Update Schedule & Changes

| | | | | |
|----------------------------|--|------------------------|-------------|---|
| 2. Planning Process | | | | • |
| 2.Planning Process | Mit | DHS&EM | 3/1 | <ul style="list-style-type: none"> Updated number of LHMPs + communities within those Included APIP, LEPCs and ASHSC involvement Note changes from HMGP Administrative Plan Updated figures (plan cycle and flowcharts) Note moved Goals development to own Chapter Included information pertaining to planning in the unorganized Borough Updated Small and Impoverished list / Appendix12 with DOL 2009 pop. est. This table is referenced for specific changes |
| 2.Planning Process | SHMAC | Various | 4/8 | <ul style="list-style-type: none"> Include language on hazard warning systems (utilization and understanding) Include language on Assessments, Plans and Mapping |
| 2.Planning Process | LEPCs | various | 4/8 | <ul style="list-style-type: none"> Reviewed for content and syntax |
| 2.Planning Process | Geologist | DGGS | 4/8 | <ul style="list-style-type: none"> Reviewed for content and syntax |
| 2. Planning Process | Mit./ SHMO | DHS&EM | 4/8 | <ul style="list-style-type: none"> Reviewed for content and syntax Added local planning support. |
| 3.0 Hazard Profiles | | | | |
| 3.1 Flood | | DHS&EM | 3/8 | • |
| 3.1 Flood | State Flood Plain Coordinator | DCCED | 2/9 & 5/10 | <ul style="list-style-type: none"> Updated NFIP communities and Program Updated FIRM and RISKmap Information Update FMA, RFC and SRL information |
| 3.1 Flood | Branch Chief | USGS | 2/22 & 6/26 | Alaska Science Center, Hydrologic Data and Monitoring <ul style="list-style-type: none"> Technical edits Addition of WaterWatch |
| 3.1 Flood | Assistant State Conservationist | NRCS | 4/12 & 6/26 | Operations and Design Engineer <ul style="list-style-type: none"> Suggested add their Emergency Watershed protection (EWP) Program information |
| 3.1 Flood | Supervisory Hydrologist and Service Coordination | NOAA NWR AR ALASKA RFC | 4/9 & 6/26 | National Weather Service Alaska Region River Forecast Center <ul style="list-style-type: none"> Technical edits |

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| | | | | |
|--|-----------------------------------|---------------------------|------------|--|
| 3.1 Flood | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> • New river map • New number and types of flooding history maps from FEMA • Section on 2012-2013 flood events with pictures, links to data and success stories • Alluvial Fan flooding updated • Glacier Outburst Flooding updated • Update on RiverWatch and inclusion of BreakUp Guide as appendix • Addition of USACE Levee Inspection Program • Addition of 2013 Spring Flooding (DR-4122) Success Story materials from FEMA and NRCS in Appendix |
| | | | | <ul style="list-style-type: none"> • |
| 3.2 Wildland and Community Fire Conflagration | | | | |
| 3.2 Wildland Fire & Conflagration | Coordinator | ACCAP | 4/21 | Alaska Center for Climate Assessment and Policy, Operations and Design Engineer Also reviewed via ACCAP by the Director of Scenarios Network for Alaska Planning (SNAP) and Neptune, Inc (of Denver, CO) <ul style="list-style-type: none"> • Technical edits |
| 3.2 Wildland Fire & Conflagration | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer <ul style="list-style-type: none"> • Technical edits |
| 3.2 Wildland Fire & Conflagration | Planning and Environ. Coordinator | BLM / Alaska Fire Service | 4/21 | <ul style="list-style-type: none"> • Technical edits • HVA map layer source • Alaska Interagency Wildland Fire Management Plan update text with map |
| 3.2 Wildland Fire & Conflagration | Meteorologist | AICC | 5/21 | <ul style="list-style-type: none"> • Technical edits • HVA map layer source |
| 3.2 Wildland Fire & Conflagration | Mit./SHMO | DHS&EM | 6/1 – 6/26 | <ul style="list-style-type: none"> • Revision of Wildland Urban Interface (WUI) • Revision of Conflagration |
| 3.3 Snow Avalanche | | | | |
| 3.3 Snow Avalanche | Avalanche Forecaster | Juneau | 2/22 | Reviewed in conjunction with the: <ul style="list-style-type: none"> ▪ Alaska Railroad avalanche authority, ▪ Director, Forecaster of the Chugach National Forest Avalanche Center and the ▪ Director of Forecasting for the DOT/PF in Thompson Pass and of the Alaska Avalanche Information Center <ul style="list-style-type: none"> • Technical edits • Programmatic updates |

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| | | | | |
|-------------------------------------|---------------------------------|------------|----------|---|
| | | | | <ul style="list-style-type: none"> • New figures for inclusion • Recent event editions |
| 3.3 Snow Avalanche | Geologist | DGGS | 3/2 | <ul style="list-style-type: none"> • Technical edits |
| 3.3 Snow Avalanche | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> • Update or pertinent information • Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials • Programmatic updates • New figures for inclusion • Recent event editions |
| Alaska Rail Road | Staff | ARRC | 4/7 | Sent materials on snow avalanche program to be incorporated into that section / assoc. appendix |
| 3.4 Volcano | | | | |
| 3.4 Volcano | Research Geologist | AVO / USGS | 2/19 | <ul style="list-style-type: none"> • Technical edits • Programmatic updates • New figures for inclusion • Recent event editions |
| 3.4 Volcano | Geologist | DGGS | 2/24 | <ul style="list-style-type: none"> • Technical edits |
| 3.4 Volcano | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer <ul style="list-style-type: none"> • Technical edits |
| 3.4 Volcano | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> • Technical edits • New figures for inclusion • Recent event editions • Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials |
| | | | | <ul style="list-style-type: none"> • |
| 3.5-6 Earthquake and Tsunami | | | | |
| 3.5 Earthquake & 3.6 Tsunami Hazard | Supervisory Physical Scientist | WC/ATWC | 2/9 | <ul style="list-style-type: none"> • Programmatic updates • Figure updates • Technical edits |

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| | | | | |
|------------------------------------|------------------------------------|--------------|----------|--|
| 3.5 Earthquake & 3.6Tsunami Hazard | State Seismologist | AEIC/UAF/GI | 2/10 | <ul style="list-style-type: none"> • Programmatic updates • Figure updates • Technical edits |
| 3.5 Earthquake & 3.6Tsunami Hazard | AK Seismic Hazards Commission | ASHSC | 3/10 | <ul style="list-style-type: none"> • Programmatic updates • Figure updates • Technical edits • Rework of goals |
| 3.5 Earthquake & 3.6Tsunami Hazard | Geologist | DGGS | 2/24 | <ul style="list-style-type: none"> • Technical edits |
| 3.5 Earthquake & 3.6Tsunami Hazard | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer <ul style="list-style-type: none"> • Technical edits |
| 3.5 Earthquake & 3.6Tsunami Hazard | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> • Technical edits • New figures for inclusion • Recent event editions • Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials • Inclusion of : <ul style="list-style-type: none"> ▪ Public School Structural Mitigation Initiatives including Kodiak Island Borough ▪ Castle Mountain Fault local to Southcentral population and ▪ Additional materials for 2002 Denali earthquake / pipeline |
| 3.7 Weather | | | | |
| 3.7Weather | Warning Coordination Meteorologist | NWS - ANC | 2/10 | <ul style="list-style-type: none"> • Technical edits • New figures for inclusion |
| 3.7Weather | Warning Coordination Meteorologist | NWS-FBKS | 2/10 | <ul style="list-style-type: none"> • Technical edits • New figures for inclusion |
| 3.7Weather | Warning Coordination Meteorologist | NWS - Juneau | 2/10 | <ul style="list-style-type: none"> • Technical edits • New figures for inclusion |
| 3.7Weather | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer <ul style="list-style-type: none"> • Technical edits • New figures for inclusion |
| 3.7Weather | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> • Update types of events with recent examples; summarize older examples |

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| | | | | |
|---------------------------|---------------------------------|--------------|----------|---|
| | | | | <ul style="list-style-type: none"> Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials Update figures |
| 3.8 Ground Failure | | | | |
| 3.8 Ground Failure | Geologist | DGGS | 2/24 | <ul style="list-style-type: none"> Technical edits |
| 3.8 Ground Failure | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer <ul style="list-style-type: none"> Technical edits |
| 3.8 Ground Failure | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> Technical edits Update types of events with examples Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials Update figures |
| 3.9 Erosion | | | | |
| 3.9 Erosion | Branch Chief | USGS | 2/22 | Hydrologic Data and Monitoring |
| 3.9 Erosion | State Flood Plain Coordinator | DCCED (DCRA) | 3/31 | In conjunction with DCRA Planner |
| 3.9 Erosion | Chief | USACE | 3/26 | Civil Works Branch Engineering Division |
| 3.9 Erosion | Geologist | DGGS | 2/24 | <ul style="list-style-type: none"> Technical edits Update types of events with examples |
| 3.9 Erosion | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer |
| 3.9 Erosion | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> Technical edits Update types of events with examples Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials Update figures |
| 3.10 Dams | | | | |
| 3.10 Dams | Dam Safety Officer | DNR | 2/24 | <ul style="list-style-type: none"> Technical edits Update types of events with examples Update charts, figures and tables |

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|---|---------------------------------|-----------------------|----------|---|
| 3.10 Dams | Assistant State Conservationist | NRCS | 4/12 | Operations and Design Engineer <ul style="list-style-type: none"> Technical edits |
| 3.10 Dams | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials Re-position of tables to Appendix 28 |
| 3.11 Oil Spill / HazMat | | | | |
| 3.11 Oil Spill / Hazmat | Environ. Program Specialist | DEC | 2/16 | Prevention and Emergency Response Program (PERP) <ul style="list-style-type: none"> Technical edits Update types of events with examples , charts and summaries |
| 3.11 Oil Spill / Hazmat | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> Update types of events with examples Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials Update figures |
| 3.12 Terrorism | | | | |
| 3.12Terrorism | DPS/ Homeland Security | DHS&EM DPS Liaison | 2/19 | Project Coordinator <ul style="list-style-type: none"> Technical edits Update types of events with examples |
| 3.12Terrorism | Mit. | DHS&EM | On-going | <ul style="list-style-type: none"> Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials |
| 3.13 Tech., Public Health & Human-caused | | | | |
| 3.13Technological, Public Health & Human Caused | DPS/ Homeland Security | DHS&EM DPS Liaison | 2/19 | Project Coordinator <ul style="list-style-type: none"> Technical edits Update types of events with examples , charts and summaries |
| 3.13Technological, Public Health & Human Caused | Data Processing Mgr | DOA | 2/17 | <ul style="list-style-type: none"> Technical edits Update types of events with examples , charts and summaries |
| 3.13Technological, Public Health & Human Caused | Mit. | DHS&EM | 2/17 | <ul style="list-style-type: none"> Update figures Update types of events with examples Removal or condensing and improving relevance of obtuse, scientific jargon and non hazard specific illustrations and materials Addition of Public Health Emergencies section |

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| | | | | • |
| 4. Vulnerability Analysis – Risk assessment | | | | |
| 4. HVA Analysis | Mit. | DHS&EM | 5/1 | <ul style="list-style-type: none"> Updated hazard analysis table with current information (declared hazards since 2007) Update Critical facilities listing to incorporate Alaska specifics – stemming from URS study Update population statistics and utilize single state source (DOL, 2012) document to illustrate changes in population stats Reference visitor population statistics. Removed summary hazards information – it was a duplicated effort to individual sections on hazards Include updated information on K-12 schools and FTE's. Note that they are not state owned, but they typically serve as critical infrastructure Include information on University system facilities and costs Update Previous occurrences of Hazards Matrix with present data Section on state capabilities through public survey. List state and federal agency descriptions. Chapter 7 (Funding) was moved to Chapter 6. Illustrate increase in infrastructure assoc. with pop. Increase by showing property values and mill rates. |
| 4. HVA Analysis | SHMAC | Various | 5/1 | Technical edits and updates |
| State Facilities / Public Facilities | Program Coordinator | DOT/PF | 4/1 | Update list and values - In conjunction with Risk Manager from DOA and regional DOT area facilities personnel |
| State Facilities / Roads | Program Coordinator | DOT/PF | 3/23 - 4/12 | Update mileage and costs - In conjunction with Engineer/Architect from DNR and a Forester from DOF |
| K-12 School Properties & FTE | Tech Eng | EED | 5/1 | Architect and School Finance Specialist <ul style="list-style-type: none"> For new Tables by REAA/Borough Total Insured values or similar In conjunction with an Executive Administrative Assistant Association of Alaska School Boards; and contacts at Alaska Public Entity Insurance, Alaska Municipal League/Joint Insurance Association |
| University of Alaska Facilities Inventory | Controller | University of Alaska | 5/1 | For new Tables by REAA/Borough Total Insured values or similar |
| | | | | |

| | | | | |
|---|-----------|--------|------|--|
| 5. Mitigation Strategy and Goals | | | | |
| 5.MSG | Mit. | DHS&EM | 6/14 | <ul style="list-style-type: none"> Reviewed and updated all goals and actions. Revised Alaska statutes. Revised DHS&EM mitigation strategy. |
| 6. Resources | | | | |
| 7. Hazard Mitigation Funding | Mit./SHMO | DHS&EM | 5/1 | Added: Compiled funding sources, programs and descriptions her – mainly pulled from appendices and Section 4.6 |
| Appendices | | | | |
| 1 Acronyms | Mit. | DHS&EM | 6/11 | Updated |
| 2 Definitions | Mit. | DHS&EM | 6/11 | Retained |
| 3 SHMP Annual Review Forms | Mit. | DHS&EM | 6/11 | Updated and retained. |
| 4 SHMAC | Mit. | DHS&EM | 6/11 | Updated to reflect current State Hazard Mitigation Advisory Committee (SHMAC) members. |
| 5 BCA | Mit. | DHS&EM | 6/11 | Updated with recent benefit cost analysis (BCA) information and FEMA references. |
| 6 Alaska Mitigation Policies, SOPs and Strategies | Mit. | DHS&EM | 6/8 | Added Initiated and updated with Alaska Mitigation Policies, Standard Operating Procedures and Strategies |
| 7 ASHSC | Mit. | DHS&EM | 3/8 | Added to reflect current Alaska Seismic Hazard Safety Commission (ASHSC) members who participated in this update |
| 8 APIP | Mit. | DHS&EM | 3/8 | Added to reflect current Alaska Partnership for Infrastructure Protection (APIP) members who participated in this update |
| 9 HMGP Administrative Plan | Mit./SHMO | DHS&EM | 3/31 | Removed |
| 9 Unorganized Borough | Mit. | DHS&EM | 3/31 | Added Clarification of 44 CFR Part 201 Mitigation Plan requirements for communities within the unorganized Borough in Alaska |
| 10 Small & Impoverished | Mit. | DHS&EM | 3/31 | Updated . |
| 11 SHMAC and Public Participation Log | Mit. | DHS&EM | 7/25 | Updated (formerly appendix 10) |

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|---|-------------|--------|------|--|--|
| 12 SHMP Updated Schedule and Changes | Mit. | DHS&EM | 8/8 | Revised this document | |
| 13 List of LHMP Communities | Mit. | DHS&EM | 5/9 | Updated list of communities with Local Hazard Mitigation Plans | |
| 14 Disaster Declarations | Mit. | DHS&EM | 8/1 | Updated for 2013. | |
| 17 COOP Risk Analysis | Mit. / Ops. | DHS&EM | 1/2 | Removed | |
| 15 SHMP Mitigation Assessment Questionnaire | Mit./SHMO | DHS&EM | 1/25 | Updated 2013 Mitigation Assessment Questionnaire for Spring Preparedness Conference. | |
| 16 Agencies and Organizations | Mit. | DHS&EM | 7/1 | Updated State and Federal Agencies and Additional Organizations. | |
| 17Regulatory Authority | Mit./Plans | DHS&EM | 7/1 | Updated and retained | |
| 18 Success stories | Mit. | DHS&EM | 7/1 | Added Hazard Mitigation success stories | |
| 24Wildland Fire Statistics | Mit. | DHS&EM | 6/1 | Moved to HVA Wildland Fires | |
| 25LEPC list | Mit./Plans | DHS&EM | 7/1 | Added to reflect current Local Emergency Planning Committee (LEPC) members who participated in this update | |
| 26ARRC Avalanche Procedures | Mit./Plans | DHS&EM | 6/1 | Mitigation information added to Chapter 5, Avalanche. | |
| 27MitigationFunding Forms | Mit./Ops. | DHS&EM | 6/1 | Burned In effigy (removed) | |
| 28Dams | Mit./Ops. | DHS&EM | 6/1 | Updated dam stats and information (formerly in Section 5.12 Dams [2007]) | |
| 29Fall SeaStorm Guide | Mit./Ops. | DHS&EM | 6/1 | Mitigation information added to Chapter 5, Severe Storms. | |
| 30KIB Erosion Study | Mit./Ops. | DHS&EM | 6/1 | Academic research paper; not a study. Removed | |
| Removed /Reworked Appendices | Mit./Ops. | DHS&EM | 6/1 | 2007 | 2010 |
| | | | | • 5 Assistance Programs | • Covered in 7. Hazard Mitigation Funding |
| | | | | • 7 Critical Facilities | • Included in 4. Hazard Analysis – Risk Assessment |
| | | | | • 8 Population Trends | • Incorporated into 1. Introduction where needed |
| | | | | • 14 Maps | • Removed |

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| | | | | <ul style="list-style-type: none">• 16 Potential HMGP Projects | <ul style="list-style-type: none">• Removed |
| | | | | <ul style="list-style-type: none">• 17 Criteria for Evaluating Proposed HMGP Projects | <ul style="list-style-type: none">• Included in Appendix 7. |
| | | | | <ul style="list-style-type: none">• 19 Local Hazard Mitigation Plan Checklist | <ul style="list-style-type: none">• Removed |
| | | | | <ul style="list-style-type: none">• 21. - 24. Links to<ul style="list-style-type: none">• Alaska Economic Development Resource Guide• Federal Programs Offering Non-Structural Flood Recovery and Floodplain management Alternatives• A Guide to Federal Aid in Disasters• State of Alaska Emergency Response Plan | <ul style="list-style-type: none">• Where still available, added in I. Resources |
| | | | | <ul style="list-style-type: none">• 25 Mitigation Tasks | <ul style="list-style-type: none">• Removed |
| | | | | <ul style="list-style-type: none">• 27 Historically active volcanoes of Alaska | <ul style="list-style-type: none">• Added in I. Resources and 5.5 Volcanoes |
| | | | | <ul style="list-style-type: none">• 28 Alaska Interagency Operating Plan for Volcanic Ash Episodes | <ul style="list-style-type: none">• Added in I. Resources |
| | | | | <ul style="list-style-type: none">• 32 AFN Resolution | <ul style="list-style-type: none">• Removed |
| | | | | | |
| New I. Resources | | | | | |
| I. Resources | Mit. | DHS&EM | On-going | Organized by section; compilation of <ul style="list-style-type: none">• Reference• Bibliography• Resources• Links• Texts• Formerly appendices 29 + 30 | |
| | | | | | |
| Agency Capability Assessment Questionnaire & Recipients | | | | | |
| Agency Capability Assessment Summary | Mit./SHMO | DHS&EM | 2/2 & 24/1 | <ul style="list-style-type: none">• Questionnaire was revised prior to distribution by Mit./SHMO• A Federal questionnaire was developed and distributed<ul style="list-style-type: none">▪ Sent to▪ State Agencies▪ Cities and Boroughs▪ Federal Agencies | |

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| | | | | <ul style="list-style-type: none"> ▪ School Districts ▪ 1st Class and Home Rule communities in unorganized Borough |
| STATE AGENCIES | | | | |
| Agency Capability Assessment | | | 2/24 3/13 4/7 4/12 5/4 | <ul style="list-style-type: none"> • Alaska Railroad • Dept. Environmental Conservation • Denali Commission • Dept. Health Social Services • Dept. Public Safety • DCCED Division of Insurance • State Historic Preservation Office • DNR Dam Safety • DNR/ • Geologic & Geophysical Surveys • Dept. Transportation and Public Facilities • Education and Early Development • DCCED/AK Coastal Management Program |
| CITIES & BOROUGHES | | | | |
| Agency Capability Assessment | | | 2/24 4/2 | <ul style="list-style-type: none"> • Kodiak Island Borough • Mat-Su Borough • MOA • FBNSB • L&P Borough • AE Borough • Juneau • Sitka • Wrangell • Denali • Haines • North Slope • NWAB • Yakutat • Skagway • Bristol Bay • Kenai Peninsula |
| FEDERAL AGENCIES | | | | |

| | | | | |
|--|--|--|------------|--|
| Fed Agency Capability Assessment | | | 5/5 5/7 | <ul style="list-style-type: none"> • USGS <ul style="list-style-type: none"> ▪ Alaska Science center ▪ Volcano Science Center • NOAA • DOI • BLM • USDA, Rural Development • USACE • EPA • USCG • NRCS • USFS |
| SCHOOL DISTRICTS | | | | |

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| Agency Capability Assessment | | | 2/24 & 2/25 | <ul style="list-style-type: none"> • Kodiak Island Borough Schools • Alaska Gateway Schools • Aleutian Region Schools • Aleutians East Borough Schools • Anchorage School District ASD • Annette Island Schools • Bering Strait Schools • Bristol Bay Schools • Chatham Schools • Chugach Schools • Copper River Schools • Cordova City Schools • Kenai Peninsula Borough Schools • Ketchikan Gateway Borough Schools • Klawock City Schools • Kodiak Island Schools • Kuspuk Schools • Nome Public Schools • North Slope Borough Schools • Northwest Arctic Borough Schools • Pelican City Schools • Petersburg City Schools • Pribilof Schools • Saint Mary's Schools • Sitka Borough Schools • Skagway Schools • Mt. Edgecumbe • High School | <ul style="list-style-type: none"> • Craig City Schools • Delta-Greely Schools • Denali Borough Schools • Dillingham City Schools • Fairbanks North Star Borough Schools • Galena City Schools • Haines Borough Schools • Hoonah City Schools • Hydaburg City Schools • Iditarod Area Schools • Juneau Borough Schools • Kake City Schools • Kasunamiut Schools • Lake and Peninsula Borough Schools • Lower Kuskokwim Schools • Lower Yukon Schools • Mat-Su Borough Schools • Saint Mary's Schools • Nenana City Schools • Southeast Island Schools • Southwest Region Schools • Tanana Schools • Unalaska City Schools • Valdez City Schools • Yukon Flats Schools • Yukon-Koyukuk Schools • Yupiit Schools • MEHS | |
|------------------------------|--|--|-------------|---|---|--|

| 1 st CLASS / HOME RULE CITIES IN UNORGANIZED BOROUGH | | | | |
|---|----------------|---------|------|---|
| Agency Capability Assessment | | | 4/5 | Home Rule city unorganized Borough <ul style="list-style-type: none">• Cordova• Nenana• Petersburg• Valdez |
| | | | | 1 st Class city unorganized Borough <ul style="list-style-type: none">• Craig• Dillingham• Galena• Hoonah• Hydaburg• Kake• Klawok• Nome• Pelican• Saint Mary's• Tanana• Unalaska/Dutch Harbor |
| Success Story Development | | | | |
| Success Stories | Mit. | DHS&EM | 3/8 | Developed and placed in appropriate sections / appendix 21 |
| Success Stories | SHMAC | Various | 5/7 | Developed and placed in appropriate sections / appendix21 |
| Success Stories | LEPC | Various | 5/6 | Developed and placed in appropriate sections / appendix21 |
| | | | | |
| Review and Submission Process | | | | |
| Master Plan Draft produced for "training review" by FEMA Region X | Mit. | DHS&EM | 7/11 | Master Draft of 2013 Plan update questions produced for "Training review" by FEMA Region X in Alaska |
| Training review" by FEMA Region X | Kristen Meyers | FEMA RX | 7/11 | <ul style="list-style-type: none">• FEMA RX does SHMP training for DHS&EM Mit. staff using the 2013 master plan draft and FEMA crosswalk. |
| Overall Plan | | | | |
| OVERALL PLAN DRAFT | SHMAC | various | 8/12 | |
| OVERALL PLAN DRAFT | APIP | various | 8/12 | |

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| OVERALL PLAN DRAFT | LEPC | various | 8/12 | |
| OVERALL PLAN online | Public | Public | continuous | 2013 SHMP draft posted online, available for Public Comment |
| | | | | |
| OVERALL 2013 PLAN FINAL DRAFT | MIT./SHMO | DHS&EM | 8/12 | Final review before sending to FEMA |
| OVERALL 2013 PLAN FINAL DRAFT | DHS&EM Management | DHS&EM | 8/12 | Final review before sending to FEMA |
| OVERALL 2013 PLAN FINAL DRAFT | FEMA | FEMA RX | 8/12 | <ul style="list-style-type: none">FEMA RX Review, return to FEMA and revise as necessaryMay include FEMA's crosswalk back to us as an appendix. |
| OVERALL 2013 PLAN FINAL DRAFT – FEMA required Revisions | Mit./MIT | DHS&EM | TBD by FEMA | <ul style="list-style-type: none">All FEMA required revisions completedFEMA Pre-Approval Letter obtained |
| DHS&EM Director's Adoption Letter | Mit./SHMO | DHS&EM | 8/1 | Director's Adoption Letter written and placed in DHS&EM transmittal for review. |
| 2013 SHMP | FEMA | FEMA RX | 9/30 | FEMA Final Approval Letter obtained |
| 2013 SHMP | Mit. | DHS&EM | 10/15 | <ul style="list-style-type: none">Copy of 2013 SHMP placed on DHS&EM web site3 hard copies of 2013 SHMP are produced for DHS&EM |
| | | | | |

Appendix 12 – Communities with Local Hazard Mitigation Plans

| | | | |
|----|-------------------------------------|----|---------------------------------|
| 1 | Akiak | 43 | Kwethluk |
| 2 | Akiachak | 44 | Lake & Peninsula Borough |
| 3 | Akhiok ** | 45 | Larsen Bay ** |
| 4 | Alakanuk | 46 | Matanuska-Susitna Borough (MSB) |
| 5 | Alatna | 47 | McGrath |
| 6 | Allakaket | 48 | Newtok |
| 7 | Anaktuvuk Pass | 49 | Nome, City of |
| 8 | Anchorage, Municipality of (MOA) | 50 | North Slope Borough (NSB)* |
| 9 | Aniak, City of | 51 | Nuiqsut |
| 10 | Anvik | 52 | NW Arctic Borough |
| 11 | Atkasuk | 53 | Old Harbor ** |
| 12 | Barrow | 54 | Ouzinkie ** |
| 13 | Bethel | 55 | Petersburg |
| 14 | Cordova | 56 | Point Hope |
| 15 | Craig | 57 | Point Lay |
| 16 | Denali Borough (including Anderson) | 58 | Port Lions ** |
| 17 | Dillingham | 59 | Red Devil |
| 18 | Emmonak | 60 | Russian Mission |
| 19 | Evansville | 61 | Saint Michael |
| 20 | Galena | 62 | Scammon Bay |
| 21 | Golovin | 63 | Seward * |
| 22 | Gulkana | 64 | Shaktoolik |
| 23 | Haines Borough | 65 | Shishmaref |
| 24 | Holy Cross | 66 | Sitka, City & Borough of |
| 25 | Homer * | 67 | Skagway |
| 26 | Hoonah | 68 | Sleetmute |
| 27 | Hooper Bay | 69 | Soldotna * |
| 28 | Huslia | 70 | St. Mary's |
| 29 | Juneau, City and Borough of (CBJ) | 71 | St. Paul |
| 30 | Kachemak City * | 72 | Stebbins |
| 31 | Kaktovik, City of | 73 | Teller |
| 32 | Kalskag Lower | 74 | Togiak |
| 33 | Kalskag Upper | 75 | Tok |
| 34 | Kenai Peninsula Borough (KPB)* | 76 | Unalakleet |
| 35 | Kenai, City of * | 77 | Unalaska |
| 36 | Kipnuk | 78 | Valdez |
| 37 | Kivalina | 79 | Wainwright |
| 38 | Kodiak City ** | 80 | Wasilla, City of |
| 39 | Kodiak Island Borough (KIB) ** | 81 | Whittier |
| 40 | Kotlik | 82 | Wrangell |
| 41 | Kotzebue | 83 | Yakutat |
| 42 | Koyukuk | | |

* Annexed into Kenai Peninsula Borough (KPB) Plan

** Annexed into Kodiak Island Borough (KIB) Plan

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DISASTER COST INDEX

PURPOSE OF THE DISASTER COST INDEX

The purpose of this index is to establish a summary of State funds expended on disaster relief since the creation by the Alaska Legislature of the Division of Homeland Security and Emergency Management (DHS&EM) formerly the Division of Emergency Services. Much of the information contained in this index is readily available from other sources; the intention of this index is to bring this information together in a single source in order to provide the user with an immediate and ready reference regarding the cost of disasters to the State of Alaska. For numerous disasters, the accounts are still open, and it may be anticipated that the amount of expenditures for each category will change as assistance is provided and additional funds are expended.

TIME FRAME OF INDEX: JUNE 10, 1977 TO PRESENT

The decision to begin the index on June 10, 1977, is to a certain extent an arbitrary decision. This date marks the effective date of the Alaska Disaster Act. Obviously, disasters occurred in the State prior to that date and State funds were expended on disaster relief prior to this Act. But the Alaska Disaster Act established the mechanism of providing State assistance which is currently in effect, and so beginning an index at this point provides a continuous monitor of expenditures since the adoption of the mechanism currently in use for providing State disaster assistance.

SCOPE OF INDEX: STATE EXPENDITURES

This index is limited in scope to State funds expended subsequent to a proclamation by the Governor of a Disaster Emergency. These expenditures are categorized according to two types of assistance which the Alaska Disaster Act provides subsequent to a Governor's proclamation: public assistance to communities and political subdivisions for the purpose of restoring essential public services, and assistance provided to individuals and families. The index does not provide an indication of all public and private funds expended for the purpose of disaster relief. In many of the incidents included in the index other federal and private or volunteer organizations had the authority and did provide assistance (i.e., Small Business Administration, American Red Cross). Moreover, the Alaska Disaster Act requires that subsequent to a disaster incident, the State expend first those funds regularly appropriated to the affected State and local entities. If these funds are sufficient to alleviate the situation, there is no resulting proclamation by the Governor and it is not necessary to draw from the Governor's Disaster Relief Fund (A.S. 26.23.300). This index therefore does not include all State funds expended in response to natural or man-made disasters, but is limited to those funds expended from the Governor's Disaster Relief Fund subsequent to a Proclamation of a Disaster Emergency. In addition to indicating the distinction between public assistance and assistance to individuals and families, this index indicates expenditures by DHS&EM for the administrative costs related to providing assistance to the affected residents and communities.

SUMMARY OF THE ALASKA DISASTER ACT (A.S. 26.23.010)

The Alaska Disaster Act, which was approved by the Governor on June 9, 1977, and which became effective the following day, establishes the mechanism whereby the State of Alaska provides assistance to individuals and communities within the State who suffer damage due to natural or man-made peacetime disasters. The act grants the Governor authority to declare that a disaster emergency exists "if he finds that a disaster has occurred or that such an occurrence is imminent. The Act defines a "disaster" as "the loss of life or property resulting from any natural or non-military man-made cause including but not limited to, fire, flood, earthquake, landslides, mudslides, avalanche, wind-driven water, weather condition, tsunami, oil spill or other water contamination requiring emergency action to avert danger or damage, volcanic activity, epidemic, air contamination, blight, infestation, explosion, riot, equipment failure, or shortage of food, water, fuel or clothing."

EFFECT OF DISASTER EMERGENCY PROCLAMATION: DISASTER ASSISTANCE

Besides granting the Governor certain emergency powers, the act permits the State to provide assistance to the affected communities and individuals without prior approval by the Alaska Legislature. The funds necessary to provide this assistance are drawn from the Governor's Disaster Relief Fund established by A.S. 26.23.300. In general, State assistance permitted by the Act falls into two broad categories: public assistance provided in the form of grants to communities to enable them to restore essential services, individual assistance in the form of temporary housing, and grants to individuals and families of up to \$5,000.00 to enable them to repair or replace essential items damaged or destroyed by the disaster incident. Public assistance includes repair or replacement of buildings, levees, flood control works, channels, irrigation works, streets, roads, bridges, equipment and other public works except those used for only recreational purposes. This type of assistance is not necessarily limited to local governments. Essential public utilities, for instance, may receive public assistance even if they are owned and operated by private concerns.

Besides these two categories of assistance, the Act provides for State assistance to communities for the purpose of debris clearance if such clearance is necessary for health and sanitation purposes, and it provides for disaster loans to both individuals and communities.

In general, the Act intends to provide State assistance to a community and its residents that will enable the community to return to its predisaster condition. It thus contemplates replacement in kind with allowances for such incidental improvement as is necessary to comply with minimum adequate codes or standards of present day construction. With respect to grants to individuals and families, the intent of the Act is to repair or replace only those items deemed essential for the well being of the affected party, and again to assist the affected party to return only to predisaster condition.

ROLE OF THE ALASKA DIVISION OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT

The Alaska Disaster Act created DHS&EM under the Department of Military and Veterans' Affairs. A.S. 26.23.040 prescribes duties and powers of DHS&EM which demonstrate the intent of the Legislature to establish a centralized office for the direction and coordination of the State's emergency management activities. These activities include the development and carrying out of the procedures to effectively employ the disaster relief funds made available under the Governor's authority. The Director of DHS&EM makes a recommendation to the Governor to assist a community by determining whether an incident is of sufficient magnitude to warrant the Proclamation of a Disaster Emergency; he recommends the type and amount of assistance necessary to restore the community to its predisaster condition, and acting on behalf of the Governor, the director carries out the administrative functions related to actually providing the assistance approved by the Governor. Besides these responsibilities, the Act assigns to DHS&EM numerous duties related to disaster preparedness and civil defense.

DISASTER EMERGENCIES INCLUDED IN THE INDEX

Between the effective date of the Alaska Disaster Act (June 10, 1977), and the time of this writing, a total of 190 events of sufficient magnitude to warrant a Proclamation of Disaster Emergency by the Governor have occurred. On eight (8) occasions, West Coast Storm (1979), Kodiak (1980), Southeast Alaska Storm (1984), the Wainwright School Fire (1987), Valdez Oil Spill (1989) and the Anchorage/Kenai Peninsula Flooding (1989), the Bristol Bay Fish Failure (1997) and the Western Alaska Fish Disaster (1998) the Governor requested that the President declare a major disaster, which would have provided federal assistance in accordance with Public Law 93-288. These requests were however denied by the Regional Director of the Federal Emergency Management Agency (FEMA), Region 10, acting on behalf of the President. On eight (8) other occasions, the Arctic Slope Storm of (1986), the October flooding in South-central Alaska of (1986), and the Barrow School Fire of (1988), Omega Block Cold Spell (1989), Spring Breakup Flooding (1989), Spring Breakup Flooding (1991), the South-central Fall Floods (1995), and the Miller's Reach Fire (1996) the President declared major disasters, providing federal payment of up to 75 percent of the assistance provided. On two occasions, Statewide Fires (1990), and the Miller's Reach Fire (1996) the Federal Emergency Management Agency authorized federal payment of up to 70% of fire expenditures that exceeded the average annual fire management budget. On one (1) occasion, the 1994 Koyukuk Flood the President authorized federal payment of up to 85% of the assistance provided.

In the federally declared disasters, and on several other occasions, federal assistance was also provided through the Corps of Engineers' emergency assistance programs, the Small Business Administration for low interest disaster loans and the Federal Highway Administration.

In other non federally declared disasters various other forms of federal assistance has been provided such as loans through the Small Business Administration, disaster assistance through the Department of Agriculture, economic assistance through the Magnuson/Stevens Act and assistance

through the Federal Highway Administration.

The following incidents were determined by the Governor to constitute Disaster Emergencies from the period June 10, 1977, to the present.

1. The Village of Karluk, January 21, 1978 As a result of a winter storm which struck Kodiak island, wind driven waves broke over the top of a spit in Karluk and ultimately cut a channel through the spit. The storm destroyed a bridge connecting the mainland portion of the village with the spit, and thus isolated the only store and the post office from the rest of the community. The waves also washed away a 10,000 gallon fuel storage tank which provided the village's only fuel supply, and destroyed all but about 1,500 gallons of fuel. Loss of electric power destroyed frozen food stocks in the store and the owner subsequently went out of business. The loss of the bridge prevented some school children from walking from their homes to school, and in addition the new channel formed by the storm undercut the bank and threatened the village's community hall and an RCA antenna, as well as two private residences. In response to this Disaster Emergency, the State provided public assistance to restore the bridge and replace the village's fuel storage facility. A number of threatened houses were moved to safer locations. The Corps of Engineers conducted bank stabilization operations which alleviated the threat to the community hall and RCA antenna.

2. Campbell Creek (Anchorage), February 10, 1978 On this occasion the Governor proclaimed a Disaster Emergency as a result of flooding and glaciation in the south fork of Campbell Creek in Anchorage which affected an area bounded by East 80th Avenue, Spruce Avenue, Lake Otis Parkway, and Abbott Loop Road, threatening a number of homes in the area with water and ice, and contamination of surface and subsurface water. Public assistance was provided through private contractors and resources of the Alaska Department of Transportation (DOT) in order to thaw the stream bed and allow the water to flow and to remove the ice which had overflowed the creek's bank. Most of the property owners in the area were insured, and thus no form of assistance to individuals and families was necessary.

3. Wrangell/Craig, November 6, 1978 During this period an intense storm occurred in the Wrangell/Craig area in Southeastern Alaska generating high winds, torrential rains and heavy sea waves. The storm caused considerable damage to both private and public property in the two communities. Subsequent to the Governor's Proclamation of Disaster Emergency, DHS&EM provided both public assistance and assistance to individuals and families to assist the communities in recovering from the disaster. SBA made disaster loans available to affected businesses and homeowners.

4. Matanuska-Susitna Borough, February 9, 1979 As a result of a winter storm generating high winds and drifting snow, many roads in the Matanuska-Susitna Borough were rendered impassable to all traffic, including emergency vehicles. DOT was tasked by DHS&EM and public assistance was provided to clear the roads; the Alaska National Guard conducted rescue operations to provide to isolated and stranded individuals. Subsequent to the Governor's request, the Small Business Administration made disaster loans available to some 44 residents and 24 businesses which suffered

damage as a result of the storm. The State did not make any direct grants to individuals or families.

5. Delta Fire, June 18, 1979 During the period from May to June of 1979, abnormally dry weather resulted in over 200 wild forest and grassland fires in the interior of Alaska. At that time the Alaska Department of Natural Resources (DNR) was conducting its fire suppression activities with funds contained in a special account created by the Legislature in 1978 in the amount of \$750,000. When these funds were depleted, the Governor proclaimed a Disaster Emergency in order to permit the immediate transfer of funds from the Disaster Relief Fund to DNR's Fire Suppression Fund. This transfer thus represents public assistance provided through DHS&EM to a State agency, the Department of Natural Resources. In part as a result of this Disaster Emergency Proclamation and the depletion of DNR's Fire Suppression Fund, the Alaska Legislature increased the fund to \$5,000,000 in 1980-81, and again to \$9,000,000 in 1982. No assistance to individuals and families was provided as a result of this incident.

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

7. Willow Creek, December 20, 1979 Abnormal weather conditions, caused by a combination of extreme debris jams, abnormal temperature variations and glaciation caused flooding of Willow Creek in the Matanuska-Susitna Borough, rendering roads in the area impassable and threatening homes.

8. Kodiak Island, February 5, 1980 The Governor proclaimed a Disaster Emergency subsequent to an intense winter storm which caused extensive damage to public and private properties on Kodiak Island during January and February of 1980. The storm caused damage to port facilities, docks and shoreline roadways in Kodiak, harbor facilities at Port Lions and Ouzinkie, and breakwaters at Old Harbor and Akhiok. On the day of his proclamation, the Governor requested that the President declare a Major Disaster in the area, but after an on-site inspection by officials of FEMA, this request was denied. The State provided disaster assistance for repair of the damaged public facilities. No grant assistance was provided to individuals and families.

9. Anchorage Windstorm, April 4, 1980 The Governor proclaimed a Disaster Emergency subsequent to a hurricane force windstorm which caused damage to over 5,000 residences and businesses in the Anchorage area and parts of the Matanuska-Susitna Borough. Though most of the residents were insured against their losses, the State provided a number of Individual and Family Grants and temporary housing, as well as public assistance to the Municipality. In addition, the SBA made disaster loans available to affected individuals.

10. Bristol Bay, September 2, 1980 Following a storm which generated high winds and heavy sea waves, causing damage to the equipment of numerous commercial fishermen, canneries and

approximately 15 to 20 private houses, the Governor proclaimed a Disaster Emergency extending from Dillingham to Port Heiden. The State provided both public assistance to communities and grants to individuals and families; the SBA provided disaster loans to residents of the area. In addition, the State provided temporary housing assistance to one of the residents who were forced to relocate due to damage to his home.

11. Copper Center, December 11, 1980 A Disaster Emergency was proclaimed as a result of flooding of the Klutina River at Copper Center due to extreme cold temperatures combined with lack of snow insulation and a high volume of water flow in the river. All structures in the area were threatened, including the Fire Hall. Public assistance was provided by DHS&EM to alleviate the situation and prevent damage. A major portion of the Disaster Relief Funds were provided to the Alaska Department of Transportation for the purpose of conducting drainage operations and performing the work necessary to recommence the normal flow of the river. No funds were necessary for grants to individuals and families.

12. Angoon, June 8, 1981 In May 1981, the community of Angoon experienced a catastrophic failure of its submerged water main resulting in a failure of the water system, the sewer system, and the interruption of fire fighting capabilities in the area. The Governor's Proclamation of a Disaster Emergency enabled DHS&EM to provide the community with the funds necessary to repair these systems and restore these services. Only public assistance was provided as damage to individual and family properties was not sufficient to warrant the institution of an Individual and Family Grant Program.

13. Southcentral Alaska Rainstorm, July 22, 1981 A torrential rainstorm resulted in widespread flooding, stream over flow and damage to bridges and culverts in South-central Alaska. This condition made travel hazardous throughout the region and in some cases roads were impassable to all traffic, including emergency vehicles. The Governor's Proclamation of a Disaster Emergency enabled DHS&EM to provide the affected communities with immediate recovery assistance, resulting in the restoration of the area's transportation system. No direct assistance was provided to individuals and families.

14. Emmonak, February 12, 1982 On February 7, 1982, a catastrophic fire destroyed the safe water facility in the community of Emmonak, situated at the mouth of the Yukon River, resulting in a shortage of potable water, causing a health hazard, and forcing the closure of schools. The Governor's Proclamation of a Disaster Emergency enabled DHS&EM to provide the community with the public assistance necessary to replace the destroyed facility.

15. Fort Yukon, May 17, 1982 In May of 1982, ice jams, excessive stream flow and abnormal temperature variations resulted in flooding in the community of Ft. Yukon located at the juncture of the Porcupine and Yukon rivers. The flood resulted in extensive damage to public and private property and forced the dislocation of several hundred residents. The Governor's Proclamation of a Disaster Emergency enabled DHS&EM to draw on the Disaster Relief Fund to provide both public assistance and grants to individuals and families. In addition to State assistance, SBA made disaster

loans in the area and the American Red Cross provided assistance using the organizations' Disaster Relief Fund.

16. Russian Mission, Akiak, Akiachak, October 1, 1982 During September of 1982, severe windstorms generating high waves caused extensive damage in the villages of Russian Mission, Akiak and Akiachak. The Governor proclaimed a Disaster Emergency to exist in the three villages and the State, through DHS&EM, provided both public assistance and grants to individuals and families in the affected villages.

17. Takotna, December 2, 1982 The Governor proclaimed a Disaster Emergency following a catastrophic fire at Takotna which destroyed the village's generator/equipment shop and storage facility. As a result of the fire, there was no electricity in the village, and heavy equipment necessary to maintain the airstrip and roads was damaged or destroyed. The Governor's proclamation provided public assistance from the Disaster Relief Fund to replace these facilities and equipment.

18. Kipnuk, April 1, 1983 During the winter of 1982, the bridge connecting the village of Kipnuk with the community school was damaged by high water and ice flows, and thus rendered unsafe for use. The Governor's Proclamation of Disaster Emergency enabled the State to provide public assistance in order to replace the bridge. At the time the Alaska Department of Transportation was able to provide a bridge that was surplus to its needs. Disaster Relief Funds were used to reimburse the Alaska National Guard for expenses incurred in transporting the bridge to the village.

19. Aniak, June 15, 1983 Flooding during spring breakup caused by ice jams and excessive stream flow resulted in damage to a public roadway and a number of public buildings in Aniak. Several families were forced to temporarily relocate due to high water. The Governor's Proclamation of a Disaster Emergency provided public assistance for the purpose of restoring the roadway to its predisaster condition. No assistance was provided for individuals and families.

20. City of Ketchikan, August 29, 1983 On August 27, 1983, a ferry mishap occurred in the City of Ketchikan which caused damage to the ferry dock on Gravina Island. The dock is needed for transport of fuel and supplies, as well as emergency fire support, between the city and the airport. The Governor's Proclamation of a Disaster Emergency enabled the State to provide temporary alternate transport capabilities using manpower and equipment of the Alaska National Guard. Public assistance from the Disaster Relief Fund will defray in part the expenses involved in the use of this personnel and equipment.

21. Cordova, September 16, 1983 The Governor proclaimed a Disaster Emergency after a flash flood generated by heavy rainfall destroyed portions of a pipeline system which provides the City of Cordova with, approximately 60% of its water supply. Public assistance was provided for the purpose of repairing the city's water system.

22. Chefnak, November 17, 1983 As a result of failure of the primary electrical generator, the city was without power. Public assistance was granted to purchase and install a new generator.

- 23. Unalakleet, March 5, 1984** Extreme cold for a period of 6-7 weeks caused a drastic reduction in the city water supply and eventual freezing of a major loop on the city water system. Public assistance has granted to repair/replace portions of the water system.
- 24. Mountain Village, March 8, 1984** Circumstances about the same as that in Unalakleet. Public assistance granted to repair/replace one loop of the city water system.
- 25. Elim, March 9, 1984** A reduction in water from the village source resulted in freezing and rupture in portions of the water and sewer system. Public assistance was granted to replace frozen portions of the water system and to assist in repairing service lines.
- 26. Kotzebue, April 30, 1984** The Governor declared a Disaster Emergency after prolonged cold weather caused freezing and ruptures in the city water system. A public assistance categorical grant was awarded to replace damaged portions of the system.
- 27. Cold Bay, May 5, 1984** Equipment failure of a private utility left the City of Cold Bay without electricity. Due to the critical needs of the residents, the Governor declared a Disaster Emergency to allow DHS&EM to transport a State-owned generator to the city for use on a temporary basis.
- 28. Alakanuk, June 13, 1984** Ice jam caused flooding caused extensive damage to the village road system. Subsequent to the Governor's Proclamation, the State awarded a categorical grant to the city to repair the roads.
- 29. Emmonak, June 15, 1984** The city requested disaster assistance to repair minor flood damage to a road. The State's categorical grant covered the cost of material to repair the road. The village provided manpower and equipment.
- 30. Cold Bay, July 31, 1984** In Cold Bay, the owner of the private electrical utility was unwilling to make the repairs necessary to provide reliable service to residents. The Governor's Declaration of Disaster Emergency authorized a disaster loan that assisted a buyer in purchasing the company.
- 31. Russian Mission, August 9, 1984** The Governor declared a Disaster Emergency after a fire destroyed the city power plant in Russian Mission. The State awarded a categorical grant to replace the plant.
- 32. 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.

33. Haines, January 25, 1985 After prolonged and excessive rainstorms caused permanent damage to the city sewer system, the Governor proclaimed a Disaster Emergency to provide funds to repair the system through a categorical public assistance grant.

34. Savoonga, February 26, 1985 The Governor proclaimed a Disaster Emergency to repair damage caused by freezing to the village water and sewer system in Savoonga. A categorical grant provided funds to repair the system.

35. Gambell, May 17, 1985 Unanticipated needs for fuel in Gambell throughout the winter depleted stocks in the village before re-supply by barge was possible. Since the freight charges of air resupply were prohibitive for residents, the Governor declared a Disaster Emergency to pay freight charges through a public assistance grant to the City.

36. Buckland, May 30, 1985 Flooding of the Buckland River caused damage to public roads and public and private buildings in Buckland. The Governor's declaration provided a State grant to repair public property. American Red Cross disaster relief programs gave assistance to individuals and families.

37. Kobuk, May 30, 1985 Ice moving through the village when the Kobuk River overflowed its banks caused damage to the city-owned fuel storage and distribution center. The Governor's declaration resulted in a categorical public assistance grant to repair the facility and replace lost fuel.

38. Anvik, June 5, 1985 Flooding of the Yukon River caused damage to city roads and private property. The Governor's declaration provided a categorical grant to repair the roads. American Red Cross granted assistance to individuals and families.

39. Emmonak, June 11, 1985 The Governor declared a Disaster Emergency after flooding caused damage to city roads. A categorical grant provided funds to assist in repairing the roads.

40. Pilot Station, June 18, 1985 Flooding of the Yukon River damaged several city-owned buildings: a lodge, day care center, television station and warehouse. Subsequent to the Governor's declaration, the State provided a categorical grant to repair these facilities. American Red Cross provided assistance for individuals and families.

41. Upper Kuskokwim River, June 18, 1985 The Governor signed a combined declaration to assist the communities of McGrath, Sleetmute and Red Devil in repairing flood damage to roads. In McGrath and Sleetmute, categorical grants assisted in restoring the roads to predisaster condition. The community of Red Devil elected to utilize a flexible funding option to construct an alternate road in a less hazardous location.

42. Pitka's Point, July 9, 1985 Pans of river ice moving with flood waters destroyed the sewer leach field serving the village safe water facility and elementary school. A public assistance grant provided funds to replace the leach field.

43. Bethel, July 10, 1985 High water accompanying breakup of the Kuskokwim River caused erosion damage at the city petroleum dock and washout of fill at the end of the seawall. Undercutting of river bank also threatened eight private residences. The Governor's Proclamation of Disaster Emergency provided public assistance to replace fill at the petroleum dock and seawall end. The State also provided funds to relocate the endangered homes, with the provision that the City of Bethel guarantee that the threatened property remain undeveloped.

44. Gambell, August 31, 1985 A fire originating in the power plant owned by Alaska Village Electric Cooperative (AVEC), destroyed the plant, the adjacent tank farm and city shop, and six private residences and buildings. The State provided temporary housing, public and individual and family assistance to replace uninsured losses. American Red Cross provided additional assistance to individuals and families.

45. Cordova, October 31, 1985 After heavy rains, a landslide destroyed water lines between Heney Creek catchment basin and the city. Disaster public assistance supported repair by the city.

46. Manokotak, November 22, 1985 A fire destroyed the power plant, leaving the city without electricity. DHS&EM assistance provided emergency replacement of the primary generator and funding to repair the backup generator and power plant building.

47. Thorne Bay, December 5, 1985 Cold weather precipitated catastrophic failure of the city water system. The Governor's declaration of disaster provided emergency assistance to restore water service and long time recovery assistance.

48. Metlakatla, December 10, 1985 Lack of rainfall in the generally rainy village reduced water levels to the point that the hydroelectric system could not generate sufficient power. Public disaster assistance provided supplemental generating capability with diesel generators.

49. Unalaska, December 13, 1985 A severe windstorm caused mudslides, road and port damage, and damage to public buildings. Public disaster assistance supplemented insurance settlements to assist in recovery.

50. Thorne Bay, February 3, 1986 Collapse of a public bridge isolated residents in sections of the village. DHS&EM provided public assistance to replace the bridge.

51. Venetie, March 3, 1986 Catastrophic failure of the electrical power generating plant caused the village to declare a local disaster. The Governor's declaration provided a loan to replace the generator.

52. Pelican, March 19, 1986 A windstorm destroyed the roof of the Pelican public school. DHS&EM provided emergency assistance to repair the roof. After the city received an insurance settlement, it reimbursed the State for the insured portion of the costs.

53. Crown Point (Moose Pass), May 1, 1986 A railroad tanker car accident contaminated the Crown Point area with dangerous fumes. The disaster declaration provided IFG and temporary housing assistance for dislocated residents and public assistance for environmental quality monitoring.

54. Napakiak, May 15, 1986 Severe bank erosion of the Kuskokwim River had reached a point where homes in Napakiak were in danger of falling in the river. The Governor's disaster declaration provided funds to move seven houses to a safe location.

55. Arctic (North Slope Major Disaster), September 25, 1986 & FEMA declared (DR-0781) on October 27, 1986 After an intense windstorm generating wind driven tides and flooding, caused extensive damage to public property, the President declared a Major Disaster to assist the State and local governments in recovering.

56. Southcentral Alaska Flood (Major Disaster), October 12, 1986 FEMA declared (DR-0782) on October 27, 1986 Record rainfall in South-central Alaska caused widespread flooding in Seward, Matanuska-Susitna Borough and Cordova. The President declared a Major disaster implementing all public and individual assistance programs, including SBA disaster loans and disaster unemployment insurance benefits.

57. Aniak, October 27, 1986 The city experienced a catastrophic failure of the sewer system serving the public day care center, laundry, library and home canning facility. Disaster assistance in the form of a loan to the City of Aniak.

58. Venetie, January 9, 1987 A structural fire destroyed the village owned electric plant and heavy equipment required for road and airport maintenance. The Governor's declaration provided public assistance to help the village recover.

59. Kotzebue, February 5, 1987 Freezing of the municipal water system reduced supplies to a level that posed a threat to public health and safety, motivating the city to declare a local disaster. The corresponding State declaration allocated public assistance from the Disaster Relief Fund to repair the system.

60. Sleetmute/Red Devil, May 28, 1987 Ice jam caused flooding inundated the Red Devil electric plant and tank farm, causing damage also to heavy equipment and power poles stored in Red Devil by the City of Sleetmute. The disaster declaration provided funds to repair or replace these items and to implement mitigation measures designed to prevent damage in future years.

61. Delta Junction, May 28, 1987 When a wildland fire in the Delta Junction area threatened

urban and developed property, DHS&EM joined the State Division of Forestry in responding. The Governor's disaster declaration covered DHS&EM costs in the response.

62. Aniak, May 29, 1987 Flooding during breakup of the Kuskokwim River caused damage to the city dike, road system, waste dump and sewage lagoon. The city repaired these items using funds authorized by the Governor's Declaration of Disaster Emergency.

63. Buckland, June 16, 1987 Flooding damaged city roads and a number of private homes. Individual and family assistance was provided. Since flooding is frequent in Buckland, the State disaster declaration included funds to mitigate the impact of future events.

64. Richardson Highway, July 24, 1987 The Governor declared a disaster after heavy rains washed out parts of the Richardson Highway. The declaration was required to obtain federal funds to repair the highway. No State funding was necessary.

65. Wainwright School, October 6, 1987 A fire destroyed the high school and major source of power to the City of Wainwright. A State disaster declaration provided funds to fly in a temporary generator and to assist in the permanent replacement of both the school and power plant.

66. Angoon, November 6, 1987 The City of Angoon sustained a threat to life and property as a result of damage to the fresh water transmission lines serving the community. The leaking lines threatened to deplete the city's entire water supply. State disaster funds were authorized to assist the community in repairing the water lines.

67. Togiak, October 1987 The City of Togiak experienced a catastrophic loss of fuel. The funds were transferred from the Disaster Relief Fund to the Governor's Emergency Fuel Relief Fund for disbursement.

68. Klehini River Bridge, November 9, 1987 Bridge failure was experienced when a snow plow attempted to cross. This bridge is on the only access route to several small communities in the area. A State disaster declaration provided the funds necessary to repair the bridge.

69. Barrow, February 16, 1988 & FEMA declared (DR-0813) on March 11, 1988 A fire destroyed the only Early Childhood Education School in the city and damaged teachers living quarters. Two hundred thirty-five children were displaced from their classes. The State disaster declaration provided an initial \$1 million to provide immediate assistance. The President declared a Major Disaster to assist the State and local governments in recovering.

70. Haines, February 29, 1988 The city experienced severe damage to streets from flooding and runoff triggered by extremely heavy rainfall. The State made available \$150,000 in disaster funds to assist in the repair of the city streets.

71. Beaver, March 8, 1988 The village of Beaver experienced total failure of their electrical

distribution system when several transformers faltered. The State disaster declaration helped the village replace the defective transformers and restore power.

72. Chefornak, March 23, 1988 A fire destroyed the village's only electric generation plant leaving the community without power. State disaster funds were utilized to provide a replacement generator for the village.

73. Chenega Bay, March 25, 1988 The village experienced failure of one of their two generators and failure of the other was imminent. A State disaster declaration provided the funds for a replacement generator to insure continued power for the community.

74. Pitka's Point, March 29, 1988 A fire caused major damage to the safe water facility supporting the village with potable water. The State provided \$105,000 in disaster funds to help restore the facility.

75. Nondalton, April 5, 1988 A fire destroyed the City Hall, fire station and fire fighting equipment. State disaster funds were made available to replace the facility and equipment.

76. Crooked Creek, May 12, 1988 After flooding of the Kuskokwim River caused extensive damage to village roads, utilities, and homes, the Governor declared a disaster providing public and individual assistance.

77. Napakiak/Napaskiak, May 24, 1988 Flood damage to roads in Napakiak and both roads and boardwalks in Napaskiak resulted in a declaration of Disaster Emergency. State disaster funds of \$200,000 were made available for public assistance.

78. Kaltag, May 26, 1988 Flooding of the Yukon River and Tributaries washed out an essential bridge in the community of Kaltag. State disaster assistance provided funding to replace the bridge.

79. Eagle, July 22, 1988 The village of Eagle experienced a catastrophic failure of its electrical utility. The Governor's declaration of disaster made funds available for emergency repair of the system.

80. Shishmaref, August 5, 1988 In late July and early August a series of intense windstorms with sea surges caused extensive damage to the seawall and erosion protection structure in the village of Shishmaref, leaving a number of critical public and private buildings subject to imminent damage. State disaster assistance provided funding to repair the damage.

81. Klawock, October 17, 1988 In Klawock, a fire of unknown origin in the land fill caused a threat to public health. Disaster funding helped the community extinguish the fire by providing funding for equipment and manpower.

82. Yukon Flats, November 10, 1988 Council of Athabascan Tribal Governments requested

assistance on behalf of trappers in the Yukon Flats for loss of trapping related essential items destroyed by the fires in the Summer of 1988.

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

84. Northwest Arctic Borough, February 1, 1989 & FEMA declared (DR-00826) on May 10, 19 During the Omega Block cold spell, the City of Kotzebue and five other villages in the Northwest Arctic Borough suffered extensive permanent damage to water & sewer systems. The City of Buckland suffered a total loss of its electrical system. The Governor declared a disaster to assist the Borough in making permanent repairs to these facilities.

85. St. George, February 9, 1989 A severe windstorm caused sinking of a landing barge used as a dock by the City of St. George. The incident resulted in a blockage of the port and a loss of the capability to off-load essential supplies. The Governor declared a disaster to provide State assistance in recovering the barge.

86. Sand Point, February 27, 1989 After the Omega Block cold spell caused permanent damage to the water main serving the Sand Point boat harbor, the Governor declared a disaster to provide assistance in repairing the line & restoring services.

87. Ahkiok, March 2, 1989 The Governor declared a disaster to assist the village of Ahkiok in replacing its electrical power generating plant, which had experienced irreparable damage caused by prolonged cold weather.

88. North Slope Borough, March 8, 1989 On February 24-28, 1989, a severe winter storm caused extensive damage to public and private property in North Slope Borough villages. The Governor's declaration of disaster authorized public, individual & family assistance in recovering.

89. Valdez Oil Spill, March 26, 1989 The Governor's declaration provided needed funding for State agency operations mobilized in response to the "Exxon Valdez" oil spill. A request for federal assistance through a Presidential declaration of disaster was denied.

90. Galena, April 20, 1989 Declared as a result of the Omega Block Cold Spell (temperatures to -85 in Galena), which caused extensive damage to water and sewer utilities in Galena.

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

92. Circle, May 6, 1989 Flooding of the Yukon River in Circle during Spring Breakup of 1989 caused damage to public and private property. Disaster was eventually included in the Presidential Declaration (#94 below).

93. Ft. Yukon, May 6, 1989, Flooding of the Yukon River which occurred one day after the Circle flood, also included in the Presidential Declaration.

94. Spring Floods, FEMA declared (DR-0832) on June 10, 1989 Presidential Declaration of Major Disaster, incorporated sixteen local declarations and applied to all communities on Yukon, Kuskokwim and Kobuk rivers and their tributaries. Provided public and individual assistance to repair damage.

95. Klawock, June 19, 1989 A heavy Fall rainstorm washed substantial materials into the city's water reservoir, reducing capacity to the extent that during the following summer water shortages threatened health and safety and economic losses due to closure of a local fish hatchery. The disaster declaration funded restoration of the reservoir to its original, pre-disaster capacity.

96. Fairbanks/North Star Borough, August 1, 1989 Flash flooding along the Tanana River in the Borough caused damage to public and private property. The Governor's declaration authorized public and individual disaster assistance.

97. Mat-Su Borough, August 4, 1989 The Governor declared a disaster to mitigate a flood threat caused by high water in the Matanuska River and placed the Old Glenn Highway and private residences along the river at risk. Funding was applied towards construction of an earthen/gravel dike.

98. Whittier, August 8, 1989 Provided funding to DOT/PF to repair the breakwater to the small boat harbor in Whittier, which was at risk of imminent collapse, threatening damage to the harbor itself and large numbers of privately owned boats.

99. Municipality of Anchorage, August 30, 1989 The Declaration addressed widespread damage caused by heavy flooding along the drainage systems within the Municipality. State assistance was limited to public property damage, although the federal Small Business Administration implemented its Disaster Loan Programs for businesses and homeowners.

100. Seward/Kenai Peninsula Borough, August 30, 1989 This Declaration relates to the same storm and flooding incident that affected Anchorage. Primary area of damage was in the city of Seward. As in Anchorage, State disaster assistance was limited to public property damage, with SBA loans available for individuals and businesses.

101. Richardson Highway, September 13, 1989 The same torrential rains that impacted Anchorage

and the Kenai Peninsula Borough caused extensive damage to the Richardson & Copper River Highways. The Governor's Declaration enabled DOT/PF to apply for and receive emergency assistance through the federal Dept. of Transportation. No State disaster funds were expended as a result of this Declaration.

102. Search & Rescue, September 13, 1989 The Governor made this Declaration of Disaster for the purpose of providing emergency funding to the Dept. of Public Safety for conducting search and rescue operations. The appropriated operating budget for these activities was depleted only two months into the fiscal year.

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

104. KPB-Mt. Redoubt, January 11, 1990 The Kenai Peninsula Borough, most directly affected by Mt. Redoubt, experienced extraordinary costs in upgrading air quality in schools and other public facilities throughout successive volcanic eruptions. The Borough also sustained costs of maintaining 24-hr. operations during critical periods. The Governor's declaration of Disaster Emergency supported these activities.

105. Tatitlek, January 31, 1990 The Governor declared a disaster to assist in the restoration of electrical service in Tatitlek after a fire destroyed the village's generator plant.

106. Broadcast Emergency (KYUK/KDGL), February 22, 1990 Radio Station KYUK in Bethel, Alaska, a public radio station and the EBS station for a large portion of Western Alaska, experienced a failure in its transmission antenna. Concurrently, KDLG, the public radio station and EBS station for the Dillingham operational area, lost its source of emergency power. The Governor's declaration of disaster enabled these stations to immediately repair these shortfalls in their capability to serve as stations on the Emergency Broadcast System network.

107. Kongiganak, March 2, 1990 Inclement weather and equipment failures prevented normal barge deliveries of winter fuel to the village of Kongiganak, causing a shortage as the winter progressed. The governor's declaration of disaster supported air delivery of supplies sufficient to last the winter.

108. Moose Feeding Project, March 28, 1990 Recorded snow depths in interior Alaska resulted in a situation where moose, unable to walk to areas of their natural feeding, were starving to death or browsing along the cleared railway, where they were killed by train. To prevent catastrophic loss of the moose population, the Governor declared a disaster. Funding provided under the declaration supported the clearing of trails and provision of alternative supplies of food.

109. Manokotak, April 5, 1990 Due to an inadequate storage capacity for fuel and gasoline, the

City of Manokotak experienced a shortage of fuel for resale to residents and for its own use. The Governor's declaration of disaster subsidized air transport of fuel.

110. Stebbins, April 9, 1990 After a fire destroyed the high school in Stebbins, the Governor declared a disaster to support the design and construction of a new high school. The declaration stipulated that the design emphasize safety and the mitigation of damage by fire or other hazards.

111. '89 Spring Floods Hazard Mitigation, April 14, 1990 The Major Disaster Declaration by the President in response to statewide flooding in the Spring of 1989 authorized the commitment of federal funds to projects designed to mitigate flood damage in future years. Since the federal funding required a State matching share, the Governor declared a disaster to provide these funds and authorize their expenditure.

112. Snow & Ice Removal, 1990 Because of record snowfalls in Southcentral Alaska, the Legislature appropriated a special grant to local governments affected in order to supplement normal snow and ice removal budgets. The Legislature directed that funds be managed by the Division of Homeland Security and Emergency Management. No Disaster Declaration occurred.

113. McGrath, May 16, 1990 Ice jam flooding washed out an extensive section of Cranberry Ridge road. The Disaster declaration provided funds for repair of the road and for mitigation to prevent a recurrence of the same event in the future.

114. Kobuk, May 17, 1990 Ice jam flooding threatened the City of Kobuk to the extent that the local government requested State assistance in evacuating the community. The Governor's declaration of disaster authorized this assistance.

115. Fire Suppression, May 29, 1990 An early wildland fire season depleted the Alaska Dept. of Natural Resources' fund for wildland fire suppression. The Governor's declaration of disaster authorized transfer of funds from the Disaster Relief Fund to this account.

116. Teklanika, May 31, 1990 Continued demands for suppressing early wildland fires resulted in a declaration of disaster authorizing transfer of additional money from the disaster relief fund to the Dept. of Natural Resources.

117. Bethel, July 2, 1990 Abnormally high water in the Kuskokwim River during breakup and continuing for an extended period after breakup resulted in scouring of toe material along the Bethel bulkhead, dislocation of the pipe pilings that form the bulkhead, and loss of material behind these pilings. The disaster declaration supported repair of the bulkhead and placement of riprap material along the toe of affected sections.

118. Statewide Fires, July 4, 1990 The wildland fire season, with all-time records in the number and gravity of fires, caused fire suppression requirements beyond the normal capability of the Dept. of Natural Resources. The Governor declared a disaster in order to authorize the use of the resources

of the Alaska National Guard in support of the State's wildland fire management programs. The Federal Emergency Management Agency authorized federal payment of up to 70% of fire expenditures that exceeded the average annual fire management budget.

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

120. Lower Kuskokwim, September 4, 1990 A severe storm compounded by high tides caused extensive flooding in coastal communities of the Kuskokwim and Bristol Bay areas and along the lower Kuskokwim River. The flooding caused damage to both public and private property. The disaster declaration authorized assistance to local governments, individuals and families affected by the flooding.

121. Kotzebue, September 4, 1990 An unseasonable storm and wind driven tides damaged public and private property in Kotzebue and surrounding traditional use areas. The Governor's declaration of disaster provided assistance to the City of Kotzebue and to individuals and families. (closed after Jan 03)

122. Nome, September 10, 1990 An unseasonable sea storm caused the sinking & destruction of a transfer barge owned by the city. As a result the city was unable to receive essential goods that are customarily transported by sea. In addition the debris presents a hazard jeopardizing the structural integrity of the Nome causeway.

123. Teller, September 10, 1990 A storm on the Bering Sea caused major damage to the wood cribbing/gabion breakwater.

124. Lowell Creek Tunnel, September 27, 1990 A major rehabilitation of Lowell Creek Tunnel is required to insure continued protection of the City of Seward. This is a mitigation project.

125. Diomedes, November 21, 1990 A severe early winter storm with waves up to 25 feet destroyed several fuel storage facilities. The resultant loss of critically needed petroleum products along with other equipment, required the declaration of disaster.

126. Eagle, December 28, 1990 A fire destroyed the privately owned power generation facility that services Eagle and Eagle Village. A temporary replacement generator was delivered and power restored on December 30, 1990.

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

128. Larsen Bay, February 14, 1991 Abnormal freezing conditions affected the City's water system, interrupting service to approximately fifty percent of the residents. The Governor's Declaration of Disaster enabled the City to obtain equipment and labor needed to restore service.

129. Karluk, February 22, 1991 A fuel shortage in the community threatened the loss of heat in private homes and the loss of electricity city-wide. The Governor declared a disaster to provide money to resupply the village with fuel. The funds were in the form of a disaster loan to the Village Council.

130. Marshall, February 25, 1991 Contamination of the water supply system for Marshall resulted in declaration of February 25, 1991. Funding was provided to Public Health Service to ensure potable water availability for residents of Marshall.

131. Angoon, May 3, 1991 Failure of an undersea water main reduced volume of water being provided to the city system to a critically low level. Declaration authorized public assistance to repair the main.

132-142. Fairbanks/North Star Borough, Aniak, McGrath, Red Devil, Anvik, Grayling, Emmonak, Holy Cross, Alakanuk, Shageluk, Galena. the Governor declared on May 3-23, 1991 FEMA declared May 30, 1991 Flooding. Record snowfalls in the interior combined with sudden Spring melt caused flooding all along the Yukon and Kuskokwim River systems. Numerous State Declarations were combined into a single Presidential Declaration of Major Disaster (FEMA-0909-AK) that authorized assistance for repair of public property only. State Disaster Relief Funds were used to implement the Individual and Family Grant Program in all of the communities included in the federal declaration.

143. Dept. of Natural Resources, July 11, 1991 A severe, early, and intense wildland fire season caused rapid depletion of the State fire suppression funds. The Governor's Declaration of Disaster was made to comply with requirements for receiving Federal wildland fire suppression funds.

144. Mat-Su Borough, July 18, 1991 Severe bank erosion near the Circle View Subdivision area along the Matanuska River destroyed one home and threatened several others, causing the Mat-Su Borough to support either construction of emergency bank protection measures or relocation of homes. The Governor's Declaration authorized a loan of up to \$500,000 dollars to the Mat-Su Borough. The following year the legislature converted this loan to a grant.

145. Whitestone Farms, July 25, 1991 The electric plant in this community was destroyed by a fire thought to be caused by lightning. The Declaration authorized public assistance funds for replacement of the plant.

146. Little Diomede, July 25, 1991 Mechanical system problems and lack of rainfall caused a critical shortage of safe water in the village of Little Diomede. Public assistance made available by the Declaration funded desalination equipment used to fill the village's storage

reservoirs with processed seawater.

147. Aniak, August 7, 1991 At the recommendation of OMB, the Alaska Energy Authority and the Office of the Attorney General, the Governor declared a Disaster to authorize an emergency loan from the Disaster Relief Fund to the City of Aniak. Funds were for the purchase of fuel and for averting a general fiscal crisis in the City.

148. Diomedes Fire, September 20, 1991 A fire in the City of Diomedes destroyed the City electric plant and water treatment plant. Also damaged the water storage tank and destroyed equipment and materials essential to recovery from two previous disasters.

149. New Koliganek, October 14, 1991 The village of New Koliganek sustained flooding which resulted in damage to a bridge and severe threat to public safety of residents. Immediate repair of the bridge was necessary in order to allow residents, school children, to safely transit within the village.

150. Kodiak, November 2, 1991 Commencing on October 31, 1991, the City of Kodiak sustained severe damage and threats to life and property from heavy rains, flooding and landslides. The rains caused severe damage to the City's roads and buildings; and caused damage to homes, businesses and loss of personal property.

151. Earthquake Mitigation, November 7, 1991 Under the authority granted in A.S.26.23.300, the Governor issued a declaration of emergency to prevent or minimize the effects of events that pose a direct and imminent threat of disaster to the State; and, to allow for training and exercise of State agency personnel, to familiarize responders with, and test the capabilities of the State's new Emergency Operations Center.

152. Seward Sewage Disaster, November 20, 1991 On August 26, 1991, the City of Seward sewage treatment lagoon located on Lowell Point Road suffered a catastrophic failure from undetermined causes.

153. Eagle City, May 19, 1992 On May 13, 1992, the ice jam precipitating the Eagle Village flood moved down to the City of Eagle flooding some private property and destroying an erosion control structure along the river front street. Both the public assistance and individual assistance programs were implemented as well as the SBA disaster loan program.

154. Eagle Village, May 19, 1992 On May 12 through 13, the Native Village of Eagle was inundated by ice jam flooding causing the entire town to be evacuated to local high ground. Flood waters caused damage to a majority of the homes, eroded the river front street and caused damage to the clinic, washeteria and tank farm. Both the public assistance and individual assistance programs were implemented as well as the SBA disaster loan program.

155. Galena-92 Flood From May 26 through 29, 1992, both down town and up town Galena were flooded as a result of an ice jam at Bishop Rock several miles down stream of Galena. This was the third worst flood in recorded history for the community. Extensive damage to State road systems, City streets, electrical distribution system, sewage lagoon and the majority of homes in down town area resulted. Both the public assistance and individual assistance programs were implemented as well as the SBA disaster loan program.

156. Flood Response, June 9, 1992 The Upper Yukon River drainage was experiencing the third worst snow melt flooding in recorded history according to the National Weather Service. The Declaration provided \$100,000.00 from the Disaster Relief Fund to cover DHS&EM expenses that began to occur as a result of the need to provide response activities and surveillance. An RSA was established with the Division of Environmental Quality, DEC to respond to and test for environmental contamination for assurance of public health.

157. Yukon River Flood, June 17, 1992 A very late spring combined with above average snow packs in the Canadian and U.S. portions of the Yukon drainage resulted in post-breakup (snow melt) flooding of the Yukon River and its tributaries from Fort Yukon to Rampart. Flood waters rose slowly over a period of days and receded gradually. The North Pole area was also included in this declaration due to effects from the Chena drainage causing the ground water to rise. The high ground water was exacerbated by the activation of the Moose Creek Diversion Dam (COE). Major damage was sustained by both public and private property. The IFG program was implemented in Fort Yukon, Beaver, Stevens Village and North Pole. No Public Assistance was implemented for the North Pole area. Rampart received only public damage. The Small Business Administration declared for the same geographic area and provided disaster loans.

158. Fire Disaster, July 7, 1992 The Department of Natural Resources exhausted fire suppression funds prior to the end of the fire season. A total of \$750,000 was appropriated from statewide funding lapse to the FY93 the Statewide Fire Suppression Program.

159. Norton Sound Herring Fishery Disaster, July 13, 1992 The Governor requested the Small Business Administration to declare an Economic Injury Disaster for Businesses and fishermen impacted by the failure of the Norton Sound herring fishery. Due to a very late spring, sea ice in the area did not breakup at the time the herring arrived in the Sound making them inaccessible to the fishermen. The Governor did not declare under AS 26.23.

160. Haines Highway Disaster, August 14, 1992 This disaster was declared in order for the State DOT/PF to request \$1.8 million in Federal Highway Administration emergency funds (under Title 23 U.S.C., Section 125) to repair damages relating to flooding of the Klehini River 30 miles north of Haines. No expenditure of State Disaster Relief Funds was required.

161. Mt. Spurr, September 21, 1992 Frequent eruptions and the possibility of further eruptions has caused health hazards and property damage within the local governments of the Municipality of Anchorage, Kenai Peninsula Borough and Mat-Su Borough. These eruptions caused physical

damage to observation and warning equipment. Funds to replace equipment for AVO.

162. Nome Highway Disaster On October 5, 1992, a major Bering Sea Storm with gale-force winds impacted the Norton Sound Coast of the Seward Peninsula in Western Alaska, producing an unusually high storm surge tide and very large waves, particularly in the Nome area. The high tidal waves severely damaged two federal-aid highways, isolating the mining community of Council and endangering the traveling public in the Nome area. DOT/PF will request emergency relief funds from Federal Highway Administration.

163. Kuskokwim Disaster On July 19, 1993, the Governor's Task Force issued a disaster declaration of economic hardship to fishermen due to poor chum fishing in the Kuskokwim area.

164. Tenakee Springs Fire On July 19, 1993, a community-wide fire destroyed 10 single family homes, the hotel and electrical poles/power lines.

165. Department of Natural Resources On August 3, 1993, funds were allocated to DNR for fire suppression.

166. Shaker IV Under the authority granted in AS 26.23.300, the Governor issued a declaration of emergency to prevent or minimize the effects of events that pose a direct and imminent threat of disaster to the State; and, to allow for training and exercise of State agency personnel, to familiarize responders with, and test the capabilities of the State's Emergency Operations Center.

167. Prince of Wales Island On October 29, 1993, funds were made available through emergency highway funding assistance to all roads on Prince of Wales Island eligible under the Department of Transportation ICTEA provision due to heavy rains and numerous mud slides.

168. Hazard Mitigation AK-0909 This is a pilot program in Ft. Yukon designed to confirm the need for long-range flood mitigation measures to prevent flooding.

169. McGrath Road Disaster On May 23, 1994, a disaster declaration was signed for the City of McGrath due to damages to approximately 1,147 linear feet of Cranberry Ridge Road. This road provides access to 3 subdivisions occupied by two family homes, the community rifle range, the rock quarry, and the emergency air strip.

170. Galena Disaster On May 10, 1994, the City of Galena sustained losses and threats to life and property resulting from flooding due to breakup. As a result of this disaster, roads and revetments suffered significant damage, and the sewer lagoon was breached.

171. Cummings Road Flood On July 13, 1994, Cummings Road was severely damaged by an overflow of waters from the Gerstle River. As a result of this disaster, families were isolated, which constituted a significant threat to the lives and safety of those individuals.

172. Matanuska River Erosion On July 1, 1994, Matanuska-Susitna Borough sustained serious damage and threats to life and property resulting from erosion of the Matanuska River, in the vicinity of Circle View Estates. As a result of this disaster authority was granted under Alaska Statutes, Section 26.23.020 to loan \$500,000.00 from the Disaster Relief Fund to the Matanuska-Susitna Borough.

173. 94 Fall Flood declared August 26, 1994 by Governor Hickle then FEMA declared (DR-1039) on September 12, 1994 On August 26, 1994, the Governor declared disaster emergencies for the communities of Kobuk, Kiana, and Kotzebue as a result of flood damage. As a result of this disaster, the conditions continue to create unprecedented losses of personal and public properties. The communities of Allakaket and Alatna had to be evacuated under emergency life-threatening conditions on Sunday, August 28, 1994, Hughes was also evacuated several days later. Active duty military assets (CH-47 Chinook helicopters) were used to evacuate Allakaket and Alatna. Guard assets were used to evacuate Hughes. Also affected by this disaster were the communities of Bettles and Wiseman.

174. Metlakatla Sea Storm On November 10, 1994, the Governor declared that a condition of disaster exists in Metlakatla, as a result of high tides and storm driven waves that threaten coastal sections. The Metlakatla Community Senior Citizens Center and a nearby drainage culvert under the public right-of-way have been put at risk.

175. Skagway Submarine Landslide On November 16, 1994, the Governor declared that a condition of disaster emergency exist in the City of Skagway, as a result of a submarine landslide. As a result of this disaster damages to Alaska Marine Ferry facilities have interrupted normal service and require emergency repairs, and damages to the small boat harbor exceed the capability of the City of Skagway to repair in an urgent manner to preclude ongoing collateral damages.

176. Yukon Kuskokwim Delta On June 5, 1995, the Governor declared a condition of disaster emergency exist in the Cities of Akiak, Kwethluk, Napaskiak, Emmonak, and Alakanuk, as a result of inundation. As a result of this disaster roads, boardwalks, and other public works essential to vital community services were damaged. (closed after Jan 03)

177. Aniak Ice Jam Flood On June 5, 1995, the Governor declared that a condition of disaster emergency exist in the City of Aniak, as a result of ice jam flooding of the Kuskokwim River and Aniak Slough. As a result of this disaster sections of Birch Road, Airport Boulevard, and the landfill access road were severely damaged.

178. Bethel Sinkhole Erosion On June 5, 1995, the Governor declared that a condition of disaster emergency exist in the City of Bethel, as a result of erosion during spring breakup. As a result of this disaster the face of the protective sea wall was damaged causing erosion under the City Dock to create and expand sinkholes on the dock.

95-179 Statewide Fire Suppression: On June 22, 1995, the Governor declared that a condition of disaster emergency exist in the State, as a result of insufficient money regularly appropriated to the Department of Natural Resources has been exhausted along with supplemental funds. As a result of this disaster authorization of sufficient funds were made available to continue fire suppression activities through June 30, 1995. DNR administers this funding; therefore, DHS/EM has no data to reflect the applicants or amount of funding.

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

96-181 Millers Reach Fire declared June 4, 1996 by Governor Knowles then FEMA declared (DR-1119) on June 8, 1996: A fire which began on June 2, 1996 near Houston, Alaska on Miller's Reach Road spread rapidly destroying 344 structures and burning 37,366 acres in the Houston-Big Lake area. Command and control of this fire was initially controlled from the Houston High School with a Type I Incident Management Team. Later a Unified Command structure was established at the Creekside Plaza Mall in Wasilla which consisted of Local, State and Federal representatives. On June 4th, 1996 Governor Knowles declared a State Disaster Declaration and President Clinton signed the Federal Disaster Declaration (AK-1119-DR) on June 8th, 1996. This provided the State with Federal Disaster relief funding for the incident. The fire was contained on June 10th and declared under control on June 15th. Individual Assistance totaled \$1.87 million for 425 applicants. Public Assistance totaled \$5.1 million for 7 applicants with 50 DSR's. Hazard Mitigation totaled \$1.75 million. The total for this disaster is \$9.35 million.

97-182 '96 Southeast Storm (Pelican/Elfin Cove): On Wednesday, September 25, 1996 a severe storm struck Southeast Alaska causing severe damage to some of the communities in the area. The community of Pelican sustained erosion damage to temporary construction (sandbags) placed to curtail erosion on Pelican Creek. The storm also caused additional erosion around the bridge that crosses the creek. In Elfin Cove the landslide damaged electrical distribution lines to homes, disrupted telephone service to 12 homes and caused remaining telephones to operate off battery power. Two homes sustained damage. Also the trail which provided the only means of access between the two sides of town was damaged causing residents to commute from one side of town to the other by boat. The Governor declared the area a disaster on November 1, 1996 due to the threat

to life and property. Public Assistance totaled \$486K for 1 applicant with 1 DSR. The total for this disaster is \$528K.

98-183 DNR Fire Suppression: On July 14, 1997, the Governor made a finding that regularly appropriated fire suppression funds were depleted and disaster relief funds to be insufficient to prevent ongoing and new fires from threatening life and property. The Department of Natural Resources implemented funding via the disaster declaration process, as referenced by legislative intent in Chapter 98, SLA 1997, Sec. 7 Pg. 3, L21-29. DNR administers these funds; therefore, DHS/EM has no data that reflect the applicants or the amount of funding.

98-184 Bristol Bay Distressed Salmon: On July 18, 1997 the Governor declared that as a result of low salmon harvest and depressed prices, municipalities in Bristol Bay and Kuskokwim river drainages suffered a severe reduction in anticipated fish tax revenue. DCRA was assigned the lead agency in a Coordinated Response Partnership of State agencies to act within their statutory authority to assist in restoring the economic health and stability in area communities and to develop goals and strategies for future economic development. Individual Assistance totaled \$500K for 446 applicants. Public Assistance totaled \$1.5 million. The total for this disaster is \$2 million.

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

98-186 Shishmaref Sea Storm: On October 6, 1997, under authority granted by the Alaska Statutes, Section 26.23.020, the Governor declared a condition existed in the City of Shishmaref to warrant a disaster declaration in order to provide for assistance. An unusually early sea storm caused severe damage resulting in homes being eroded into tidewater and being destroyed. Additional federal assistance under the Federal Emergency Management Agencies Flood Mitigation Assistance Grant in the amount of \$600,000 was provided to complete the move of additional damaged structures. In addition the Alaska Housing Finance Corporation provided \$200,000 in housing assistance for the match to the federal assistance. Individual Assistance totaled \$16K for 6 applicants. Public Assistance totaled \$1.2 million for 3 applicants and 14 DSR's. Hazard Mitigation totaled \$50K. The total for this disaster is \$1.46 million. (closed after Jan 03)

98-187 DNR Fire Suppression: On June 5, 1998, the Governor made a finding that insufficient money was regularly appropriated and money from the disaster relief fund was insufficient. DNR Commissioner was hereby authorized to utilize money made available necessary for fire protection and suppression for the balance of FY98 to prevent continuing and new fires from threatening life

and property as referenced by legislative intent in sec 7(b), chapter 98, SLA 1997. DNR administered the funding for this disaster; therefore, DHS/EM has no date reflecting the applicants or amount of funding.

98-188 Endicott Mountains Flood 6/18/98: On June 18, 1998, under the authority granted by the Alaska Statutes, Section 26.23.020, the Governor declared a disaster existed in the cities of Allakaket and Huslia, the communities of Wiseman and Evansville and along the Dalton Highway between Coldfoot and Atigun Pass. Acute erosion, flash flooding caused damaged to public infrastructures, fuel tank farms, private property, dikes and bridge abutment revetments. Only Public Assistance was granted. It totaled \$660K for 5 applicants with 8 DSR's. The total for this disaster is \$668K.

98-189 Western AK Fisheries Disaster: On July 30, 1998, under the authority granted by Alaska Statute 26.23.020 (c), the Governor declared a disaster existed in the Bering Sea that affected fishing communities along its coastal areas. The Bering Sea suffered a catastrophic rise in sea surface temperatures and as a result disrupted the salmon populations which in the food chain cause the starvation of seabirds and marine mammals. Families in this area depend on the salmon industry to earn salaries to pay for fuel oil to heat their homes, electricity, water and sanitation and food in the harsh winter climate. The Governor requested that the Small Business Administration made an administrative declaration of economic injury to provide loans to small businesses. On September 16, 1998 the Governor issued another declaration of disaster emergency adding the communities of Stebbins, St. Michaels, Minto and Manley Hot Springs. On October 16, 1998 the Governor amended his declaration of September 16, 1998 to include the communities of Nelson Lagoon, False Pass and Tyonek. Assistance was broken into two groups FEDA and ELE. The following is the total for both groups: Individual Assistance, for 4800 applicants, = \$19.4 million, and Public Assistance = \$348K. The grand total for the disaster is \$24.1 million.

98-190 Southeastern Storm: On October 27, 1998, the Governor declared a disaster to exist in the communities of Haines and the City and Borough of Juneau for the purposes of accessing federal highway administration funds after the worst two-day rainfall in fifty years occurred in Southeast Alaska on October 19-20, 1998. Over 6 inches of rain fell within a 48-hour period. As a result, extensive damage to many road systems, public, private and non-profits properties was caused from mudslides and water erosion. On November 24, 1998, under the authority granted by Alaska Statute 26.23.020, the governor amended his declaration of disaster in the City and Borough of Juneau, the City and Borough of Haines, to include the Chilkat Indian Village (Community of Klukwan) in order for public (infrastructure) assistance to public property and individual and family grant assistance. The Governor also requested that the Small Business Administration declare an administrative declaration for physical disaster damages to provide low interest loans to businesses and private property owners. Individual Assistance totaled \$167K for 65 applicants. Public Assistance totaled \$828K for 10 applicants with 30 PW's. The total for this disaster is \$1.12 million.

00-191 Central Gulf Coast Storm declared February 4, 2000 by Governor Murkowski Murkowski then FEMA declared (DR-1316) on February 17, 2000: On Feb 4 2000, the Governor

declared a disaster due to high impact weather events throughout an extensive area of the state. The State began responding to the incident since the beginning of December 21, 1999. The declaration was expanded on February 8 to include City of Whittier, City of Valdez, Kenai Peninsula Borough, Matanuska-Susitna Borough and the Municipality of Anchorage. On February 17, 2000, President Bill Clinton determined the event disaster warranted a major disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288 as amended ("the Stafford Act). On March 17, 2000, the Governor again expanded the disaster area and declared that a condition of disaster exists in Aleutians East, Bristol Bay, Denali, Fairbanks North Star, Kodiak Island, and Lake and Peninsula Boroughs and the census areas of Dillingham, Bethel, Wade Hampton, and Southeast Fairbanks, which is of sufficient severity and magnitude to warrant a disaster declaration. Effective on April 4, 2000, Amendment No. 2 to the Notice of a Major Disaster Declaration, the Director of FEMA included the expanded area in the presidential declaration. Public Assistance, for 64 applicants with 251 PW's, totaled \$12.8 million. Hazard Mitigation totaled \$2 million. The total for this disaster is \$15.66 million.

00-192 **Fire Suppression:** Governor Knowles issued a disaster declaration on May 24, 2000 to make funds available for wildland fire fighting for the remainder of the fiscal year. DNR administers funding; therefore, DHS/EM has no data reflecting applicants or amount of funding.

00-193 **Fire Suppression:** On June 23, 2000, Governor Knowles writes to speaker of the House, Brian Porter mentioning the issuance of another fire suppression declaration, because the 30-day life period of his May 24, 2000 declaration had expired. Funding was still needed to fight fires through the end of Fiscal Year 2000. DNR administered funding; therefore, DHS/EM has no data reflecting applicants or amount of funding.

01-194 **Identified as YKN:** dated prior to Kake: On July 19, 2000 Governor Knowles declared a disaster due to failure of salmon returns to the Yukon, Kuskokwim and Norton Sound fishing districts. In some areas the return was significantly less than 50% of the long-term average. This catastrophic decline resulted in food shortages for subsistence fishermen and economic injury to businesses and individuals. The Governor initiated a coordination group named Operation Renew Hope (ORH) to manage this disaster. ORH was lead by DCED Deputy Commissioner Bernice Joseph. DHS&EM provided a full time Public Information Officer (Kerre Fisher) and Department liaison (Michael Bird) in support of this operation. The group was charged with securing basic needs such as heating fuel, essential utilities, USDA commodities and chum salmon from the Kotzebue fishery. At Governor Knowles request, the federal commerce Department issued a declaration of a fishery disaster under the Magnuson-Stevens Act. On October 24, 2000 the U.S. Small Business Administration issued a Declaration of Economic Injury Disaster #9J35. SBA tied this event to the 1995 Fall Flood Disaster. The Kenai Peninsula borough was the primary declaration area. The contiguous Boroughs of Mat-Su, Lake and Peninsula and the Regional Education Attendance Area #10 and the Municipality of Anchorage were eligible. The total for this disaster is \$747K (mainly from Admin. Allowance). (closed after Jan 03)

01-195 **Kake Water Containment Failure:** On July 31, 2000 Governor Knowles submitted a

financial plan in accordance with AS 26.23.020 (h) to the Alaska State House and Senate for immediate financial assistance to the City of Kake. As general fund appropriations were not made to the disaster relief fund for FY2001 to cover state costs to prevent, minimize or respond to an incident that poses direct and imminent threat to the community, a supplemental appropriation was submitted during the following legislative session. On July 27, 2000, the Mayor of Kake declared a disaster emergency due to public health threat resulting from the Gunnuck Creek Dam failure. The community does not have a potable drinking source available and was seeking assistance to fund an interim water supply system until the Alpine Lake Water Pipeline, which is under construction and projected to be operational in Spring of 2001, was completed. One applicant was funded, which totaled \$405. The disaster total was \$410K.

01-196 Middle Yukon Flood: On May 31, 2001 Governor Knowles declared a disaster for the communities of Koyukuk and Nulato due to ice jams on the Yukon River. On May 24, 2001, ice jams at Last Chance and Nine-Mile Island caused flooding in Nulato and Koyukuk. The ice jam persisted for several days and floodwaters continued to rise until there was little or no dry ground in the village of Koyukuk. Weather conditions were unseasonably cold, and windy. Both snow and rain showers exacerbated the human misery. As precautionary and planned event to avoid attempting to respond to a crisis on a long holiday weekend, 35 high-risk individuals were transported to Galena via helicopter. Able-bodied adults remained in town to minimize losses. Flooding occurred in the village of Nulato on the Yukon River. Homes sustained water damages inside of the structures. City owned fuel tanks at tank farm were unstable. Fuel intake heads were inundated and sustained damages. Water overtopped the public landfill. Individual Assistance totaled \$209K for 30 applicants. Public Assistance totaled \$250K for 4 applicants with 17 PW's. The total for this disaster is \$510,554.

*****Tracking of Administrative Orders and other means of access to the Disaster Relief Fund begin at this point in chronicling major events.*****

02-197 KOTZ AM Radio (Admin Order 191): On August 13, 2001, the radio tower antenna for KOTZ AM, the radio station serving the northwest arctic area, was destroyed in a fatal aircraft accident. Because the radio station disseminates event warnings and notifications to local villages and numerous subsistence and hunting camps by way of the Emergency Alert System and programmed messaging services, the governor signed Administrative Order No. 191 on August 24, 2001. The prescribed assistance was to provide this essential service through several low-watt FM stations placed in 6 villages. KOTZ AM Radio is part of the Public Broadcasting System and is a non-profit entity. The Northwest Arctic Borough acted as the applicant in this incident. The total for this incident is \$41,226.77.

02-198 Shishmaref Seawall (Admin Order 194): Winds and high tides combined to strike the Shishmaref coastline from October 5 through October 7, 2001 and eroded inward as much as 50 feet. Some sections of the sand scarp were undercut as much as 16 to 20 feet due to the surf melting the underlying permafrost. In order to prevent further destruction of the coastline due to storms prior to tidewater freeze up, Governor Knowles issued Administrative Order No. 194 on October 27, 2001

which was not to exceed \$110K (including DHS&EM administrative costs). These Public Assistance funds were to be used to establish a sacrificial sandbag revetment to last through the storm season. The total for this incident is \$87,858.74.

02-199 Sleetmute Core Service Facility Fire (Admin Order 196): At approximately midnight December 20th, 2001, a fire destroyed the community building in Sleetmute. The building housed the clinic, Council Office, VPSO office, washeteria and the TV equipment for the ARCS station. The Disaster Policy Cabinet recommended that disaster assistance be provided to Sleetmute for, “full recovery or temporary measures only as appropriate for the parameters that will provide for a safe, secure and sanitary community by measures that are unable to be addressed through other State (non-DRF), and federal and non-profit agency’s emergency funding resources.” On May 24, 2002, the Governor signed AO 196 and provided funding not to exceed \$150K. This was the unfunded balance after all other grant sources were exhausted. Total recovery costs for the village were estimated to be \$2.26M. Disaster Relief Funds provided were an “improved project” category. Sleetmute was funded for the entire \$150K.

02-200 02 Interior Floods (AK-DR-1423) Declared May 29, 2002 by Gov Knowles then FEMA Declared (DR-1423) on June 26 2002: Flooding occurred in various interior and western Alaska river drainages, including the Tanana, Kuskokwim, Nushagak, Susitna and Yukon River drainages beginning on April 27, 2002 and continuing. The floods caused widespread damage to and loss of property in the Fairbanks North Star Borough (Tanana River drainage); in McGrath, Lime Village, Sleetmute, Red Devil, Crooked Creek, Aniak and Kwethluk (Kuskokwim River drainage); Ekwok and New Stuyahok (Nushagak River drainage); in the Susitna River drainage from Chase to Montana Creek; and in Emmonak (Yukon River drainage). The following conditions exist as a result of this disaster: widespread damage to public facilities and infrastructure, including damage to public airports, roads, and buildings; to public utilities, including water , sewer, and electrical utilities; to personal residences, in some areas requiring evacuation and sheltering of residents; to commercial operations; and to other public and private real and personal property. Public & Individual Assistance provided as well as the 404 Mitigation Program. Added: Gov amendment dated July 12, 2002 added Alakanuk to the State Declaration. Gov declaration dated July 12, 2002 was also made for DOTPF to access FHWA Emergency Relief Funds for damages to roads in the State. Individual Assistance totaled \$292K for 60. Public Assistance totaled \$4.42 million for 29 applicants with 55 PW's. Hazard Mitigation totaled \$725K. The total for this disaster is \$6.13 million. *(closeout data: \$5.1 million total paid out(\$3.8 mil fed and 1.3 mil state)—includes \$419,000 mitigation and \$238,000 IA/posted 7/29/08-rbs)*

03-201 Northwest Fall Sea Storm Declared October 23, 2002 - Coastal storm surge flooding occurred in communities on the Northwestern coast of Alaska commencing on October, 8, 2002. A fall sea storm with 18-20 foot seas, extremely high winds, and strong tidal action caused severe damage. This storm was caused by a low pressure system moving down from the Arctic Ocean and settling over the Chuckchi Sea and the Kotzebue Sound resulting in widespread damage and coastal flooding, including damage to public roads and other public real property. The Governor declared a disaster for the cities of Kotzebue and Kivalina in the Northwest Arctic Borough. On November 6,

2002, an amendment was made to the original declaration to include the community of Shishmaref. The Northwest Arctic Borough (NWAB) provided funds to the City of Kotzebue (\$10,000) and the City of Kivalina (\$5,000). NWAB was provided a grant to reimburse funds given to those communities. Shishmaref did not have any eligible damage or expenses. The total for this disaster is \$382K. This is only for Public Assistance totaling \$344K for 4 potential applicants with 1 PW.

03-202 Kenai Peninsula Borough Flooding (AK-DR-1445) Declared November 6, 2002 by Governor Knowles then FEMA Declared December 4, 2002. FEMA amended the Declaration to extend the incident period to December 20th—Starting October 23, 2002 through November 12, 2002, heavy rains (from three inches to fifteen inches) caused widespread damage, school closures, road washouts and stranded residents & hunters throughout the Kenai Peninsula Borough, the Kodiak Borough and the Chignik Bay area, including Chignik Lake and Chignik Lagoon. The driving rain continued for an extended time frame with multiple storm fronts. Although damages were widespread, the Kenai Peninsula Borough received the most damages. Damages in the Kenai Peninsula Borough consisted of road washouts, culvert damages, bridge damage at several locations, and private home damages caused by overflowing rivers and streams. The Kodiak Borough damages included road washouts, culvert damages, river spike damage, and damages to a pier caused by sea surge. The Four Dam Pool Power Agency received damages to their facility. The Chignik Bay area, including Chignik Lake and Chignik Lagoon damage consisted of sea surge damage to docks and piers, damage a fuel of loading facility and dump truck, damage to a bridge in Chignik, and damage to the Department of Transportation-Chignik Lagoon Airport. The Kodiak Borough and Chignik Bay area also experienced private home damages. Federal Disaster Assistance for Individual Assistance, Debris Removal, Emergency Protective Measures and all categories of Permanent Work were provided under the Public Assistance Program. FEMA also authorized 404 Hazard Mitigation funding. Individual Assistance totaled \$142K. Public Assistance totaled \$16.6 million for 26 applicants with 118 PW's. Hazard Mitigation totaled \$582K. The total for this disaster is \$17.6 million.

03-203 Denali Fault Earthquake (AK-DR-1440) Declared November 6, 2002 by Governor Knowles then FEMA Declared November 8, 2002 - A major earthquake with a preliminary magnitude of 7.9 occurred on the Denali Fault in Interior Alaska on November 3, 2002, with strong aftershocks. The earthquake caused severe & widespread damage and loss of property, and threat to life & property in the Fairbanks North Star Borough, the Denali Borough, the Matanuska-Susitna Borough, and numerous communities within the Delta Greely, Alaska Gateway, Copper River, and Yukon-Koyukuk Regional Education Attendance Areas including the cities of Tetlin, Mentasta Lake, Northway, Dot Lake, Chistochina and Tanacross, and the unincorporated communities of Slana and Tok. The areas experienced severe damage to numerous personal residences requiring evacuations and sheltering of residences; extensive damage to primary highways including the Richardson Highway, the Tok Cutoff, the Parks Highway and road links to communities including the road to Mentasta and Northway. Damage to supports for the Trans-Alaska Pipeline necessitated the shutdown of the pipeline. Additionally; fuel spills from residential storage tanks, significant damage to water, septic, sewer and electrical systems also occurred. Not all of the areas listed in the State disaster were included in the Federal Individual Assistance Program. Assistance to those areas was

thought the State Individual Assistance Program. Additionally, not all of the areas listed in the State declaration were eligible for all categories of assistance under the federal Public Assistance Program. Those areas were only eligible for Debris Removal & Emergency Protective Measures under the Federal Public Assistance Program but were eligible for all Permanent Work categories under the State public Assistance Program. FEMA also authorized 404 Mitigation funding. DOT submitted an appeal letter after funding was denied by FEMA for permanent repair of the runways at Northway and Gulkana Airports. On August 10, 2004, FEMA granted the second appeal, which awarded DOT an extra \$13.5 million to conduct the repairs. Individual Assistance totaled \$67K for 12 applicants. Public Assistance totaled \$24.8 million for 17 applicants with 53 PW's.

03-204 Southcentral Windstorm (AK-DR-1461) Declared March 28, 2003 by Governor Murkowski then FEMA declared April 26, 2003: A major windstorm with sustained and severe winds that exceeded 100 mph occurred between March 6 and March 14, 2003. The windstorm affected the Matanuska-Susitna Borough, the Municipality of Anchorage, and the Kenai Peninsula Borough. Severe damage occurred to numerous personal residences and local businesses; extensive damage occurred to public facilities (i.e. schools, libraries, community centers, airports, buildings and utilities) in the Matanuska-Susitna Borough, Municipality of Anchorage and the Kenai Peninsula Borough. Although damages were widespread, Anchorage facilities received the most damages. Federal Disaster Assistance for Debris Removal, Emergency Protective Measures and all Permanent Work categories were approved under the Public Assistance Program. FEMA also authorized 404 Mitigation funding and individual assistance under the Individual and Household Program. Individual Assistance totaled \$48K. Public Assistance totaled \$2.5 million for 24 potential applicants with 87 PW's. Hazard Mitigation totaled \$532K. The total for this disaster is \$3.47 million. *(closeout data: \$2.8 million total paid out (includes \$220,000 mitigation and \$47,600 State IA//posted 7/29/08 rbs).*

03-205 Salcha Flood 2003 State Disaster (AK-03-205) Declared May 21, 2003 by Governor Murkowski: Warm temperatures in Central Alaska triggered an ice blockage on the Tanana River. The subsequent flooding in the unincorporated community of Salcha impacted 100 homes and caused the evacuation of approximately 40 residents. Salcha is located in the jurisdictional boundaries of the Fairbanks North Star Borough (FNSB). Flooding began on April 29, 2003. Flood water continued to rise and fall through May 7, 2003 as the water volume changed and ice jams dislodged and reformed. An emergency shelter was opened by the American Red Cross at the Salcha School. The Shelter was never used because displaced residents chose to stay with family and friends. The FNSB Emergency Manager requested assistance from the State; an Emergency Management Specialist was dispatched to assist. The Civil Air Patrol was used to gather reconnaissance photos of the ice blockages and flooded area. During the incident period, a community meeting was held to listen to resident's concerns. Participants included the Commissioner for the Department of Transportation, the Commander for the Army corps of Engineers, and the Division of Emergency Management. Damages included residential homes, roads (local and state), culverts (local and state) and damage to a dike. Disaster Assistance for Debris Removal, Emergency Protective Measures and Permanent Work category C were approved under the State Public Assistance Program. No Federal Disaster

Assistance was requested. Individual assistance totaled \$118k for 43 applicants. Public Assistance totaled \$230K for 6 potential applicants with 8 PW's.

04-206 03 July Riverine Flooding (AK-04-206) Administrative Order Number 212 by Governor Murkowski-Heavy flooding during the period July 14, 2003 through August 3, 2003 caused damages to the Department of Transportation roads and bridges, local businesses and some residential homes. The Denali Borough declared a local disaster and requested assistance from the State. An Emergency Management Specialist and Assistant were sent to assess damages. The Division of Homeland Security and Emergency Management procured and provided 2000 sandbags and 24 potable water containers to the Denali Borough for emergency response. The Department of Transportation damages included areas on the Chena Hot Springs Road, the Elliot Hwy, and the Parks Hwy at Honolulu Creek and Carlo Creek. Several businesses in the affected area were damaged. The American Red Cross responded to the area but residents did not require services. The Small Business Administration provided financial counseling to local residents and businesses. The Denali Borough's request for state assistance, beyond what was provided for emergency response, was denied by the Governor. Disaster Assistance for Debris Removal, Emergency Protective Measures and Permanent Work category C were approved under the State Public Assistance Program. No Federal Disaster Assistance was requested. Total for this disaster is \$340K. There were 2 applicants and 11 PW's for Public Assistance.

04-207 03 Fall Flood (AK-04-207) Declared November 3, 2003 by Governor Murkowski-Unseasonable amount of rain during the period of September 26 through October 3, 2003 caused heavy flooding in the Lake and Peninsula Borough, the Kenai Borough and the Kodiak Island Borough. The Lake and Peninsula Borough declared a local disaster emergency. The Kenai Borough did not declare a disaster emergency but extended a letter of support for the Lake and Peninsula Borough declaration. The heavy rains resulted in localized flash flooding and some general flooding. The Department of Transportation experienced extensive damage on the Chiniak Hwy in Kodiak and to multiple locations on the Williamsport-Pile Bay road in the Lake & Peninsula Borough and the Kenai Borough. The Department of Transportation requested emergency repair funds for the Chiniak Hwy; they will use Statewide Transportation Improvement Program funds for the permanent repair. Other damage to Department of Transportation facilities included damage at Pedro Bay and South Naknek airports. The Department of Transportation used in-house and deferred maintenance funds to make repairs to the damages at the airports. The Tanalian Electric Cooperative in Port Alsworth experienced damage to overhead power lines resulting in power failures. Disaster Assistance for Emergency Protective Measures and Permanent Work category C were approved under the State Public Assistance Program. No Federal Disaster Assistance was requested. Total estimate for this disaster was \$342,136. Actual expenditure was \$235,407. This is only for Public Assistance for 2 applicants with 4 PW's.

04-208 03 Kasaan Landslide (AK-04-208) Declared January 29, 2004 by Governor Murkowski- On October 17, 2003 a stream debris basin failure caused a large landslide that damaged the City of Kasaan's potable water system. The land/debris slide caused damage to the water treatment facility by washing out the road to the water treatment plant, filled the stream

impoundment with rocks and debris, exposed a buried water transmission line, destroyed a small stringer bridge, and deposited debris around the water treatment plant preventing normal access. The City of Kasaan declared a local disaster emergency and requested State assistance. Although the water treatment plant was still operational, the repair of the system was beyond the ability of the community. The State did send a Department of Transportation hydrologic engineer to assess the damages. Emergency Protective Measures and Permanent Work-category C were approved under the State Public Assistance Program. No Federal Disaster Assistance was requested. The total for this disaster is \$443K. This is only for Public assistance for 2 applicants with 3 PW's.

04-209 03 Fall Sea Storm (AK-04-209) Declared January 29, 2004 by Governor

Murkowski - A series of sea storms with high winds and tidal surge during the period of November 1 to November 24, 2003 caused damages in the communities of Unalakleet, Diomede, and Port Heiden. Damage was also reported by the Department of Transportation. The City of Unalakleet and Port Heiden declared local emergencies and Diomede requested assistance in a letter to the Division of Homeland Security and Emergency Management. The Department of Transportation reported damages in Nome on the Nome-Counsel Road (MP 22 and 23.8) and at the Unalakleet airport. The City of Unalakleet had a large quantity of debris deposited throughout the road system. Damages to a gabion protection wall, roads and exposure of a water line were also experienced. Port Heiden experienced tidal erosion that exposed two grave sites, a power line and endangered a road. The US Air Force, under the coordination of the Division of Homeland Security and Emergency Management, addressed the issue of the two grave sites. Disaster Assistance for Emergency Protective Measures and Permanent Work category C for the City of Port Heiden, the Department of Transportation and Unalakleet, category F for Port Heiden and debris removal for Unalakleet were approved under the State Public Assistance Program. No Federal Disaster Assistance was requested. No Hazard Mitigation was applicable. The total for this disaster is approximately \$654K. This is for Public Assistance for 4 potential applicants with 5 PW's.

04-210 Interior Fires (DNR-Declared): On June 29, 2004 declaration was made for DNR to provide fire suppression activities to prevent continuing and new fires from threatening life and property. On July 1, 2004 the Fairbanks North Star Borough (FNSB), the Alaska Department of Natural Resources (DNR) and the Alaska Interagency Coordination Center (AICC) requested that the Alaska Division of Homeland Security and Emergency Services (DHS&EM) assist with evacuation of local residents threatened by growing wildfires. On July 1, 2004 the Alaska Department of Natural Resources and DHS/EM staff on scene determined that local resources, both within FNSB and the surrounding unorganized borough were becoming overwhelmed by the five major fires burning in the region. Dense smoke has limited visibility, hampered air operations in the region and prompted health warnings for residents of Interior Alaska. The funding and assistance for this disaster is administered by DNR; therefore, DHS/EM has not data on applicants or total amount of funding.

05-211 2004 Bering Strait Sea Storm declared October 28, 2004 by Governor Murkowski then FEMA declared (DR-1571) on November 15, 2004. Amended declaration to extend incident to October 24, 2004: Between October 18 and 20, 2004, a severe winter storm with strong winds and

extreme tidal surges occurred along the Western Alaska coastline, which resulted in severe damage and threat to life and property, specifically in the Bering Strait Regional Educational Attendance Area (REAA), including Elim, Nome, Koyuk, Shaktoolik, Unalakleet, and other communities; in the Northwest Arctic Borough, including Kivalina, Kotzebue, and other communities; and in the City of Mekoryuk; with potentially unidentified damages in adjacent areas, and additional storm surges likely from continuing weather patterns in this area Alaska. Conditions that exist in the coastal communities of the Northwest Arctic Borough as a result of this disaster: severe damage to roadways, power distribution systems, and drain fields. Conditions that exist in the coastal communities of the Bering Strait REAA as a result of this disaster: severe damage to gabions (used to protect shoreline), major damage to coastal highways and roads, damage to water and septic systems, damage to a bridge, damage to power distribution systems, damage to fuel storage tanks, fuel spills, and property damage. Conditions that exist in the City of Mekoryuk as a result of this disaster: major damage to sea wall and damage to roadways. On November 16, 2004, the declaration was amended to reflect a more accurate timeframe of the disaster. The City of St. George appealed the denial of funding decision for the breakwater. The appeal was granted, which increased the original estimate for total funding of this disaster by more than \$3 million. The dates of the severe storm were changed to October 18 through October 24, 2004. Individual assistance totaled \$1 million for 271 applicants. Public Assistance total \$13 million for 60 potential applicants with 125 PW's. Hazard Mitigation totaled \$800K. The total for this disaster is \$17 million.

05-212 2005 Kaktovik Winter Storm declared January 15, 2005 by Governor Murkowski Murkowski then FEMA declared (DR-1584) on March 14, 2005: Over a week-long period beginning on January 7, 2005, a severe winter storm with extremely low temperatures, 60-knot winds, and blizzard conditions enveloped the coastal city of Kaktovik, Alaska. The high winds blew down several power lines and caused the backload and subsequent shut down of the main electrical grid and generators. On January 8, 2005, approximately 60% of the city was without power. Attempts to restore power at the main power plant continued over the next day with intermittent success; however, power was lost to the entire city, including 107 homes, and the airport, by late afternoon on January 9, 2005. At 1700 hours, the North Slope Borough (NSB), which provides all public utilities for the city, notified the State Emergency Coordination Center (SECC) and Division of Homeland Security & Emergency Management (DHS&EM) that the city was in danger of city-wide freezing damage to water and sewer transmission pipelines, and requested emergency transportation of life safety repair technicians and repair equipment to the city of Kaktovik. Individual Assistance total \$85K for 63 applicants. Public Assistance totaled \$5.6 million for 6 applicants with 19 PW's. Hazard mitigation totaled \$455K. The total for this disaster is \$6.7 million.

05-213 2005 Spring Floods (AK-05-213) declared July 20, 2005 by Governor Murkowski Beginning May 13, 2005, a large ice jam blocked the mouth of the Lower Yukon River and caused widespread flooding to the cities of Emmonak and Alakanuk. In both cities, several roads were inundated and eroded by the floodwaters. Floodwaters also inundated city infrastructure to include the above-ground circulating water and vacuum sewage systems which were displaced and/or knocked off their mounting supports. Both cities have submitted local disaster declarations

requesting State assistance. There were no life safety issues during this event. Floodwaters subsequently subsided to normal levels within the river banks on or about May 18, 2005. Additionally, in the city of McGrath, beginning on May 3, 2005, ice jam flooding eroded several local roads, including Takotna Avenue and Cranberry Ridge Road, and unusually high water levels threatened city infrastructure and private homes, in the City of McGrath. The city infrastructure at risk included: the City Office building which housed the water plant, health clinic, fire station, laundromat, and State Trooper Office; the utility corridor containing power and water lines; two marine fuel headers and associated tank farms; and Federal and State offices and housing. Several private homes were cut off from emergency services due to impassable roads. Takotna Avenue is a main transportation avenue in town. The road also serves as a levee against rising river water that if breeched, would threaten a large portion of the City of McGrath. The City of McGrath signed a local disaster declaration and requested State assistance on May 13, 2005. The high water levels at McGrath receded slowly from May 14 to 18, 2005. Individual Assistance totaled \$300K for 75 applicants. Public Assistance totaled \$1.06 million for 3 applicants with 8 PW's. The total for this disaster is \$1.55 million.

06-214 2005 Bristol Bay Storm (AK-06-214) declared October 03, 2005 by Governor Murkowski: On August 23, 2005, a strong storm with high winds combined with high tides produced storm surges of 2 to 3 feet above the high tide levels and caused widespread coastal flooding in the upper Bristol Bay area. Public infrastructure, commercial property, and personal property damages were reported in the City of Clark's Point, the nearby unincorporated community of Ekuk, and the City of Togiak. Damages were also reported in Lake and Peninsula Borough, Bristol Bay Borough and the City of Dillingham. Lake and Peninsula Borough, Bristol Bay Borough and the City of Dillingham elected not to declare local disasters and are not seeking assistance. Clark's Point and Togiak have each signed local disaster declarations and are asking for state Individual Assistance and Public Assistance in response and recovery from this storm. Individual Assistance totaled \$131,890 for 39 applicants(w/admin=\$157,465). Public Assistance totaled ~~\$157K~~ (final amt was 77,111 + 29,427 admin=\$106,539)for 3 applicants and 11 PW's. The total for this disaster is ~~\$326K~~.(final total \$264,004). Administrative closeout on Jan 18, 08. Formal closeout letter to DMVA/DAS was Nov 6, 2008. (RBS, Nov 7, 008)

06-215 2005 West Coast Storm declared October 24, 2005 by Governor Murkowski then FEMA declared (DR-1618) on December 9, 2005: Beginning on September 22, 2005 and continuing through September 26, 2005, a powerful fall sea storm produced high winds combined with wind-driven tidal surges resulting in severe and widespread coastal flooding and a threat to life and property in the Northwest Arctic Borough, and numerous communities within the Bering Strait (REAA 7), the Kashunamiut (REAA 55), the Lower Yukon (REAA 32) and the Lower Kuskokwim (REAA 31) Rural Education Attendance Areas including the cities of Nome, Kivalina, Unalakleet, Golovin, Tununak, Hooper Bay, Chevak, Mekoryuk and Napakiak. The following conditions existed as a result of this disaster: sever damage to personal residences requiring evacuation and sheltering of the residents; to businesses; to drinking water systems, electrical distribution systems, local road systems, airports, seawalls, and other public infrastructure; and to individual personal and real property; necessitating emergency protective measures and temporary and permanent repairs. On

October 25, 2005, a request for a federal time extension was submitted. On December 9, 2005 a presidential disaster was declared (DR-1618) for Public Assistance for the Northwest Arctic Boro, Bering Strait REAA, Kashunamiut REAA (Chevak) and the Lower Kuskokwim REAA however, they failed to include the Lower Yukon REAA in the federal declaration. The State will write Project Worksheets for the Lower Yukon REAA under or State Public Assistance Declaration. Individual Assistance total is estimated at \$209K, with 220 applicants. Public Assistance is around \$3.63 million for 16 potential applicants with around 20 PW's. Hazard Mitigation total is \$254K. The total cost for disaster is estimated at \$5.33 million.

06-216 2005 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 severe 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 the following: Individual Assistance totaling \$500K for 52 applicants and Public Assistance totaling \$1.1 million for 14 applicants and 31 PW's. There was no hazard mitigation. Nov 21, 08 update—Closeout later to DAS total cost of \$1,684,311 (included \$183,088 for IA, plus IA Admin of \$35,748, PA Grantee admin of \$133,779, and subgrantee admin allowance of \$30,290.) Lapse to DRF was \$183,586. RBS-11/28/08.

06-217 2006 South Central Storm (AK-06-217) declared March 13, 2006 by Governor Murkowski:

Beginning on February 5, 2006 and continuing through February 11, 2006, a series of strong winter storms with high winds, heavy snow, and freezing rain occurred in the City of Seward and surrounding areas of the Kenai Peninsula Borough in South Central Alaska, causing avalanches that severely damaged power lines and other infrastructures, blocked roads, and threatened further damages. As a result of the disaster, there was severe damage to power transmission and distribution lines supplying the City of Seward and surrounding areas; disruption of normal power supply requiring the prolonged use of emergency backup generators with extraordinary expensive operation costs; and damage and threat to public and private property as a result of power disruption. On March 13, 2006, a letter was submitted to request a federal time extension of 30 days. As of 3/20/06, the decision is pending. Decision made not to seek Federal assistance. Current estimated cost for repairs is \$1,254,730; however, this does not include the ongoing cost of line repair. No federal declaration was sought; therefore, the State is limited to public assistance only (no HM or IA). As of 3/20/06, only the City of Seward and Sealife Center are applicants. Disaster administratively closed out and letter sent to applicants on 6/29/07. (7 Nov 08 update)--Formal closeout letter to DMVA/DAS was dated 6 Nov 08 (funds authorized = \$1,465,321; funds expended = \$1,306,509.72; funds lapsed to DFR = \$158,811.28. (7Nov08, R.B.Stewart)

06-218 2006 Spring Floods (AK-06-218) declared June 27, 2006 by Governor Murkowski then FEMA declared (DR-1657) on August 04, 2006: Beginning May 5, 2006 continuing through May 30, 2006, the National Weather Service (NWS) issued flooding warnings and watches across the state as excessive snowmelt and ice jams caused flooding along the Yukon, Kuskokwim, and Koyukuk river drainages. The most serious impacts were reported in the communities of Hughes, Koyukuk, Kwethluk, Alakanuk, and Emmonak, along with substantial damage to State-maintained airports, roads, and highways. In each community, large portions of the village, city infrastructure, and several roads were inundated and eroded by the floodwaters. Total eligible state damages (item V.C. Remaining Costs, \$6,704,370) less ineligible repairs for Federal-Aid roads (\$469,600), less IA funds (\$485,000), less ERFO road costs (\$240,500) still leaves approximately \$5,509,270 that may be eligible under FEMA's Public Assistance program.

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

07-219 2006 Hooper Bay Fire (AK-07-219) declared August 6, 2006 by Governor Murkowski then FEMA declared (DR-1666) on October 27, 2006: Beginning on August 3, 2006 and continuing through August 4, 2006, the Second Class City of Hooper Bay, Alaska sustained severe losses and threats to life and property from a community structure fire that has destroyed the elementary school, the high school, school support facilities, and 14 homes. As a result of this disaster the homes and personal property of 17 families consisting of 66 people are lost and 400 students do not have educational facilities. There are also potential water contamination and air quality issues. The eligible damage estimate is \$10 million.

07-221 2006 October Southern Alaska Storm (AK-07-221) declared October 14, 2006 by Governor Murkowski FEMA declared (DR-1669) on December 8, 2006: Beginning on October 8, 2006 and continuing through October 13, 2006, a strong large area of low pressure that developed in the Northern Pacific and moved into the Southwest area of the state, produced hurricane force winds throughout much of the state and heavy rains in the Southcentral and Northern Gulf coast areas, which resulted in severe flooding and wind damage and threats to life in the Southern part of the state, to include the Kenai Peninsula Borough including the Cities of Seward and Seldovia, the Chugach Rural Education Area including the City of Cordova and the City of Valdez, and the Copper River Rural Education Area including the Richardson Highway to the Glenallen and highways and drainages in the McCarthy areas. Initial total damages are estimated at \$557,415 with a public assistance estimate of \$456,855. Federal declaration was made December 2006

including assistance for Public Assistance and Hazard Mitigation but not including Individual Assistance. Revised State of Alaska Cost estimates are \$1,265,000 in Individual Assistance and \$38,241,826 in Public Assistance for a total cost of \$39,506,826. There is \$26,825,918 available from the Federal Highway Administration leaving a requested amount of \$13,948,999. A total of 10 individuals or households applied for assistance through the State's IA Temporary Housing program. Six eligible applicants received a total of \$93,611.21 for home replacement, major repair and mitigation, and/or for temporary housing accommodations. Each TH applicant involved extensive case management. The temporary housing program closed 3/10/2008.

07-22- 2006 October Kivalina Storm, Administrative Order #231, issued November 19, 2006 by Governor Frank H. Murkowski: October 11, 2006 through October 13, 2006 a fall sea storm with sustained high surf and storm surge caused severe wave damage and coastal erosion in the City of Kivalina. Through local declarations on October 19, 2006 the Northwest Arctic Borough and the City of Kivalina requested assistance to repair the seawall and protect community infrastructure. The Alaska village Electric Cooperative also requested state disaster emergency. In accordance with AS 26.23.020(h) assistance from the disaster relief fund was found appropriate by Governor Murkowski to cover eligible emergency response costs and emergency protective measures. Permanent repairs to or replacement of the seawall were not found to be appropriate for funding. The amount of funding was not to exceed \$235,000 including administrative fees. Governor Murkowski also directed the Department of Commerce, Community, and Economic Development (consistent with AO#175) to coordinate with other state and federal agencies to propose long-term solutions to the ongoing erosion issues in Kivalina and other coastal communities in the state of Alaska.

07-223 2007 January Kenai Ice Jam Flood, AK-07-223, issued March 02, 2007 by Governor Sarah Palin: Beginning on January 25 and continuing through February 4, 2007, Skilak glacier-dammed lake breached releasing a four-foot high surge of water into the Kenai River that ultimately dislodged river ice, moved the ice rafts downriver and created ice jams at various points along the river. These ice rafts, some up to 4 feet thick and weighing several tons destroyed or damaged public and private riverbank fishing platforms, stairs, and elevated walkways as they moved downriver. Where ice jams formed, the water and ice rafts overtopped the riverbanks (some up to 15 feet high) and flooded several public campgrounds, fishing parks, and residential homes from the community of Sterling to the City of Soldotna, within the Kenai Peninsula Borough. Approximately 150 homes and riverside businesses in the City of Soldotna and in the Big Eddy, Poacher's Cove, and River Quest portions of the Kenai Borough reported damage to their buildings, fishing structures, and/or docks; another 775 home properties within the borough were also impacted by floodwaters or ice. Some of the damaged fishing platforms were specially designed for handicap access. A voluntary evacuation program was instituted in several areas. Some roads were inundated and impassable due to high water. Ice jams also threatened the temporary highway bridge at Soldotna when the water level rose to 20 feet; however, the water dropped before damage could occur to the bridge or embankment. Preceding the flooding, the National Weather Service issued flood warnings, watches and advisories.

Confirmed damages occurred along the Kenai River in the Kenai Peninsula Borough, especially in the area of the City of Soldotna. Public infrastructure, commercial property, and personal property damages were reported in the metropolitan areas and the borough. The Division of Homeland Security and Emergency Management (DHS&EM) has received local disaster declarations from the City of Soldotna through the Kenai Peninsula Borough, requesting State disaster assistance; and from the Kenai Peninsula Borough, dated Feb 13, 2007, expanding the event date through February 5 and expanding the impacted area to include from Skilak Lake to the mouth of the Kenai River into the Cook Inlet. Due to the severity of the initial damage reports, the Governor inspected the flooding damage on February 3, 2007.

08-224 2007 Beaver Generator Fire, AK-08-224, issued September 14, 2007 by Governor Sarah

Palin: On July 29, 2007, during the installation of a new generator in the Beaver Village power plant, a welding spark ignited a fire that completely engulfed and consumed the power plant. The building and all of its contents including the new generator and two backup generators were completely destroyed. The Beaver Village Council had used Legislative Grant funding to purchase the new generator and hired Marsh Creek LLC to install the new generator. An employee of the contractor installing the generator was welding in the building at the time of the fire.

On August 6, 2007, The Division of Homeland Security & Emergency Management (DHS&EM) received a local disaster declaration and request from First Chief of the Beaver Village Council, Selina Petruska seeking State assistance in replacing the Power Plant Building and power generating facilities before the onset of winter.

08-225 2007 Kivalina Storm Admin Order # 239 issued by Governor Palin on January 22, 2008:

On September 12 and 13, 2007, a low pressure system from the Bering Sea generated storm conditions and coastal flood warnings for communities along the Chukchi Sea coast, including the Cities of Kivalina, Shishmaref, and Point Hope. Substantial coastal erosion by high winds, storm surge, and high waves generated by the storm further damaged the existing sea wall adjacent to the Alaska Village Electric Corporation (AVEC) bulk fuel facility. The Northwest Arctic Borough (NWAB) sent a disaster declaration to the Division of Homeland Security and Emergency Management (DHS&EM) on September 25 that included AVEC's response and tank farm relocation costs.

09-226 2008 Tanana Basin Flooding (AK-09-226) declared August 4, 2008 by Governor Palin then FEMA declared (DR-1796) on September 26, 2008:

Beginning on July 27, 2008 through August 6, 2008, a strong large area of low pressure developed in the Beaufort Sea near the northern border of the state, bringing a series of storms that moved from the northwest coast into the interior. These severe storms caused losses of property and threats to life and property in the Fairbanks North Star Borough, the North Slope Borough including the cities of Wainwright and Kaktovik, the Yukon-Koyukuk Regional Educational Attendance Area (REAA) including the City of Nenana, and the Denali Borough. The preliminary life safety assessments and joint preliminary damage assessments with FEMA indicated the most severe impacts were to highways, roads, buildings, sea walls, runways, water, sewer, and electric utilities, homes, and businesses.

The City of Nenana, suffered major damages to lift stations which are critical to the city sewer system. All of the lift stations serving the City of Nenana were either operating at reduced capacity or completely inoperable, placing the city at increased risk for public health hazards. The City of Nenana, Nenana City School District and Nenana Native Tribal Council all experienced significant impacts to buildings and/or equipment requiring major repairs or total replacement.

The Fairbanks North Star Borough (FNSB) experienced damages to local roads and flood waters caused many homes and businesses to be inaccessible.

Golden Valley Electric Association's supply routes in the borough were impacted, leaving some residents without power for several days.

The North Slope Borough suffered extensive damages to its sea-wall located in Wainwright leaving the community susceptible to severe flooding associated with fall sea storms which typically occur this time of year. The North Slope Borough also experienced major damages to the seawall and runway located in Kaktovik preventing complete use of the runway by larger aircraft, which normally supply food and other essential items to the community.

The Denali Borough experienced damages to local roads and bridges preventing access to homes, requiring transient accommodations until access could be re-established.

The Department of Transportation and Public Facilities (DOT&PF), Department of Natural Resources (DNR), and the Alaska Rail Road Corporation (ARRC) suffered damages to their facilities as a direct result of this event. DOT&PF damages were limited to roads located within the FNSB and to some equipment and supplies in Nenana. DNR damages were also restricted to locations within the FNSB and consisted of damages to roads and recreational areas. ARRC damages were more extensive requiring total shutdown of all northbound freight and passenger service due to track failures in Nenana and in the Healy Canyon in the Denali Borough.

09-227, 2009 Spring Flood declared by Governor Palin on May 6, 2009 then FEMA declared under DR-1843 on June 11, 2009: Extensive widespread flooding due to snow melt and destructive river ice jams caused by rapid spring warming combined with excessive snow pack and river ice thickness beginning April 28, 2009 and continuing. The ice jams and resultant water backup along with flood waters from snow melt left a path of destruction along 3,000 miles of interior rivers, destroying the Native Village of Eagle and forcing the evacuation of multiple communities. The following jurisdictions and communities in Alaska have been impacted: Alaska Gateway Rural Regional Educational Attendance Area (REAA) including the City of Eagle and Village of Eagle; the Copper River REAA including the Village Community of Chisotchina; the Matanuska-Susitna Borough; the Yukon Flats REAA including the City Community of Circle, and City of Fort Yukon, the Villages Communities of Chalkyistik, Beaver, Stevens Village, and Rampart; the Yukon-Koyukuk REAA including the Cities of Tanana, Ruby, Galena, Koyukuk, Nulato, and Kaltag; the Iditarod Area REAA including the Cities of McGrath, Grayling, Anvik, and Holy Cross; the Northwest Arctic Borough including the Cities of Kobuk, and Buckland; the Lower Yukon REAA including the Cities of Russian

Mission, Marshall, Saint Mary's, Mountain Village, Emmonak, Alakanuk and Pilot Station and the Community of Ohogamiut; the Lower Kuskokwim REAA including the Cities of Bethel, Kwethluk, Napakiak, Napaskiak, and the Village Community of Oscarville; the Yupiit REAA including the City of Akiak, and the Villages of Akiachak, and Tuluksak; the Kuspuk REAA including the Cities of Aniak, Upper Kalskag, Lower Kalskag, and the Villages Communities of Stony River, Sleetmute, Red Devil, Crooked Creek, and Napaimute; the Fairbanks North Star Borough including the City of North Pole and Community of Salcha; the Bering Strait REAA including the City of Nome area.

09-228, Pelican Admin Order (AO # 259) signed by Governor Parnell on September 29, 2009:

Beginning on August 16, 2009, the City of Pelican, Alaska experienced an extreme rainfall event with approximately 10 inches of rain over a 48-hour period. The event caused severe flooding that overwhelmed and weakened the primary water supply flume for the Pelican hydroelectric and the drinking water supply systems. Excessive debris entered the dam's water intake, caused several breaks in the water distribution system, and clogged supply lines. Four days later, approximately 30 feet of the flume collapsed disrupting the water supply to the community.

The reservoir, flume, and distribution systems are shared infrastructure between the City of Pelican and the Pelican Utility District (PUD). The City of Pelican water utility provides drinking water for community residents and cooling water for the refrigeration system at the Pelican Seafood fish-processing facility. The Pelican Seafood facility is now abandoned; however, cooling water is still supplied to the facility to maintain the freezers. PUD uses the same infrastructure to generate hydroelectric power for the community.

09-229, 2009 October Kodiak Storms declared by Governor Sean Parnell on November 5, 2009 then FEMA declared on December 18, 2009 (DR-1865):

Beginning on October 9, 2009 and continuing, the Kodiak Island Borough, Kodiak, Alaska experienced a series of storms producing extreme rainfall within the Borough. Within 24-hours, the precipitation reached approximately 6.4 inches. On October 21, 2009 the Borough experienced another significant rainfall of 5.5 inches causing additional road failures and closures. The event caused severe rock/mudslides, road washout/sloughing, and flooding. Excessive debris clogged several culverts causing the water to flow over the roads and wash them out in several locations. Alaska Department of Transportation (DOT) closed roads and the airport. The hydroelectric plant was closed due to flooding; necessitating the use of the diesel generators in order to supply power to the community.

09-230, 2009 Seward Storm Surge declared by Governor Parnell on December 31, 2009:

On December 1, 2009 the City of Seward experienced a winter storm event that caused damage to the shoreline and an important roadway within the community. High winds, 3 plus inches of rainfall, and a 12.6 foot tide, caused extensive damage to the wave barrier along Lowell Point Road, the Seward Greenbelt area and the seawall at the Alaska Sea Life Center.

10-231, 2010 July Interior Flooding declared by Governor Parnell on July 26, 2010:

Beginning on July 10, 2010 and continuing through at least July 13, 2010, heavy rainfall through the Upper Tanana and Yukon River Basins caused severe flooding along several creeks along the Taylor Highway, Nabesna Road and the Alaska Highway. The damages are located within the Alaska

Gateway Rural Education Attendance Area (REAA 3) and the Copper River Rural Education Attendance Area (REAA 11). There are no official jurisdictions in the areas.

Heavily damaged areas are primarily between MP 64 near Chicken MP 160 in Eagle. Damages include: landslides, washouts, erosion and bridge abutment and culvert damage. Minor damages are flood related on the Tok Cutoff at MP 123 and the Alaska Highway at MP 164.

11-232, 2010 Savoonga Power Outage declared by Governor Parnell on January 14, 2011: Beginning on December 26, 2010 and continuing through January 6, 2011, a severe winter storm with extremely low temperatures, 60 mph winds, wind chills to minus 50 degrees Fahrenheit, and blizzard conditions enveloped the coastal city of Savoonga, Alaska. The severe weather blew ice-laden transmission lines together and the resulting arcing shorted out the electrical system causing a community-wide power outage.

Approximately 60% of the city was without power including several public buildings, the ANICA store, health clinic, fire hall, the airport runway lighting and telecommunication systems, and most of approximately 160 private homes. On December 27, the Mayor of Savoonga notified the Governor's Office that the city was out of power and in danger of city-wide freezing damage to water and sewer transmission pipelines, and requested assistance. The outage caused water and sewer lines in several buildings and private homes to freeze requiring the evacuation and sheltering of up to 147 of the city's 721 residents (over 20% of the population) for six days. As a result of the freezing temperatures and/or warming after power and heat were restored, the frozen lines ruptured and flooded the interior of several buildings.

11-233, 2011 Spring Flooding declared by Governor Parnell on May 17, 2011 then FEMA declared on June 10, 2011 (DR-1992): Beginning on May 8, 2011 and continuing through May 9, 2011, the Villages of Red Devil and Crooked Creek sustained flooding because of an ice jam that formed on the Kuskokwim River, which resulted in 54 residents being evacuated and extensive damage to homes and public infrastructure. A total of 15 homes were destroyed or otherwise not habitable. Middle Kuskokwim Electric Cooperative sustained approximately \$80,000 in damages to the electrical power distribution infrastructure.

Labor Support of Volunteers (PW not written)- \$50,000.00

Bus Barn cleaning

Porta-Potty Maintenance

Washeteria agreement

Phone Line for SP

Labor, equipment and fuel for building material movement and staging

Equipment Support of Volunteers (PW not written)- \$20,000.00

Fuel and maintenance costs for CCTC equipment to build housing pads

Power extension to home sites (PW not written) - \$25,000.00

Current as of 2/17/16 - A Cavallo

Road repair necessary due to damage from heavy equipment usage (PW not written) - \$20,000.00

School utilization in support of volunteers (PW not written) - \$25,000.00

Bus Barn for sleeping/storage

Cooking/feeding of volunteers

12-234, 2011 Birch Creek Fire declared by Governor Parnell on August 9, 2011: On May 26, 2011 the tribal office building in Birch Creek caught fire. The fire spread and destroyed the community's power plant, tribal office, potable watering point, and telephone building. On June 2, 2011, The Division of Homeland Security & Emergency Management (DHS&EM) received a local disaster declaration and request from the Tribe seeking State disaster assistance for emergency protective measures, temporary and permanent repairs to village infrastructure, and technical and funding assistance needed to repair or replace damaged facilities. Since the fire, temporary power has been restored to the village. Alaska Energy Authority (AEA) has delivered and installed a 28kw generator at the old school that is providing power for the community. A satellite telephone was provided to the community as United Utilities attempts to restore some local and long distance telephone service. Arctic Resources Group, LLC, and Tanana Chiefs Conference Division of Environmental Health have provided bottled water for the community, and are working on a temporary water source.

12-235, 2011 Dot Lake Fire declared by Governor Parnell on October 4, 2011: At approximately 11:00 PM, August 28, 2011, a fire at the village utility building occurred. Local efforts to suppress the fire with available equipment were unsuccessful and the entire building and its contents were destroyed. The building housed the local washeteria and showers. The facility also provided water and heat for several home homes in the community through an underground utilidor and is utilized as a watering point for other residents in the area. Due to the fire, electrical power has been lost to the local community building and the clinic. Six families are without water and five families are without adequate heat. Two families have Toyo stoves and two families have wood stoves as back up, these backup systems will not prevent their water lines from freezing nor is there any method of preventing the water lines in the underground system from freezing. This facility served 55 people in Dot Lake Village and the immediate area.

12-236, 2011 West Coast Storm declared by Governor Parnell on December 5, 2011 then FEMA declared December 22, 2011 (DR-4050): On November 7, 2011 the National Weather Service (NWS) issued the first of several coastal flood warnings for the western coastline of Alaska from Hooper Bay to the North Slope. The NWS warned of "*a rapidly intensifying storm...expected to be an extremely powerful and dangerous storm...one of the worst on record.*" Over the next three days additional warnings in response to the 942 millibar low pressure system were issued for coastal villages as the storm moved northerly from the Aleutian Islands into the Bering and Chukchi Seas. The west coast was impacted with hurricane force winds exceeding 85 mph, high tidal ranges, and strong sea surges up to 10-ft above mean sea level (msl). Before the first storm had passed, a second equally-low pressure system (e.g., 942 millibar) impacted the western coastline from the Yukon-Kuskokwim Delta south to Bristol Bay. This combined weather extended the incident period for the state to

November 13, 2011. The FEMA declaration was limited to the incident period from November 8 – 10, 2011.

12-237, 2011 Kenai Peninsula Windstorm declared by Governor Parnell on December 12, 2011 then FEMA declared February 2, 2012 (DR-4054): On November 1, 12, and 15, 2011, a series of major windstorms caused widespread power outages threatening life and property. Power was disrupted to 17,300 homes and businesses. Local utilities, Homer Electric Association (HEA) and Chugach Electric employed several work crews to restore power to the area. Public Infrastructure, commercial property, and personal property damages were reported in the metropolitan areas and throughout the borough. DHS&EM received local declarations from the Kenai Peninsula Borough (KPB) requesting state disaster assistance to cover immediate response, public and individual costs and from the City of Seward through the KPB requesting State assistance.

12-238, 2012 Prince William Sound Winter Storm declared by Governor Parnell on February 9, 2012: Beginning in mid December, 2011 and continuing through January 2012, the City of Cordova and Prince William Sound area began receiving snowfall that put them on a pace to approach or break record seasonal precipitation accumulations. On December 12, the City of Cordova began working in emergency snow removal status. The Cities of Valdez and Yakutat had been facing similar challenges. Avalanches across roadways and extreme conditions have limited or cut off access to airports and other critical infrastructure and endangered public, private and commercial facilities throughout the communities.

12-239, Kivalina Water Issue declared by Governor Parnell on September 7, 2012: On August 13th, a week of record rainfall began in Kivalina which resulted in record flows on the Wulik River. The high water washed several sections of the surface water piping into the river and overtopped the City's landfill, washing landfill debris into the community. The City of Kivalina and NWAB declared a disaster emergency to make repairs "to the water and landfill infrastructure" and "technical assistance and funding to evaluate damage and perform needed repairs".

12-240, 2012 September Storm declared by Governor Parnell on October 17, 2012 then FEMA declared November 27, 2012 (DR-4094): Beginning on September 4, 2012, and continuing, a strong weather system produced high winds and heavy rains, resulting in severe and widespread wind damage and flooding throughout much of South-central and Interior Alaska. The series of storms created a threat to life and property in the Matanuska-Susitna Borough, Kenai Peninsula Borough, Alaska Gateway Regional Educational Attendance Area (REAA), and the Chugach area. The magnitude of the storm resulted in wind damages and flooding which necessitated debris clearance, emergency protective measures, damage to public facilities including roads, bridges, railroad, electrical distribution and water systems; and damage to private residences to include losses of personal property.

12-241, 2012 October Kuskokwim Delta Flood declared by Governor Parnell on November 26, 2012:

On October 5, 2012, a strong Fall storm moved north into the Bering Sea and produced severe winds, heavy rain, and storm surges up to 4 feet above mean tide levels in the Kuskokwim Delta, with severe impact to the Native Village of Napaskiak. The impact of the storm resulted in floodwaters surrounding the tribal-owned maintenance garage undermining and shifting the building and foundation; damage to the driveway ramp to the maintenance yard; and substantial damage to community boardwalks.

13-242, 2013 Spring Floods declared by Governor Parnell on May 30, 2013 then FEMA declared on June 25, 2013 (DR-4122): Beginning on May 17, through June 10 2013, excessive snow pack and ice thickness, combined with rapid spring warming caused ice jams and severe flooding. The following jurisdictions and communities in Alaska have been impacted: Alaska Gateway Rural Regional Educational Attendance Area (REAA) including the City and Village of Eagle; the Copper River REAA including the Village Communities of Chisotchina and Gulkana; the Yukon Flats REAA including the Community of Circle, and City of Fort Yukon; the Yukon-Koyukuk REAA including the Cities of Galena; the Lower Yukon REAA including the Cities of Emmonak and Alakanuk. The impact of the flooding resulted in severe damage to approximately 194 homes (requiring evacuations and sheltering) to include loss and damage to personal property, multiple businesses (including loss of revenue), and public infrastructure to include: hazardous and non-hazardous debris removal, emergency protective measures (leading to ongoing mass care operations), damage to city and state roads, bridges, water and sewer systems, electrical generation and distribution systems, recreation areas and fuel storage facilities.

13-F-243, 2013 October KPB Flood Disaster declared by Governor Parnell on November 18, 2013 then FEMA declared January 16, 2014 (DR-4161): Beginning October 27, 2013, the Kenai Peninsula received substantial amounts of rain following several weather systems that had previously inundated low-lying areas. On October 26, the National Weather Service issued a flood watch for areas around Western Prince William Sound due to a slow moving system which brought widespread rainfall to the mainland. The forecast was calling for local amounts in excess of 5 inches of rain. Seward, Homer, and other areas of the Kenai Peninsula received heavy rain and flooding which caused landslides, bridge, and airport and road closures. Damages were reported in Seward, Homer, Kenai, Anchor Point, and the Tyonek area along Beluga Road. Flood damages affecting many individual homes were reported and several businesses were also impacted. Disaster Declarations were received from the Kenai Peninsula Borough and the City of Seward on October 29, 2013.

13-S-244, 2013 November Storm Disaster declared by Governor Parnell on November 16, 2013 then FEMA declared January 23, 2014 (DR-4162): On November 5, 2013 the National Weather Service (NWS) issued the first of several coastal flood and winter storm warnings ranging from the central Aleutians to and including the western coastline of Alaska from Bristol Bay to the North Slope. In their published message the NWS warned of very strong low pressure system south of Shemya, moving to the central Bering and Chukchi Sea's bringing a combination of gale, high surf, high wind, freezing spray, coastal flooding and sea surge warnings and watches. The west coast was impacted with hurricane force winds exceeding 85 mph, high tidal ranges, and strong sea surges.

The resultant impact culminated to, damage to public facilities including roads, seawalls, bridges, airports, and public buildings; damage to electrical distribution systems and drinking water systems; damages to private residences and the losses of personal and real property; and coastal flooding and power outages which necessitated evacuation and sheltering operations. Overall, the series of storms created a threat to life and property in 23 cities and villages in the Bering Strait Regional Educational Attendance Area (REAA), Lower Yukon REAA, and Lower Kuskokwim REAA, and the Fairbanks North Star Borough.

13-Z-245, 2013 December Kwethluk Power Outage, Administrative Order # 267 signed by Governor Parnell on December 27, 2013: On December 12, 2013, the City of Kwethluk suffered a power system failure after its two main generators failed due to extreme cold winter temperatures approaching negative 15 degrees Fahrenheit. The City rationed power using a single small auxiliary generator, which restored limited power to all but 12 structures in the community. Upon request, the Alaska Energy Authority (AEA) provided technical assistance to remotely repair the system. After several unsuccessful attempts, it was determined the damage to the system was too severe to affect remote repairs. AEA contacted the State Emergency Operations Center (SEOC) for emergency authorization to deploy electrical workers and supplies to the City to affect repairs and also to avoid further damage to the power system and other infrastructure in the community.

13-Z-246, 2013 December Diomedes Power Issues, Administrative Order # 268 signed by Governor Parnell on December 27, 2013: On December 18, 2013, the City of Diomedes suffered a complete power system failure after the last of three generators failed due to extreme cold winter temperatures approaching negative 15 degrees Fahrenheit. Due to a lack of a community power plant operator, the City requested technical assistance from the Alaska Energy Authority (AEA) to instruct the mayor to restart one of the three generators. After the mayor restarted one of the generators, the limping generator continued to have distribution and cooling problems. AEA continued to provide remote assistance however, they were not able to stabilize the generators and restore full power to the community. After several unsuccessful attempts, it was determined the damage to the system was too severe to affect remote repairs. AEA contacted the State Emergency Operations Center (SEOC) for emergency authorization to deploy electrical workers and supplies to the City to affect repairs and to avoid further damage to the power system and other infrastructure in the community.

AK-15-247, 2015 Alatna Washeteria Fire declared by Governor Walker on April 25, 2015: On the morning of 15 April, 2015, the Multi-Purpose Building in Alatna caught fire in the boiler room. The building houses the water treatment facility, Washeteria, and clinic. The fire was extinguished, but not before it caused substantial damage to the water treatment facility and heating components, rendering both inoperable. The Washeteria and clinic sustained substantial smoke damage. Extensive damage to the electrical wiring in the Multi-Purpose Building has been reported and the entire building is without power. Damage to the water treatment facility has cut off the supply of potable water to the village. The cause of the fire is unknown at this time. Currently, village residents are able to drive across the Koyukuk River to Allakaket, five miles away on the other bank, and access potable water and the clinic; however, this option will not be viable for long as break-up is imminent.

AK-15-248, 2015 North Slope Borough Flooding declared by Governor Walker on May 21, 2015:

Beginning the week of March 13, 2015, the Sagavanirktok (Sag) River near the Dalton Highway began overflowing the highway between Mile 390 and Mile 405, reaching up to 30 inches above road level in several areas. This flooding continued for over a month disrupting normal traffic and commerce between Fairbanks and the petroleum facilities on the North Slope near Deadhorse. On April 7, Governor Walker declared a disaster for the Alaska Department of Transportation and Public Facilities (DOT&PF) for their emergency protective measures to reopen and repair the highway.

After two weeks of record-high temperatures accelerated spring snow melt in the Brooks Range, the additional runoff overflowed the Sag, Kuparuk and Colville rivers, causing additional flooding along Mile 335 to Mile 415 of the Dalton Highway, Deadhorse Airport and nearby facilities. The flooding has severely impacted and damaged highway infrastructure, including the road surface, embankments, and drainage structures; as well as restricted or prohibited travel, causing economic hardship to local regional and international business; and created an urgent need for immediate road repairs and flow diversion efforts to alleviate future threats to that infrastructure.

AK-15-249, 2015 Sockeye Wildfire declared by Governor Walker on June 15, 2015:

Beginning on June 14, 2015 and continuing, a large urban interface wildfire exacerbated by record high temperatures caused widespread damage to the community of Willow and surrounding areas of the Matanuska Susitna Borough. The response to the wildfire is hampered by red flag warnings for record warm temperatures, strong winds, low humidity, and dry thunderstorms this month that affects the entire central portion of the state, including the Matanuska Susitna Borough. The wildfire has damaged or destroyed at least 50 private homes and/or secondary structures and damaged several more, and resulted in 175 residents seeking refuge in temporary shelters, although these numbers are expected to rise. The following conditions exist as a result of this disaster: a robust emergency response and management operation requiring substantial additional labor, equipment, and support costs to combat the fire; activation of the emergency operations center; damage or destruction of at least 50 homes and other structures; evacuation and sheltering of 175 residents and hundreds of pets/work animals to date; severe damage to personal and real property; disruption of power, natural gas, communications, and other utility infrastructure requiring temporary and permanent repairs.

AK-15-250, 2015 Kenai Wildfire declared by Governor Walker on June 19, 2015:

Beginning on June 15, 2015 a series of wildfires have occurred in the Kenai Peninsula Borough as a result of prolonged hot, dry weather and human error. The most significant of these is the Card Street Wildfire which began on June 15 and damaged 11 buildings in Sterling, including 3 primary residences. The fire moved away from residences into the Kenai Wildlife Refuge but is not yet fully contained. The Alaska Division of Forestry, local firefighters, and national wildland firefighter teams are currently working to gain control of the Card Street fire and numerous other fires within the Borough. A federal Fire Management Grant (FMAG) has been authorized to assist in the cost of suppression. The SEOC has been fully activated to support firefighting efforts. In addition, the AK National Guard and DOD are providing fire suppression support with troop and resource deployments as well as supporting SEOC operations.

AK-15-251, 2015 Summer Alaska Wildfires declared by Governor Walker on June 26, 2015:

Beginning on June 14, 2015 and continuing, wildland fires have impacted multiple communities throughout the state requiring emergency response, evacuations, and sheltering. Due to ongoing fire growth and new fire starts, the number of communities that will be impacted or threatened and the extent of community fire damage is unknown. Current and forecasted weather including warm temperatures, strong winds, low humidity, and dry thunderstorms indicate a continued wildland fire threat to the state. The following conditions exist as a result of this disaster: a robust emergency response and management operation requiring substantial additional labor, equipment, and support costs to combat the fire; activation of the emergency operations center; evacuation and sheltering of over 200 residents from five different communities.

AK-15-252, 2015 Fort Yukon Flooding declared by Governor Walker on June 26, 2015: Warmer than normal temperatures in mid-May caused rapid snowmelt in the highlands of northeastern Alaska causing a corresponding rise in runoff in the Yukon and Porcupine Rivers. On May 19, the National Weather Service (NWS) issued a flood advisory for the Fort Yukon area due to rising water levels in the upper portions of the Porcupine River. By May 20, the water levels in the Porcupine River had risen to bank full in some locations and low-lying areas and roads near the main channel were inundated with up to two feet of water. Water levels in Fort Yukon remained high for about a week. After the water levels receded, the City of Fort Yukon began a damage assessment of the area and discovered flood-related damage to three roads, and the embankment of the sewage lagoon. The following information provides a more detailed view of the damages incurred by the event: Flood waters caused sloughing and erosion to all of the outside sections of the constructed sewage lagoon. This weakens and greatly undermines the integrity of the outside berms. The Landfill Road was flooded and has washed out sections; culverts are plugged with grave, mud and debris. The Gravel Pit Road has several washed out sections; culverts are plugged with grave, mud and debris. The Airport Access Road which is owned and maintained by DOT&PF Northern Region has several washed out sections; culverts are plugged with grave, mud and debris.

AK-15-253, 2015 Dalton Highway Flooding declared by Governor Walker on April 7, 2015:

Beginning on March 13, 2015 and continuing, the Sagavanirktok (Sag) River experienced a major ice jam that resulted in unprecedented flooding between Mile 390 and 415 of the Dalton Highway about 25 to 30 miles south of Deadhorse. Road clearing and overflow diversion work has been ongoing since mid-March, and was hampered by very cold temperatures, high winds, and low- to no-visibility conditions. The flooding and emergency work have disrupted normal commercial and private traffic along the Dalton Highway, including critical fuel shipments to the petroleum production and distribution facilities at Deadhorse. The flooding has severely impacted and damaged highway infrastructure, including the road surface, embankments, and drainage structures; has restricted or prohibited travel, causing economic hardship to local regional and international business; and has created an urgent need for immediate road repairs and flow diversion efforts to alleviate future threats to that infrastructure. The Department of Transportation and Public Facilities (DOT&PF) requires this State Disaster Declaration to

request Federal Highway Administration (FHWA) funding. Additionally, the Declaration waives State permitting necessary for response and repair activities for the 30-day emergency period of the declaration. If response and recovery efforts require permit waivers beyond this period a disaster declaration extension will be required. Per AS 26.23 .202(c) an extension requires approval by the Legislature through a concurrent resolution

AK-15-254, 2015 August Southeast Raines declared by Governor Walker on August 27, 2015:

Commencing on August 14, 2015, the City and Borough of Sitka received almost three inches of rain in six hours. This intense rainfall was accompanied by heavy wind and came on the heels of an unusually wet summer. Due to ground saturation and the wind, the hillsides within the borough failed resulting in **three deaths**, seven landslides and a sinkhole. The landslides and heavy rain, damaged homes, roads, and other infrastructure. The City and Borough of Sitka, along with state staff and contracted engineers, are monitoring slope stability to ensure safety of search and rescue and assessment efforts. On August 18, the City and Borough of Sitka declared a local disaster and requested state assistance. They have been fully engaged in debris removal operations since August 19th. After the failure of the slope on August 18, the Borough activated and staffed an emergency operations center to coordinate the response efforts and provide guidance to first responders, with utility and engineering specialists conducting body recovery as well as evaluating the slopes and affected residential areas.

AK-15-255, 2015 August North Slope Borough Sea Storm declared by Governor Walker on October 14, 2015 then FEMA declared on October 30, 2015 (DR-4244):

Beginning the week of August 27, 2015, a strong arctic coastal sea storm along the Northern Arctic Coast produced high waves and accelerated beach erosion that redeposited much of this beach gravel atop seven miles of borough roads, as well as loss of material along road surfaces and embankments. There is also reported damage to portions of the community water and sewer infrastructure that services both residential and commercial areas within Barrow in the North Slope Borough. This event most severely affected roads located within the community of Barrow; however, some minor damage was reported in the community of Wainwright.

The North Slope Borough Resolution 53-2015, entitled *A Resolution Ratifying the Mayor's Declaration of Emergency for Barrow as a Result of the August 27, 2015 Fall Storm Surges*, which includes a request for state assistance, dated September 11, 2015, was received by the State of Alaska Division of Homeland Security and Emergency Management (DHS&EM) on September 14, 2015. The initial damages reported by the Borough exceeded \$7.2 million. The Borough has refined their estimated response and recovery costs over the past few weeks and this amount has dropped slightly to \$6,844,431.

AK-15-256, 2015 December Bering Sea Storm declared by Governor Walker on January 29, 2016 then FEMA declared on February 17, 2016 (DR-4257):

Beginning December 12, 2015 and continuing for several days, the low pressure system reached 933 mbars moving northeast from the Central and Western Aleutian Islands past the Pribilof Islands, and into the Yukon-Kuskokwim Delta region. These communities were impacted by hurricane force winds exceeding 100 miles per hour (mph) and gusts of up to 122 mph, high tidal ranges, and strong sea surges up to 10 feet above mean sea level

(msl). Island communities also experienced extreme wave heights of 40–50 feet. This combined weather system began on December 15, 2015 and extended the incident period to December 19, 2015.

As a result of this storm, the Cities of Adak and St. George have each issued local disaster declarations and requested State assistance. The State Emergency Operations Center (SEOC) was contacted by the President of the Kipnuk Native Village about storm damage to their community-wide boardwalk system and a few surrounding homes. Other minor storm damage has been reported in the Native Villages of Atka and Kwingillingok.

AK-15-257, 2015 December Windstorm declared by Governor Walker on January 29, 2016: On December 24, 2015, a storm moved from the Pribilof Island region in a northeasterly direction to the mainland. The storm damaged the City of Togiak's protective sea wall, city dock, power distribution lines, City building roof tops, and residential home roof tops. Subsequent sea surges dislodged road surface material from City roads.

On December 30, 2015, The City of Togiak's Mayor, signed a local disaster emergency specifically requesting individual disaster relief for homeowners with flooded homes and damaged personal, real, and subsistence property. The declaration also requests the aid of our public assistance program for emergency protective measures, technical assistance to evaluate damage, and financial assistance for temporary and permanent repairs to public infrastructure including the sea wall and City water collection and transmission lines.

Our damage assessment conducted in partnership with community leadership shows damage to 750 feet of the 1,500 foot long seawall. Damage includes sections that have heaved and bowed, as well as the separation of sections from the main wall. Damage to the dock is also evident.

EXPLANATION OF THE DISASTER COST INDEX

To date this Disaster Cost Index includes a total of 257 incidents.

The index presents cost data related to these incidents in nine columns. Column one indicates the disaster, which resulted in the expenditure of public funds; column two indicates the disaster number. In column two, the first two numbers indicate the State fiscal year based on the declared date signed by the Governor and the second set of numbers indicate the number of declared disasters since the creation of the disaster relief fund. Column three indicates the total amount of funds disbursed in the form of grants to individuals and families; column four indicates the number of grants awarded for each disaster; while column five gives the average amount of each grant. In column six, the amount of public assistance provided to the community is indicated; column seven indicates the cost to DHS&EM in expenditures related to the administration of the assistance program. Column eight summarizes the cost data, giving the total cost of both Federal and State expenditures for each disaster emergency. Column nine represents the total federal contribution for the disaster.

REFERENCES

AS 26.23.010 Alaska Disaster Act.

AS 26.23.300 Disaster Relief Fund.

State of Alaska Administrative Plan for Disaster Public Assistance, all applicable.

State of Alaska Individual Assistance Disaster Grant Program Administrative Plan, all applicable.

| | |
|--|--|
| 15-257, 2015 December Windstorm, 1/29/16 | 08-224 07 Beaver Fire state declared 9/14/07 |
| 15-256, 2015 December Bering Sea Storm, 1/29/16, 2/17/16 (DR-4257) | 07-223 07 Kenai River Flood 3/2/07 declared |
| 15-255, 2015 August NSB Sea Storm, 10/14/15, 10/30/15 (DR-4244) | 07-222 06 Kivalina Seawall 11/29/06 Admin Order |
| 15-254, 2015 August Southeast Rains, 8/27/15 | 07-221 06 Oct Southern Storm State Dec 10/14/06 |
| 15-253, 2015 Dalton Highway Flooding, 4/7/15 | 07-220 06 South central Flood State 8/19/06 |
| 15-252, 2015 Fort Yukon Flooding, 6/26/15 | 07-219 06 Hooper Bay Fire declared 8/6/06 (DR-1666) |
| 15-251, 2015 Summer Alaska Wildfires, 6/26/15 | 06-218 06 Spring Flood declared 6/27/06 fed 8/4/06 |
| 15-250, 2015 Kenai Wildfires, 6/19/15 | 06-217 06 South Central Storm state declared 3/13/06 |
| 15-249, 2015 Sockeye Wildfires, 6/15/15 | 06-216 05 Southeast Storm state declared 12/23/05 |
| 15-248, 2015 North Slope Borough Flooding, 5/21/15 | 06-215 05 West Coast Storm state declared 10/24/05 |
| 15-247, 2015 Alatna Washeteria Fire, 4/25/15 | 06-214 Bristol Bay Storm 10/3/05 state declared |
| 13-246, 2013 December Diomedea Power, 12/27/13 | 06-213 2005 Spring Flood 7/20/05 |
| 13-245, 2013 December Kwethluk Power, 12/27/13 | 05-212 Kaktovik Power Loss 1/15/05 |
| 13-244, 2013 November Storms, 11/16/13, 1/23/14 (DR-4162) | 05-211 2004 Bering Strait Sea Storm 10/18/04 |
| 13-243, 2013 October KPB Floods, 11/18/13, 1/16/14 (DR-4161) | 04-210 04 July Interior Fires declared DNR 5/29/04 |
| 13-242, 2013 Spring Floods, 5/30/13, 6/25/13 (DR-4122) | 04-209 03 Fall Sea storm declared 1/29/04 |
| 12-241, 2012 October Kuskokwim Delta Flood, 11/26/12 | 04-208 Kasaan Landslide declared 1/29/04 |
| 12-240, 2012 September Storm, 10/17, 11/27/12 (DR-4094) | 04-207 2003 Fall Flood 11/3/03 |
| 12-239, Kivalina Water Issue, 9/7/12 | 04-206 July 03 Riverine Flood 7/30/03 |
| 12-238, 2012 Prince William Sound Winter Storm, 2/9/12 | 03-205 2003 Salcha Flood 4/29/03 |
| 12-237, 2011 KPB Windstorm, 12/12/11, 2/12/12 (DR-4054) | 03-204 2003 South-central Windstorm 3/13/03 |
| 12-236, 2011 West Coast Storm, 12/5/11, 12/22/11 (DR-4050) | 03-203 Denali Earthquake AK-1440-DR 11/6/02 |
| 12-235, 2011 Dot Lake Fire, 10/4/11 | 03-202 Kenai Flood AK-1445-DR 11/6/02 |
| 12-234, 2011 Birch Creek Fire, 8/9/11 | 03-201 Northwest Fall Sea Storm 10/23/02 |
| 11-233, 2011 Spring Flooding, 5/17/11, 6/10/11 (DR-1992) | 02-200 Interior200Ak-1423-DRdeclared5/29/02 |
| 11-232 2010 Savoonga Power Outage, 1/14/11 | 02-199 Sleetmute Core Facility Fire (AO-196) 5/24/02 |
| 10-231 2010 July Interior Flooding, 7/26/10 | 02-198 Shishmaref Seawall (AO 194)10/27/01 |
| 09-230 2009 Seward Storm, 12/31/09 | 02-197 KOTZ AM Radio (AO 191) 9/24/01 |
| 09-229 09 October Kodiak Storms, 11/5/09, 12/18/09 (DR-1865) | 01-196 Middle Yukon Flood 5/31/01 |
| 09-228 Pelican Water System Failure AO 251 9/29/09 | 01-195 Kake Water Containment Failure, 7/31/00 |
| 09-227 09 Spring Flood declared 5/6/09 | 01-194 Operation Renew Hope YKN 7/19/00 |
| 09-226 08 Tanana Basin Flood declared 8/4/08 (DR-1796) | 00-193 Fire Suppression #2 6/??/00 |
| 08-225 07 Northwest Storm AO239 1/22/08 | 00-192 Fire Suppression #1 5/24/00 |
| | 00-191 Central Gulf Coast Storm 2/4/00, 2/8/00, 3/17/00 |
| | 99-190 Southeastern Storm10/27 & 11/24/98 |
| | 99-189 Western Alaska Fisheries 7/30/98, 9-16-98, 10/16/98 |
| | 98-188 Endicott Mountains Flood 06/18/98 |
| | 98-187 DNR Fire Suppression 06/05/98 |
| | 98-186 Shishmaref Sea Storm 10/06/97 |

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| 98-185 Eastern Tanana River 08/26/97 | 91-126 EAGLE 12/28/90 |
| 98-184 Bristol Bay Distressed Salmon 07/18/97 | 91-125 DIOMEDE 11/21/90 |
| 98-183 DNR Fire Suppression 07/14/97 | 91-124 LOWELL CREEK TUNNEL 09/27/90 |
| 97-182 '96 Southeast Storm (Pelican/Elfin Cove) 01/13/97 | 91-123 TELLER 10/10/90 |
| 96-181 Miller's Reach Fire 1119 06/04/97 | 91-122 NOME 10/10/90 |
| 96-180 South-Central Fall Floods 10/21/95-DR 1072 | 91-121 KOTZEBUE 09/04/90 |
| 95-179 Statewide Fire Suppression 06/22/95 | 91-120 LOWER KUSKOKWIM 09/04/90 |
| 95-178 Bethel Sinkhole Erosion 06/05/95 | 91-119 HAZARD MITIGATION COLD WEATHER 1990 |
| 95-177 Aniak Ice Jam Flood 06/05/95 | 91-118 STATEWIDE FIRES 07/04/90 |
| 95-176 Yukon Kuskokwim Delta 06/05/95 | 91-117 BETHEL 06/02/90 |
| 95-175 Skagway Submarine Landslide 11/16/94 | 90-116 TEKLANIKA FIRE 05/31/90 |
| 95-174 Metlaktla Sea Storm 11/10/95 | 90-115 FIRE SUPPRESSION 05/29/90 |
| 95-173 94 Fall Flood 09/27/94 FEMA 1039 | 90-114 KOBUK 05/17/90 |
| 95-172 Matanuska River Erosion 07/01/94 | 90-113 MCGRATH 05/16/90 |
| 95-171 Cummings road Flood 08/2/94 | 90-112 SNOW & ICE REMOVAL 1990 No Dec |
| 94-170 1994 Galena Flood | 90-111 HAZ MIT 89 SPRING FLOODS 04/14/90 (FEMA0832) |
| 94-169 McGrath Road Disaster 05/23/94 | 90-110 STEBBINS 04/09/90 |
| 94-168 Hazard Mitigation - 909 | 90-109 MANOKOTAK 04/05/90 |
| 94-167 Prince of Wales Island 10/29/93 | 90-108 MOOSE 03/28/90 |
| 94-166 Shaker IV | 90-107 KONGIGANAK 03/02/90 |
| 94-165 DNR 08/04/93 | 90-106 BROADCASTING 02/22/90 |
| 94-164 Tenakee Springs 07/19/93 | 90-105 TATITLEK 01/31/90 |
| 94-163 Kuskokwim Chum 07/19/93 | 90-104 KENAI MT. REDOUBT 01/11/90 |
| 93-162 Nome Hwy 10/12/92 | 90-103 MT. REDOUBT 12/20/89 |
| 93-161 MT. Spurr 09/21/92 | 90-102 SEARCH & RESCUE 09/13/89 |
| 93-160 Haines Highway 08/14/92 | 90-101 RICHARDSON HIGHWAY 09/13/89 |
| 93-159 Norton Sound Fishery 07/13/92 | 90-100 KENAI PENINSULA 08/30/89 |
| 93-158 Fire Disaster 07/07/92 | 90-99 ANCHORAGE 08/30/89 |
| 92-157 Yukon River 06/17/92 (92 Spring Flood) | 90-98 WHITTIER 08/08/89 |
| 92-156 Response 06/09/92 | 90-97 MAT-SU 08/04/89 |
| 92-155 92-Galena Flood 06/04/92 | 90-96 FAIRBANKS NORTH STAR BOROUGH 08/01/89 |
| 92-154 Eagle City 05/19/92 | 90-95 KLAWOCK 06/19/89 |
| 92-153 Eagle Village 05/19/92 | 89-94 SPRING FLOODS 06/10/89 |
| 92-152 Seward Sewage 11/20/91 | 89-93 FORT YUKON 05/06/89 |
| 92-151 Earthquake Mitigation 11/07/91 | 89-92 CIRCLE 05/06/89 |
| 92-150 KODIAK 11/02/91 | 89-91 GLENNALLEN 05/06/89 |
| 92-149 NEW KOLIGANEK 10/14/92 | 89-90 GALENA 04/20/89 |
| 92-148 DIOMEDE FIRE 09/20/91 | 89-89 VALDEZ 03/26/89 |
| 92-147 ANIAK LOAN 08/07/91 | 89-88 NORTH SLOPE 03/08/89 |
| 92-146 LITTLE DIOMEDE 07/25/91 | 89-87 AHKIOK 03/02/89 |
| 92-145 WHITESTONE FARMS 07/27/91 | 89-86 SAND POINT 02/27/89 |
| 92-144 MAT-SU BOROUGH 07/18/91 | 89-85 ST. GEORGE 02/09/89 |
| 92-143 DNR 07/11/91 | 89-84 NORTHWEST ARCTIC 02/01/89 |
| 92-142 GALENA-91 S.F. 06/01/91 | 89-83 STATEWIDE COLD 01/28/89 |
| 91-141 SHAGELUK 05/23/91 | 89-82 YUKON FLATS 11/10/88 |
| 91-140 ALAKANUK 05/23/91 | 89-81 KLAWOCK 10/17/88 |
| 91-139 HOLY CROSS 05/23/91 | 89-80 SHISHMAREF 08/05/88 |
| 91-138 EMMONAK 05/23/91 | 89-79 EAGLE 07/22/88 |
| 91-137 GRAYLING 05/16/91 | 89-78 KALTAG 05/26/88 |
| 91-136 ANVIK 05/16/91 | 88-77 NAPAKIAK/NAPASKIAK 05/24/88 |
| 91-135 RED DEVIL 05/13/91 | 88-76 CROOKED CREEK 05/12/88 |
| 91-134 MCGRATH 05/10/91 (FEMA 0909) | 88-75 NONDALTON 04/05/88 |
| 91-133 ANIAK 05/13/91 | 88-74 PITKA'S POINT 03/29/88 |
| 91-132 FAI NS BOROUGH/07/91 (91 Spring Flood) | 88-73 CHENEGA BAY 03/25/88 |
| 91-131 ANGOON 05/03/91 | 88-72 CHEFORNAK 03/23/88 |
| 91-130 MARSHALL 02/25/91 | 88-71 BEAVER 03/08/88 |
| 91-129 KARLUK 02/22/91 | 88-70 HAINES 02/29/88 |
| 91-128 LARSEN BAY 02/14/91 | 88-69 BARROW 02/16/88 |
| 91-127 TOGIAK 02/08/91 | |

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|-------|--------------------------------|------|---------------------------|
| 88-68 | KLEHINI 11/09/87 | 80-9 | ANCHORAGE |
| 88-67 | TOGIAK 10/87 | 80-8 | KODIAK ISLAND |
| 88-66 | ANGOON 11/06/87 | 80-7 | WILLOW CREEK |
| 88-65 | WAINWRIGHT 10/06/87 | 80-6 | WEST COAST STORM |
| 88-64 | RICHARDSON HIGHWAY 07/24/87 | 79-5 | DELTA FIRE |
| 87-63 | BUCKLAND 06/16/87 | 79-4 | MATANUSKA SUSITNA BOROUGH |
| 87-62 | ANIAK 05/29/87 | 79-3 | WRANGELL/CRAIG |
| 87-61 | DELTA JUNCTION 05/28/87 | 78-2 | CAMPBELL CREEK ANCHORAGE |
| 87-60 | SLEETMUTE/RED DEVIL 05/22/87 | 78-1 | KARLUK |
| 87-59 | KOTZEBUE 02/05/87 | | |
| 87-58 | VENETIE 01/09/87 | | |
| 87-57 | ANIAK 10/27/87 | | |
| 87-56 | SOUTHCENTRAL ALASKA 10/12/86 | | |
| 87-55 | NORTH SLOPE 09/25/86 | | |
| 86-54 | NAPAKIAK 05/15/86 | | |
| 86-53 | CROWN POINT 05/01/86 | | |
| 86-52 | PELICAN 03/19/86 | | |
| 86-51 | VENETIE 03/03/86 | | |
| 86-50 | THORNE BAY 02/03/86 | | |
| 86-49 | UNALASKA 12/13/85 | | |
| 86-48 | METLAKATLA 12/10/85 | | |
| 86-47 | THORNE BAY 12/05/85 | | |
| 86-46 | MANAKOTAK 11/22/85 | | |
| 86-45 | CORDOVA 10/31/85 | | |
| 86-44 | GAMBELL 08/31/85 | | |
| 86-43 | BETHEL 07/10/85 | | |
| 86-42 | PITKA'S POINT 07/09/85 | | |
| 85-41 | UPPER KUSKOKWIM RIVER 06/18/85 | | |
| 85-40 | PILOT STATION 06/18/85 | | |
| 85-39 | EMMONAK 06/11/85 | | |
| 85-38 | ANVIK 06/05/85 | | |
| 85-37 | KOBUK 05/30/85 | | |
| 85-36 | BUCKLAND 05/30/85 | | |
| 85-35 | GAMBELL 05/17/85 | | |
| 85-34 | SAVOONGA 02/26/85 | | |
| 85-33 | HAINES 01/25/85 | | |
| 85-32 | SOUTHEAST ALASKA | | |
| 85-31 | RUSSIAN MISSION | | |
| 85-30 | COLD BAY | | |
| 84-29 | EMMONAK | | |
| 84-28 | ALAKANUK | | |
| 84-27 | COLD BAY | | |
| 84-26 | KOTZEBUE | | |
| 84-25 | ELIM | | |
| 84-24 | MOUNTAIN VILLAGE | | |
| 84-23 | UNALAKLEET | | |
| 84-22 | CHEFORNAK | | |
| 84-21 | CORDOVA | | |
| 84-20 | KETCHIKAN | | |
| 83-19 | ANIAK | | |
| 83-18 | KIPNUK | | |
| 83-17 | TAKOTNA | | |
| 83-16 | RUSSION MISSION/ANIAK/AKIACHAK | | |
| 82-15 | FORT YUKON | | |
| 82-14 | EMMONAK | | |
| 82-13 | SOUTHCENTRAL | | |
| 81-12 | ANGOON | | |
| 81-11 | COPPER CENTER | | |
| 81-10 | BRISTOL BAY | | |

Appendix 14 – 2013 Alaska State Hazard Mitigation Plan Update Mitigation Capability Assessment Questionnaire

Would you please answer the following questions about your organization's activities and role in reducing future disaster losses in the State and provide any suggestions you may have for improving State-level disaster mitigation.

This questionnaire is in MSWord so that you may type your answers directly into the document and return it to:

Scott Nelsen
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P.O. Box 5750
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Toll Free: (800) 478-2337
Website: <http://www.ready.alaska.gov>

Introduction:

Hazard mitigation is any action taken to reduce or eliminate the long-term risk to human life and property from natural and human-caused hazards. The purpose of the Alaska State Hazard Mitigation Plan is to identify hazards, complete a risk assessment and vulnerability analysis, identify and coordinate needed mitigation efforts with State, Federal, and local partners and fulfill the requirements set forth in the federal 44 CFR 201.4 DMA 2000 legislation.

For your organization in the State of Alaska, could you please answer?

1. What activities does your organization do in an effort to reduce future disaster losses (mitigation) in the State?
 - a. Include references to any statutory or regulatory authorities that address hazard mitigation.
 - b. Include any activities that enhance understanding of hazards and vulnerability in the State (hazard identification, mapping, etc.)
 - c. Include references to any established (written) mitigation policies or procedures that your organization uses to reduce disaster losses or that your organization intends to develop.
 - d. Include any activities related to public hazard mitigation including regulation of development, building codes, standards, public education, training, etc.
 - e. Include specific examples of programs or activities directly related to the following hazards specified in the State Hazard Mitigation Plan.
 - Flood Wildland Fire Earthquake Volcanoes
 - Snow Avalanche Tsunami Severe Weather

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Appendix 14 - Capability Assessment Questionnaire

- Ground Failure (Landslide, mudslide, permafrost, etc)
 - Erosion Economic Oil Spill and Hazardous Materials
 - Terrorism Technological, Human caused Health
2. If your organization owns or operates property located in any areas subject to the hazards listed in #1e above, would you list any specific mitigation measures your organization has taken to protect these properties and operations from specific hazards?
 3. Please list other Federal, State, Local, non-profit or private agencies your organization works with to reduce disaster losses from the hazards listed in #1e and...:
 - a. Briefly describe the cooperative mitigation work.
 - b. What challenges your organization has faced in cooperating with other agencies in hazard mitigation.
 - c. How you have overcome or suggest overcoming these challenges.
 4. Are there any State statutes, authorities, or regulations that are particularly effective in assisting your organization in reducing future disaster losses?
 - a. Are there any new or amended State statutes, authorities, or regulations that would enhance your organization's ability to reduce future disaster losses?
 5. What role does public opinion and opportunities for public involvement play in your organization's effort to reduce future disaster losses?
 6. What challenges (staffing, funding, remote community locations, data, mapping, etc.) does your organization face in efforts to reduce future disaster losses.
 7. Are there any other State-level initiatives or ideas that your organization can suggest that would enhance the State's effort to reduce future disaster losses?

2013 Alaska State Hazard Mitigation Plan Update Federal Agency Mitigation Questionnaire

The State of Alaska is currently updating the State Hazard Mitigation Plan (SHMP). The State is required to revise and update our plan every three years in order to continue to be eligible for almost all FEMA funding. The purpose of the SHMP is to identify hazards, complete a risk assessment and vulnerability analysis, identify and coordinate needed mitigation efforts with State, Federal, and local partners and fulfill the requirements set forth in the Federal 44 CFR 201.4 DMA 2000 legislation (<http://www.fema.gov/pdf/help/fr02-4321.pdf>).

State and Federal partnerships are one mechanism used to accomplish mitigation tasks. In Alaska there are multiple Federal agencies with programs, projects, data and staff expertise that contribute to decision making concerning hazard mitigation in Alaska. In many cases these partnerships have been identified in the hazard specific sub-sections (earthquake, volcanic eruption, flood, snow avalanche, weather, etc.) of section five of the current, 2007, SHMP (also see table included). However, we are aware that there are additional Federal agency ventures concerning hazard mitigation that are absent from the existing Plan. We would like the 2010 update of the SHMP to reflect, identify and recognize all of your agency's contributions (programs, projects and staff areas of expertise) in providing local data and guidance with a goal of reducing future disaster losses in the State of Alaska.

In order to most appropriately and accurately identify these contributions we are asking you to read and respond to the questions below. We also welcome links, digital documents and images which illustrate and/or support these programs, projects and areas of expertise. Our goal in this process is to simply compile and present a comprehensive, accurate and up-to-date representation of these existing programs in the SHMP.

Please return your contributions and answers to the provided questions back to me by May 21, if possible. Please feel free to contact me anytime with comments and questions.

Scott Nelsen, Emergency Management Specialist
Alaska Department of Homeland Security and Emergency Management
Email: scott.nelsen@alaska.gov
Office Ph: (907) 428-7010; Office Fax: (907) 428-7009; Toll Free Phone: (800) 478-2337

For reference, the current Plan is available as a PDF (17.6 MB) at:
http://ready.alaska.gov/plans/pdf_docs/StateHazardMitigationPlan07/2007%20SHMP%20Master.pdf

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Federal agencies noted in the 2010 State All-Hazard Risk Mitigation Plan. Current Plan is available at http://ready.alaska.gov/plans/pdf_docs/StateHazardMitigationPlan07/2007%20SHMP%20Master.pdf

| Agency Sections | NOAA | | | DOI | | | | | | | USDA | | FAA | USACE | EPA | USCG |
|--------------------------|--------|-----|-----|------|----------|-----|-----|-----|---------|-----|------|------|-----|-------|-----|------|
| | WCATWC | NWS | NMF | USGS | USGS/AVO | NPS | FWS | BLM | AFS/BLM | BIA | NRCS | USFS | | | | |
| 5.1 All Hazards | | | | | | | | | | | | | | | | |
| Goals 1 | X | X | | | | | | | | | | | | | | |
| 4 | | | | X | | | | | | | X | | | X | | |
| 5 | X | X | | | X | | | | | | | | | | | |
| 5.2 Floods | | | | | | | | | | | | | | | | |
| RiverWatch | | X | | | | | | | | | | | | | | |
| Goals 1 | | | | | | | | | | | | | | X | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | X | X | X | | | | | | | | | | X | X | |
| 6 | | X | | | | | | | | | | | | | | |
| 7 | | | | X | | | | | | | | | | X | | |
| 12 | | | X | X | | | | | | | | | | X | X | |
| 13 | | | X | X | | | | | | | | | | X | X | |
| 5.3 Wildland Fire | | | | | | | | | | | | | | | | |
| AWFCG | | | | | | X | X | X | | X | | | | | | |
| AICC | | | | | | X | X | X | | X | | X | | | | |
| Goals 1 | | | | | | | | | X | | | X | | | | |
| 2 | | | | | | | | | X | | | | | | | |
| 3 | | | | | | | | | X | | | X | | | | |

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|--------------------------------------|---------------|------------|------------|-------------|-----------------|------------|------------|------------|----------------|------------|-------------|-------------|------------|--------------|------------|-------------|
| 5 | | | | | | | | | X | | | X | | | | |
| 5.4 Snow Avalanche | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Goal 5 | | | | X | | | | | | | | | | | | |
| 5.5 Volcano | | | | | | | | | | | | | | | | |
| AVO | | | | | X | | | | | | | | | | | |
| Goals 1 | | | | | X | | | | | | | | | | | |
| 2 | | | | | X | | | | | | | | | | | |
| 3 | | X | | | X | | | | | | | | X | | | |
| 5.6 Earthquake | | | | | | | | | | | | | | | | |
| AEIC | | | | X | | | | | | | | | | | | |
| Agency Sections | NOAA | | | DOI | | | | | | | USDA | | FAA | USACE | EPA | USCG |
| | WCATWC | NWS | NMF | USGS | USGS/AVO | NPS | FWS | BLM | AFS/BLM | BIA | NRCS | USFS | | | | |
| ASHSC | | | | | | | | | | | | | | | | X |
| Goals 3 | | | | X | | | | | | | | | | | | |
| 4 | | | | X | | | | | | | | | | | | |
| 5 | | | | X | | | | | | | | | | | | |
| 6 | | | | DOI | | | | | | | | | | | | |
| 7 | | | | X | | | | | | | | | | | | |
| 8 | | | | X | | | | | | | | | | | | |
| 5.7 Tsunami & Seiches | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| TWS | NOAA | | | | | | | | | | | | | | | |
| DART | NOAA | | | X | | | | | | | | | | | | |

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|----------------------------------|-------------|------|------------|---|--|--|--|--|--|-------------|--|------------|--------------|------------|-------------|
| Goals 1 | X | NOAA | | | | | | | | | | | | | |
| 2 | X | NOAA | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | X | | |
| 5.8 Weather | | | | | | | | | | | | | | | |
| StormReady | NOAA | | | | | | | | | | | | | | |
| Op Weather Blanket | | X | | | | | | | | | | | | | X |
| Goals 1 | | X | | | | | | | | | | | | | |
| 2 | | X | | | | | | | | | | | | | |
| 3 | | X | | | | | | | | | | | | | |
| 5 | X | X | | | | | | | | | | | | | |
| 5.9 Ground Failure | | | | | | | | | | | | | | | |
| Goals 1 | | | | X | | | | | | | | | | | |
| 3 | | | | X | | | | | | | | | X | | |
| 5.10 Erosion | | | | | | | | | | | | | | | |
| Goals 1 | | | | | | | | | | | | | X | | |
| 3 | | | | | | | | | | X | | | X | | |
| 4 | | | | | | | | | | X | | | | X | |
| 5.13 Oil Spill and HazMat | | | | | | | | | | | | | | | |
| OSWNER | | | | | | | | | | | | | | X | |
| 5.14 Terrorism | | | | | | | | | | | | | | | |
| Agency | NOAA | | DOI | | | | | | | USDA | | FAA | USACE | EPA | USCG |

State of Alaska
Hazard Mitigation Plan 2013
Appendix 14 - Capability Assessment Questionnaire

| Sections | WCATWC | NWS | NMF | USGS | USGS/AVO | NPS | FWS | BLM | AFS/BLM | BIA | NRCS | USFS | | | | |
|---------------------------|--------|-----|-----|------|----------|-----|-----|-----|---------|-----|------|------|--|--|---|--|
| Op. Liberty | | | | | | | | | | | | | | | | |
| Shield "Federal Agencies" | | | | | | | | | | | | | | | | |
| Goal 2 | | | | | | | | | | | | | | | X | |

AWFCG The Alaska Wildland Fire Coordinating Group

AICC Alaska Interagency Coordination Center

AVO Alaska Volcano Observatory

AEIC Alaska Earthquake Information Center

ASHSC Alaska Seismic Hazard Safety Commission

TWS Tsunami Warning System

DART Deep-ocean Assessment and Reporting of Tsunamis

OSWNER Office of Solid Waste and Emergency Response

SHMAC State Hazard Mitigation Advisory Committee

**State of Alaska Department of Homeland Security and Emergency Management
2010 Update State Hazard Mitigation Plan
Federal Agency Mitigation Questionnaire**

1. What programs, projects and/or expertise does your agency have that contributes to long-term mitigation efforts to reduce disaster losses in the State?
 - f. Include references to any of your agency's existing State-Federal partnerships that address, long-term hazard mitigation.
 - g. Include any of your agency's activities that enhance understanding of hazards and vulnerability in the State (hazard identification, mapping, etc.)
 - h. Include references to any established (written) mitigation policies or procedures that your organization uses to reduce disaster losses or that your organization intends to develop through State-Federal partnerships.
 - i. Include specific examples of programs or activities directly related to the following hazards specified in the State Hazard Mitigation Plan (including: detection, retrofit, building codes, hazard maps, gauges, models, forecasts, historic data, and dynamic data).
 - Flood
 - Wildland Fire
 - Earthquake
 - Volcanoes
 - Snow Avalanche
 - Tsunami
 - Severe Weather
 - Ground Failure
 - Erosion
 - Oil Spill and Hazardous Materials
 - Terrorism
 - Technological, Human caused
 - Health (pandemic flu, Bird flu, Swine flu, H1N1...)

2. Please list other Federal, State, local, non-profit and/or private organizations your agency works with to reduce disaster losses from the hazards in the bulleted list above and briefly describe the cooperative program or project. Please include any challenges, success stories and protocols that may have come from each program or project.

3. What role does public opinion and opportunities for public involvement play in your organization's effort to reduce future disaster losses?

4. What challenges (staffing, remote location, data, mapping, etc.) does your organization face in efforts to reduce future disaster losses?

5. Are there any other ongoing or developing initiatives or ideas that your agency can suggest that would enhance the State's effort to reduce future disaster losses?

6. Do you have any suggestions on how the State can more effectively use or deliver the mitigation programs you identified?

7. Do you have a mechanism to assess, design and build your agency's infrastructure to withstand particular natural disasters? If so, how and which hazards? For example are air traffic control towers, piers, docks, office buildings, warehouses built or retrofitted to withstand a significant earthquake event? Please explain.

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Appendix 15 – State and Federal Agencies and Additional Organizations

Within Alaska there are an abundance of state and federal agencies responsible for issuing disaster warnings, collecting and distributing data and information and providing assistance to communities and individuals to prepare for or respond to disasters.

State of Alaska

Department of Administration

The Mission of the Department of Administration (DOA) is to provide consistent and efficient support services to State agencies so that they may better serve Alaskans.

<http://doa.alaska.gov/home.html>

Division of Risk Management

The Objective of the Division of Risk Management is to protect the financial assets and operations of the State of Alaska from accidental loss through a comprehensive self-insurance program for normal and expected property and casualty claims of high frequency and low severity combined with high limit broad form excess insurance protection for catastrophic loss exposures.

<http://doa.alaska.gov/drm/>

Department of Commerce, Community and Economic Development

The Mission Statement of the Department of Commerce, Community and Economic Development (DCCED) is: Promoting a Healthy Economy and Strong Communities.

[http://www.commerce.state.ak.U.S. /](http://www.commerce.state.ak.U.S./)

Division of Insurance

AS 21.06.080 gives the Director of the Division of Insurance (DOI) has the authority to take action deemed necessary to assurance that contracts of insurance already issued will be honored during a catastrophe. Actions can include emergency orders permitting the immediate licensing of adjusters to facilitate handling of claims, permitting a licensee to move or remove a record as required by the existence of the catastrophe, or permit the issuance by the insurance company of checks or drafts on out-of-state banks to pay a claim.

<http://www.commerce.state.ak.U.S. /insurance/>

Division of Community and Regional Affairs

The mission of the Division of Community and Regional Affairs (DCRA) fulfills its Constitutional mandate “to advise and assist local government, review their activities, collect and publish local government information, and perform other duties prescribed by law” through its mission to promote strong communities and healthy economies.

<http://www.commerce.state.ak.U.S. /dca/>

Planning and Land Management

The Planning and Land Management Section provides assistance, training, and resources to help communities with local and regional land management and planning efforts.

<http://www.commerce.state.ak.U.S./dcra/planning/planning.htm>

Floodplain Management

The Floodplain Management Program provides coordination, funding, and technical assistance to National Flood Insurance Program (NFIP) communities to reduce public and private sector losses and damage caused by flooding and erosion, flood insurance available within the community at a low cost.

<http://www.commerce.state.ak.U.S./dcra/planning/nfip/nfip.htm>

Alaska Coastal Management Program

The Alaska Coastal Management Program (ACMP) provides stewardship for Alaska's rich and diverse coastal resources to ensure a healthy and vibrant Alaskan coast that efficiently sustains long-term economic and environmental productivity.

ACMP balances the U.S. use and protection of coastal resources and used by developing local coastal district plans and reviewing development projects against the standards and policies of the program. The governor appoints the six state agency officials and nine locally elected officials that make up the Coastal Policy Council (CPC), which determines overall ACMP policy direction.

The Department of Commerce, Planning and Land Management and the Department of Natural Resources (DNR) are partners in the ACMP. As required by Alaska state law (AS 44.31.781), DCRA provides research, training, and technical assistance to coastal districts for the development, implementation, and maintenance of district coastal management plans. This includes the direct granting of ACMP funds to coastal districts.

<http://www.alaskacoast.state.ak.U.S./>

<http://www.commerce.state.ak.U.S./dca/planning/acmp/acmp.htm>

Community Development Block Grant

The Division administers the Community Development Block Grant (CDBG) program funds, enhancement grants to address coastal hazards, mini-grants and administers various flood mitigation planning and project grants, including the acquisition of flood-prone homes and businesses, throughout the State.

Local Government Assistance

This program provide assistance and training in interpreting Title 29 and other laws or regulations affecting or defining municipal authority; technical advice on ordinance writing; grant project development and application; and lead communities through a process that leads to community visions for the future.

<http://www.commerce.state.ak.U.S./dca/lga/lga.htm>

Department of Education and Early Development

The Department of Education and Early Development (EED) is responsible for the development of life-long learners. The State Board EED is the executive board of the department. The board develops educational policy, promulgates regulations governing education, appoints the Commissioner of EED with the Governor's approval, and is the channel of communication between state government and the public for educational matters. Education policies are determined by the board and administered by the Commissioner through department divisions. Programs administered include: public school funding, early childcare, teacher certification, school construction and major maintenance grant program, debt reimbursement program for school facilities and student assessment. The only State operated school is Mt. Edgecumbe High School in Sitka.

The EED also administers the state libraries, archives, records and museum services, provides grants to the arts community.

The EED does not have statutory responsibility in overseeing planning or education around crisis response plans or emergency drills. AS 14.33.100 (crisis response plans) and AS 14.03.140 (emergency drills) both assign all of these responsibility to individual school districts.

[http://www.mehs.educ.state.ak.U.S. /](http://www.mehs.educ.state.ak.U.S./)

<http://www.eed.state.ak.U.S. />

Department of Environmental Conservation

It is the policy of the State Department of Environmental Conservation (DEC) to conserve, improve, and protect its natural resources and environment and control water, land, and air pollution, in order to enhance the health, safety, and welfare of the people of the state and their overall economic and social well being.

<http://www.dec.state.ak.U.S. />

Division of Spill Prevention and Response

The DEC's Division of Spill Prevention and Response (SPAR) is responsible for protecting Alaska's land, waters, and air from oil and hazardous substance spills. Alaskans have made a concerted effort to prevent and clean up spills. Significant progress has been made in the safe handling, storage and transportation of oil and chemicals and the cleanup of historic contamination. We will never totally eliminate the risk of spills, but we are constantly learning how to better manage that risk.

<http://www.dec.state.ak.U.S. /spar/>

Division of Environmental Health

The Division of Environmental Health (EH) deals with the basics: safe drinking water, food and sanitary practices. Our goal is to provide businesses with clear standards so that they can protect our environment and provide safe food and drinking water to Alaskans.

<http://www.dec.state.ak.U.S. /eh/>

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Appendix 15 – State and Federal Agencies & Organizations

Drinking Water Program

The Drinking Water Program requires public water systems to be in compliance with state and federal regulations, for drinking water, for the public health protection of the residents and visitors to the State of Alaska.

<http://www.dec.state.ak.U.S./eh/dw/>

Division of Air Monitoring & Quality Assurance

The Division of Air Quality, Air Monitoring & Quality Assurance Program operates and oversees air quality monitoring networks throughout Alaska. Our primary services include:\

- Operating ambient air quality monitoring networks to assess compliance with the National Ambient Air Quality Standards (NAAQS) for carbon monoxide, particulates, nitrogen dioxide, sulfur oxide, and lead.
- Assessing ambient air quality for ambient air toxics level.
- Providing technical assistance in developing monitoring plans for air monitoring projects.
- Issuing Air Advisories to inform the public of hazardous air conditions.

<http://www.dec.state.ak.U.S./air/am/index.htm>

Department of Health & Social Services

<http://www.hss.state.ak.U.S./>

Division of State Health Planning and Systems Development

Health Planning and Systems Development (HPSD) runs programs that strengthen health care access with a focus on rural areas and underserved populations. We also conduct statewide health planning to help sustain organized and efficient health care delivery in Alaska. HPSD Programs focus on:

- Health Care Delivery
- Workforce Development
- Health Care Financing and Reimbursement Strategies
- Facility Planning

<http://www.hss.state.ak.U.S./dhcs/healthplanning/>

Community Health and Emergency Medical Services

The Community Health and Emergency Medical Services (CHEMS) is a section within Division of Public Health within the DHSS. One of CHEMS' responsibilities is developing, implementing, and maintaining a statewide comprehensive emergency medical services system. The department's statutory mandate (AS 18.08.010) requires it to:

1. Coordinate public and private agencies engaged in the planning and delivery of emergency medical services, including trauma care, to plan an emergency medical

services system;

2. Assist public and private agencies to deliver emergency medical services, including trauma care, through the award of grants in aid;
3. Conduct, encourage, and approve programs of education and training designed to upgrade the knowledge and skills of health personnel involved in emergency medical services, including trauma care
4. Establish and maintain a process under which hospitals and clinics can represent themselves to be trauma centers because they voluntarily meet criteria adopted by the department which are based on an applicable national evaluation system.

In addition to these responsibilities, the section is heavily involved in planning and responding to bioterrorist events.

<http://www.chems.alaska.gov/>

Department of Law

[http://www.law.state.ak.U.S. /](http://www.law.state.ak.U.S./)

Office of the Attorney General

Provides legal advice to the governor and other state officers and has the duties and powers listed in AS 44.23.020. Apart from advising other state agencies, the Department of Law is not engaged in activities and programs to decrease vulnerability to hazards identified in the State Hazard Mitigation Plan.

Department of Military & Veterans Affairs

<http://www.dmva.alaska.gov/>

Division of Homeland Security & Emergency Management

Has responsibility for disaster preparedness including preparation of a comprehensive state emergency plan, assisting local governments in designing emergency response plans, distribution of food and supplies during disasters, and establishing public information education programs. DHS&EM is responsible for recommending land-use and building regulations to communities to reduce the impacts and cost of disasters. DHS&EM coordinates with Tsunami Warning Center, Alaska State Troopers, State Emergency Response Commission, and local communities. Included in DHS&EM duties are the preparation and maintenance of a state emergency plan which shall include recommendations for zoning, building and other land use controls; safety measures for securing mobile homes and other nonpermanent or semi-permanent structures; and other preventive and preparedness measures designed to eliminate or reduce disasters or their impact.

<http://www.ready.alaska.gov/>

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Department of Natural Resources

The Department of Natural Resources (DNR) Mission is to develop, conserve and enhance natural resources for present and future Alaskans.

<http://dnr.alaska.gov/>

Division of Geological & Geophysical Surveys

The Division of Geological & Geophysical Surveys (DGGS) collects, evaluates, and distributes geologic data and information on earthquakes, volcanoes, and engineering geology. DGGS conducts geological and geophysical studies to determine potential geological hazards to buildings, roads, bridges and other installations and structures. Publishes maps and reports on the geology of Alaska, including location and severity of geologic hazards.

<http://www.dggs.alaska.gov/>

Division of Forestry

The Division Forestry (referred to as Forestry) protects water quality, fish and wildlife habitat, and other forest values through appropriate forest practices and administration of the Forest Resources and Practices Act. In cooperation with federal agencies, Forestry manages a wildland fire program on 150 million acres of land. Forestry is responsible to oversee and control the fire protection obligation on all state, private, and municipal lands in the State of Alaska on behalf of the Department.

Alaska is the only state with an interagency fire plan. This plan divides the state into fire protection levels based on major natural firebreaks and the objectives of land managers. Firefighting resources can be allocated to the highest priority areas--those areas where communities and valuable resources are located. It also gives options for lower cost strategies in remote and unpopulated areas.

Urban interface areas are growing as the population increases. This will present increased potential for losses from wildland fire. Increased fire prevention activities continue to educate the public on its responsibility to be prepared for fire.

Authority for managing wildland fire is derived from AS 41.15.10. - 41.15.170.

<http://forestry.alaska.gov/>

Department of Public Safety

AS 18.76.010 Statutory responsibility for Alaska Avalanche Warning System, part of the Alaska Avalanche and Fire Weather Forecast System. Located within Alaska Department of Public Safety, in cooperation with a municipality or federal agency, shall participate in the development and implementation of a statewide avalanche warning system. The statewide system shall:

- Establish & maintain a service center and primary and supplementary field stations to gather information and data concerning ground water conditions, snow pack and avalanche activity

- Forecast snow avalanche conditions statewide
- Coordinate a public awareness program
- Catalog a comprehensive atlas of avalanche paths and slide occurrences; and assist local governments and state agencies in identifying hazardous zones and in developing snow avalanche zoning regulations

The Department of Public Safety provides legal counsel to DHS&EM for mitigation and other emergency management related issues, as needed.

[http://www.dps.state.ak.U.S. /](http://www.dps.state.ak.U.S./)

Division of Alaska State Troopers

The Division of Alaska State Troopers (AST) is charged with statewide law enforcement, prevention of crime, pursuit and apprehension of offenders, service of civil and criminal process, prisoner transportation, central communications, and search and rescue.

<http://www.dps.alaska.gov/AST/>

Division of Fire and Life Safety

The mission of the Division of Fire and Life Safety is to prevent the loss of life and property from fire and explosion. We are composed of three Bureau's: Life Safety Inspection; Plan Review; and Training and Education. AS 18.70 states that:

(a) The Department of Public Safety shall adopt regulations for the purpose of protecting life and property from fire and explosion by establishing minimum standards for:

- Fire detection and suppression equipment;
 - Fire and life safety criteria in commercial, industrial, business, institutional, or other public buildings, and buildings used for residential purposes containing four or more dwelling units;
 - Any activity in which combustible or explosive materials are stored or handled in commercial quantities;
 - Conditions or activities carried on outside a building described in (2) or (3) of this subsection likely to cause injury to persons or property.

(b) The commissioner of public safety may establish by regulation and the department may charge reasonable fees for fire and life safety plan checks made to determine compliance with regulations adopted under (a)(2) of this section.

<http://www.dps.state.ak.U.S. /fire/default.aspx>

Fish and Wildlife Safeguard

Fish and Wildlife Safeguard is a non-profit volunteer citizen's organization that works in cooperation with the Alaska Wildlife Troopers. By providing a toll-free hotline phone number which citizens may call to report a resource law violation, the organization gives the public an opportunity to become involved in protecting Alaska's natural resources.

<http://www.dps.state.ak.U.S. /AWT/Safeguard.aspx>

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Department of Transportation & Public Facilities

The Department of Transportation and Public Facilities (DOT/PF) and DHS&EM collaborate on and coordinate with construction, buyout, and land U.S. e projects to ensure that there are no potential right-of-way conflicts with future bridge and highway multi-hazard mitigation initiatives.

Additionally, DOT/PF provides safe, efficient, economical, and effective State highway, harbor, and airport operations. The Department uses the various systems, regions, and divisions resources to identify hazards, plan and initiate mitigation activities to meet the transportation needs of Alaska, and make Alaska a better place to live and work. The Department, in collaboration with DHS&EM, budgets for temporary bridge and materials replacement necessary to make the multi-modal transportation system operational following a natural disaster.

[http://www.dot.state.ak.U.S. /](http://www.dot.state.ak.U.S./)

Division of Design & Engineering Services

The mission of Statewide Design & Engineering Services is to provide technical services to the Department, other state and federal agencies and governments.

<http://www.dot.state.ak.U.S. /stwdde/index.shtml>

Alaska Railroad Corporation

The Alaska Railroad Corporation (ARRC) is a full-service railroad serving ports and communities from the Gulf of Alaska to Fairbanks. Owned by the State of Alaska since 1985, the Railroad is governed by a seven-member Board of Directors appointed by the Governor of Alaska.

The Alaska Railroad is a self-sustaining corporation that operates without state subsidy, and provides year-round passenger, freight and real estate services. The Alaska Railroad carries nearly 500,000 passengers annually. The ARRC rail line covers over 500 miles of Alaska through very diverse environments. To assist in response planning, the rail line is broken into the following geographical sections. In this way, emergency planning can be performed specific to the unique local characteristics in each section. Many of the response issues will be common throughout the entire section (i.e. wildlife issues, local public safety response contacts, logistical resources and requirements, environmental and seasonal conditions). Passenger emergency response strategies and considerations were developed for each section. These sections are grouped based on local environment.

<http://www.alaskarailroad.com>

<http://www.alaskarailroad.com/corporate/Corporate/FreightServices/RoutesMap/tabid/392/Default.aspx>

Other State Entities

There are a number of Boards and Commissions which can assist in refining hazard mitigation strategies for communities including the Alaska Coastal Policy Council, State Emergency Response Commission, Safety Advisory Council, Alaska Science and Technology Council, and Alaska Water Resources Board.

University of Alaska Fairbanks Geophysical Institute

At the Geophysical Institute (GI; also known as the University of Alaska Fairbanks Geophysical Institute [UAFGI]) the diversity of research focus is reflected in their disciplinary-based, functional groupings of faculty and research staff. These divisions are:

- Space physics
- Remote Sensing
- Atmospheric sciences
- Snow, ice, and permafrost
- Seismology
- Volcanology
- Tectonics and Sedimentation

<http://www.gi.alaska.edu/>

Alaska Satellite Facility

The largest facility at the UAFGI is a satellite ground station and associated processing and archiving center called the Alaska Satellite Facility (ASF) which is funded by various federal, local, and private entities. Radar images produced there enable the all-weather study of sea ice, earthquakes, volcanoes, and regularly provide hazard-management products for agencies such as the National Oceanic and Atmospheric Administration (NOAA) and the National Ice Center. Through the International Observatory of the North, optical images of the Arctic from NASA and NOAA satellites are received and processed to support remote sensing research and data services to the state.

<http://www.asf.alaska.edu/home>

Alaska Earthquake Information Center

The Alaska Earthquake Information Center (AEIC) operates a regional network of over 300 seismometers and reports more than 50 earthquakes a day occurring within the state.

The AEIC is a cooperative project with USGS and the UAFGI.

<http://www.aeic.alaska.edu/>

Federal

Federal Emergency Management Agency Region X

Headquartered in Bothell, Washington, Federal Emergency management Agency (FEMA) Region X (Ten) works with the emergency management agencies in Alaska, Idaho, Oregon and Washington. FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.

The states served by FEMA Region X experience a variety of hazards including earthquakes, wild fires, volcanic eruptions, landslides and tornados as well as weather emergencies like snow, ice, wind and heavy rain.

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To help accomplish FEMA's mission Region X maintains strong partnerships through its Regional Advisory Council and Regional Interagency Steering Committee.

<http://www.fema.gov/about/regions/regionx/>

U.S. Department of the Interior

<http://www.doi.gov/>

U. S. Geological Survey

<http://www.usgs.gov/>

Alaska Science Center

The mission of the Alaska Science Center (ASC) is to provide objective and timely data, information, and research findings about the earth and its flora and fauna to Federal, State, and local resource managers and the public to support sound decisions regarding natural resources, natural hazards, and ecosystems in Alaska and circumpolar regions.

The U.S. Geological Survey (USGS), the Nation's largest water, earth, and biological science and civilian mapping agency, has studied the natural features of Alaska since its earliest geologic expeditions in the 1800s. The complexity of Alaska's unique landscapes and ecosystems requires USGS expertise from many science disciplines to conduct thorough, integrated research.

In Alaska each year, natural hazards may cause deaths and can cost millions of dollars due to the disruption of commerce, and the destruction of critical infrastructure. The USGS works extensively with local, state and federal agencies to reduce the loss from natural hazards. Collaborative processes have included stream and precipitation gauges on the Kenai Peninsula, volcano hazard monitoring, and improved seismic sensors. The USGS ASC science helps forecast and mitigate disasters and build resilient communities through cutting edge science, research, and monitoring tools and techniques pioneered here for Alaska's diverse and challenging landscape. Monitoring programs that address natural and emerging hazards include:

- Operating a streamflow monitoring network for flood warning and mitigation.
- Tracking emerging wildlife diseases, such as Avian Influenza (Highly Pathogenic H5N1) in migratory birds.

<http://alaska.USGS.gov/>

<http://pubs.USGS.gov/fs/2007/3019/>

USGS Water Resources of Alaska

The USGS ASC Water Resources Office continuously monitors surface water, ground water, and water quality parameters across the state. Monitoring sites are operated in cooperation with various local, State, or Federal agencies. There are five programs within the Water Resources discipline which related to hazards. They include:

- **Streambed Scour**
The USGS ASC is researching streambed scour at bridges through scour monitoring, hydrodynamic modeling, and data collection during high flows.
- **Surface Water**
Alaska provides real-time water-stage, streamflow and precipitation data at 152 sites across the state.
- **Ground Water**
Fourteen ground-water wells are monitored by the USGS in Alaska. These wells record data on hourly intervals.
- **Flood Watch**
The "Flood and high flow" map shows the location of stream gages where the water level is currently at or above flood stage.
- **Water Quality**
Water-quality conditions are continuously monitored by the USGS at 42 sites across the state of Alaska

The USGS Water Resources website provides current ("real-time") stream stage and streamflow, water-quality, and ground-water levels for over 200 sites in Alaska.

<http://alaska.USGS.gov/science/water/index.php>

Volcano Hazard Program

The overall objectives of the Volcano Hazards Program (VHP) are to advance the scientific understanding of volcanic processes and to lessen the harmful impacts of volcanic activity. The VHP monitors active and potentially active volcanoes, assesses their hazards, responds to volcanic crises, and conducts research on how volcanoes work to fulfill a Congressional mandate (P.L. 93-288) that the USGS issue "timely warnings" of potential volcanic hazards to responsible emergency-management authorities and to the populace affected. Thus, in addition to obtaining the best possible scientific information, the program works to effectively communicate its scientific findings to authorities and the public in an appropriate and understandable form.

Monitoring and research at the five volcano observatories in conjunction with the Menlo Science Center in Menlo Park helps advance VHP's understanding of active volcanism and allows the Program to provide warnings of impending eruptions in the United States. Through these observatories, the VHP monitor earthquake activity, ground deformation, gas chemistry, and other geophysical and hydrologic conditions before, during, and after eruptions. Observations are used to detect activity leading to an eruption, provide real-time emergency information about future and ongoing eruptions, identify hazardous areas around active and potentially active volcanoes, and improve our understanding of how volcanoes erupt and change our environment. The Volcano Disaster Assistance Program (VDAP) also assists other nations prepare for and respond to volcano emergencies.

<http://volcanoes.USGS.gov/>

Alaska Volcano Observatory

The Alaska Volcano Observatory is a joint program of USGS, the University of Alaska Fairbanks Geophysical Institute (UAFGI), and Alaska Division of Geological and Geophysical

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Surveys (DGGS). AVO monitors and studies Alaska's volcanoes to predict and record eruptive activity and informs and advises on volcanoes. Three primary objectives: conduct monitoring and other scientific investigations to assess the nature, timing, and likelihood of activity; assess volcanic hazards associated with anticipated activity, including kinds of events, effects and areas of risk; and provide timely and accurate information on volcanic hazards and warnings of impending activity.

<http://www.avo.alaska.edu/>

U.S. Fish and Wildlife Service Alaska Region

The U.S. Fish and Wildlife Service (USFWS) Alaska Region manages 16 national wildlife refuges in Alaska, totaling 76,774,229 acres. Management goals include conservation, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the State for the benefit of present and future generations of American. The USFWS Conservation Planning & Policy team in Alaska works cooperatively with state agencies, members of the public, and other stakeholders to provide refuge management at all levels. In doing this, they give the public a meaningful voice in the future of each refuge and make sure that the rights of traditional users and the State of Alaska are respected and reflected in daily refuge administration.

<http://alaska.fws.gov/>

Bureau of Land Management

In Alaska, the Bureau of Land Management (BLM) administers approximately 80 million surface acres of federal public land. The focuses of the BLM in Alaska includes:

- **Land Transfer**
Alaska is a young state and land ownership is still being settled. The BLM is tasked with conveying federal land to the State of Alaska, Alaska Native corporations and individual Alaska Natives. Once final land status is determined, the BLM will manage about 70 million acres of federal public lands and 220 million acres of subsurface mineral estate in Alaska.
- **Energy Development**
The BLM is committed to sound land use planning for the 23-million-acre National Petroleum Reserve-Alaska (NPR-A). Many resource management issues transcend the boundaries of NPR-A and are applicable to the entire North Slope of Alaska. The BLM partners with other federal and state agencies form the North Slope Science Initiative, a newly developed organization that encourages sharing knowledge to make science-based decisions about development activities on the North Slope.
<http://www.northslope.org/>
http://www.blm.gov/ak/st/en/prog/energy/oil_gas/npra.html
- **Trans-Alaska Pipeline System**
The BLM partners with other federal and state agencies at the Joint Pipeline Office to work proactively with Alaska's oil and gas industry to safely operate the Trans-Alaska Pipeline System.
<http://www.jpo.doi.gov/>
- **Fire Management**
The BLM provides wildland fire suppression services for all Department of the

Interior and Alaska Native corporation lands in Alaska through the Alaska Interagency Coordination Center (AICC) and Alaska Fire Service (AFS).

<http://fire.ak.blm.gov/afs/>

<http://fire.ak.blm.gov/aicc.php>

<http://www.blm.gov/ak/st/en.html>

National Park Service Alaska Region

Alaska hosts 15 national parks, preserves, monuments and national historical parks. The National Park Service (NPS) also plays varying roles in the administration of 13 national wild rivers, two affiliated areas and a national heritage area. Alaska is also home to 49 National Historic Landmarks and 16 National Natural Landmarks.

<http://www.nps.gov/akso/index.html>

Bureau of Indian Affairs Alaska Region

The Alaska Region encompasses a dynamic and diverse mix of Tribes, Tribal organizations and natural features. With the exception of the Annette Island Reserve, which falls under the Northwest Region, the entire state of Alaska falls under the jurisdiction of the Alaska Region.

Within that area the Alaska Regional Office (ARO) Headquarters is located in Juneau, Alaska with Trust, Transportation and Environmental offices located in Anchorage as is the West Central Alaska Agency. The other agency in ARO can be found in Fairbanks, Alaska. This agency provides services to the villages within the Interior and the North Slope of Alaska.

The nearly 80,000 Tribal members that make up the 229 Tribes under the Alaska Region jurisdiction stretch from Ketchikan in the Southeast Panhandle to Barrow on the Arctic Ocean and from Eagle on the Yukon Territory border to Atka in the Aleutian Chain. Alaska Region Tribes Served are listed here:

<http://www.bia.gov/WhoWeAre/RegionalOffices/Alaska/WeAre/Tribes/index.htm>

<http://www.bia.gov/WhoWeAre/RegionalOffices/Alaska/index.htm>

U.S. Army Corps of Engineers Alaska District

The U.S. Army Corps of Engineers (USACE) Alaska District provides a full spectrum of quality engineering, technical, and construction support services in support of peacetime and contingency operations in Alaska and throughout the Pacific Region. Their major programs focus on military construction, civil works and environmental cleanup. Their civil works program operates and maintains 52 river and navigation projects along the coast of Alaska. Of these projects, 36 are small boat harbors, 10 are channels, four are breakwaters and two are river projects. Their formerly-used defense sites (FUDS) program has identified 312 environmental cleanup and restoration projects within the state. They are committed to supporting the overseas contingency operations by constructing quality facilities for service members and their families in Alaska.

The Corps of Engineers is also one of the primary Federal agencies assisting state and local governments in protecting the public from natural and manmade emergencies.

For floods, the Corps is the lead Federal response agency. Flood response activities are authorized under Public Law 84-99, and we can provide either technical assistance or direct assistance. There is no provision for financial assistance under PL 84-99.

<http://www.poa.U.S.ace.army.mil/hm/default.htm>

<http://www.poa.U.S.ace.army.mil/EM/EM.html>

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Appendix 15 – State and Federal Agencies & Organizations

Economic Development Administration

The Economic Development Administration (EDA) was established under the Public Works and Economic Development Act of 1965 (42 U.S.C. § 3121), as amended, to generate jobs, help retain existing jobs, and stimulate industrial and commercial growth in economically distressed areas of the United States. EDA assistance is available to rural and urban areas of the Nation experiencing high unemployment, low income, or other severe economic distress. In fulfilling its mission, EDA is guided by the basic principle that distressed communities must be empowered to develop and implement their own economic development and revitalization strategies. Based on these locally- and regionally-developed priorities, EDA works in partnership with state and local governments, regional economic development districts, public and private nonprofit organizations, and Indian tribes. EDA helps distressed communities address problems associated with long-term economic distress, as well as sudden and severe economic dislocations including recovering from the economic impacts of natural disasters, the closure of military installations and other Federal facilities, changing trade patterns, and the depletion of natural resources.

<http://www.eda.gov/>

Environmental Protection Agency Region 10 Alaska

The mission of The Environmental Protection Agency (EPA) is to protect human health and to safeguard the natural environment -- air, water and land -- upon which life depends. Alaska is in the Pacific Northwest Regional Office (Region 10) of the EPA. Region 10 focuses on EPA's work and mission in the region which is comprised of the states of Alaska, Idaho, Oregon, Washington and Pacific Northwest Indian Country.

<http://yosemite.epa.gov/r10/homepage.nsf/webpage/Alaska%27s+Environment?OpenDocument>
<http://www.epa.gov/region10/>

U.S. Forest Service

The mission of the Alaska Region of the U.S. Forest Service (USFS) is to manage the Chugach and Tongass National Forests to meet society's needs for a variety of goods, services, and amenities while enhancing the Forests' health and productivity, and to foster similar outcomes for State and private forestland across Alaska.

The USFS in Alaska also participates in wildfire management through the Alaska Interagency Coordination Center and Alaska Fire Service.

<http://www.fs.fed.U.S./r10/>

U.S. Department of Agriculture

<http://www.U.S.da.gov/wps/portal/U.S.da/U.S.dahome>

Farm Service Agency

The Farm Service Agency (FSA) lends money and provides credit counseling and supervision to eligible applicants who operate family-size farms. A family-size farm is considered to be one that a family can operate and manage itself. FSA makes and guarantees a variety of loans for youth, new and experienced farmers, and producers undergoing emergency situations. FSA also provides credit counseling and supervision to farmers and ranchers who are temporarily unable to obtain private, commercial credit. FSA also provides

assistance for natural disaster losses, resulting from drought, flood, fire, freeze, tornadoes, pest infestation, and other calamities.

<http://www.fsa.U.S. da.gov/FSA/stateoffapp?mystate=ak&area=home&subject=prog&topic=landing>
<http://www.fsa.U.S. da.gov/FSA/webapp?area=home&subject=diap&topic=landing>

Rural Development

Rural Development is committed to helping improve the economy and quality of life in all of rural America. Through our programs, they touch the rural residents of our state every day.

Their guarantee, loan and grant programs support such essential public facilities and services as water and sewer systems, housing, health clinics, emergency service facilities and electric and telephone service. They promote economic development by guaranteeing loans to businesses through qualified lenders. They promote renewable energy and energy efficiency projects including wind, geothermal, hydro and biodiesel initiatives. They offer technical assistance and information to help cooperatives get started and through our Rural Economic Development Loan and Grant program we supply funds to cooperatives to promote small business development.

In Alaska, Rural Development achieves its mission by helping families, communities and businesses from Barrow to Metlakatla and from Nome to Northway obtain the financial and technical assistance needed to address their needs. Rural Development works to make sure that rural citizens can participate fully in the global economy by supporting projects to stabilize the cost of electricity and extend broadband service to rural villages.

<http://www.rurdev.U.S. da.gov/ak/Director.htm>

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. NRCS puts nearly 70 years of experience to work in assisting owners of America's private land with conserving their soil, water, and other natural resources. Local, state and federal agencies and policymakers also rely on our expertise. They deliver technical assistance based on sound science and suited to a customer's specific needs. Cost shares and financial incentives are available in some cases. Most work is done with local partners. Their partnership with local conservation districts serves almost every county in the nation, and the Caribbean and Pacific Basin. Participation in our programs is voluntary. Alaska NRCS Programs are:

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- Conservation Innovation Grants (CIG)
 - Conservation Technical Assistance (CTA)
 - Conservation Stewardship Program (CSP new)
 - Conservation Security Program (CSP old)
 - Emergency Watershed Protection Program (EWP)
 - Environmental Quality Incentive Program (EQIP)
 - Farm and Ranch Land Protection Program FRPP)
 - Grassland Reserve Program (GRP)
 - Resource, Conservation & Development Program (RC&D)
 - Snow Survey
 - Soil Survey
 - Watershed Planning
 - Wildlife Habitat Incentives Program (WHIP)
- <http://www.ak.nrcs.U.S. da.gov/>

Alaska Division of the U.S. Department of Transportation Federal Highway Administration

The Federal Highway Administration (FHWA) Mission is to improve mobility on our Nation's highways through national leadership, innovation, and program delivery. Programs include:

- Bridge / Structures
- Environment
- Marine
- Highways
- Safety
- Civil Rights
- Finance
- Planning
- Security & Emergency Preparedness
- Engineering
- ITS
- Right-of-Way

<http://www.fhwa.dot.gov/akdiv/>

U.S. Department of Housing and Urban Development

Housing and Urban Development's (HUD) mission is to create strong, sustainable, inclusive communities and quality affordable homes for all. HUD is working to strengthen the housing market to bolster the economy and protect consumers; meet the need for quality affordable rental homes; utilize housing as a platform for improving quality of life; build inclusive and sustainable communities free from discrimination; and transform the way HUD does business.

<http://portal.hud.gov/portal/page/portal/HUD/states/alaska>

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) is a federal agency focused on the condition of the oceans and the atmosphere.

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

National Weather Service

The National Weather Service (NWS) is the official U.S. weather, marine, fire and aviation forecasts, warnings, meteorological products, climate forecasts and information about meteorology.

<http://www.arh.noaa.gov/>

West Coast and Alaska Tsunami Warning Center

NOAA's tsunami mission is to provide reliable tsunami detection, forecasts and warnings, and to promote community resilience.

The primary operational warning system objectives for carrying out this mission are to rapidly locate, size, and otherwise characterize major earthquakes, determine their tsunamigenic potential, predict tsunami arrival times, predict coastal runup when possible, and disseminate appropriate warning and informational products based on this information.

NOAA operates two tsunami warning centers in the United States: the West Coast/Alaska Tsunami Warning Center and the Richard H. Hagemeyer Pacific Tsunami Warning Center. The West Coast/Alaska Tsunami Warning Center area-of-responsibility (AOR) consists of Canadian coastal regions, Puerto Rico, the Virgin Islands, and the ocean coasts of all U.S. States except Hawaii. The Pacific Tsunami Warning Center AOR consists of Hawaii, other U.S. interests in the Pacific Basin, countries participating in the Tsunami Warning System in the Pacific, and Indian Ocean and Caribbean Sea countries.

<http://wcatwc.arh.noaa.gov/>

National Marine Fisheries Service

The Alaska Region of NOAA National Marine Fisheries Service (NMFS) oversees sustainable fisheries that produce about half the fish caught in U.S. waters, with responsibilities covering 842,000 square nautical miles off Alaska. The Alaska Region also works to ensure the viability of protected species—principally marine mammals—and to protect and enhance Alaska's marine habitat.

<http://www.fakr.noaa.gov/>

Denali Commission

Introduced by Congress in 1998, the Denali Commission (Commission) is an independent federal agency designed to provide critical utilities, infrastructure, and economic support throughout Alaska. With the creation of the Denali Commission, Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities. Since its first meeting in April 1999, the Commission is credited with providing numerous cost-shared infrastructure projects across the State that exemplifies effective and efficient partnership between federal and state agencies, and the private sector. The Denali Commission's programs include:

- Community Planning
- Conference Sponsorships
- Economic Development
- Energy
- Government Coordination
- Health Facilities
- Solid Waste
- Teacher Housing
- Training
- Transportation

Grants Management Electronic Processing and Reporting Systems

The Denali Commission has two electronic web-based systems for Grants Management; GrantSolutions for processing proposed awards and post award amendments and the Commission Project Database for reporting progress on funded awards.

GrantSolutions - Electronic Grants Management Processing System

The Commission utilizes GrantSolutions to manage the electronic processing of every award from start to finish. The award starts with the posting of announcements of funding opportunities, receipt and review of applications, issuance of funded awards, the generation of post award amendments, to the close out of each award.

The GrantSolutions system provides access to award information based on verified identification of the individual, their job function or role within their organization, and their organization's business relationship with the Commission through their official awards or proposed awards. Individual users and the public do not have access to the GrantSolutions database itself but do have access to awards funded by the Commission in the Commission's Project Database System (see also Commission's Project Database - Electronic Grants Management Reporting System).

<https://www.grantsolutions.gov/cf/display/mkt/home>
https://www.denali.gov/index.php?option=com_content&view=frontpage&Itemid=2

Small Business Administration

The U.S. Small Business Administration (SBA) was created in 1953 as an independent agency of the federal government to aid, counsel, assist and protect the interests of small business concerns, to preserve free competitive enterprise and to maintain and strengthen the overall economy of our nation. We recognize that small business is critical to our economic recovery and strength, to building America's future, and to helping the United States compete in today's global marketplace. Although SBA has grown and evolved in the years since it was established in 1953, the bottom line mission remains the same. The SBA helps Americans start, build and grow businesses.

SBA provides low interest disaster loans to homeowners, renters, businesses of all sizes and private, non-profit organizations to repair or replace real estate, personal property, machinery & equipment, inventory and business assets that have been damaged or destroyed in a declared disaster.

<http://www.sba.gov/localresources/district/ak/index.html>

Additional Organizations

American Red Cross Alaska

The American Red Cross has been the nation's premier emergency response organization. As part of a worldwide movement that offers neutral humanitarian care to the victims of war, the American Red Cross distinguishes itself by also aiding victims of devastating natural disasters. Over the years, the organization has expanded its services, always with the aim of preventing and relieving

Today, in addition to domestic disaster relief, the American Red Cross offers compassionate services in five other areas: community services that help the needy; support and comfort for military members and their families; the collection, processing and distribution of lifesaving blood and blood products; educational programs that promote health and safety; and international relief and development programs.

The American Red Cross also has Disaster Services and Emergency Assistance. Each year, the American Red Cross of Alaska responds immediately to more than 300 disasters, including house or apartment fires (the majority of disaster responses), earthquakes, floods, mudslides, avalanches, hazardous materials spills, and other natural and man-made disasters throughout the state. Trained Red Cross volunteers and staff are ready 24-hours-a-day, year-round to meet the disaster-caused needs of people in our community.

All disaster assistance from the Red Cross is based upon verified, disaster-caused need and is provided at no charge to the disaster client. While you are ultimately responsible for your own recovery, Red Cross is here to guide you through the process.

http://alaska.redcross.org/Home_Page.php

http://alaska.redcross.org/Disaster_Services.php

Alaska Conference of Mayors

The purpose of the Alaska Conference of Mayors (ACoM) is to offer an opportunity for the mayors to discuss issues of common concern, to work together for the betterment of their municipalities, and to improve the understanding of information about municipalities in Alaska.

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Alaska Municipal League

ACoM is the parent organization of the Alaska Municipal League. The ACoM and AML work together to form a municipal consensus on statewide and federal issues facing Alaskan local governments. The AML is a voluntary, nonprofit, nonpartisan, statewide organization of 140 cities, boroughs, and unified municipalities, representing over 97% of Alaska's residents. The mission of the Alaska Municipal League is to:

1. Represent the unified voice of Alaska's local governments to successfully influence state and federal decision making.
2. Build consensus and partnerships to address Alaska's Challenges, and
3. Provide training and joint services to strengthen Alaska's local governments.

<http://www.akml.org/>

Interagency Hydrology Committee for Alaska

The Interagency Hydrology Committee for Alaska (IHCA) is an organization of technical specialists working for Federal, State, borough, and local governments and federally recognized tribes, who coordinate the collection and interpretation of data related to water resources and climate throughout the State of Alaska. The IHCA meets twice per year to coordinate multi-agency issues and exchange information. The work of the Committee is to a large extent based on coordination and prior knowledge of related activities of other agencies. Thus, to be effective, the continuity of the membership is considered necessary. The IHCA meets once in the spring and fall each year to coordinate multi-agency issues and exchange of information. Meetings rotate between Juneau, Anchorage, and Fairbanks to encourage participation by the greatest number.

<http://ak.water.usgs.gov/ihca/>

Appendix 16 – Regulatory Authority

This is a list of the regulatory authorities authorizing mitigation activities.

AS 26.20 Civil Defense
AS 26.23 Military and Veterans Affairs, Disasters
AS 29.35.040 Emergency Disaster Powers
AS 44.33.285 Action by Governor
AS 46.04.080 Catastrophic Oil Discharges
AS 46.09.030 Disaster Emergencies
AS 26.23.071 Alaska state Emergency Response Commission
AS 26.23.073 Emergency planning districts and committees
AS 46.08 Oil and Hazardous Substances Releases
AS 55.201 Conservation surcharge on oil – surcharge levied
AS 43.55.3000 Additional Conservation surcharge on oil – surcharge levied
USC 42 11001-11005 Duties and Functions SERC and LEPCs
AO No. 170 Establishing statewide Emergency Management Plan
AO No. 203 Establishing the Division of Homeland Security
AO No. 217 Amendment to AO 203
AO No. 228 Pandemic Influenza Preparedness

Federal

Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288) as amended through the Disaster Mitigation Act of 2000 (Public Law 106-390)

Executive Order 12612, Federalism

FEMA Regulations, 44 CFR Part 9, Floodplain Management & Protection of Wetlands

FEMA Regulations, 44 CFR Part 10, Environmental Considerations

FEMA Regulations, 44 CFR Part 13, Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments

FEMA Regulations, 44 CFR Part 206, Subparts M and N

The National Flood Insurance Act of 1968, Sections 1366 and 1367, as amended by the National Flood Insurance Reform Act of 1994, Sections 553 and 554 Mitigation Assistance

FEMA Regulations, 44 CFR Part 59-77 National Flood Insurance Program

Other Federal Acts

Federal Water Pollution Control Act (P.L. 92-500, enacted in 1972), commonly known as the Clean Water Act (amended by P.L. 95-217 in 1977, P.L. 97-117 in 1981, and P.L. 100-4 in 1987).

Coastal Zone Management Act

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National Environmental Policy Act of 1969 the National Environmental Policy Act of 1969 (NEPA). The Act, considered to be the basic "National Charter" for protection of the environment, includes three major goals:

1. It sets national environmental policy
2. It establishes a basis for environmental impact statements
3. It created the Council on Environmental Quality

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Article 3, Section 23 of the Alaska State Constitution authorizes the governor to make changes in the organization of the executive branch or assignment of functions among units to provide for efficient administration. If changes require the force of law, they shall be set forth in executive orders. The legislature has 60 days of a regular session to disapprove executive orders. If not disapproved then orders become effective at a date designated by the governor. The governor also has the authority to issue Administrative Orders that direct agencies to implement specific goals and objectives. Administrative Orders are only in effect during a governor's term of office while Executive Orders can transcend administrations.

Alaska Disaster Act, Alaska Statute 26.23.010, states the purpose of DHS&EM is to:

- a) Reduce vulnerability of people and communities to damage, injury and loss of life and property resulting from a disaster;
- b) Prepare for the prompt and efficient rescue, care and treatment of persons victimized or threatened by disaster;
- c) Provide a setting conducive to rapid and orderly restoration following a disaster;
- d) Clarify and strengthen the roles of state agencies and local communities to prevent, prepare for, respond and recover from disasters;
- e) Authorize and provide for cooperation in disaster prevention, preparedness, response and recovery;
- f) Authorize and provide for coordination of activities relating to disaster prevention, preparedness, response and recovery; and
- g) Assist in the prevention of disasters caused or aggravated by inadequate planning for, and regulation of, public and private facilities and land use.

Title 29, Municipal Government

AS 29.03 The Unorganized Borough

Areas of the state not within the boundaries of an organized borough. The legislature has the authority to establish, alter, or abolish service areas within the unorganized borough.

AS 29.05.030 Emergency Ordinances

To meet the demands during a public emergency the governing body may adopt an emergency ordinance declaring an emergency exists together with supporting statement of facts. The ordinance cannot be used to levy taxes, grant, renew or extend a franchise or regulate the rate charged by a public utility.

AS 29.35.040 Emergency Disaster Powers

Once the Governor or President has declared a municipality to be a disaster area it may participate in and provide housing, urban renewal, and redevelopment in same manner as home rule city. Except powers transferred by a city, these powers may only be exercised on a non-area-wide basis. A municipality must exercise these powers within 5 years after the declaration and may only be extended for no more than three years.

AS 29.40.040 Land Use Regulation

Comprehensive Plan shall adopt or amend provisions governing the use and occupancy of land that may include:

1. Zoning regulations restricting use of land and improvements by geographic district;
2. Land use permit requirements designed to encourage or discourage specified uses and construction of specified structures, or to minimize unfavorable effects of uses and construction of structures;
3. Measures to further goals and objectives of comp plan.

AS 29.40.070 Platting Regulations

Platting regulations may include controls of

1. Form, size, and other aspects of subdivision, dedications and vacations of land;
2. Dimension and design of lots;
3. Street width, arrangement, rights of way including requirements for public access to lots and installation of street paving, curbs, gutters, sidewalks, sewers, water lines, drainage and other public utility facilities and improvements;
4. Dedication of streets, rights of way, public utility easements and areas considered necessary by the platting authority for other public uses.

AS 29.40.100. Information required Plats must show:

1. Initial point of survey;
2. Original or re-established corners;
3. Actual traverse areas of closure.

AS 29.45.230. Tax adjustments on property affected by a natural disaster.ⁱ

Municipalities can provide for reassessment and reduction of taxes for property destroyed, damaged or otherwise reduced in value by a disaster. Taxpayer must submit a sworn statement that loss exceeds \$1,000. Reduction in taxes is only for the remainder of the year following the disaster. With reassessments, local governments shall re-compute the tax and refund any taxes already paid.

Alaska Department of Commerce, Community and Economic Development, Division of Insurance

AS 21.06.080 gives the director the authority to take action deemed necessary to assure that contracts of insurance already issued will be honored during a catastrophe. Actions can include emergency orders permitting the immediate licensing of adjusters to facilitate handling of claims, permitting a licensee to move or remove a record as required by the existence of the catastrophe, or permit the issuance by the insurance company of checks or drafts on out-of-state banks to pay a claim.

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Appendix 16 – Regulatory Authority

Alaska Division of Geological & Geophysical Surveys

AS 41.08.020 Powers and duties

- a) The state geologist shall conduct geological and geophysical surveys to determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources; the locations and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct such other surveys and investigations as will advance knowledge of the geology of the state. With the approval of the commissioner, the state geologist may acquire, by gift or purchase, geological and geophysical reports, surveys, and similar information.

ⁱ Disaster in this instance means a major disaster declared by the President under federal law or by the governor under AS 26.23.010 – 26.23.110.

Appendix 17 – Hazard Mitigation Success Stories

5.1 State of Alaska Hazards and Assessment

Alaska Community Mitigation Success Stories

http://ready.alaska.gov/plans/mitigation/success_stories.htm

5.1 Flood

FEMA Success Stories: State, FEMA and Volunteers Work Together to Help Re-Build Eagle

<http://www.fema.gov/news-release/2009/08/11/success-stories-state-fema-and-volunteers-work-together-help-re-build-eagle>

FEMA Success Stories: Where M*A*S*H Meets *Mush!* - FEMA & State Public Assistance Programs Meet Critical Facility Challenge with Innovative Solution

<http://www.fema.gov/news-release/2009/09/17/success-stories-where-mash-meets-mush-fema-state-public-assistance-programs>

FEMA Success Stories: State, FEMA and Volunteers Work Together to Help Re-Build Stevens Village

<http://www.fema.gov/news-release/2009/09/01/success-stories-state-fema-and-volunteers-work-together-help-re-build>

FEMA Success Stories: Rebuilding Tanana

<http://www.fema.gov/news-release/2009/08/24/success-stories-rebuilding-tanana>

FEMA Success Stories: Fish Wheel

<http://www.fema.gov/news-release/2009/08/10/success-stories-fish-wheel>

FEMA Success Stories: Road Opens between Eagle and Eagle Village

<http://www.fema.gov/news-release/2009/08/10/success-stories-road-opens-between-eagle-and-eagle-village>

5.2 Fire

Miller's Reach Develops Plan to Mitigate Wildfires

<https://www.llis.dhs.gov/content/millers-reach-develops-plan-mitigate-wildfires>

Wildfire Mitigation in Matanuska-Susitna Borough, Alaska

<https://www.llis.dhs.gov/content/wildfire-mitigation-matanuska-susitna-borough-alaska>

5.12 Oil Spill and Hazmat

Survival of the Trans-Alaska Oil Pipeline

<https://www.llis.dhs.gov/content/survival-trans-alaska-oil-pipeline>

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Appendix 18 – State of Alaska Administrative Order No. 175

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU
ADMINISTRATIVE ORDER NO.175

FINDINGS

I, Tony Knowles, Governor of the State of Alaska, make the following findings concerning the siting and construction of state-owned and state-financed construction projects:

1. It is in the state's best interest to protect the state's capital investments by ensuring that future state-owned, and state-financed, construction projects are sited and constructed in a manner that reduces the potential for flood and erosion damage. The Department of Community and Regional Affairs (DCRA) is the appropriate agency to be tasked with coordinating this effort.
2. The Federal Emergency Management Agency (FEMA) is responsible for the National Flood Insurance Program and through regulations has developed flood plain management criteria for flood-prone, mudflow-prone, and flood-related erosion-prone areas. It is in the state's best interest to site and construct state-owned and state-financed projects using the portions of those regulations pertaining to construction standards as a guide.

ORDER

Under the authority of Article II, Section 1 of the Alaska Constitution and AS 26.23. 150, I, Tony Knowles, Governor of the State of Alaska, hereby order:

1. To the maximum extent possible, consistent with existing law, all state agencies with construction authority, or that administer grants, loans, or disaster assistance for construction, shall use pertinent portions of the FEMA National Flood Insurance Program regulations, 44 CFR Part 60, as a guide for such construction activities, and shall encourage a broad and united effort to lessen the risk of flood and erosion losses in connection with state lands and installations and state-financed or supported improvements. Specifically, state agencies directly responsible for building and structure construction, and other development including grading, paving, and excavation, shall to the maximum extent possible, preclude the uneconomic, hazardous, or unnecessary use of documented flood plains and erosion areas in connection with such development.
2. DCRA is the state coordinating agency for the National Flood Insurance Program and shall assist state agencies in complying with this order.

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Appendix 18 – Administrative Order No. 175

3. State agencies responsible for the construction of, or the administration of grant or loan programs involving the construction of, buildings, structures, roads, or other facilities shall consider the potential of flood and erosion hazards.

Consideration shall be given to setbacks, flood proofing, building elevation, and erosion control measures in flood and erosion-prone areas.

4. State agencies responsible for the leasing or disposal of lands or properties shall, to the extent the action is economically feasible, evaluate flood and erosion hazards in connection with lands or properties proposed for disposal and, in order to minimize future state expenditures for protection and disaster relief, shall consider including within all new subdivision proposals and other proposed developments greater than 50 lots or 5 acres, whichever is the lesser, base (100) year flood elevation data, or information on approximate flood risks.

5. State agencies responsible for programs that affect land use planning, including state permit programs, shall, consistent with existing statutory and regulatory requirements, take flood and erosion hazards into account when evaluating plans and permits and shall encourage land use appropriate to the degree of hazard involved.

7. Administrative Order No. 46 dated January 24, 1978, is hereby revoked.

This order takes effect immediately.

Dated at Juneau, Alaska this ~ day of ~ 1998.

Tony Knowles

Governor

Appendix 19 – Fire Occurrence Statistics

The following was derived from datasets compiled by the Alaska Interagency Coordination Center.

Recent Alaska Fire History by Year

- 2011 – 592 Wildfires
- 2012 – 509 Wildfires
- 2013 – 687 Wildfires

Prior to the 1980s planning efforts, wildland fires were suppressed based on resource availability. In 1988, the interagency planning efforts were completed and four fire management options (Critical, Full, Modified and Limited) that set the resource assignment priorities and describe the standard response to a wildland fire within the option boundaries had been defined and used by federal, state and Alaska Natives entities statewide. Standard responses range from aggressive suppression to surveillance. Those management options definitions were carried forward to the Alaska Interagency Wildland Fire Management Plan as amended 1998 and into this 2013 update.

1967 -1981 Before the Interagency Fire Management Plans
1988 – 2002 Interagency Fire Management Plans in effect for 15 years.
1988-2007 Interagency Fire Management Plans in effect for 20 years.
Statewide Occurrence

| Years | Human | | Lightning | | Total | |
|--------------------|-------|-----------|-----------|------------|--------|------------|
| | Fires | Acres | Fires | Acres | Fires | Acres |
| 1967 – 1981 | 4,353 | 2,102,657 | 3,219 | 9,666,982 | 7,572 | 11,769,639 |
| 1988 – 2002 | 5,863 | 1,075,412 | 2,527 | 14,064,870 | 8,390 | 15,140,282 |
| 1988 - 2007 | 7,487 | 1,353,308 | 3,523 | 26,559,330 | 11,010 | 27,912,638 |

| Management Option | Statewide 1988-2002 | | | | | | | |
|----------------------|---------------------|------------|---------|------|-------|--------|--------|--------|
| | Fire Size (Acres) | | | | | | | |
| | Fires | Acres | Average | <50% | <80% | <90% | <95% | <98% |
| Critical | 4,188 | 60,829 | 15 | 0.1 | 0.3 | 1.0 | 2.0 | 6.0 |
| Full | 1,813 | 1,393,257 | 768 | 0.3 | 5.0 | 35.0 | 370.0 | 5,255 |
| Limited | 1,325 | 10,392,779 | 7,843 | 40.0 | 2,970 | 13,214 | 36,400 | 93,317 |
| Modified | 921 | 3,177,693 | 3,450 | 4.0 | 180 | 1,880 | 8,541 | 43,952 |
| Unplanned | 143 | 115,724 | | | | | | |
| Total | 8,390 | 15,140,282 | | | | | | |

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Appendix 19 – Fire Occurrence Statistics

| Management Option | Statewide 1988- 2007 | | | | | | | |
|-------------------|----------------------|--------------|---------|------|-------|--------|--------|---------|
| | Fire Size (Acres) | | | | | | | |
| | Fires | Acres | Average | <50% | <80% | <90% | <95% | <98% |
| Critical | 5,324 | 198,896.3 | 37 | 0.1 | 0.3 | 1.0 | 2.5 | 8.0 |
| Full | 2,443 | 2,459,962 | 1007 | 0.3 | 5.0 | 40.0 | 325.0 | 5,400 |
| Limited | 1,968 | 20,234,722 | 10,282 | 60.0 | 3,500 | 17,958 | 47,060 | 131,913 |
| Modified | 1,122 | 4,439,190 | 3,956 | 4.0 | 212 | 2,400 | 11,582 | 49,906 |
| Unplanned | 153 | 579,868 | | | | | | |
| Total | 11,010 | 27,912,638.3 | | | | | | |

1988-2007 Ten Largest Fires Statewide

| Year | Fire Number & Name | | Latitude&Longitude | | Size(Acres) | Cause |
|------|--------------------|--------------|--------------------|-------|-------------|-----------|
| 1997 | B393 | Inowak | 6159 | 15705 | 606,945 | Lightning |
| 1988 | A043 | 832015 | 6554 | 14807 | 541,231 | Lightning |
| 2004 | A4SZ | Boundary | 6516 | 14653 | 537,627 | Lightning |
| 2004 | A7AA | Dall City | 6618 | 14952 | 483,280 | Lightning |
| 1990 | A143 | FYU NE 85 | 6731 | 14235 | 464,320 | Lightning |
| 2004 | A5RC | Billy Creek | 6349 | 14349 | 463,994 | Lightning |
| 2004 | A4RZ | North Dag | 6544 | 15213 | 419,884 | Lightning |
| 2004 | A4XX | Pingo | 6712 | 14622 | 403,993 | Lightning |
| 1990 | A185 | BTTS S 40 | 6615 | 15127 | 400,182 | Lightning |
| 1997 | B280 | Simels | 6334 | 15712 | 365,871 | Lightning |
| 2004 | A4XV | Winter Trail | 6657 | 14520 | 344,833 | Lightning |

1988-2002 Ten Largest Fires Statewide

| Year | Fire Number & Name | | Latitude&Longitude | | Size(Acres) | Cause |
|-------------|-------------------------------|---------------|-------------------------------|-------|--------------------|--------------|
| 1997 | B393 | Inowak | 6159 | 15705 | 606,945 | Lightning |
| 1988 | A043 | 832015 | 6554 | 14807 | 541,231 | Lightning |
| 1990 | A143 | FYU NE 85 | 6731 | 14235 | 464,320 | Lightning |
| 1990 | A185 | BTTS S 40 | 6615 | 15127 | 400,182 | Lightning |
| 1997 | B280 | Simels | 6334 | 15712 | 365,871 | Lightning |
| 1997 | B309 | Magitchlie Ck | 6338 | 15825 | 308,120 | Lightning |
| 1988 | A165 | 832064 | 6558 | 14549 | 289,360 | Lightning |
| 1990 | A121 | 032018 | 6637 | 14751 | 267,930 | Lightning |
| 2002 | A283 | Geskakmina | 6438 | 15026 | 257,549 | Lightning |
| 1991 | B569 | | 6644 | 15207 | 249,784 | Lightning |

1967-1981 Ten Largest Fires Statewide

| Year | Fire Number & Name | | Latitude&Longitude | | Size(Acres) | Cause |
|-------------|-------------------------------|-------------|-------------------------------|-------|--------------------|--------------|
| 1969 | 9482 | Holanada Ck | 6603 | 15211 | 803,420 | Lightning |
| 1969 | 9430 | Butte Creek | 6520 | 14212 | 525,000 | Human |
| 1974 | 8686 | Buza | 6604 | 15742 | 512,000 | Lightning |
| 1969 | 9486 | Bear | 6450 | 15650 | 422,000 | Lightning |
| 1969 | 9406 | Fishhook | 6638 | 14341 | 363,000 | Human |
| 1977 | 7721 | Bear Creek | 6240 | 15410 | 361,600 | Lightning |
| 1969 | 9447 | Big Denver | 6502 | 15100 | 314,683 | Human |
| 1977 | 8623 | Kugruk | 6545 | 16223 | 270,000 | Lightning |
| 1977 | 8689 | Augus | 6612 | 15916 | 270,000 | Lightning |
| 1969 | 9513 | Ridge Top | 6518 | 15225 | 251,520 | Lightning |

State of Alaska

Hazard Mitigation Plan 2013

Appendix 19 – Fire Occurrence Statistics

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**Appendix 20 – Local Emergency
Planning Committee**

Aleutian & Pribilof Islands
Coordinator and Chair
Unalaska, AK

Anchorage
Support Staff
Anchorage, AK

Bristol Bay Borough
Chair
King Salmon, AK

Juneau
Member
Juneau, AK

Copper River
Chair
Glennallen, AK

Delta Greely
Chair
Delta Junction, AK

Denali Borough
Chair
Healy, AK

Fairbanks Area
Chair
Fairbanks, AK

Greater Ketchikan Area
Member
Ketchikan, AK

Kenai Peninsula Borough
Member
Soldotna, AK

Kodiak Island Borough
Member
Kodiak, AK

Matanuska-Susitna Borough
Chair
Wasilla, AK

Nome
Chair
Nome, AK

Northern Southeast
Member
Skagway, AK

North Slope Borough
Chair
Barrow, AK

Northwest Arctic
Chair
Kotzebue, AK

Petersburg/Wrangell
Chair
Petersburg, AK

Wrangell
Member
Wrangell, AK

Sitka
Member
Sitka, AK

Southern Southeast
Chair
Craig, AK

Valdez
Member
Valdez, AK

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Appendix 21 - Public Notices

Associated Press Release:

The following statement was released to the Associated Press as an addendum to DR 4122 public updates:

“State hazard mitigation plans are required by FEMA to access much of their disaster mitigation assistance. The State of Alaska Hazard Mitigation plan was recently updated to include the Fall 2012 Storms and the Spring 2013 Flood Disaster affecting communities along the Yukon River. The plan draft is on Alaska’s Department of Homeland Security and Emergency Management website at Ready.Alaska.gov/mitigationplan and is available for public comment through September 15, 2013.”

Those visiting the website were given a short questionnaire.

Website comment form questions:

1. City of Residence

2. Mitigation is action taken to limit damage due to natural or man-made hazards. Your response to these questions will help us to develop appropriate hazard mitigation measures.

How concerned are you about the following natural and man-made hazards directly affecting your local community? Please check one box for each hazard listed.

| HAZARD | Very Concerned | Somewhat Concerned | No Opinion | Not Very Concerned | Not At All Concerned |
|---------------------------------------|----------------|--------------------|------------|--------------------|----------------------|
| Earthquake | | | | | |
| Flood | | | | | |
| Ash fall from volcanic activity | | | | | |
| Wildfire | | | | | |
| Severe weather | | | | | |
| Erosion | | | | | |
| Wind | | | | | |
| Natural gas line rupture or explosion | | | | | |
| Hazardous material spill | | | | | |
| Extended power outage | | | | | |
| Tsunami | | | | | |
| Other? | | | | | |
| Other? | | | | | |

3. What changes would you like to make to Alaska’s Hazard Mitigation Plan?

State of Alaska

Hazard Mitigation Plan 2013



Yukon River 2013 Ice Jam Flooding in Galena, AK

Public Comment Period

Ends September 15

Visit

Ready.alaska.gov/mitigationplan

State:

Date of Plan:

Standard State Hazard Mitigation Plan Review and Approval Status

| | |
|--|---|
| State Point of Contact: Scott Nelsen | Address: Department of Military and Veterans Affairs Division of Homeland Security and Emergency Management P. O. Box 5750 Fort Richardson, AK 99505-5750 |
| Title: 2013 Alaska Hazard Mitigation Plan | |
| Agency: State of Alaska DHS&EM | |
| Phone Number: 907-428-7010 | E-Mail: scott.nelsen@alaska.gov |

| | | |
|---------------------------------------|---------------|--------------|
| FEMA Reviewer: | Title: | Date: |
| Date Received in FEMA Region X | | |
| Plan Not Approved | | |
| Plan Approved | | |
| Date Approved | | |

State: _____

Date of Plan: _____

STANDARD STATE HAZARD MITIGATION PLAN SUMMARY CROSSWALK

The plan cannot be approved if the plan has not been formally adopted.

Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a "Needs Improvement" score.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement.
Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Prerequisite

Adoption by the State: §201.4(c)(6) and §201.4(c)(7)

| NOT MET | MET |
|---------|-----|
| X | |

Planning Process

Documentation of the Planning Process: §201.4(c)(1)

Coordination Among Agencies: §201.4(b)

Program Integration: §201.4(b)

| N | S |
|---|---|
| | |
| | |
| | |

Risk Assessment

Identifying Hazards: §201.4(c)(2)(i)

Profiling Hazards: §201.4(c)(2)(i)

Assessing Vulnerability by Jurisdiction: §201.4(c)(2)(ii)

Assessing Vulnerability of State Facilities:
§201.4(c)(2)(ii)

Estimating Potential Losses by Jurisdiction:
§201.4(c)(2)(iii)

Estimating Potential Losses of State Facilities:
§201.4(c)(2)(iii)

| N | S |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |

Mitigation Strategy

Hazard Mitigation Goals: §201.4(c)(3)(i)

State Capability Assessment: §201.4(c)(3)(ii)

Local Capability Assessment: §201.4(c)(3)(ii)

Mitigation Actions: §201.4(c)(3)(iii)

Funding Sources: §201.4(c)(3)(iv)

| N | S |
|---|---|
| | |
| | |
| | |
| | |
| | |

Coordination of Local Mitigation Planning

Local Funding and Technical Assistance:
§201.4(c)(4)(i)

Local Plan Integration: §201.4(c)(4)(ii)

Prioritizing Local Assistance: §201.4(c)(4)(iii)

| N | S |
|---|---|
| | |
| | |
| | |

Severe Repetitive Loss Mitigation Strategy
(only required for 90/10 under FMA & SRL)

Repetitive Loss Mitigation Strategy:

§201.4(c)(3)(v)

Coordination with Repetitive Loss Jurisdictions
§201.4(c)(3)(v)

| N | S |
|---|---|
| | |
| | |

Plan Maintenance Process

Monitoring, Evaluating, and Updating the Plan:
§201.4(c)(5)(i)

Monitoring Progress of Mitigation Activities:
§201.4(c)(5)(ii) and (iii)

| N | S |
|---|---|
| | |
| | |

STANDARD STATE HAZARD MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED

PLAN APPROVED

| |
|--|
| |
| |

See Reviewer's Comments

State: _____

Date of Plan: _____

PREREQUISITE

Adoption by the State

Requirement §201.4(c)(6): The plan **must** be formally adopted by the State prior to submittal to [FEMA] for final review and approval.

Requirement §201.4(c)(7): The plan **must** include assurances that the State will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c). The State will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|---------|-----|
| | | | NOT MET | MET |
| A. Has the State formally adopted the new or updated plan? | | | X | |
| B. Does the plan provide assurances that the State will continue to comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d)? | 2-5 | | | X |
| SUMMARY SCORE | | | | |

PLANNING PROCESS: §201.4(b): An effective planning process is essential in developing and maintaining a good plan.

Documentation of the Planning Process

Requirement §201.4(c)(1): [The State plan **must** include a] description of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how other agencies participated.

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---------------------|-------|---|
| | | | N | S |
| A. Does the plan provide a narrative description of how the new or updated plan was prepared? | 2-7, Appendix 11, 14, 3 | | | |
| B. Does the new or updated plan indicate who was involved in the current planning process? | 2-1, Appendix 11, 4, 6, 8, 15, 20 | | | |
| C. Does the new or updated plan indicate how other agencies participated in the current planning process? | 2-1, Appendix 20, 11, 14, 3 | | | |
| D. Does the updated plan document how the planning team reviewed and analyzed each section of the plan? | 2-5, Appendix 11 | | | |
| E. Does the updated plan indicate for each section whether or not it was revised as part of the update process? | 2-8 | | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

Coordination Among Agencies

Requirement §201.4(b): *The [State] mitigation planning process **should** include coordination with other State agencies, appropriate Federal agencies, interested groups, and*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---|-------|---|
| | | | N | S |
| A. Does the new or updated plan describe how Federal and State agencies were involved in the current planning process? | 2-2, Appendix 4,7,8,15, 20 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| B. Does the new or updated plan describe how interested groups (e.g., businesses, non-profit organizations, and other interested parties) were involved in the current planning process? | 2-2, Appendix 4,7,8,15, 20 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| C. Does the updated plan discuss how coordination among Federal and State agencies changed since approval of the previous plan? | 2-2, Appendix 4,6,7,8,15 | | | |
| SUMMARY SCORE | | | | |

Program Integration

Requirement §201.4(b): *[The State mitigation planning process **should**] be integrated to the extent possible with other ongoing State planning efforts as well as other FEMA mitigation programs and initiatives.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---|-------|---|
| | | | N | S |
| A. Does the new or updated plan describe how the State mitigation planning process is integrated with other ongoing State planning efforts? | 2-5, Appendix 12 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| B. Does the new or updated plan describe how the State mitigation planning process is integrated with FEMA mitigation programs and initiatives? | 1-1, 2-1, 6-2 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

RISK ASSESSMENT: §201.4(c)(2): *[The State plan must include a risk assessment] that provides the factual basis for activities proposed in the strategy portion of the mitigation plan. Statewide risk assessments must characterize and analyze natural hazards and risks to provide a statewide overview. This overview will allow the State to compare potential losses throughout the State and to determine their priorities for implementing mitigation measures under the strategy, and to prioritize jurisdictions for receiving technical and financial support in developing more detailed local risk and vulnerability assessments.*

Identifying Hazards

Requirement §201.4(c)(2)(i): *[The State risk assessment shall include an] overview of the type ... of all natural hazards that can affect the State*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan provide a description of the type of all natural hazards that can affect the State? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the State, this part of the plan cannot receive a Satisfactory score. | Chapter 3 | | | |
| SUMMARY SCORE | | | | |

Profiling Hazards

Requirement §201.4(c)(2)(i): *[The State risk assessment shall include an overview of the] location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazards addressed in the new or updated plan? | Chapter 3 | | | |
| B. Does the new or updated plan provide information on previous occurrences of each hazard addressed in the plan? | Chapter 3 | | | |
| C. Does the new or updated plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan? | Chapter 3.15 | | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

Assessing Vulnerability

Requirement §201.4(c)(2)(ii): [The State risk assessment *shall* include an] overview and analysis of the State's vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments as well as the State risk assessment. The State *shall* describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. State owned critical or operated facilities located in the identified hazard areas shall also be addressed

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development...

Assessing Vulnerability by Jurisdiction

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan describe the State's vulnerability based on estimates provided in local risk assessments as well as the State risk assessment? | Chapter 4 | | | |
| B. Does the new or updated plan describe the State's vulnerability in terms of the jurisdictions most threatened and most vulnerable to damage and loss associated with hazard event(s)? | Chapter 4 | | | |
| C. Does the updated plan explain the process used to analyze the information from the local risk assessments, as necessary? | Chapter 4 | | | |
| D. Does the updated plan reflect changes in development for jurisdictions in hazard prone areas? | Chapter 4 | | | |
| SUMMARY SCORE | | | | |

Assessing Vulnerability of State Facilities

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan describe the types of State owned or operated critical facilities located in the identified hazard areas? | Chapter 4 | | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

Estimating Potential Losses

Requirement §201.4(c)(2)(iii): [The State risk assessment **shall** include an] overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State **shall** estimate the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development...

Estimating Potential Losses by Jurisdiction

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan present an overview and analysis of the potential losses to the identified vulnerable structures? | Chapter 4 | | | |
| B. Are the potential losses based on estimates provided in local risk assessments as well as the State risk assessment? | Chapter 4 | | | |
| C. Does the updated plan reflect the effects of changes in development on loss estimates? | Chapter 3 &4 | | | |
| SUMMARY SCORE | | | | |

Estimating Potential Losses of State Facilities

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan present an estimate of the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities in the identified hazard areas? | Chapter 4 | | | |
| SUMMARY SCORE | | | | |

State: _____

Date of Plan: _____

MITIGATION STRATEGY: §201.4(c)(3) [To be effective the plan must include a] Mitigation Strategy that provides the State's blueprint for reducing the losses identified in the risk assessment.

Hazard Mitigation Goals

Requirement §201.4(c)(3)(i): [The State mitigation strategy **shall** include a] description of State goals to guide the selection of activities to mitigate and reduce potential losses.

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities...

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan provide a description of State mitigation goals that guide the selection of mitigation activities? | Chapter 5 | | | |
| B. Does the updated plan demonstrate that the goals were assessed and either remain valid or have been revised? | Chapter 5 | | | |
| SUMMARY SCORE | | | | |

State Capability Assessment **Requirement §201.4(c)(3)(ii):** [The State mitigation strategy **shall** include a] discussion of the State's pre-and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including: an evaluation of State laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard-prone areas [and] a discussion of State funding capabilities for hazard mitigation projects

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan include an evaluation of the State's pre-disaster hazard management policies, programs, and capabilities? | Chapter 5 & 6 appendices 6, 15, 16 | | | |
| B. Does the new or updated plan include an evaluation of the State's post-disaster hazard management policies, programs, and capabilities? | Chapter 6, Appendices 6, 15, 16 | | | |
| C. Does the new or updated plan include an evaluation of the State's policies related to development in hazard prone areas ? | Appendix 6, 15, 16 | | | |
| D. Does the new or updated plan include a discussion of State funding capabilities for hazard mitigation projects? | Chapter 6, Appendix 5 | | | |
| E. Does the updated plan address any hazard management capabilities of the State that have changed since approval of the previous plan? | Appendix 14 | | | |

State:

Date of Plan:

SUMMARY SCORE

Local Capability Assessment

Requirement §201.4(c)(3)(ii): *[The State mitigation strategy **shall** include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan present a general description of the local mitigation policies, programs, and capabilities? | Chapter 2, Appendices 6, 17 | | | |
| B. Does the new or updated plan provide a general analysis of the effectiveness of local mitigation policies, programs, and capabilities? | Chapter 2 & 5, Appendices 6, 10, 17 | | | |
| SUMMARY SCORE | | | | |

Mitigation Actions

Requirement §201.4(c)(3)(iii): *[State plans **shall** include an] identification, evaluation, and prioritization of cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering and an explanation of how each activity contributes to the overall mitigation strategy. This section **should** be linked to local plans, where specific local actions and projects are identified.*

Requirement §201.4(d): *Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities...*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|--|-------|---|
| | | | N | S |
| A. Does the new or updated plan identify cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering? | Chapter 5 | | | |
| B. Does the new or updated plan evaluate these actions and activities? | Chapter 5, Appendix 17 | | | |
| C. Does the new or updated plan prioritize these actions and activities? | Chapter 5 | | | |
| D. Does the new or updated plan explain how each activity contributes to the overall State mitigation strategy? | Chapter 5, Appendix 6 | | | |
| E. Does the mitigation strategy in the new or updated section reflect actions and projects identified in local plans? | Chapter 2 & 5 | Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing. | | |
| SUMMARY SCORE | | | | |

State: _____

Date of Plan: _____

Funding Sources

Requirement §201.4(c)(3)(iv): *[The State mitigation strategy **shall** include an] identification of current and potential sources of Federal, State, local, or private funding to implement mitigation activities.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan identify current sources of Federal, State, local, or private funding to implement mitigation activities? | Chapter 6, Appendix 15 | | | |
| B. Does the new or updated plan identify potential sources of Federal, State, local, or private funding to implement mitigation activities? | Chapter 6, Appendix 15 | | | |
| C. Does the updated plan identify the sources of mitigation funding used to implement activities in the mitigation strategy since approval of the previous plan? | Chapter 6, Appendix 15 | | | |
| SUMMARY SCORE | | | | |

COORDINATION OF LOCAL MITIGATION PLANNING

Local Funding and Technical Assistance

Requirement §201.4(c)(4)(i): *[The section on the Coordination of Local Mitigation Planning **must** include a] description of the State process to support, through funding and technical assistance, the development of local mitigation plans.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan provide a description of the State process to support, through funding and technical assistance, the development of local mitigation plans? | Chapter 2 & 6, Appendices 6, 10, 12, | | | |
| B. Does the updated plan describe the funding and technical assistance the State has provided in the past three years to assist local jurisdictions in completing approvable mitigation plans? | Chapter 2 & 6, Appendices 6, 13, 15, 17 | | | |
| SUMMARY SCORE | | | | |

State: _____

Date of Plan: _____

Local Plan Integration

Requirement §201.4(c)(4)(ii): *[The section on the Coordination of Local Mitigation Planning **must** include a] description of the State process and timeframe by which the local plans will be reviewed, coordinated, and linked to the State Mitigation Plan.*

Requirement §201.4(d): *Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities...*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan provide a description of the process and timeframe the State established to review local plans? | Chapter 2, Appendix 6 | | | |
| B. Does the new or updated plan provide a description of the process and timeframe the State established to coordinate and link local plans to the State Mitigation Plan? | Chapter 2, Appendix 6 | | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

Prioritizing Local Assistance

Requirement §201.4(c)(4)(iii): [The section on the Coordination of Local Mitigation Planning **must** include] criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available funding programs, which **should** include consideration for communities with the highest risks, repetitive loss properties, and most intense development pressures.

Further, that for non-planning grants, a principal criterion for prioritizing grants **shall** be the extent to which benefits are maximized according to a cost benefit review of proposed projects and their associated costs.

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities...

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---|-------|---|
| | | | N | S |
| A. Does the new or updated plan provide a description of the criteria for prioritizing those communities and local jurisdictions that would receive planning and project grants under available mitigation funding programs? | Chapter 2, 6, Appendix 6, 10, | | | |
| B. For the new or updated plan, do the prioritization criteria include, for non-planning grants, the consideration of the extent to which benefits are maximized according to a cost benefit review of proposed projects and their associated cost? | Chapter 5 & 6, Appendix 5 & 6 | | | |
| C. For the new or updated plan, do the criteria include considerations for communities with the highest risk? | Chapter 4, 5 & 6, Appendix 6 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| D. For the new or updated plan, do the criteria include considerations for repetitive loss properties? | Chapter 4, 5 & 6 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| E. For the new or updated plan, do the criteria include considerations for communities with the most intense development pressures? | Chapter 4, 5 & 6, Appendix 6 | <i>Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.</i> | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

PLAN MAINTENANCE PROCESS

Monitoring, Evaluating, and Updating the Plan **Requirement §201.4(c)(5)(i):** *[The Standard State Plan Maintenance Process **must** include an] established method and schedule for monitoring, evaluating, and updating the plan.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|---------------------|-------|---|
| | | | N | S |
| A. Does the new or updated plan describe the method and schedule for monitoring the plan? (e.g., identifies the party responsible for monitoring , includes schedule for reports, site visits, phone calls, and/or meetings) | Chapter 2, Appendix 11 | | | |
| B. Does the new or updated plan describe the method and schedule for evaluating the plan? (e.g., identifies the party responsible for evaluating the plan, includes the criteria used to evaluate the plan) | Chapter 2, Appendix 11 | | | |
| C. Does the new or updated plan describe the method and schedule for updating the plan? | Chapter 2, Appendix 11 | | | |
| D. Does the updated plan include an analysis of whether the previously approved plan's method and schedule worked, and what elements or processes, if any, were changed? | Chapter 2 | | | |
| SUMMARY SCORE | | | | |

Monitoring Progress of Mitigation Activities **Requirement §201.4(c)(5)(ii):** *[The Standard State Plan Maintenance Process **must** include a] system for monitoring implementation of mitigation measures and project closeouts. Requirement §201.4(c)(5)(iii):* *[The Standard State Plan Maintenance Process **must** include a] system for reviewing progress on achieving goals as well as activities and projects in the Mitigation Strategy.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|--|-------|---|
| | | | N | S |
| A. Does the new or updated plan describe how mitigation measures and project closeouts will be monitored? | Chapter 2.5 | | | |
| B. Does the new or updated plan identify a system for reviewing progress on achieving goals in the Mitigation Strategy? | Chapter 2.5, 5, appendix 3 & 6 | | | |
| C. Does the updated plan describe any modifications, if any, to the system identified in the previously approved plan to track the initiation, status, and completion of mitigation activities? | Chapter 2.5, 5, Appendix 3 & 11 | | | |
| D. Does the new or updated plan identify a system for reviewing progress on implementing activities and projects of the Mitigation Strategy? | Chapter 2.5, 5, Appendix 3 & 14 | | | |
| E. Does the updated plan discuss if mitigation actions were implemented as planned? | Chapter 5, Appendix 13 & 17 | <i>Note: Related to §201.4 (c)(3)(iii)</i> | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

SEVERE REPETITIVE LOSS STRATEGY (*only required for 90/10 under FMA & SRL*)

Repetitive Loss Mitigation Strategy

Requirement §201.4(c)(3)(v): A State may request the reduced cost share authorized under §79.4(c)(2) of this chapter for the FMA and SRL programs, if it has an approved State Mitigation Plan ... that also identifies specific actions the State has taken to reduce the number of repetitive loss properties (which **must** include severe repetitive loss properties), and specifies how the State intends to reduce the number of such repetitive loss properties.

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|---|--|---|---------|-----|
| | | | NOT MET | MET |
| A. Does the new or updated plan describe State mitigation goals that support the selection of mitigation activities for repetitive loss properties (see also Part 201.4(c)(3)(i))? | Chapter 5 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| B. Does the new or updated plan consider repetitive loss properties in its evaluation of the State's hazard management policies, programs, and capabilities and its general description of the local mitigation capabilities (see also Part 201.4(c)(3)(ii))? | Chapter 5, Appendix 6 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| C. Does the new or updated plan address repetitive loss properties in its risk assessment (see also Part 201.4(c)(2))? | Chapter 5 & 6 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| D. Does the new or updated plan identify, evaluate and prioritize cost-effective, environmentally sound, and technically feasible mitigation actions for repetitive loss properties (see also Part 201.4(c)(3)(iii))? | Chapter 5 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| E. Does the new or updated plan describe specific actions that have been implemented to mitigate repetitive loss properties, including actions taken to reduce the number of severe repetitive loss properties? | Chapter 5, 6, Appendix 17, | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| F. Does the new or updated plan identify current and potential sources of Federal, State, local, or private funding to implement mitigation activities for repetitive loss properties (see also Part 201.4(c)(3)(iv))? | Chapter 6, Appendix 15, 17 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| SUMMARY SCORE | | | | |

State:

Date of Plan:

Coordination with Repetitive Loss Jurisdictions

Requirement §201.4(c)(3(v)): *In addition, the plan **must** describe the strategy the State has to ensure that local jurisdictions with severe repetitive loss properties take actions to reduce the number of these properties, including the development of local mitigation plans.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | |
|--|--|--|-------|---|
| | | | N | S |
| A. Does the new or updated plan provide a description of the State process to support, through funding and technical assistance, the development of local mitigation plans in communities with severe repetitive loss properties (see also Part 201.4(c)(4)(i))? | Chapter 5 & 6, Appendix 6 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| B. Does the new or updated plan include considerations for repetitive loss properties in its criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available mitigation funding programs (see also Part 201.4(c)(3)(iii))? | Chapter 5 & 6, Appendix 6 | [Note: Only required for SRL 90/10 under FMA & SRL] | | |
| SUMMARY SCORE | | | | |

State: _____

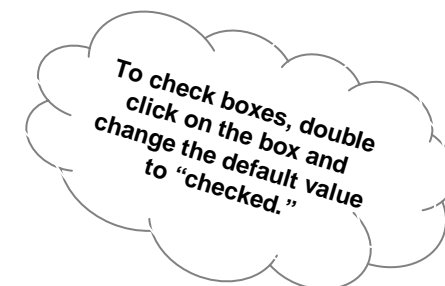
Date of Plan: _____

Matrix A: Profiling Hazards

This matrix can assist FEMA in scoring each hazard. States may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the State. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.4(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An “N” for any element of any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

| Hazard Type | Hazards Identified Per Requirement §201.4(c)(2)(i) | A. Location | | B. Previous Occurrences | | C. Probability of Future Events | |
|---------------------|--|--------------------------|--------------------------|----------------------------|--------------------------|------------------------------------|--------------------------|
| | Yes | N | S | N | S | N | S |
| Avalanche | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Coastal Erosion | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Coastal Storm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dam Failure | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Drought | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Earthquake | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Expansive Soils | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Extreme Heat | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Flood | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hailstorm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hurricane | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Land Subsidence | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Landslide | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Levee Failure | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Severe Winter Storm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tornado | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tsunami | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Volcano | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wildfire | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Windstorm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Legend:**

§201.4(c)(2)(i) Profiling Hazards

A. Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the **new or updated** plan?B. Does the plan provide information on previous occurrences of each hazard addressed in the **new or updated** plan?C. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the **new or updated** plan?

State: _____

Date of Plan: _____

Matrix B: Assessing Vulnerability

This matrix can assist FEMA in scoring each hazard. States may find the matrix useful to ensure that their plan addresses each requirement. Note that this matrix only includes items for Requirements §201.4(c)(2)(ii) and §201.4(c)(2)(iii) that are related to specific natural hazards that can affect the State. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.4(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An “N” for any element of any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

| Hazard Type | Hazards Identified Per Requirement §201.4(c)(2)(i) | 1. Vulnerability by Jurisdiction | | 2. Vulnerability to State Facilities | | 3. Loss Estimate by Jurisdiction | | 4. Loss Estimate of State Facilities | |
|---------------------|--|----------------------------------|--------------------------|--------------------------------------|--------------------------|----------------------------------|--------------------------|--------------------------------------|--------------------------|
| | Yes | N | S | N | S | N | S | N | S |
| Avalanche | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Coastal Erosion | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Coastal Storm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dam Failure | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Drought | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Earthquake | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Expansive Soils | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Extreme Heat | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Flood | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hailstorm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hurricane | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Land Subsidence | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Landslide | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Levee Failure | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Severe Winter Storm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tornado | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Tsunami | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Volcano | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wildfire | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Windstorm | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

To check boxes, double click on the box and change the default value to “checked.”

Legend

§201.4(c)(2)(ii) Assessing Vulnerability by Jurisdiction (see element B)

1. Does the **new or updated** plan describe the State's vulnerability in terms of the jurisdictions most threatened and most vulnerable to damage and loss associated with hazard event(s)?

§201.4(c)(2)(ii) Assessing Vulnerability to State Facilities (see element A)

2. Does the **new or updated** plan describe the types of State owned or operated critical facilities located in the identified hazard areas?

§201.4(c)(2)(iii) Estimating Potential Losses by Jurisdiction (see element A)

3. Does the **new or updated** plan present an overview and analysis of the potential losses to the identified vulnerable structures?

§201.4(c)(2)(iii) Estimating Potential Losses of State Facilities (see element A)

4. Does the **new or updated** plan present an estimate of the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities in the identified hazard areas?

2015 Annual Review Summary of Changes

Page 3-4, paragraph 2, removed the comment “rainfall June-November”

Page 3-4, Erosion, added “thawing permafrost” as a factor in the erosion process

Page 3-31, Figure 3.3.5; although there is clearly an error in the map legend, the error is sourced to the original publication. The figure will remain until there is a more suitable replacement.

Page 3-50, Figure 3.5.4; outdated fault map replaced with the Koehler QFF map.

Page 3-65, paragraph 1, “vegetation” added as a component considered in ground failure analysis.

Page 3-65, “*Seasonally Frozen Ground*”; rewrote the paragraph as follows:

Frost Action

Frost action is repeated cycles of freezing and thawing of water in the pores, cracks, and other openings of a substance, such as soil. Frost action may gradually force man-made structures such as porches, fence posts, and utility poles out of the ground, commonly referred to as “frost jacking” or “frost heaving”(Figure 3.8.1).

Page 3-68, 4-42 Figures 3.8.1& 4.7; replaced outdated permafrost map with the Jorgenson and others 2008 map.

Page 5-14, Goal 4: Objective 4.2; added DNR/DGGS as points of contact.

SHMP Annual Review 2015 Summary of Changes

Section 1

1.2 Authority: Replaced FEMA's Interim Final Rule of 2002 with their Final Rule of 2009.

Updated information contained in **1.10 Space Transportation** to March 2016.

Section 2

No changes

Section 3:

Added **Climate Factors** sub-section for Floods, Fires, & Severe Weather

3.1 Floods

Added **Aufeis (Ice Overflow) Flood** into flood hazard profiles.

Added Figure 3.1.2 March 2015 aufeis event Dalton Hwy.

Moved Ivu or ice override hazard to **3.7 Severe Weather**

Added **Climate Influence upon Flooding** sub-section and figure 3.1.3 on p. 3-4

Added the following disasters to flood history, p. 3-10:

- Snowmelt Floods, AK-15-252
- Ice Overflow, (Aufeis) Floods, AK-15-253

3.2 Wildland Fire

Added **Wildland Fire History** section p. 3-22

Updated **Conflagration Fire History**

3.3 Avalanche

No changes

3.4 Volcano

No changes

3.5 Earthquake

Added January 2016 earthquake M7.1 to history

3.6 Tsunami

1. p. 3-53: added 1957 Aleutian Earthquake Tsunami.
2. P. 3-53 added 1883 Augustine Volcanic Tsunami
3. P. 3-52 re-defined the types of tsunamis per NOAA guidelines (local, regional, distant)

3.7 Severe Weather

Moved Aufeis from Severe Weather to Section 3.1 Flood.

Added Figures 3.7.1, 3.7.7, 3.7.8, 3.7.9, & 3.7.10

Added DR-4162 to severe weather history p. 3.63

Added coastal surge event AK-09-230-09.

Added "Climate Factors" p. 3.63 for severe storms and sea ice.

3.8 Ground Failure

Added “Climate Factors” for permafrost degradation, p. 3.66

Added Figure 3.8.1

3.9 Erosion

No changes

3.10 Dams

No changes

3.11 Hazardous Materials

Re-wrote and updated sections 3.11.1 & 3.11.2 to 2014. Added **3.11.3 Contaminated Sites in Alaska** and associated figures.

3.12 Terrorism

No changes

3.13 Technological, Public Health, and Human-Caused

RE-wrote the section, added Figure 3.13.2 and updated statistical information to 2014 (best available).

3.14 Economic

No changes

Section 4

No changes

Section 5

Added under section **5.1.3 Goals, Objective, and Actions** subsection **All Hazards**, with 2 goals.

5.1 Floods

Added Figures 5.1.2 and 5.1.3

Updated Table 5.1.1

Added Hughes, Galena, Alakanuk, Quinhagak, Kotlik, and Sleetmute to section **5.1.2 Hazard Mitigation Successes**

Deleted Objectives 3.2 and 3.3 p.5-17. Unincorporated communities in the Unorganized Borough have no jurisdictional authority to either implement or enforce floodplain ordinances. FEMA and the State cannot implement and enforce floodplain ordinances on their behalf.

Deleted Goal 4: Reduce Flooding. Goal 4 and Goal 1 are identical. Actions previously located under Goal 4 are now under Goal 1 as Actions 1.5.3, 1.5.4, and 1.6.2.

5.2 Wildfires

Added Community Wildfire Protection Plans under 5.2.2

Updated all goals, objectives, and actions for 2016.

5.3 Avalanches

Added the Alaska Avalanche Information Center under section 5.3.1
Updated all goals, objectives, and actions for 2016.

5.4 Volcanoes

Updated all goals, objectives, and actions for 2016

5.5 Earthquakes

Updated all goals, objectives, and actions for 2016

5.6 Tsunamis & Seiches

Added Figures, 5.6.3 & 5.6.5

Added new tsunami hazard map links

Updated all web links

Updated all goals, objectives, and actions for 2016.

5.7 Severe Weather

Updated all goals, objectives, and actions for 2016.

5.8 Ground Failure

Added **Completed Goals, Objectives, and Actions** to section **5.8.2 Hazard Mitigation Successes**.

Updated all goals, objectives, and actions for 2016.

5.9 Erosion

Added the following programs under **5.9.1 Programs and Strategies**:

- Alaska Climate Change Impact Mitigation Program
- Alaska Coastal Protection Project
- Newtok Planning Group

Added Figure 5.9.1 and 5.9.3

Added the following completed initiatives under **5.9.2 Hazard Mitigation Successes**:

- Newtok Relocation Strategic Management Plan
- Innovative Readiness Training Program
- McGrath Riverbank Stabilization

Added **Completed Actions** under **5.9.2 Hazard Mitigation Successes**

Updated all goals, objectives, and actions for 2016.

5.10 Dams

Added **Completed Goals, Objectives, and Actions** under **5.10.2 Hazard Mitigation Successes**.

Updated all goals, objectives, and actions for 2016.

5.11 Hazardous Materials

Added **Completed Goals Objectives, and Actions** under **5.11.2 Hazard Mitigation Successes**.

Updated all goals, objectives, and actions for 2016.

5.12 Terrorism

Added **Completed Goals, Objectives, and Actions** under **5.12.2 Hazard Mitigation Successes**.

Updated all goals, objectives, and actions for 2016.