



FEMA

August 22, 2013

Honorable James Kacsh
Mayor, City of Cordova
P.O. Box 1210
602 Railroad Avenue
Cordova, Alaska 99574

Dear Mayor Kacsh:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***Cordova Local Hazards Mitigation Plan*** as a local plan as outlined in 44 CFR Part 201. With approval of this plan, the City of Cordova is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through August 21, 2018.

The plan's approval provides eligibility to apply for hazard mitigation projects through your State. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs. Approved mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at www.fema.gov/business/nfip/crs.shtm or through your local floodplain manager.

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

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Carey", written over a blue circular stamp.

Mark Carey, Director
Mitigation Division

cc: Ann Gravier, Alaska Division of Homeland Security and Emergency Management

Enclosure

BH:bb

City of Cordova, Alaska

Local Hazards Mitigation Plan



**Date of Plan March 8, 2008
Adopted August 6, 2008
Updated 2013**

**Originally Prepared by:
City of Cordova
WHPacific Incorporated
Bechtol Planning and Development**

Updated by: City of Cordova

Acknowledgements

Cordova City Council

Jim Kallander, Mayor
David Reggiani, Vice Mayor
David Allison
Robert Beedle
Bret Bradford
E.J. Cheshier
James Kacsh
Timothy Joyce

Cordova Planning Commission

Tom Bailer, Chair
John Greenwood
Greg LoForte
Tom McGann
Scott Pegau
David Reggiani, City Council
John Baenen

City Staff

Samantha Greenwood, City Planner
P.O. Box 1210
Cordova, Alaska 99574
Phone: (907) 424-6233
Email: planning@cityofcordova.net
City Website: <http://www.cityofcordova.net>

Shannon Joekay, Assistant Planner
P.O. Box 1210
Cordova, Alaska 99574
Phone: (907) 424-6220
Email: planning2@cityofcordova.net
City Website: <http://www.cityofcordova.net>

Technical Assistance

Scott Nelsen, Alaska State DHS&EM
Taunnie Boothby, Dept. of Commerce, Community and Economic Development

Photography

All Photography provided by the City of Cordova Planning Department

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The update was financed by City of Cordova.

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Acronyms

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

**CITY OF CORDOVA, ALASKA
RESOLUTION 08-08-33**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CORDOVA,
ALASKA, ADOPTING THE LOCAL HAZARDS MITIGATION PLAN**

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

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

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

WHEREAS, the Cordova Local Hazards Mitigation Plan has been sent to the Alaska Division of Homeland Security and Emergency Management and the Federal Emergency Management Agency and it has received their approval.

NOW, THEREFORE, BE IT RESOLVED, that the Cordova City Council, hereby adopts the City of Cordova Local Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the City of Cordova will provide this resolution to the Alaska Division of Homeland Security and Emergency Management and the Federal Emergency Management Agency officials.

ADOPTED BY THE CITY OF CORDOVA THIS 6TH DAY OF AUGUST, 2008




Timothy L. Joyce, Mayor

ATTEST:


Lila J. Koplin, CMC, City Clerk

Chapter 1. Success and Changes

Mitigation Plan Update Summary

Numerous mitigation projects have been accomplished or initiated since this plan was last updated. In addition, some projects were added to the plan. The primary obstacle to implementation of larger projects is lack of funding and personnel. Funding is not anticipated to improve, thus community resilience in the long term could be compromised. Still, the priority of current projects remains the same. If funding eludes the most significant projects, work will continue on those projects that require fewer monetary resources. No records indicate that the plan was reviewed annually. Efforts to review the plan in this cycle will include a City Council workshop that will focus on their opportunity to use this plan in their prioritization efforts as they commit resources.

Community education with regards to this updated plan and its benefits will commence. Sharing the goals in this plan amongst the City Council, the Emergency Management Organization and the public at large will increase the probability that the plan will actually be used, leading to a long-term community vision for increased resilience.

Mitigation Projects Successfully Accomplished

Flood and Erosion Projects

- 2008 FLD-3. Letter of Map Revision for Flood Insurance Rate Maps for North Fill (2008) and South Fill (2001). High priority. Accomplished by the City of Cordova. **Letter was drafted and distributed.**
- 1986 FLD 15. Require that all new structures in the flood zone be constructed according to NFIP requirements and set back from the river shoreline to lessen future erosion concerns and costs. High priority. Accomplished by the City of Cordova. **This has been accomplished for Cordovan property, if it is in the mapped flood zone**

Severe Weather Projects

- Winter of 2011/12 Accomplished by City of Cordova

Survived declared snow emergency, SNOWPOCALYPSE 2012. After three years of consistent disaster preparation training, the City of Cordova Incident Management Team successfully activated the EOC and managed the local disaster in a timely, efficient manner. As a result, damages and injuries were minimized.

- 2012 Implementing by the City of Cordova
A system to identify when snow pack conditions and future weather conditions make roof clearing advisable. Developing a system to have qualified person/team determine this level and developing plan to get that word out to community to shovel roofs.
- 2012 Accomplished by the City of Cordova
City code for Ground Snow Load was changed to 150 pounds per square foot ground snow load.
- 2012 Project SW-1 Research and consider instituting the National Weather Service program of “*Storm Ready*”. Researching and Implementing by City of Cordova. High priority.
This is being implemented alongside and included in the “Tsunami READY” program for Cordova.
- 2012 Project SW-2. Conduct special awareness activities, such as Winter Weather Fair, Flood Awareness Week, etc. Accomplished during April 2012 and November 2012, respectively. (EMPG Grant and Sound Alternatives) High Priority.
Flood awareness Week was timed to prepare citizens for the possible effects of the excessive record-breaking snowfall in the previous winter. Winter Weather Fair (November 2012) prepared them for the NEXT winter.
- 2009-2012 Project SW-3. Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability
Accomplished/ongoing by City of Cordova. (EMPG Grant). High Priority.
This takes place almost monthly, through the Neighborhood Campaign Program.
- 2012 Accomplished by City of Cordova (EMPG Grant and Planning Department)
The Neighborhood Campaign banded together neighborhoods for early, organized response to ANY severe weather or disaster. Neighborhood Leaders are currently being solicited/trained and a multilayered GIS map is being created to assist in disaster response.

- 2009-2012 Project SW-4. Encourage weather resistant building construction materials and practices. Accomplished by City of Cordova. Medium Priority.

Wild land Fire Projects

- Ongoing. Accomplished by the City of Cordova
Continue to support the fire department with adequate firefighting equipment and training.
- 2004 Project WF-2. Promote Fire Wise building design, siting, and materials for construction. Accomplished by the Native Village of Eyak. High Priority.
- 2004 Project WF-3: Enhance public awareness of potential risk to life and personal property. Encourage mitigation measures in the immediate vicinity of their property. Accomplished by the Native Village of Eyak. High Priority.
This project was accomplished in conjunction with project WF-2.

Earthquake Projects

- 2011 Project E-2. Identify buildings and facilities that must be able to remain operable during and following an earthquake event. Accomplished by City of Cordova (EMPG staff). High priority.
This project was accomplished during COOP Plan formulation.

Tsunami/Seiche Projects

- 2009 Being Implemented by the City of Cordova (NTHMP Grant)
Tsunami Warning Sirens are currently being installed in the City of Cordova. Additional sirens will be installed at Whitshed road and the Six Mile subdivision.
- 2009-2012 Project T/S-1: Participation in the Tsunami Awareness Program accomplished by the City of Cordova (EMGP Grant). High Priority
This is part of the Tsunami READY program that Cordova is currently finishing up.
- 2012 Project T/S-2. Tsunami Ready Community Designation Being Implemented by the City of Cordova. (EMPG grant) High Priority
Tsunami Ready Community Designation Signs have arrived, routes have been determined and posting of signs has begun.
- 2010-2012 Project T/S-4. Update Cordova Emergency Operations Plan Accomplished by City of Cordova (EMPG Grant)

Emergency Operations Plan was completed and used in exercises regarding natural hazards, including tsunami danger. This was accomplished by participation in numerous local exercises , as well as participating in the statewide AK Shield 2010 and 2012 Alaska Shield 2010 (April 30 - May 1). More than 770 participants from 35 organizations took part in 2010.

Additionally, Mass Inoculation Exercises in 2009 and 2013 utilized the EOP.

Avalanche/Landside Projects

- 2000 Project A/L-1. Prohibit new construction in avalanche zones. Accomplished by City of Cordova. Medium Priority.
The City of Cordova adopted avalanche zoning district ordinances following the loss of life and destruction of property during the Central Gulf Coast Storm event, December 1999 through February 2000
- 2000 Project A/L-3. Enact buyout of homes in avalanche paths. Accomplished by FEMA and City of Cordova. Low Priority.
Funding from the Hazard Mitigation Grant Program (HMGP) was used to buy and/or relocated homes in Cordova. This project removed individuals from the high hazard avalanche zone and preserved the land as open space in perpetuity
- 2000 Accomplished by City of Cordova
Copper River Highway Avalanche Plan was written for City *The “Avalanche Hazard Analysis and Mitigation Recommendations for 5.3 and 5.5 Mile paths, Copper River Highway, Cordova Alaska”*, was written by Doug Fesler and Jill Fredston for the City in the aftermath of the 2000 avalanche. All recommendations specific to those avalanches paths have already been accomplished.
- 2000 Accomplished by City of Cordova and the State of AK
Copper River Highway Avalanche Monitoring. The City of Cordova and the State of AK have been jointly funding a contracted position for avalanche monitoring on the Copper River Highway.

Technological, Public Health, Human-Caused, and Hazardous Materials Hazards

- 2000 Project TPHH-4: Participate in regional oil spill drills/exercises. Accomplished by City of Cordova and the State of AK. Priority High.
Cordova fully participated in the BP Oil Spill drill in fall 2011, gathering all the stakeholders in the process.

Significant Mitigation Plan Changes

Table 2 Page 5 Continued Plan Development, deleted- discussion is adequate

Table 4 Page 15 Community Information, deleted- not required and contact info changes routinely

Table 11 Page 41 FIRM Zones, deleted because we do not have all those zones...applicable Zones can be found on the City map

Tables 15 and 16 Combined in individual tables for each hazard for easier viewing

Page 23 Page 23 Hazard DROUGHT dropped from plan. Drought is not a hazard for Cordova.

Page 41 Page 33 Project FLD-1 (from previous plan) has been removed from the mitigation projects. It is no longer considered a priority. The channels have shifted and there is not a current threat.

Page 44 Project FLD-6 Heney Creek Waterline Repair (from previous plan) has been removed from the plan. The decision has been made to replace it instead

Page 45 Project FLD- 9 and FLD-13 Wording on these projects has been revised to better reflect the City's ability to accomplish it

Chapter 2. Planning Process and Methodology

Introduction

The scope of this plan is natural hazards: flooding, erosion, severe weather, wild land fire, avalanche, tsunami and earthquake hazards, and man-made hazards such as oil spills, hazardous materials and other hazards.

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

Plan Development Location

Cordova is located at the southeastern end of Prince William Sound in the Gulf of Alaska. The community was built on Orca Inlet, at the base of Eyak Mountain. It lies 52 air miles southeast of Valdez and 150 miles southeast of Anchorage.



The community lies at approximately 60.542780° North Latitude and -145.757500° (West) Longitude. (Sec. 28, T015S, R003W, Copper River Meridian.) Cordova is located in the Cordova Recording District. The area encompasses 61.4 sq. miles of land and 14.3 sq. miles of water.

Project Staff

2012 Plan Update Staff

City Planner, Samantha Greenwood
Assistant City Planner, Shannon Joekay
Emergency Management Planner, Joanie Behrends
Public Works Director, Moe Zamarron
Water/Sewer Division Supervisor, Malvin Fajardo
Cordova Planning and Zoning Commission
Hazard Mitigation Planner, Scott Nelsen of the Division of Homeland Security & Emergency Management (DHS&EM) provided technical assistance and reviewed the drafts of this plan.

Taunnie Boothby of the Dept. of Commerce, Community and Economic Development provided additional guidance during the update.

2008 Original Plan

WHPacific, Incorporated and Eileen R. Bechtol, AICP, of Bechtol Planning & Development wrote the original plan with the City input.

Plan Research

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

1. *Alaska State Hazard Plan*. Prepared by and for DHS&EM. September 2004
2. *Alaska State Hazard Plan*. Prepared by and for DHS&EM. October 2010
3. *Cordova Comprehensive Plan, Draft*. Prepared by and for City of Cordova. October 20, 2006.
4. *Cordova Comprehensive Plan*, Prepared by and for City of Cordova. 2008
5. *Cordova Emergency Operation Plan*. Prepared by and for City of Cordova. May 2010.
6. *Cordova Coastal Management Plan 2007 Amendment*. Prepared by Bristol Engineering for the Cordova Coastal District, 2007.

7. *Eyak River Flood Control Study*. Prepared by USCOE for the City of Cordova. July 14, 2003.
8. *Flood Mitigation Plan*. Prepared by and for the City of Cordova. 1996
9. *Flood Insurance Study*. Prepared by U.S. Department of Housing & Urban Development Federal Insurance Administration (now FEMA) for the City of Cordova. October 1978.
10. FEMA How to Guides
 - a. Getting Started: Building Support For Mitigation Planning (FEMA 386-1)
 - b. Understanding Your Risks: Identifying Hazards And Estimating Losses (FEMA 386-2)
 - c. Developing The Mitigation Plan: Identifying Mitigation Actions And Implementing Strategies (FEMA 386-3)
 - d. Bringing the Plan to Life: Implementing the Hazard Mitigation Plan (FEMA 386-4)
 - e. Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)
11. *Evaluation of Recent Channel Changes on the Scott River Near Cordova, Alaska*. Prepared by USDA-Forest Service Chugach National Forest Anchorage, Alaska, Blanchet, Hydrologist. December 1983.
12. *Local Mitigation Plan Review Guide*. (FEMA October 2011)
13. *DCED Community Information*:
http://www.dced.state.ak.us/dca/commdb/CF_COMDB.htm.
14. *FEMA Benefit-Cost Analysis Website*:
<http://www.fema.gov/government/grant/bca>.
15. American Planning Association: <http://www.planning.org>
16. Association of State Floodplain Managers: <http://www.floods.org>
17. Association of State Floodplain Managers: <http://www.floods.org>
18. Developing the Implementation Strategy: www.pro.gov.uk
19. Federal Emergency Management Agency:
<http://www.fema.gov/plan/mitplanning/>
20. Community Rating System: <http://www.fema.gov/business/nfip/crs.shtm>
21. Flood Mitigation Assistance Program:
<http://www.fema.gov/government/grant/fma/index.shtm>

22. Hazard Mitigation Grant Program:
<http://www.fema.gov/government/grant/hmgrp/>
23. Individual Assistance Programs:
http://www.fema.gov/assistance/process/individual_assistance.shtm
24. Interim Final Rule: <http://www.fema.gov/library/viewRecord.do?id=1933>
25. National Flood Insurance Program: <http://www.fema.gov/nfip>
26. Public Assistance Program:
<http://www.fema.gov/government/grant/pa/index.shtm>

Public Involvement

Site visits by Taunie Boothby Department of Commerce, Community and Economic Development on September 25, 2011 and February 29, 2012 assisted in the initial updating process.

The Planning and Zoning Commission reviewed the plan, provided input and held public meetings to provide for public input on August 4th, 2012, and October 9th, 2012.

All Planning and Zoning meetings are noticed via the newspaper, radio, GCI scanner, flyers and the city web page.

Cordova's Emergency Management Organization (local stakeholders who meet for monthly disaster preparation meetings) and the general public were invited to attend the LHMP kickoff meeting. None of the general public attended, however the emergency managers did and were briefed on the update. They approved the project and requested they be notified when the plan went to the Planning and Zoning Commission for review.

The below entities/communities were contacted and asked to participate in the 2012-13 plan update

- Chugach Alaska Corporation, Regional Native Corporation
- The Native Village of Eyak
- Eyak Corporation
- The Tatitlek Corporation
- Copper River Watershed Project
- Prince William Sound Science Center
- Prince William Sound Regional Citizens' Advisory Council

A copy of the update LHMP is available for public perusal during the update process at the Planning Department, City Hall, and online at the city website under the planning department tab:

Plan Implementation

DHS&EM and FEMA will review and pre-approve the updated plan. After that pre-approval Planning and Zoning will review and make a recommendation to City Council to adopt the plan by resolution.

The City Council has the authority to promote sound public policy regarding hazards. The Hazards Mitigation Plan will be assimilated into other Cordova plans and documents as they come up for review according to each plans' review schedule.

Please see the following table for plan review schedules.

Table 1. Cordova Plans

Document	Completed	Next Review
Cordova Comprehensive Plan	Draft Plan -2006	5 years from adoption
Cordova Emergency Operations Plan	2010	Annually
Cordova COOP Plan	2011 (not yet adopted)	Annually
Comprehensive Economic Development Strategy Plan	2003	As Needed
Avalanche Hazard Plan	Date	As Needed
Tourism Plan	1999	As Needed
Parks and Recreation Plan	2000	As Needed
Waterfront Plan	2000	As Needed

Continuing Review and Plan Development

The Cordova LHMP will be reviewed on an annual basis to determine whether the plan reflects the current situation in regards to natural hazards. If funding is available, the plan will be updated every 5 years, after a Federally Declared Disaster, or as required by DHS&EM. The City Planner is the responsible City employee assigned to this task, as time and funding allow.

The Cordova LHMP will be further developed as funding and time allow. Areas to be addressed may include additional information on about hazards not currently covered in the plan or additional information on described hazards.

Continued Public Involvement

The plan will be available for public review and input will be accepted by City Planner. Below is a list of the places where the plan will be available to the public.

1. City website:
<http://www.cityofcordova.net/images/planning/resources/Local%20Hazards%20Mitigation%20Plan.pdf>
2. A hard copy will be kept in the planning department at City Hall
3. On an annual basis the Planning Commission will review the plan at an annual meeting following all public notice procedures.

Methodology

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, and disruption to local and regional economies, environmental damage and disruption, and the amount of public and private funds spent to assist with recovery.

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

A risk assessment typically consists of three components:

1. Hazards Identification - The first step in conducting a risk assessment is to identify and profile hazards and their possible effects on the jurisdiction. This information can be found in Chapter 3: Hazards.
2. Vulnerability Assessment – Step two is to identify the jurisdiction's vulnerability; the people, infrastructure and property that are likely to be affected. It includes everyone who enters the jurisdiction including employees, commuters, shoppers, tourists, and others.
3. Risk analysis - Step three is the process of defining and analyzing the dangers to individuals, businesses and government agencies posed by potential natural and human-caused adverse events.

Hazards Identification Methodology

Alaska State Hazard Mitigation Plan, 2007 identified hazard and local officials verified when possible. A table from the state plan is in chapter 3.

Vulnerability Assessment Methodology

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

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

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

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

Critical facilities may include:

- Essential facilities, which are necessary for the health and welfare of an area and are essential during response to a disaster, including hospitals, fire stations, police stations, shelters, hospital alternate care sites, pet shelter, and other emergency facilities;
- Transportation systems such as highways, water ways, harbor facilities, and airways;
- Utilities, water treatment plants, communications systems, power facilities;
- High potential loss facilities such as bulk fuel storage facilities; and
- Hazardous materials sites.

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

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

Chapter 3 of this document. This hazard plan includes an inventory of critical facilities from the records and land use map.

Facilities were designated as critical if they are:

- (1) vulnerable due to the type of occupant (children, disabled or elderly for example);
- (2) critical to the community’s ability to function (roads, power generation facilities, water treatment facilities, etc.);
- (3) have a historic value to the community (museum, cemetery);
- (4) critical to the community in the event of a hazard occurring (emergency shelters, hospital alternative care site, pet shelter, etc.).

Risk Assessment Methodology

An example of the results of a risk analysis would be several schools exposed to one hazard but one school may be exposed to four different hazards. A multi-hazard approach will identify such high-risk areas and indicate where mitigation efforts should be concentrated.

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

Federal Requirement for Risk Assessment

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

Table 2. Federal Requirements

Section 322 Requirement	How is this addressed?
Identifying Hazards	Cordova city staff and the Cordova Disaster Management Team identified natural hazards at community meetings, which were used in developing the Plan.
Profiling Hazard Events	The hazard-specific sections of the Cordova LHMP provide documentation for all natural hazards that may affect the City. Where information was available, the Plan lists relevant historical hazard events.
	Vulnerability assessments for floods/erosion,

Assessing Vulnerability: Identifying Assets and Estimating Potential Losses of Critical Facilities	severe weather, wild land fire, earthquakes, avalanches and tsunamis have been completed and are contained within the hazard chapter. Additional vulnerability assessments may be added as they are funded and completed.
Assessing Vulnerability: Analyzing Development Trends	The Community Profile Section and Chapter 3 include a description of development in Cordova.

Economic Analysis

FEMA and DHS&EM require that the city perform a benefit/cost analysis of mitigation projects when applying for grant funds for actual project. This section briefly outlines what a cost/benefit analysis entails and provides information on where to obtain information when the city applies for project specific grants.

Only mitigation options with essentially no cost can be accurately assessed at this time. The data necessary to conduct an accurate cost-benefit analysis of mitigation actions that require significant investments, such as engineering analysis or project design is not currently available, but will be added as resources allow further study.

Chapter 4, Mitigation Strategy, outlines Cordova’s overall strategy to reduce its vulnerability to the effects of the hazards studied. Originally, the planning effort was limited to the *natural* hazards determined to be of the most concern; flooding/erosion, severe weather earthquake, avalanche and tsunamis. Additions include *manmade* hazards such as technology, public health crisis and hazardous material spills.

The City of Cordova will use the following FEMA required factors to prioritize mitigation project items should funding become available.

1. Extent the project reduces risk to life.
2. Extent to which benefits are maximized when compared to the costs of the project.
3. Project protects critical facilities or critical city functionality.
 - A. Hazard probability.
 - B. Hazard severity.

Please see specific projects, with baseline cost estimates in Chapter 4.

Cordova will prioritize projects and prepare mitigation grant applications as mitigation funding becomes available and as applicable to grant funding guidelines and as time allows.

Benefit-cost analysis will be conducted as projects are submitted to DHS&EM for consideration.

Chapter 3: Community Resources

Community Assets

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

Community Maps

List of Maps from this plan:

- Map 1. Cordova Regional Map
- Map 2. Cordova Flood Rate Insurance Map
- Map 3. Cordova Critical Infrastructure, Geo-Reference Photography
- Map 4. Cordova Regional Critical Infrastructure
- Map 5: Cordova Tsunami Hazard Zones Map

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

- Oil Spill Response Facilities(SERVS)
- Roads and Bridges
- Communications
- Utilities
- Hospital/Ilanka Community Health Center/Public Health Nurse
- Mud Hole Smith Airport
- Cordova Municipal Airport
- City Hall
- Fire Department
- Police Department
- State Troopers
- Coast Guard
- Water Treatment Plant
- City Water
- Refuse
- Public Works—streets and other support
- AK Marine Highway and Ferry Terminal
- Cordova Harbor

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

- Designated Shelters/Alternate Care Centers/Pet Shelters
- City Hall Buildings-Emergency Operation Center
- Bulk Fuel Storage Tank Farm
- Cordova Telephone Cooperative (CTC)
- Mt. Eccles Elementary
- Cordova Junior/Senior High School
- USFS Building– Alternate EOC (Emergency Operation Center)

Critical Infrastructure: Infrastructure that provides services to Cordova.

- Cordova Telephone lines (CTC)
- Cordova Electric Power Network (CEC)
- Air Transportation networks (Merle K Smith & city airports)
- Wastewater collection
- Water Supply Facilities including storage and delivery systems
- Power Generators including Humpback Creek, Power Creek hydro facilities
- Fuel Storage facilities (Shoreside Petroleum)
- Community Freezer facilities (canneries)
- Reservoir and water supply
- Landfill and Incinerator
- US Postal Service

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

- Schools (Mt Eccles Elementary, High School)
- Hospital
- Nursing Home (IN HOSPITAL)
- Elderly residents
- Tourists
- Functional Needs Population

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

- Cordova Museum/Library, & Archives
- Ilanka Cultural Center
- City Hall
- Forest Service
- Identified local historic structures/old town
- Masonic Temple
- Alaska Fishermen's Camp

- Cannery Row
- Graveyards

Community Resources

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

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

FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from the FEMA Publication Warehouse (1-800-480-2520) and are briefly described below:

- **How-to Guides.** FEMA has developed a series of how-to guides to assist states, communities, and tribes in enhancing their hazard mitigation planning capabilities. The first four guides mirror the four major phases of hazard mitigation planning used in the development of the Newtok Hazard Mitigation Plan. The last five how-to guides address special topics that arise in hazard mitigation planning such as conducting cost-benefit analysis and preparing multi-jurisdictional plans. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting Disaster Mitigation Act (DMA) 2000 requirements (<http://www.fema.gov/fima/planhowto.shtm>).
- **Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments.** FEMA DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation and shows state and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.
- **Mitigation Resources for Success CD.** FEMA 372, September 2001. This CD contains a wealth of information about mitigation and is useful for state and local government planners and other stakeholders in the mitigation process. It provides mitigation case studies, success stories, information about Federal mitigation

programs, suggestions for mitigation measures to homes and businesses, appropriate relevant mitigation publications, and contact information.

- **A Guide to Federal Aid in Disasters.** FEMA 262, April 1995. When disasters exceed the capabilities of state and local governments, the President's disaster assistance program (administered by FEMA) is the primary source of federal assistance. This handbook discusses the procedures and processes for obtaining this assistance, and provides a brief overview of each program.
- **The Emergency Management Guide for Business and Industry.** FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to Newtok businesses.
- **Department of Agriculture.** Assistance provided includes: Emergency Conservation Program, Non-Insured Assistance, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service.
- **Department of Energy, Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program.** This program minimizes the adverse effects of high energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services such as an all-around safety check of major energy systems, including heating system modifications and insulation checks.
- **Department of Housing and Urban Development, Office of Homes and Communities, Section 108 Loan Guarantee Programs.** This program provides loan guarantees as security for federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing.
- **Department of Housing and Urban Development, Community Development Block Grants.** Administered by the Alaska DCRA, Division of Community Advocacy. Provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income persons.

- **Department of Labor, Employment and Training Administration, Disaster Unemployment Assistance.** Provides weekly unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible.
- **Federal Financial Institutions.** Member banks of the Federal Deposit Insurance Corporation (FDIC) or Federal Home Loan Bank Board (FHLBB) may be permitted to waive early withdrawal penalties for Certificates of Deposit and Individual Retirement Accounts.
- **Internal Revenue Service, Tax Relief.** Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous tax returns to reflect loss back to three years.
- **United States Small Business Administration (SBA).** May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. Requests for SBA loan assistance should be submitted to the Alaska DHS&EM.

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

- **Federal Emergency Management Agency**, <http://www.fema.gov> – includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.
- **American Planning Association**, <http://www.planning.org> – is a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.
- **Institute for Business and Home Safety**, <http://ibhs.org> – an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters. Online resources provide information on natural hazards, community land use, and ways citizens can protect their property from damage.

State Resources

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

Improving hazard mitigation technical assistance for local governments is high priority item for the State of Alaska. Providing hazard mitigation training, current hazard information, and the facilitation of communication with other agencies would

encourage local hazard mitigation efforts. DHS&EM provides resources for mitigation planning on their website at <http://www.ak-prepared.com>.

- **DCRA, Division of Community and Regional Affairs:** Provides training and technical assistance on all aspects of the National Flood Insurance Program (NFIP) and flood mitigation.
- **Department of Health and Human Services:** Provides special outreach services for seniors, including food, shelter, and clothing.
- **Division of Insurance:** Provides assistance in obtaining copies of policies and provides information regarding filing claims.
- **Department of Military and Veteran's Affairs:** Provides damage appraisals and settlements for Veterans Administration (VA)-insured homes, and assists with filing for survivor benefits.

Other Funding Sources and Resources

- **Real Estate Business.** Real estate disclosure is required by state law for properties within flood plains.
- **American Red Cross.** Provides for the critical needs of individuals such as food, clothing, shelter, and supplemental medical needs. Provides recovery needs such as furniture, home repair, home purchasing, essential tools, and some bill payment may be provided.
- **Crisis Counseling Program.** Provides grants to State and Borough mental health departments, which in turn provide training for screening, diagnosing and counseling techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster.

Local Resources

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

Table 3. Legal and Technical Capability

Cordova is capable of initiating all the processes below in order to implement mitigation projects:

Regulatory Tools (ordinances, codes, plans)	Do we HAVE these items...and the Local Authority to administer them? (Y/N)	Comments (Year of most recent update; problems administering it, etc.)
Building code	Yes	
Zoning ordinance	Yes	Ongoing Update, as necessary
Subdivision ordinance or regulations	Yes	Ongoing Update, as necessary
Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Yes	Part of the NFIP. Local floodplain regulations and avalanche regulations.
Growth management ordinances (also called "smart growth" or anti-sprawl programs)	No	
Site plan review requirements	Yes	
Comprehensive plan	Yes	.
A capital improvements list	Yes	
An economic development plan	Yes	Prince William Sound Economic Strategy that includes the Valdez/Cordova region
An emergency response plan	Yes	Plan that being implemented through training exercises.
A post-disaster recovery plan	Yes	COOP Plan
Real estate disclosure requirements	State	No local requirement.

Table 4. Personnel Capability:

Cordova has these employees to help of implement mitigation projects:

Staff/Personnel Resources	Does this manager have the fiscal responsibility Y/N	Department/Agency and Position
City Manager, Don Moore, Interim	Yes- city wide	City Administration Chief Administrative Officer
City Planner, Samantha Greenwood	Yes- for dept.	City Planning Department Planning Director
Fire Chief, Mike Hicks	Yes	City Fire Department
City Clerk, Susan Bourgeois	Yes	City Clerk Department Head
Public Works Director, Moe Zamarron	Yes	City Public Works Department Head
Public Safety Director, George Wintle	Yes	City Police and Dispatch
Asst. City Manager, Cathy Sherman	Yes	City Administration
Fire Department, Paul Trumblee	Yes	City Fire Department Fire Marshal, Department Head
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	No	Public Works
Planners or Engineer(s) with an understanding of natural and/or human-caused hazards	Yes	Fire Department, Paul Trumblee, Mike Hicks, Dick Groff, Joanie Behrends and others Public Works Planning Department, Samantha Greenwood
Floodplain manager	Yes	Planning Director Samantha Greenwood
Surveyors	No	No certified surveyors, staff with surveying training and experience
Staff with education or expertise to assess the community's vulnerability to hazards	Yes	Fire Department, , Paul Trumblee, Dick Groff Public Works staff City Police Chief, Ron Bishop Planning Department Jim Goossens, AICP
Personnel skilled in GIS and/or HAZUS	Yes	Planning Department Samantha Greenwood, Shannon Joekay
Individuals familiar with the hazards of the community	No	Various City personnel, local agencies and organizations
Emergency manager	Yes	City Manager, Don Moore , Interim
Environmental Advisory Council	Yes	Various local non-profits and governmental agencies exist for this role

Table 5. Administrative and Technical Capability

Financial Resources	Accessible or Eligible to Use (Yes or No)
Community Development Block Grants (CDBG)	No
Capital improvements project funding	Yes, Pubic Works mostly but others as approved by Council
Authority to levy taxes for specific purposes	Yes
Fees for sewer	Yes
Impact fees for homebuyers or developers for new developments/homes	No
Incur debt through general obligation bonds	With Voter Approval
Incur debt through special tax and revenue bonds	With Voter Approval
Incur debt through private activity bonds	No
Withhold spending in hazard-prone areas	Yes

Chapter 4: Hazards

Cordova All Hazard Mitigation Plan, 2013 Matrix

The current information is based on Table 4.1 and 4.2 in the *Alaska State Hazard Mitigation Plan, 2010* (Cordova falls under Chugach (REAA)). The following probability analysis proceeds with the most current available data, originating from the State of Alaska DHS&EM Disaster Cost Index 2012. It is a historical record of statewide disasters since 1978. In this plan, the previous occurrences sections under each hazard are for incidents that occurred within the Cordova city limits.

Hazard Probability:

Each hazard is assigned a rating based upon the following criteria for probability (Table 6) and extent, or magnitude. The probability is determined by reviewing historic events and anecdotal information. Where such information is absent, the probability is unknown (U).

Table 6. Hazard Matrix

Cordova					
Flood	Wild land Fire	Earthquake	Volcano	Avalanche	Tsunami & Seiche
Y-H-T	Y -M- L	Y-H - T	U	Y-M - L	Y-M - L
Severe Weather	Landslides	Erosion	Technological	Economic	
Y-H - T	Y-M - L	Y-H - L	Y	Y	

Source: Alaska State Hazard Mitigation Plan, 2010

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

Extent:

- Z = Zero
- L = Limited
- T = Total

Identification of Assets and Vulnerability

The Hazard Vulnerability Matrices below lists the City of Cordova facilities, utilities and transportation systems, including the school district and hospital. The dollar values listed below are from the City of Cordova Property Schedule for Renewing Businesses 2012-2013. The list is provided to identify city assets and provide an indication of each asset's vulnerability to natural hazards.

Table 7. City of Cordova - Asset Matrix - Structures and Infrastructure

Building Name	Occ / Description		Construction	Year Built	Sq. Ft	Building Value \$
City Hall (including Fire and Police)	City Offices	602 Railroad Ave	Steel on Steel Frame	1976	11,920	3,102,000
Fire Dep't Van	2 connected Sealand Vans - for storage purposes	602 Railroad Ave				0
PWS Science Center	Office	Breakwater Ave	Frame	1964	2,900	395,000
Cordova Chamber of Commerce		404 First Street	Frame		600	164,000
Hospital		508 Chase Avenue	Reinforced Concrete	1986	43,440	17,080,979
5 Mile Fire Station		5 Mile Copper River Hwy	Steel	2001	2,400	357,000
Municipal Ocean Dock	Ocean Dock		Concrete /Steel	1968	32,060	8,410,000
North Containment Dock	Commercial Shipping		Concrete /Steel	1990	9,686	3,802,000
Harbor Bathroom		Breakwater Ave	Frame	1983	300	92,000
Old Grid Dock & Approach	PWS Science Center	Breakwater Ave	Wood Timber	1964	7,093	1,068,000
Harbormaster Building	Office	114 Nicholoff Way	Frame	1983	2,011	481,000
Coast Guard Dock	USCG	Breakwater Ave	Wood Timber	1960	13,152	2,483,000
Loading Dock with Hoist	Marine Advisory	Breakwater Ave	Wood Timber		4,940	1,036,000
Small Boat Harbor Approach		Breakwater Ave	Wood Piling		2,184	474,000
3 Stage Dock		Nicholoff Way	Wood Timber		3,843	798,000
New Grid Approach		Nicholoff Way	Steel / Timber	1982-1983	672	321,000
Approach No. 1	Small Boat Harbor		Steel / Timber		1,312	0
Approach No. 2	Small Boat Harbor		Steel / Timber		1,312	0
Approach No. 3	Small Boat Harbor		Steel / Timber		1,105	0
Approach No. 4	Small Boat Harbor		Steel / Timber		2,184	0
Inner Harbor Launch Ramp	Small Boat Harbor		Steel / Timber	2005		340,000

CHAPTER FOUR

HAZARDS

Building Name	Occ / Description		Construction	Year Built	Sq. Ft	Building Value \$
Float A	Small Boat Harbor		Wood / Concrete	2005	A-7410	1,206,000
Float B	Small Boat Harbor				B-9715	1,206,000
Float C	Small Boat Harbor				C-10452	1,046,000
Float D	Small Boat Harbor				D-6735	672,000
Float E and Approach No. 4	Small Boat Harbor				E-5453	1,416,000
Float F	Small Boat Harbor				F-2565	445,200
Float G and Approach No. 3	Small Boat Harbor				G-11556	2,696,000
Float H	Small Boat Harbor				H-15684	3,442,000
Float I and Approach No.2	Small Boat Harbor				I-15684	3,465,000
Float J	Small Boat Harbor				J-8064	1,776,000
Float K and Approach No. 1	Small Boat Harbor				K-13242	3,187,000
Float L	Small Boat Harbor		Wood / Concrete		L-7720	1,705,000
Float M	Small Boat Harbor		Wood / Concrete		M-5535	1,212,000
Boat Haul out Facility	Vessel Maintenance/Storage- Ocean Dock Subdivision		Steel/Concrete		143,150	2,000,000
Harbor - Forest Service Building	US Forest Service Building		Frame		816	196,000
Library Centennial Building	Public Library	622 First Avenue	Steel on Steel Frame	1966	6,480	1,879,000
Odiak Camper Park	Public Restrooms	1451 Whitshed Road	Frame	1976	792	62,000
Tourist Booth/big Gazebox	at Hollis Henrichs Park	Chase & Copper River Hwy	Frame	1985	100	13,568
Skaters Cabin		Power Creek Road	Log		684	143,000
Bidarki Rec. Center		103 Council	Frame	1933/ 1988/ 1989	11,450	2,345,000
Swimming Pool Building		610 Railroad Ave	HCB & Frame	1974	7,968	2,107,000
Ball field Restroom/Concession		101 South First St	Frame			124,000
Fleming Spit Restroom Bldg.		Shelter (Hippy) Cove	Orca Road	1999	182	63,000

CHAPTER FOUR

HAZARDS

Building Name	Occ / Description		Construction	Year Built	Sq. Ft	Building Value \$
Shelter Cove RV Park	Fleming Spit		prop in open			0
Shelter Cove Fish Cleaning Station	Fleming Spit					0
Odiak Pond	gazebo, boardwalk	CRH				84,800
Hollis Henrichs Park	restroom	CRH & Chase				147,000
Parks Maintenance Facility	(old CG bldg. by city dock)	Breakwater & Seafood				116,600
Nettie Hansen Park	playground equipment	4th St. & Browning	prop. In open	2007		42,400
Nettie Hansen Park		4th St. & Browning	prop. In open			25,000
Children's Memorial Park	playground equipment	101 S First St	prop. In open			0
Tot Park	playground equipment	101 S First St	prop. In open			30,000
Mt Eccles Estate Park Playground Equipment	Mt Eccles Estate		prop in open			10,000
Skate Park	fencing, ramps, prks&rec equip.	101 S First St	prop. In open			31,800
Nirvana Park	large covered shelter, P&R equip.	Lake Ave. & LeFevre				32,000
Public Works	Public Works Shop	.7 Whitshed Road	Wood/Steel Frame		7,260	1,511,000
Baler Building	Solid Waste Baler	Mile 1 Whitshed Road	Steel on Steel Frame	1985	6,132	861,000
17 Mile Landfill Bldg.	Storage & Shop	Sec 13, T16S, R1w	Steel	2000	2,400	320,000
ILP Building	District Office Modular	100 Fisherman's Ave	Frame		600	25,000
Cordova Jr./Sr. High School	School		100 Fisherman's Ave	HCB & Frame	1980	52,008
Mt. Eccles Elem. School	School	201 Adams	Steel on Steel Frame	1955	31,048	11,531,085
Elementary Playground	Playground equipment	201 Adams	Frame		2,736	7,835,301
Eyak Mt. Chairlift	Ski Resort	Eyak Mtn. Ski Area	Steel	1978		121,459
Eyak Mt. Chairlift Building/Bottom	Ski Resort	Eyak Mtn. Ski Area	Frame	1960	240	309,520
Eyak Mt. Chairlift	Ski Resort	Eyak Mtn. Ski Area	Steel	1978		10,000

CHAPTER FOUR

HAZARDS

Building Name	Occ / Description		Construction	Year Built	Sq. Ft	Building Value \$
Building/Midway						
Eyak Mt. Maintenance Shop	Ski Resort	Eyak Mtn. Ski Area	Frame	1980	240	15,000
Eyak Mt. Snack Shack	Ski Resort	Eyak Mtn. Ski Area	Frame	1960	600	253,100
Eyak Mt. Clubhouse/Rental Shop	Ski Resort	Eyak Mtn. Ski Area	Frame	1992	832	120,000
Eyak Mt. Water Tank	Ski Resort	Eyak Mtn. Ski Area	Steel	1980		151,000
Eyak Mt. Chairlift Building/Top	Ski Resort	Eyak Mtn. Ski Area	Frame	1975		253,000
Public Works - Water/Sewer 1	Sewage Treatment	Orca Inlet Drive	Joisted Masonry/ Frame	1975	1,560	10,000
Public Works - Water/Sewer 2	STP generator outbuilding	Orca Inlet Drive	fiberglass			548,000
Public Works - Water/Sewer 3	WWTP Garage	Orca Inlet Drive	Frame	1982	2,904	40,000
Public Works - Water/Sewer 4	Whisky Ridge Lift Station	Whitshed Road	Frame	1978	256	430,000
Public Works - Water/Sewer 5	Whisky Ridge gen. outbldg.	Whitshed Road	fiberglass			14,000
Public Works - Water/Sewer 6	Meals WTP	Whitshed Road	Frame	1975	240	32,860
Public Works - Water/Sewer 7x	Meals Dam	Whitshed Road	Sheet Steel / Earth	1973		49,000
Public Works - Water/Sewer 8	Eyak WTP	Mile 1 Copper River Hwy	Frame	1984	4,428	0
Public Works - Water/Sewer 9	Wet Well/Dry Well Murchison Lift Station	Mile 1 Copper River Hwy			30,000	1,500,000
Public Works - Water/Sewer 10	Mews Pump Station	6th Street		Frame	1980	225
Public Works - Water/Sewer 11	Mews Water Tank	6th Street	Steel	1980		10,458
Public Works - Water/Sewer 12	1.5 mg Water Tank	5th Street	Steel	1980		240,000
Public Works - Water/Sewer 13	1.5 mg Pump house	5th Street	Frame			6,000,000
Public Works - Water/Sewer 14	Ferry Dock Lift Station	Ferry Dock Drive	Frame	1985	256	0
Public Works - Water/Sewer 15x	Eyak Lift Station	LeFevre/Chase	Fiberglass/ Steel			30,000
Public Works - Water/Sewer 16x	Odiak Lift Station	South 2nd	Frame			12,720

Building Name	Occ / Description		Construction	Year Built	Sq. Ft	Building Value \$
Public Works - Water/Sewer 17	Orca WTP	Chugach Cannery	Frame	1982		636,000
Public Works - Water/Sewer 18	Morpac Lift Station	Copper River Highway	Steel	1985	256	47,000
Public Works - Water/Sewer 19	Morpac Water Tank	Copper River Highway	Steel	1980		30,000
Public Works - Water/Sewer 20	CT (Murcheson) Water Tank	1 Mile Copper River	Steel			2,800,000
Public Works - Water/Sewer 21	CT (Meals) Water Tank	.75 Mile Whitshed Road	Steel			2,800,000
Public Works - Water/Sewer 22	Solid Handling Bldg.	Orca Inlet Drive	Steel	2007	2,772	2,800,000
Building #4x			Frame		400	627,000
Public Works – Refuse	EVOS Building/Waste Oil Storage	Mile 1 Whitshed Road	Concrete	1998		14,840
New Storage Garage		Whitshed Road				120,000
New Parks Maintenance Facility		.7 Whitshed Road				299,000
17 Mile Landfill Bldg.	Storage and Shop	Sec 13,T16S, R1W	Steel	2000	2,400	129,000
Orca Inlet Rec Area and M/U Field		Whitshed Road	prop in open			320,000
Extra Expense						75,000
Increased Cost of Construction						5,000,000
Total Insured Value						1,000,000

The following table depicts each of the facilities in Table 10 in relation to whether they are vulnerable to the listed natural hazards. However, the designations under flood/erosion are taken from the FEMA Flood Insurance Rate Map that is dated 1979. Since that time areas have been filled to above the Base Flood Evaluation in some cases. Until the FIRM has an official revision or a Letter of Map Revision is approved by FEMA, the designations stand but may not be accurate but do not necessarily reflect the current situation in the field. There are no structures located in the currently delineated avalanche areas.

Table8. Assets and Vulnerability Matrix - Structures and Infrastructure

Facility	Flood/ Erosion	Severe Weather	Wild land Fire	Earthquake	Tsunami	Avalanche/ Landslide
City Hall		X		X	X	
Fire Dep't Van		X		X	X	
PWS Science Center	X	X		X	X	
Cordova Chamber of Commerce		X		X	X	
Hospital	X	X		X	X	
5 Mile Fire Station	X	X	X	X	X	
Municipal Ocean Dock	X	X		X	X	
North Containment Dock	X	X		X	X	
Harbor Bathroom	X	X		X	X	
Old Grid Dock & Approach	X	X		X	X	
Harbormaster Building	X	X		X	X	
Coast Guard Dock	X	X		X	X	
Loading Dock with Hoist	X	X		X	X	
Small Boat Harbor Approach	X	X		X	X	
3 Stage Dock	X	X		X	X	
New Grid Approach	X	X		X	X	
Approach No. 1	X	X		X	X	
Approach No. 2	X	X		X	X	
Approach No. 3	X	X		X	X	
Approach No. 4	X	X		X	X	
Inner Harbor Launch Ramp	X	X		X	X	
Float A	X	X		X	X	
Float B	X	X		X	X	
Float C	X	X		X	X	
Float D	X	X		X	X	
Float E	X	X		X	X	
Float F	X	X		X	X	

Facility	Flood/ Erosion	Severe Weather	Wild land Fire	Earthquake	Tsunami	Avalanche/ Landslide
Float G	X	X		X	X	
Float H	X	X		X	X	
Float I	X	X		X	X	
Float J	X	X		X	X	
Float K	X	X		X	X	
Float L	X	X		X	X	
Float M	X	X		X	X	
Harbor - Forest Service Building	X	X		X	X	
Library Centennial Building		X		X	X	
Odiak Camper Park	X	X		X	X	
Tourist Booth/big Gazebo		X		X	X	
Skaters Cabin	X	X		X	X	
Bidarki Rec. Center		X		X	X	
Swimming Pool Building		X		X	X	
Ball field Restroom/Concession	X	X		X	X	
Fleming Spit Restroom Bldg.	X	X		X	X	
Odiak Pond		X		X	X	
Hollis Henrichs Park		X		X	X	
Parks Maintenance Facility		X		X	X	
Nettie Hansen Park		X		X		
Children's Memorial Park		X		X	X	
Tot Park		X		X		
Skate Park		X		X	X	
Nirvana Park	X	X		X	X	
Baler Building		X	X	X		
17 Mile Landfill Bldg.		X	X	X		
Cordova Jr./Sr. High School		X		X	X	
ILP Building		X		X	X	

Facility	Flood/ Erosion	Severe Weather	Wild land Fire	Earthquake	Tsunami	Avalanche/ Landslide
Mt. Eccles Elem. School		X		X		
Elementary Playground		X		X		
Eyak Mt. Chairlift		X	X	X		
Eyak Mt. Chairlift Building		X	X	X		
Eyak Mt. Maintenance Shop		X	X	X		
Eyak Mt. Snack Shack		X	X	X		
Eyak Mt. Clubhouse/Rental Shop		X	X	X		
Eyak Mt. Water Tank		X	X	X		
Eyak Mt. Chairlift Building/Top		X	X	X		
Public Works - Water/Sewer -1	X	X	X	X	X	
Public Works - Water/Sewer -2	X	X	X	X	X	
Public Works - Water/Sewer -3	X	X	X	X	X	
Public Works - Water/Sewer -4		X		X	X	
Public Works - Water/Sewer -5		X	X	X	X	
Public Works - Water/Sewer -6	X	X	X	X		
Public Works - Water/Sewer -7	X	X	X	X		
Public Works - Water/Sewer -8	X	X		X	X	
Public Works - Water/Sewer -9	X	X	X	X	X	
Public Works - Water/Sewer -10		X	X	X		
Public Works - Water/Sewer -11		X	X	X		
Public Works - Water/Sewer -12		X	X	X		
Public Works - Water/Sewer -13		X	X	X		
Public Works - Water/Sewer -14	X	X		X	X	
Public Works - Water/Sewer -15	X	X		X	X	
Public Works - Water/Sewer -16	X	X		X	X	
Public Works - Water/Sewer -17		X	X	X		
Public Works - Water/Sewer -18	X	X	X	X	X	
Public Works - Water/Sewer -19		X	X	X		

Facility	Flood/ Erosion	Severe Weather	Wild land Fire	Earthquake	Tsunami	Avalanche/ Landslide
Public Works - Water/Sewer -20		X	X	X		
Public Works - Water/Sewer -21		X	X	X		
Public Works - Water/Sewer -22	X	X	X	X	X	
Public Works - Refuse	X	X	X	X	X	

Location of Identified Hazards

In summary, most identified hazards are area wide. The principal natural hazards of flood, erosion, severe weather, tsunami, avalanche and earthquake could potentially impact any part of Cordova. Manmade and Technological hazards are also potentially area wide.

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

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

Wild land Fire could occur anywhere in the Cordova region as the area is heavily forested. However, it is also a rain forest so the probability of wild land fire is listed on the Alaska State Hazard Plan matrix, Table 8, as having a moderate probability. The community listed the critical facilities located in heavily forested areas on Table 10. A serious wild land fire could impact the facilities listed in Table 10 and other areas that are undeveloped, but the overall impact, due to the rain forest environment would be limited.

Earthquake damage would be area-wide with potential damage to critical infrastructure up to and including the complete abandonment of key facilities. Priority would have to be given critical infrastructure to include: public safety facilities, health care facilities, shelters and potential shelters, and finally public utilities.

Avalanche and landslide danger is limited primarily to the identified avalanche and landslide areas depicted on Map 4. There are no critical facilities located in the avalanche and landslide areas.

Tsunami damage would impact the structures directly adjacent to the coastline and as depicted on Map 5 Tsunami Hazard Zones.

Technological or Cyber Threats could be area wide, affecting all critical infrastructures and/or the total population. The same is true for nuclear, biological, or chemical threats.

Hazardous Material Spills could be either site specific or area-wide with potential evacuation from critical infrastructure up to and including the complete abandonment of key facilities.

Oil Spill threat could be local or region-wide.

Public Health hazards could be area wide, affecting the total population.

Other human caused threats (like civil disobedience or mass transportation accidents) would be limited to the site.

Section 1. Floods and Erosion**Hazard Description and Characterization**

Flood hazards in Cordova include storm surges, voluminous rainfall, snow and glacier melt and release of glacier-dammed lakes.

Storm Surge Flooding

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

Rainfall/Snowmelt/Glacier Melt Flooding

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

Local Flood and Erosion Hazard Identification

The following section regarding hazard identification was taken from the *Eyak River Flood Control Study*. Prepared by USCOE for the City of Cordova. July 14, 2003.

The principal flood problem in Cordova is caused by high water in Eyak Lake. The Eyak River, which drains Eyak Lake, does not have the capacity for peak flow and hence the lake level rises. Persistent flooding in the Cordova area has also been caused by inflows of the Scott River into the Eyak River. These inflows raise the water surface of both the Eyak River and Eyak Lake.

The Eyak River is a small, clear water river that drains Eyak Lake and has a drainage area of 42 square miles. The Eyak River lies along the extreme western edge of the Scott River delta and the eastern extent of the Heney Range. The Scott River delta is a long, broad delta with considerable topographic relief extending from the Scott Glacier to Prince William Sound. The Scott River is a glacial outwash river that is characterized by a tremendous sediment load and a multi-channeled, braided stream channel system that extends across the entire extent of its previously glaciated valley. Flow paths are highly variable within the delta as stream channels meander, are abandoned for lower grade channels, or are captured by larger flows.

The additional flow and sediment deposition from the Scott River into the Eyak River has greatly restricted the natural flow from the Eyak drainage. Under these conditions, water surface elevations of the Eyak River upstream of the intrusions of the Scott River

are held continuously high. The increased water surface elevations of the Eyak River, in turn, keep the water surface of Eyak Lake continuously high and well above normal.

Conditions have changed somewhat since the initiation of this study. Channel shifts at the foot of Scott Glacier and in the mid floodplain area north of the Copper River Highway appear to have led to decreased flows of silt, glacial water into the Eyak River. During the summer of 2001 the flow from Scott Glacier shifted more to the east, away from the Eyak River. This has reduced the amount of Scott River stream flow and sediment into the Eyak River. If these conditions persist, the Eyak River may erode and transport the sediment shoals that have been deposited in it and return the stream channel to its base level. Average channel velocities during a 2-year (50% probability) flood event are estimated to be 3 feet per second, a sufficient velocity to erode the fine sediment that the shoals are composed of. This will return water surface elevations and flooding hazards to those present before the intrusion of the Scott River. It is not known how long these conditions may persist and whether the Eyak River will return to prior conditions.

Below the terminus of the Scott Glacier, the Scott River drainage forms a wide, low elevation flood plain of approximately 30 square miles. In its upper seven miles this floodplain is bounded on both sides by steep valley walls, and averages about two miles in width. The lower section of the floodplain widens out into a broad delta, which coalesces with the delta of the Glacier River to the east.

In early July of 1983 a major shift in the water flow patterns down the Scott River drainage was noted at the Copper River Highway.

This flow shift is likely related to a change in the channels of the Scott River from underneath the Scott Glacier which occurred at about the same time. (However, the flow pattern change could have occurred through a major channel shift further down the valley, independent of the channel changes at the terminus of the Scott Glacier.)

Previous to the July 1983 channel shift at the Copper River Highway, the majority of the turbid, summer and fall glacial flows from the Scott River passed under the Mile 9 bridges on the Copper River Highway (and on the east side of the drainage.) The Mile 7 Bridge passed primarily non-glacial waters from Laydick Creek. These flows were of much less volume than those under the Mile 9 Bridge.

At flood stage, individual channels in the Scott River drainage are incapable of holding all flows. Floodwaters rise and spread across the width of the valley, and high, turbid flows pass under all the highway bridges, which span the drainage.

Since the July 1983 flow shift, the majority of stream flow from Scott River passes under the Mile 7 Bridge and are now turbid glacial waters. Significantly less than half the flows of the Scott River now pass under the Mile 9 bridges (and at low summer stage virtually no flow.)

The Scott River drainage area is 154 square miles, most of which is mountainous. Elevations range from sea level to 6,000 feet. The Scott Glacier covers 45 percent of the watershed, which receives approximately 150 inches of precipitation per year.

Outburst Floods from Scott Glacier

Along the east flank of Scott Glacier, about 1.5 miles above its terminus, the glacier blocks off a small, east-west trending valley. A lake of approximately 80 acres in surface area forms behind this glacial dam. Occasionally, outburst floods occur from this lake and the majority of its water volume drains out from under the glacier and flows down the Scott River valley. The recurrence interval of this outburst flood may be as frequent as once or twice a year (Post, Austin & Mayo Glacier dammed Lakes and Outburst Floods in AK. USGS, 1971). Apparently, these outburst floods are not of significant enough volume to have a strong downstream influence. Further up the Scott Glacier is another glacially dammed lake, which has occasional outburst floods. The lake is small enough that outburst floods would likely have a low impact on flooding downstream.

Based on the limited data concerning outburst floods from Scott Glacier, it was assumed that outburst flooding would have a minimal direct impact on the frequency or magnitude of major flood events on the Scott River. The outburst floods could redistribute substrate material sufficiently to cause changes in flow patterns within the upper Scott River floodplain. These changes in flow patterns could propagate to lower portions of the watershed and affect the amount of additional flow entering the Eyak River. In 2001 it appeared that channel shifts at the foot of the Scott Glacier led to decreased flows of Scott River water into the Eyak River. (*Eyak River Flood Control Study, 2003*).

The Scott River is a heavily braided stream that flows from the terminus of Scott Glacier. Downstream from the glacier the Scott River forms a wide, low elevation floodplain of approximately 30 square miles. The upper 7 miles of this floodplain is bounded by steep valley walls, and averages about 2 miles in width. The lower section of the floodplain widens out into a broad delta that extends to the Gulf of Alaska.

Community Participation in the NFIP

The City of Cordova participates in the National Flood Insurance Program, and has been in partnership with NFIP since 1979. The function of the National Flood Insurance Program (NFIP) is to provide flood insurance to homes and businesses located in floodplains at a reasonable cost. In trade, the City of Cordova regulates new development and substantial improvement to existing structures in the floodplain. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce flood damage primarily through requiring the elevation of structures above the base (100-year) flood elevations.

Table 9. NFIP Statistics

Total by Community	
Total Number of Policies:	12
Total Premiums:	\$11,738
Insurance in Force:	\$3,059,000
Total Number of Closed Paid Losses:	1
\$ of Closed Paid Losses:	\$64,529

Cordova Floodplain Coordinator	Samantha Greenwood, City Planner P.O. Box 1210 Cordova, Alaska 99574 Phone: (907) 424-6233, Email: planning@cityofcordova.net
State of AK Floodplain Coordinators	Taunnie Boothby, Floodplain Management Program Coordinator Department of Commerce, Community & Economic Development Division of Community Advocacy 550 W. 7th Avenue, Suite 1640 Anchorage, AK 99501, (907) 269-4567, Email: taunnie_boothby@commerce.state.ak.us

Cordova’s Participation in RiskMAP

On March 4 2011, federal and state emergency management personnel met in Cordova to begin a RiskMAP project for the City. The vision for Risk MAP is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. Risk MAP builds on flood hazard data and maps produced during the [Flood Map Modernization](#) (Map Mod) program. Map Modernization is responding to National Flood Insurance Program (NFIP) requirements and feedback provided by Federal, State, and local Program stakeholders.

- Flood hazard conditions are dynamic, and many NFIP maps may not reflect recent development and/or natural changes in the environment.
- Updated NFIP maps can take advantage of revised data and improved technologies for identifying flood hazards.
- Up-to-date maps support a flood insurance program that is more closely aligned with actual risk, encourage wise community-based floodplain management, and improve citizens’ flood hazard awareness.
- Local communities and various stakeholders desired more timely updates of flood maps and easier access to the flood hazard data used to create the maps.

Table 14 outlines the City of Cordova’s RiskMAP data requirements.

Table 14: Cordova Mapping Needs

STUDY AREA	STUDY LENGTH (miles)	LOCATION DESCRIPTION	STUDY TYPE
Cannery Road Loop	0.25	Near the loop at northern end of Cannery Road	Detailed Coastal
Cannery Road/ Fleming Creek	0.5	Coastline near Fleming Creek	Detailed Coastal
Seafood Lane	0.5	Coastline along Seafood Lane	Detailed Coastal
Eyak Lake	2.7	Shoreline study along the west end of the lake	Approximate
Eyak River	1	Near the lake	Detailed
Ibek Creek	1.2	The confluence of Ibek Creek and Eyak River	Approximate

Source: State of Alaska DCCED.

Economic Considerations. The area of Cordova along the western shore of Eyak Lake is populated with single- and multi-family residential and commercial structures. All land suitable for development has been developed and no changes in land use are expected over the 25-year period of analysis.

The developed area of Eyak on the east bank of the Eyak River consists primarily of single-family residential structures. This area has yet to be mapped by FEMA.

A structure inventory was conducted to identify all structures in the floodplain. The inventory identified 196 residential and commercial structures at risk of flooding from a 0.2 percent chance event, commonly referred to as a 500-year flood. At that time the value of property, excluding utilities, within the 500-year flood plain of the Eyak River is estimated to be approximately \$16 million.

Previous Occurrences of Flood and Erosion

The following information is from the DHS&EM Disaster Cost Index, 2006.

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.

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.

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.

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 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.

06-220 2006 August Southcentral Flooding (AK-06-220) 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.

06-221 2006 October Southern Alaska Storm (AK-06-221) declared October 14, 2006 by Governor Murkowski

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. Total damages are estimated at \$557,415 with a public assistance estimate of \$456,855 less the US Army Corps of Engineers (USASCE) Advanced Measures Assistance of \$250,000 leaving \$206,855.

Flood and Erosion Hazard Vulnerability

Please see matrices at the beginning of Chapter 3.

The following table displays output from the FDA model and demonstrates the calculation of average annual flood damages, which are estimated to equal \$205,000 as noted in the lower right cell of the table.

Table 10 Eyak River 2003 Study FDA Model

Return Interval – In years	Probability of Occurrence	Number of Structures Flooded	Single Event Damages	Expected Annual Damages – Cumulative
2	0.5	6	\$206,999	\$51,700
5	0.2	6	\$223,654	\$116,300
10	0.1	6	\$367,023	\$145,800
25	0.04	22	\$571,794	\$174,000
50	0.02	31	\$729,668	\$187,000
100	0.01	31	\$989,183	\$195,600
250	0.004	31	\$1,231,884	\$202,300
500	0.002	53	\$1,708,884	\$205,200

Eyak River Study, 2003

Tables 7 and 8 illustrate the dollar amount of facilities located with flood/erosion areas. Cordova is located on the water and therefore the Port and Harbor facilities and areas near the shore are always vulnerable to flooding/erosion.

Probability

Referring to the maps on pages 118-120, much of the City is located in a federally designated flood plain and tsunami inundation zone. Minor flooding within the watersheds is experienced annually. The sources of flooding are: coastal inundation, riverine, and rapid snow and ice melt. Given the proximity to these sources, the historical record, and the flood plain map, it is highly probable that Cordova will experience flooding within one year's time (Table 6).

Flood and Erosion Mitigation Goals and Projects:

Goals

- Goal 1.** Support and encourage building practices that reduce damage from flooding in areas that are prone to flooding.
- Goal 2.** Develop Base flood elevations in areas that are prone to flooding.
- Goal 3:** Protect drinking water sources from flood infusion water.
- Goal 4:** Increase public knowledgeable about flood insurance, mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards.

Projects (listed numerically as FLD = FLOOD)

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

- **Project FLD-1:Six-Mile Subdivision Drainage System**
Flooding could be mitigated greatly by a drainage system at Six-Mile Subdivision.
- **Project FLD-2:Alternative Water Source to Six Mile Subdivision**
- **Project FLD-3:Letter of Map Revision for Flood Insurance Rate Maps (FIRM)**
The FEMA FIRMs are dated 1979. Much of the port area has been filled and therefore the maps are very outdated.
- **Project FLD-4:Design and Construct Flood proofing for Hospital**
The basement of the Cordova Hospital has flooded in recent years and would benefit by flood proofing techniques.
- **Project FLD-5:Heney Creek Waterline Replacement**
During the 2006 flood the Heney Creek water line was damaged. The water line needs studied to decide if it should be 1) abandoned, 2) an alternative route be designed for the water line or 3) replace the water line with a new line at Power Creek.
- **Project FLD-6:Power Creek Waterline Repair and/or Replacement**
- **Project FLD-7. Identify Drainage Patterns and Develop a Comprehensive Drainage System**
- **Project FLD-8:Structure Elevation and/or Relocation**

A list of homes, commercial structures and critical facilities that are in danger of flooding and in erosion danger should be identified and mitigation projects for elevating and/or relocating the structures determined.

- **Project FLD-9: Take Steps to Update FIRM Cordova Maps**
Increase public knowledgeable about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards. This would include advising property owners, potential property owners, and visitors about the hazards. In addition, dissemination of a brochure or flyer on flood hazards in Cordova could be developed and distributed to all households.
- **Project FLD-10: Public Information**
- **Project FLD-11: Install new stream flow and rainfall measuring gauges**
- **Project FLD-12: Apply for grants/funds to implement riverbank protection methods.**
- **Project FLD-13: Investigate obtaining a CRS rating to lower flood insurance rates.**
- **Project FLD-14: Continue to obtain flood insurance for all City structures, and continue compliance with NFIP.**
- **Project FLD-15: Require that all new structures in the Flood Zone be constructed according to NFIP requirements and set back from the river shoreline to lessen future erosion concerns and costs.**
- **Project FLD-16: Take steps towards Mapping the Six-Mile Subdivision as FIRM Maps**

Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Flood/Erosion (FLD)						
Project FLD-1. Six-Mile Subdivision Drainage System	Benefit to Six-Mile Subd. Property Damage Reduction and drinking infiltration reduced.	Engineering Needed	High	FEMA	PDMG HMGP USCOE	<1 year
Project FLD-2. Alternative Water Source to Six Mile Subdivision	PDMG** Funding Possible Benefit to entire community	Expensive >\$3.5 million 5+ years to implement	Low	FEMA	PDMG HMGP USCOE	>1 year
Project FLD-3. Letter of Map Revision for Flood Insurance Rate Maps for North and South Fill	No direct cost Benefit to city and private properties within floodplain.	Staff time	High- DONE 2001 & 2005	City DCRA FEMA	City/State Budgets	Ongoing
Project FLD-4. Design and Construct Flood proofing for Hospital	Damage Reduction PDMG**, HMGP*** Benefit to public institution	0 – 1 years	High	To be determined	PDMG HMGP USCOE	
Project FLD-5. Heney Creek Waterline Replacement	Life/safety issue Benefit to entire community Reduction in property damage	Engineering needed. >\$1.5 million >5 years	High	FEMA	PDMG HMGP USCOE	>5 years

CHAPTER FOUR

FLOODS and EROSION

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Flood/Erosion (FLD) cont.						
Project FLD-6. Power Creek Hydro facility Repair and/or Replacement	Life/safety issue Benefit to entire community Reduction in property damage	Engineering needed >\$1.5 million >5+ years	Low	FEMA DHS&EM	PDMG HMGP USCOE	>1 year
Project FLD-7. Identify Drainage Patterns and Develop a Comprehensive Drainage System	Benefit to entire community Property damage reduction	Engineering study needed >\$50,000 1 – 5 years	Medium	FEMA	PDMG HMGP USCOE	>1 year
Project FLD-8. Structure Elevation and/or Relocation	Life/Safety project Benefit to government facilities and private properties. Potential PDMG**, HMGP***, FMA****	Dollar cost unknown, >\$50k 1 – 5 year implementation	Medium	FEMA DHS&EM	PDMG HMGP USCOE	>1 year
Project FLD-9. Take Steps to Update FIRM Cordova Maps	FEMA, PDMG**, HMGP*** and State DCRA funding available. USCOE facilitated project. Can be started immediately.	Expensive, at least \$100,000	High	FEMA	PDMG HMGP	<1 year

CHAPTER FOUR

FLOODS and EROSION

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Flood/Erosion (FLD) cont.						
Project FLD 10. Public Education	DCRA funding may be available. Could be done yearly. Inexpensive <\$1,000/City	Not clear if there would be community interest or participation.	Medium	City DHS&EM	City	Ongoing
Project FLD 11. Install upgraded stream flow and rainfall measuring gauges	Life/Safety project Benefit to government facilities and private properties. Potential PDMG**, HMGP***, FMA****	Dollar cost unknown, >\$50k 1 – 5 year implementation	Medium	FEMA DHS&EM	PDMG HMGP USCOE	<1 year
Project FLD 12. Apply for grants/funds to implement riverbank protection methods.	Life/Safety project Benefit to government facilities and private properties. Potential PDMG**, HMGP***, FMA****	Dollar cost unknown, >\$50k 1 – 5 year implementation	Medium	City	PDMG HMGP USCOE	<1 year
Project FLD 13. Investigate obtaining a CRS rating to lower flood insurance rates.	High capability by city to do on an annual basis Will reduce NFIP insurance for entire community.	Staff time.	High	City	City	<1 year

CHAPTER FOUR

FLOODS and EROSION

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Flood/Erosion (FLD) cont.						
Project FLD 14. Continue to obtain flood insurance for all City structures, and continue compliance with NFIP.	High capability by city to do on an annual basis. Public benefit to have public buildings insured through NFIP. Inexpensive, approx. \$3,000/year.	Staff time	High	City	City	Ongoing
Project FLD 15. Require that all new structures in the flood zone be constructed according to NFIP requirements and set back from the river shoreline to lessen future erosion concerns and costs.	High capability by city to do on an annual basis. Public benefit to have public buildings insured through NFIP. Inexpensive, approx. \$3,000/year.	Staff time	High DONE , if it is in the mapped flood zone	City	City Budget	Ongoing
Project FLD 16. Takes steps to Map the Six-Mile Subdivision as FIRM Maps	FEMA, PDMG**, HMGP*** and State DCRA funding available. USCOE facilitated project. Can be started immediately.	Expensive, at least \$100,000	High	FEMA USCOE	PDMG HMGP USCOE	>1 year

Section 2. Severe Weather

Hazard Description and Characterization

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

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

Local Severe Weather Hazard Identification

The Cordova area has a maritime climate, which is characterized by cool summers, mild winters, and heavy year-around precipitation. This type of climate is typical of the southeastern and southern coastal areas of Alaska where the ocean exerts a modifying influence and causes relatively low seasonal and diurnal temperature variations. Proximity to the ocean and the frequent lows which develop or move out of the Gulf of Alaska result in heavy precipitation. According to the U.S. Army corps of Engineers, the design snow load factor for Cordova should be 150 pounds per square foot; the highest in the state. In practical terms, it means that people have to guard against excessive snow accumulations on roofs, boats, and airplanes.

Cordova's winters are relatively mild. The coldest month (January) has an average daily temperature of about 23 degrees F., and although temperatures as low as -33 degrees F. have been recorded, extremely cold weather is usually of short duration. On the other hand, summer temperatures in the community tend to be on the cool side, averaging between 50 and 55 degrees F., with daily maximums reaching into the low 60's in July and August. The record high temperature in Cordova is 84 degrees F., a mark set back in 1946.

Table 13. Cordova Weather Summary, from 1995 - 2012

	Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
	High	Date	Low	Date	Highest Mean	Year	Lowest Mean	Year	>= 90 F	<= 32 F	<= 32 F	<= 0 F
	F	dd/yyyy or yyyymmdd	F	dd/yyyy or yyyymmdd	F	-	F	-	# Days	# Days	# Days	# Days
January	58	21/1961	-4	12/1969	38.0	2001	13.6	1969	0.0	10.7	23.8	0.4
February	59	05/1995	-2	20/1956	38.3	1998	22.7	1956	0.0	6.3	20.5	0.1
March	51	31/1957	-13	03/1956	37.5	2005	27.4	2007	0.0	3.1	22.3	0.2
April	64	28/1989	3	27/1959	42.4	1993	36.2	1956	0.0	0.1	11.3	0.0
May	73	24/1969	23	04/1956	49.6	2004	40.7	1956	0.0	0.0	1.1	0.0
June	78	11/1959	34	05/1956	56.8	1959	48.1	1956	0.0	0.0	0.0	0.0
July	80	09/1971	35	18/1964	59.5	2004	52.2	2012	0.0	0.0	0.0	0.0
August	81	08/1957	35	01/1964	61.0	2004	52.4	1955	0.0	0.0	0.0	0.0
September	71	01/1960	28	24/1970	54.7	1995	45.5	1992	0.0	0.0	0.5	0.0
October	64	06/1969	16	09/1959	47.2	2002	35.9	1968	0.0	0.1	7.2	0.0
November	55	04/1957	4	30/1990	43.7	2002	26.0	1955	0.0	4.2	17.2	0.0
December	52	17/1969	-23	14/1964	39.5	1986	19.0	1964	0.0	8.0	21.9	0.3
Annual	81	19570808	-23	19641214	44.1	1997	37.8	1956	0.0	32.5	125.8	0.9
Winter	59	19950205	-23	19641214	37.9	1987	20.7	1969	0.0	25.0	66.1	0.7
Spring	73	19690524	-13	19560303	42.1	1993	35.2	1956	0.0	3.2	34.7	0.2
Summer	81	19570808	34	19560605	59.0	2004	52.2	2008	0.0	0.0	0.0	0.0
Fall	71	19600901	4	19901130	47.4	2002	37.3	1955	0.0	4.3	24.9	0.0

Source: Western Regional Climate Center, wrcc@dri.edu

Heavy Snow

Heavy snow, generally more than 12 inches of accumulation in less than 24 hours, can immobilize the community by bringing transportation to a halt. Until the snow can be removed, the airport and the one highway out of town Copper River Highway are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services.

Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns. Injuries and deaths related to heavy snow usually occur as a result of vehicle

accidents. Casualties also occur due to overexertion while shoveling snow, falls from roofs while shoveling snow, snow and ice falling from roofs, and hypothermia caused by overexposure to the cold weather.

High Winds

Another major weather factor in the community is high winds. The wind chill factor can bring temperatures down to -50°F, which can lead to frozen pipes and dangerous conditions for outdoor activities. While most home and business owners are prepared for the heavy winds and low temperatures, construction practices must be followed to protect against the high winds.

Previous Occurrences of Severe Weather

Wind storm that occurred on December 22, 1999 Planning Commissioners at the August 12, 2007 public meeting related their recollections of this wind storm that. The wind gusts of over 150 mph damaged roofs, structures and roads.

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.

2012 Prince William Sound Winter Storm (AK12-238) declared February 9, 2012 by Governor Sean Parnell

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. Avalanches across roadways and extreme conditions had limited or cut off access to airports and other critical infrastructure and endangered public, private, and commercial facilities throughout the communities. Total damages are still to be determined, but are currently over \$900,000.

Severe Weather Hazard Vulnerability and Probability

The entire community is vulnerable to severe weather (Table 8). The citizens of Cordova are vulnerable to bitter cold weather, heavy snowfall and high winds. Alaskans living outside the City must be able to survive without public assistance throughout most winters. Referring to City records, public recollection, and the recent storm disaster history, it is highly probable that Cordova will experience a severe weather event within one year's time.

Severe Weather Mitigation Goals and Projects

Goals

- Goal 1:** Mitigate the effects of extreme weather by instituting programs that provide early warning and preparation.
- Goal 2:** Educate people about the dangers of extreme weather and how to prepare.
- Goal 3:** Develop practical measures to warn in the event of a severe weather event.

Projects (listed numerically as SW = SEVERE WEATHER)

- **Project SW-1** Research and consider instituting the National Weather Service program of “*Storm Ready*”.

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

To be officially Storm Ready, a community must:

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

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

- **Project SW-2:** Conduct special awareness activities, such as Winter Weather Awareness Fair, Flood Awareness Week, etc.
- **Project SW-3:** Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability.
- **Project SW-4:** Encourage weather resistant building construction materials and practices.

Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Severe Weather (SW)						
Project SW-1. Research and consider instituting the National Weather Service program of “ <i>Storm Ready</i> ”.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be implemented annually	EMPG grant	High DONE summer 2012	City	City	<1 year
Project SW-2. Conduct special awareness activities, such as Winter Weather Awareness Week, Flood Awareness Week, etc.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	EMPG grant	High DONE	City DCRA DHS&EM	City DCRA DHS&EM	<1 year

CHAPTER FOUR

SEVERE WEATHER

Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Severe Weather (SW) cont.						
Project SW-3. Expand public awareness about NOAA Weather Radio for continuous weather broadcasts and warning tone alert capability	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	EMPG grant	High DONE through Neighborhood Campaign	City	NOAA	Ongoing
Project SW-4. Encourage weather resistant building construction materials and practices.	Risk and damage reduction. Benefit to entire community.	Would require ordinance change. Potential for increased staff time. Research into feasibility necessary. Political and public support not determined. 1 – 5 year implementation	Medium DONE - have building requirements for this	City	City	<1 year

Section 3. Wild land Fire

Hazard Description and Characterization

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

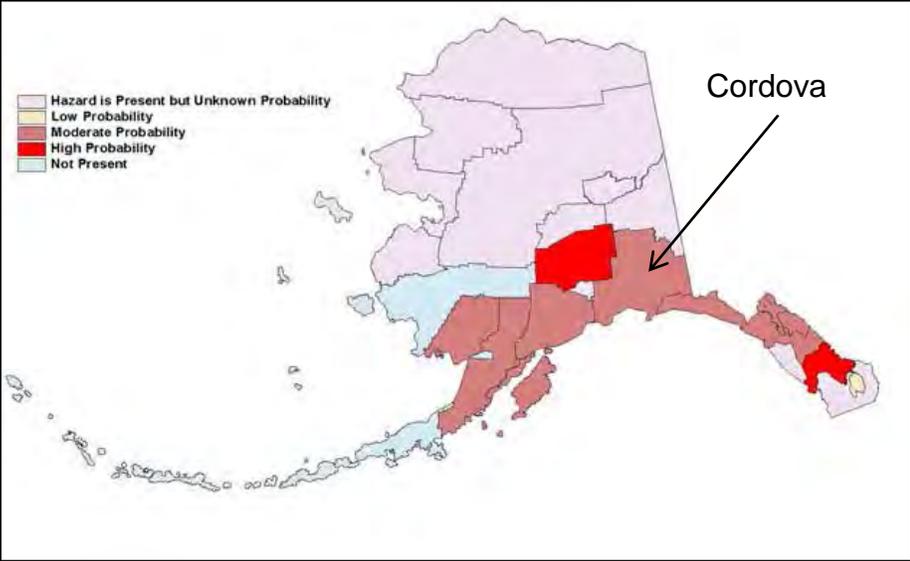
Wild land fire risk is increasing in Alaska due to the spruce bark beetle infestation. The beetles lay eggs under the bark of a tree. When the larvae emerge, they eat the tree’s phloem, which is what the tree uses to transport nutrients from its roots to its needles. If enough phloem is lost, the tree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

Local Wild land Fire Hazard Identification

Cordova is located in the Chugach Regional Education Attendance Area (REAA), which is a full protection area of the state protection option areas. This designation appears in the Alaska Interagency Fire Management Plan (AICC) 2013. Full protection is suppression action provided on a wild land fire that threatens uninhabited private property, high-valued natural resource areas, and other high-valued areas such as identified cultural and historical sites. The suppression objective is to control the fire at the smallest acreage reasonably possible. The allocation of suppression resources to fires receiving the full protection option is second in priority only to fires threatening a critical protection area.

Figure 1 depicts the Chugach REAA as having a moderate probability of wildland fire occurrence.

Figure 1. Alaska Hazard Plan - Fire Risk Map



Source: Alaska Interagency Coordination Center (AICC) 2013.

Wild land Fire Hazard Vulnerability and Probability

Cordova is at moderate risk for wildland fire. The conclusion is based upon the lack of historical events and limited vulnerability (Tables 6 & 8) coupled with high fuel loads in the nearby woodlands.

Previous Occurrences of Wild land Fire

Even though the Alaska State Hazard Plan, 2010 lists Chugach REAA as a critical management option in AK HAZUS, there have be no recorded incidents of serious wild land fire in Cordova.

Wild land Fire Mitigation Goals and Projects

Goals

- Goal 1:** Establish building regulations to mitigate against fire damage.
- Goal 2:** Conduct outreach activities to encourage the use of Fire Wise development techniques.
- Goal 3:** Encourage the evaluation of emergency plans with respect to wild land fire assessment.
- Goal 4:** Acquire information on the danger of wild land fires and how best to prepare.

Projects (listed numerically as WF = WILD LAND FIRE)

- **Project WF-1:** Continue to support the fire department with adequate firefighting equipment and training.
- **Project WF-2:** Promote Fire Wise building design, siting, and materials for construction.

The Alaska Fire Wise Program is designed to educate people about wild land fire risks and mitigation opportunities. It is part of a national program that is operated in the State by the Alaska Wildfire Coordinating Group (AWCG).

- **Project WF-3:** Enhance public awareness of potential risk to life and personal property. Encourage mitigation measures in the immediate vicinity of their property.

CHAPTER FOUR

WILDLAND FIRE

Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
Wild land Fire (WF)						
Project WF-1. Continue to support the local fire department with adequate firefighting equipment and training.	Life/Safety issue Risk reduction Benefit to entire community State assistance available Annual project.	Dollar cost not determined. Staff time to research grants	High	City	City Budget	Ongoing
Project WF-2. Promote Fire Wise building design, siting, and materials for construction.	Life/Safety issue Risk reduction Benefit to entire community, Annual project. State assistance available	Dollar cost not determined. Staff time to research grants	High DONE by Native Village of Eyak	City	City Budget	Ongoing
Project WF-3: Enhance public awareness of potential risk to life and personal property. Encourage mitigation measures in the immediate vicinity of their property.	Life/Safety issue Risk reduction Benefit to entire community Inexpensive State assistance available Could be implemented annually	Staff time	High DONE by Native Village of Eyak	City	City Budget	Ongoing

Section 4. Earthquake

Hazard Description and Characterization

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

Local Earthquake Hazard Identification

Prince William Sound is backed by the Chugach Mountains in its central and eastern portions, and by the Kenai Mountains at its western edge. The highest sections of the Kenai-Chugach Range consist of extremely rugged northeast trending ridges from 7,000 to 13,000 feet high. The lower sections consist of massive mountains five to ten miles wide and between 3,000 to 6,000 feet in height. All higher parts of the range are buried in ice fields that feed massive valley and piedmont glaciers. The coastline is deeply indented by drowned glacial valleys and there are numerous islands, particularly in the more westerly portions of the Sound. Like the mountain ridges, the major fjords and islands also trend in a northeasterly direction.

The March 1964 earthquake wrought major changes in the physical landscape of the Cordova area. Little structural damage occurred in town and the only fatality occurred at Point Whited. However, the tectonic uplift which took place in the Cordova area had a much greater impact upon this community than structural damage had upon some other communities in Southcentral Alaska. Uplifts of 6.5 to 7.5 feet were recorded on the tide gauges at Cordova. Extensive coastal tracts of mud flats, beaches, and reefs throughout the area that were formerly exposed only at lowest minus tides became permanently exposed.

In the immediate Cordova area, the effects of tectonic uplift were described by the U.S. Geological Survey as follows:

"At Cordova, all dock facilities were raised so high that they could be reached by boats only at highest tides. Several nearby canneries had to extend their docks more than 100 feet to permit access. The area in the vicinity of the city dock and the small boat basin was above water at most tides; an extensive and difficult dredging project, together with new breakwaters and dock repairs, was necessary to make the facilities usable. In the course of this work, which was done by the Corps of Engineers, the boat basin was much enlarged, and about 20 acres of new land, eventually usable for industrial purposes, was made from the material dredged from the boat basin. It was also necessary for the Corps of Engineers to dredge a new channel through almost the entire length of Orca Inlet for use by fishermen."

Cordova was once referred to as the clam processing capital of the world. The earthquake effectively eliminated that very important local industry.

In practical terms, the earthquake also ended Cordova's capacity to serve as a deep-water port. This had rather significant economic implications for the community. Cordova has considered several options and has been discussing the possibility of re-establishing itself as a deep water port, however, to date; no decisions have been made on this issue. (*Draft 2006 Cordova Comprehensive Plan*)

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

Figure 2. AEIS Earthquake Active Faults

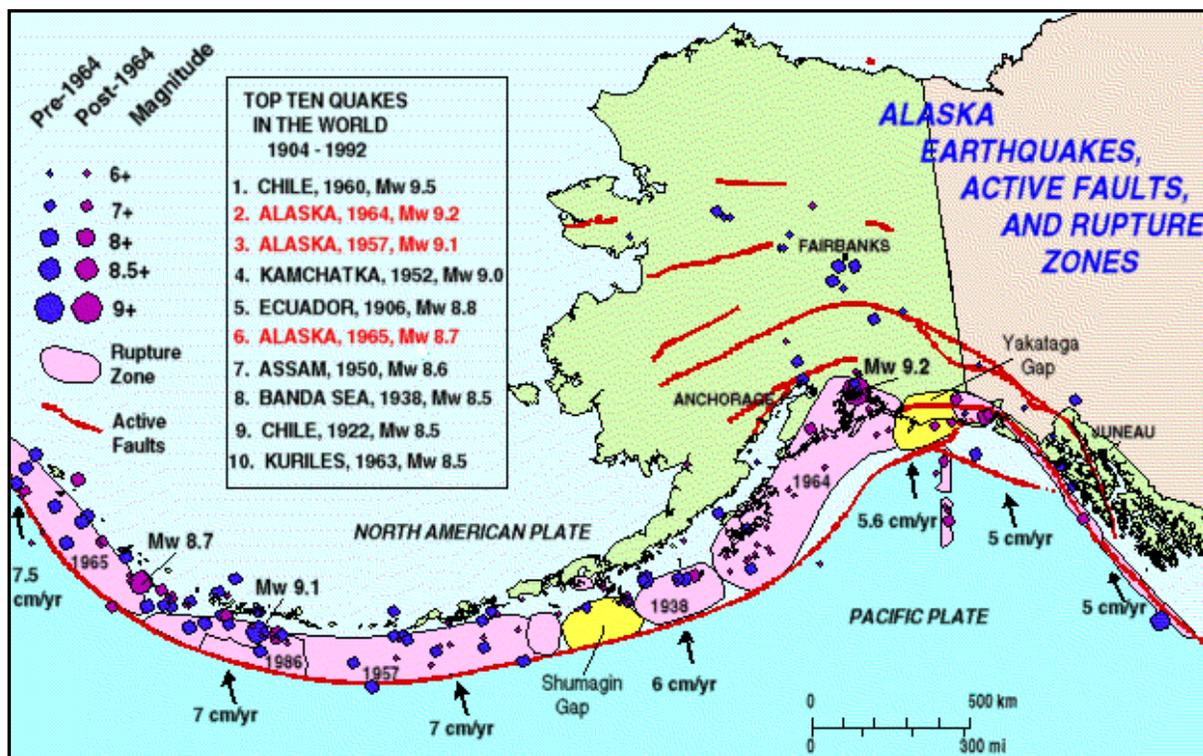
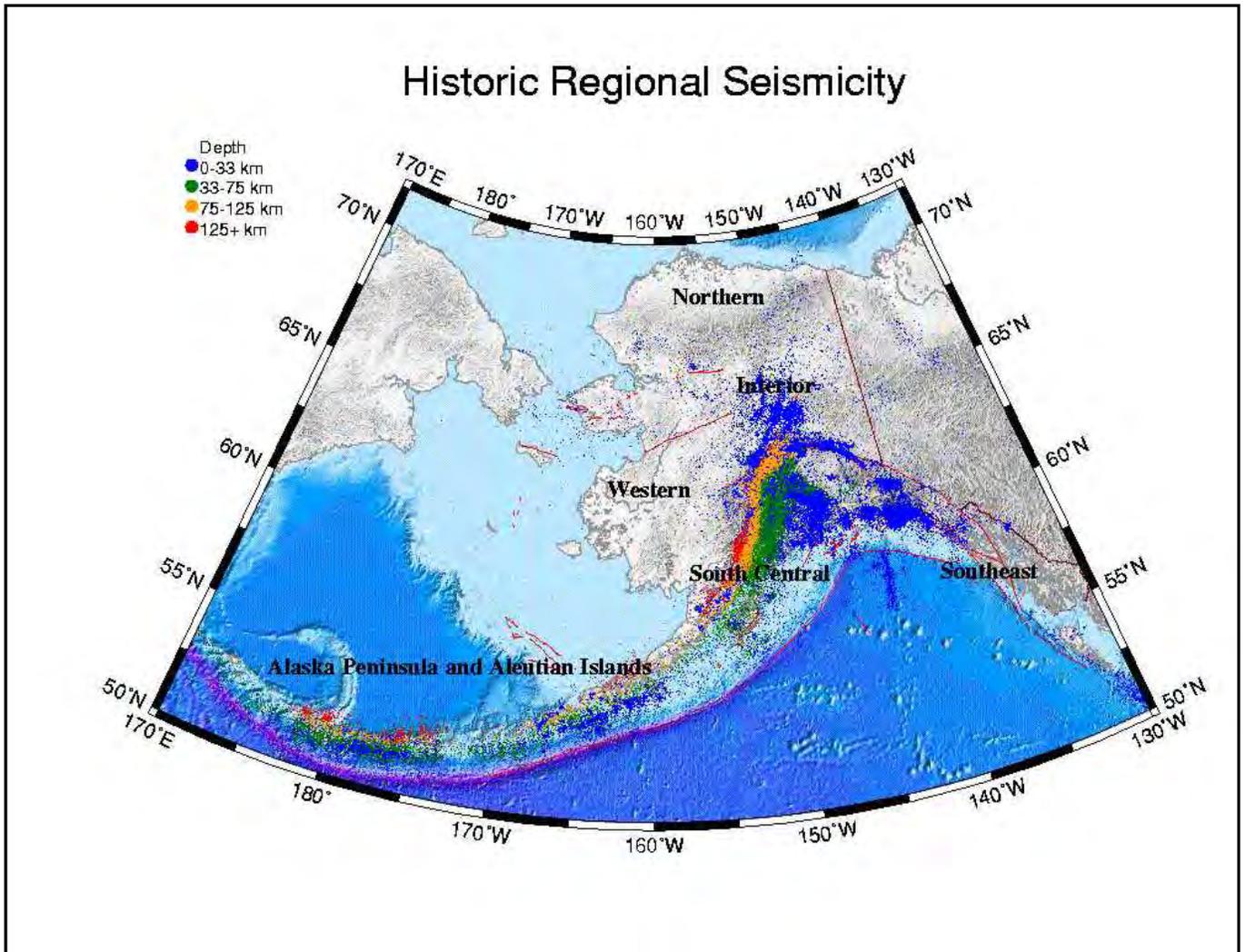
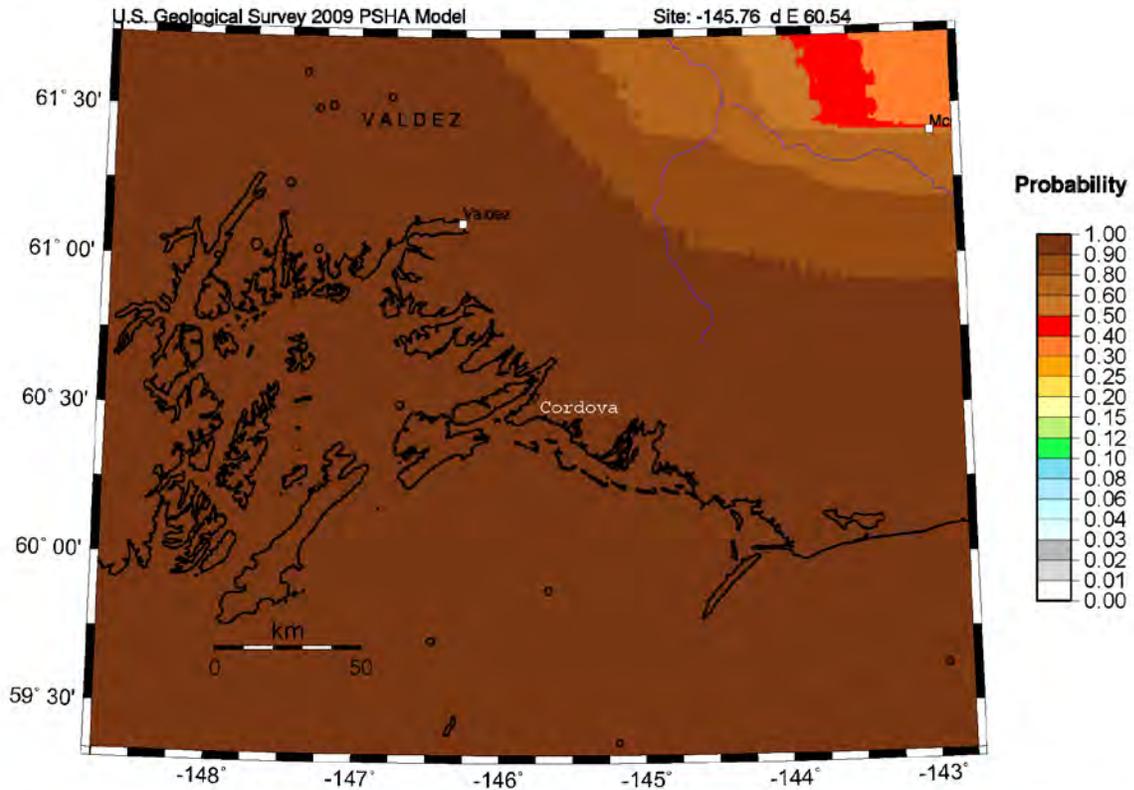


Figure 3. AEIS Historic Regional Seismicity 2012



Probability of earthquake with $M > 5.0$ within 50 years & 50 km



GMT 2013 Jun 20 16:44:19 EQ probabilities from USGS OFR 2007-1043 PSHA. 50 km maximum horizontal distance. Site of interest: triangle. Fault traces are brown; rivers blue. Epicenters $M \geq 6.0$ circles.

Figure 4 U. S. Geological Survey Earthquake Probability Map for Cordova and Valdez 2013
Source: USGS Earthquake Probability Study 2009

Previous Occurrence of Earthquakes

According to the U. S. Geological Survey Alaska Science Center, Alaska experiences at least one earthquake per year greater than magnitude 5. Please see the above hazard identification regarding the 1964 earthquake, the worst in Alaska's history.

Earthquake Hazard Vulnerability and Probability

Referring to Tables 7 and 8, the entire City of Cordova is vulnerable to an earthquake event. Based upon Figures 2, 3, and 4, the City of Cordova has a high probability of experiencing an earthquake of magnitude 5 or greater in the near future. The U. S. Geological Survey regards this hazard probability as 1 in 1 for Cordova (Figure 4).

Earthquake Mitigation Goals and Projects

Goals

Goal 1: Obtain funding to protect existing critical infrastructure from earthquake damage.

Goal 2: Maintain the current level of commitment to earthquake preparation

Projects (listed numerically as E = EARTHQUAKE)

- **Project E-1: If funding is available, perform an engineering assessment of the earthquake vulnerability of each identified critical infrastructure owned by the City of Cordova.**
- **Project E-2: Identify buildings and facilities that must be able to remain operable during and following an earthquake event.**
- **Project E-3 Contract a structural engineering firm to assess the identified buildings and facilities to determine their structural integrity and strategy to improve their earthquake resistance.**
- **Project E-4 Continue to educate all City employees and citizens with regards to earthquake preparedness, particularly with regards to the current EOP, Incident Command structure, Cordova COOP plan, and personal Responder READY courses.**

CHAPTER FOUR

EARTHQUAKE

Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	High	Responsible Agency	Funding Sources	Estimated Timeframe
Earthquake (E)						
Project E-1. If funding is available, perform an engineering assessment of the earthquake vulnerability of each identified critical infrastructure owned by the City of Cordova.	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	Staff time	High	City DHS&EM	State Grants USCOE	>1 year
Project E-2. Identify buildings and facilities that must be able to remain operable during and following an earthquake event.	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	EMPG staff time	High DONE , through COOP Plan	City DHS&EM	City budget DHS&EM	>1 year
Project E-3. Contract a structural engineering firm to assess the identified bldgs. and facilities and bridges.	Benefit to entire community Risk reduction	Feasibility and need analysis needed. 1 – 5 years	HIGH	City DHS&EM	PDMG HMGP	>5 years

CHAPTER FOUR

EARTHQUAKE

Mitigation Projects	Benefits (pros)	Costs (cons)	High	Responsible Agency	Funding Sources	Estimated Timeframe
Earthquake (E)						
Project E-4 Continue to educate all City employees and citizens, with regards to earthquake preparedness	Benefit to entire community Risk reduction	EMPG staff time	HIGH	City DHS&EM	City budget DHS&EM	Ongoing

Section 5. Tsunami and Seiche Hazard

Hazard Description and Characterization

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

Tsunami damage is a direct result of three factors:

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

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

Local Tsunami Hazard Identification

The following is from Map 5 Cordova, Alaska Tsunami Hazard Zones, (in the appendix) produced by the State of Alaska, Division of Emergency Services.

Local Tsunami

These are waves that are generated from nearby waters and could reach the community before a warning is issued. Local tsunamis are normally caused by a strong earthquake whose epicenter is located a short distance away. Such an earthquake can trigger massive landslides or changes in the underwater terrain that will create large waves in the immediate area. Historically such waves have been the highest, reaching heights of 100 feet or more and up to one-mile inland. Cordova is considered to have a local tsunami hazard.

Map 5 illustrates, for the public, blue shaded areas that are below the 100-foot approximate elevation level or less than one-mile inland. Table 8 marks critical facilities that are located within the tsunami hazard zone as shown on the map.

Distant Source Tsunami

This is a tsunami that is generated so far away that the earthquake was either not felt or only slightly felt. The waves from a distant source tsunami are generally smaller than those created by a local tsunami. There will normally be sufficient time for officials to issue a warning and alter (you) to possible danger. Cordova is considered to have a moderate potential danger from a distant source tsunami. This means that a wave of 35 feet with water reaching up to ¼ mile inland is possible.

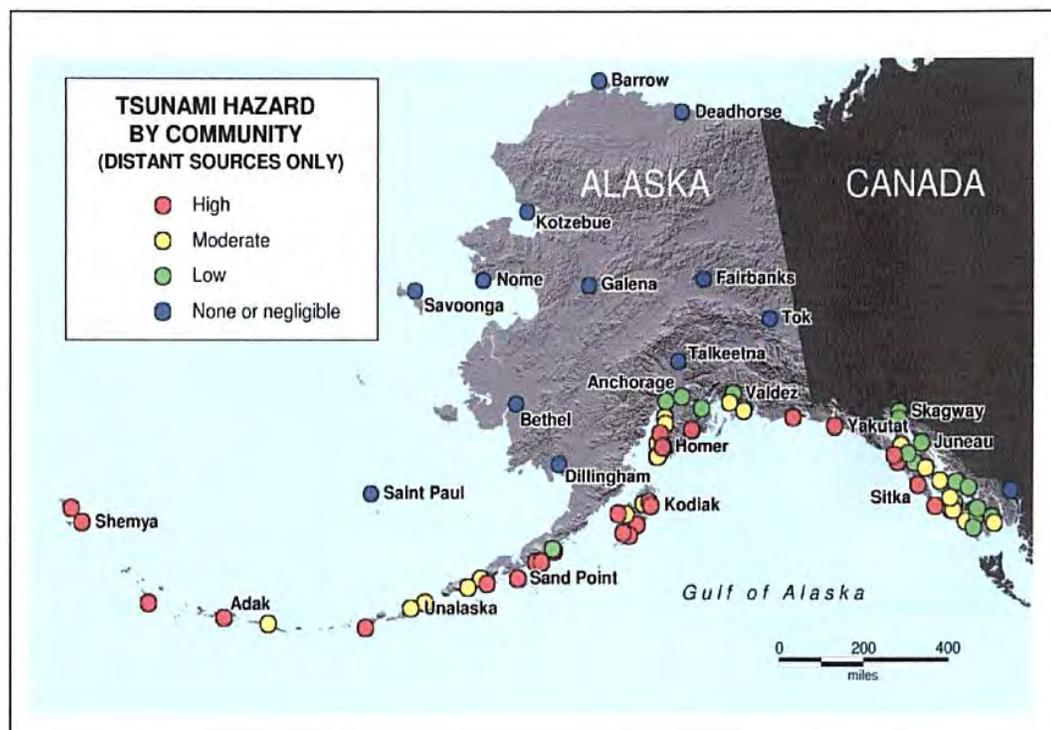
Extent or Severity of Tsunami Hazard in Cordova

The State of Alaska DHS&EM designates Cordova as having an extent or possible severity of *limited* damage from a tsunami. Table 8 at the beginning of this chapter marks critical facilities that are located within the tsunami hazard zone, or within one mile of the shoreline and below 100 feet in elevation.

Port and harbor facilities, public works facilities, structures, vehicles, equipment, and transportation facilities such as docks, float systems, and roads could all be affected.

Environment that could be affected include wetlands with inclusive flora and fauna, and coastal vegetation.

Figure 5 Tsunami Hazard by Community



Source: DHS&EM 2013

Previous Occurrences of Tsunamis/Seiches

1964 Earthquake Tsunami

The 1964 earthquake triggered several tsunamis, one major tectonic tsunami and about 20 local submarine and sub aerial landslide tsunamis. The major tsunami hit between 20 and 45 minutes after the earthquake. The locally generated tsunamis struck between two and five minutes after being created and caused most of the deaths and damage. Tsunamis caused more than 90% of the deaths – 106 Alaskans and 16 Californian and Oregonian residents were killed.

While there was tsunami damage throughout the area, the effects were most significant in Kodiak, Seward, Whittier, Chenega and Valdez. There was a small wave run up from a tsunami at Cordova, but it did not cause any damage.

There are no other reports of tsunami occurrences in Cordova.

Tsunami/Seiche Hazard Vulnerability and Probability

Please see Tables 7 and 8 at the beginning of this chapter, which outlines the structures and infrastructure vulnerable to tsunami damage. Table 6 data gathered from the Alaska State Hazard Plan 2010 designates Cordova as having a moderate probability of 1 in 3 year's time. Even though the historical record shows only one damaging tsunami impacting Cordova, there have been many small residual tsunami waves, such as the one generated from the 2012 Earthquake in Japan.

In Cordova, the most serious threat is from a locally generated tsunami/Seiche originating in the Gulf of Alaska and the near shore water bodies. These waves have reached heights of 170 feet. Because they are generated immediately offshore, they may strike the coast before a warning could be issued.

Vulnerability: Currently, all coastal areas below 100 ft. elevation and/or within one mile of the water's edge. More current tsunami inundation mapping may lead to a revision of vulnerable areas.

Property That May Be Affected: Port and harbor facilities, public works facilities, structures, vehicles, equipment, and transportation facilities such as docks, float systems, and roads. Critical facilities marked on Table 10.

Environment That May Be Affected: Wetlands with inclusive flora and fauna, coastal vegetation.

Unusual Conditions: Multiple fish processing facilities including but not limited to the following hazardous materials: Ammonia, Freon, Crude Oil, etc.

Tsunami/Seiche Mitigation Goals and Projects

Goals

- Goal 1. Continue Public Education about Tsunamis and Seiches.**
- Goal 2. Finish Tsunami Ready Community Designation.**
- Goal 3. Develop accurate inundation maps for the Port of Cordova.**
- Goal 4. Continue Updating Cordova Emergency Operations Plan.**

Projects (listed numerically as T/S= TSUNAMI/SEICHE)

- **Project T/S-1: Continue Participation in the Tsunami Awareness Program.**

Residents and visitors will be educated about the threat of tsunamis to the City of Cordova, as well as being informed about tsunami evacuation areas, routes and safe areas. Community members will be encouraged to develop a Family Disaster Plan and an Emergency Survival Kit for their home and vehicles.

- **Project T/S-2: Finish Tsunami Ready Community Designation**

Participate in the NWS/WC&ATWC Tsunami Ready Program. The City of Cordova could participate in the “Tsunami Ready Certification”. The Tsunami Ready 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 improvement of public safety during tsunami emergencies.

- **Project T/S-3: Inundation Mapping**

Obtain tsunami inundation maps for Cordova. Without these maps, communities must rely on historical or estimated information for land use and evacuation route planning. Inundation maps will provide more accurate and precise information. Our goal is to ensure that emergency management has the most up to date and accurate information needed for planning and zoning.

- **Project T/S-4: Continue Using the Emergency Operations Plan in exercises regarding natural hazards including tsunami danger.**

Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	High	Responsible Agency	Funding Sources	Estimated Timeframe
Tsunami/Seiche (T/S)						
Project T/S-1: Participation in the Tsunami Awareness Program.	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	Staff time	High DONE summer 2012	City DHS&EM	PDMG HMGP	>5 years
Project T/S-2. Tsunami Ready Community Designation	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	Staff time	High DONE summer 2012	City DHS&EM	PDMG HMGP	>5 years
Project T/S-3. Inundation Mapping	FEMA, PDMG, HMGP and State DCRA funding available. USCOE facilitated project. 1 – 5 year project.	Expensive, at least \$100,000	Medium	City DHS&EM	PDMG HMGP USCOE	>5 years

CHAPTER FOUR

TSUNAMI and SEICHE

Mitigation Projects	Benefits (pros)	Costs (cons)	High	Responsible Agency	Funding Sources	Estimated Timeframe
Tsunami/Seiche (T/S)						
Project T/S-4. Update Cordova Emergency Operations Plan	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available 1 – 5 years, or as needed.	EMPG Grant	Medium DONE May 2010	City DHS&EM	HSGP	Ongoing

Section 6. Avalanche and Landslides**Hazard Description and Characterization****Avalanches**

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

A snow avalanche is a swift, downhill-moving snow mass. The amount of damage is related to the type of avalanche, the composition and consistency of the material in the avalanche, the force and velocity of the flow, and the avalanche path.

The 2010 HAZUS-MH STUDY revealed the Chugach REAA to have a high avalanche threat. The following table depicts the extent of risk.

Table 12**2010 High Snow Avalanche Hazard Vulnerability Analysis - State Facilities**

Borough / REAA	# of Facilities	SQ FEET	% of Risk SQ Footage	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	12	26,330	0.44%	\$5,522,896.00

CHAPTER FOUR

AVALANCHE and LANDSLIDES

Wrangell				
State Total	732	5,972,494	100.00%	\$1,178,145,135.00

2010 High Snow Avalanche Hazard Vulnerability Analysis - AK HAZUS
 (utilizes 2000 Census data)

AK HAZUS Population	AK HAZUS # of Households	AK HAZUS Average Value for Households	AK HAZUS Buildings: Commercial	AK HAZUS Buildings: Industrial	AK HAZUS Buildings: Residential
61,844	21,730	\$135,704	282	18	23,318

Source: 2010 Alaska State Hazard Plan

Local Avalanche/Landslide Hazard Identification

Alaska has a long history of snow avalanches. It has been estimated that there have been over 4,500 avalanche disaster events in the past 200 years. The Palm Sunday avalanche, April 3, 1898 is considered to be the deadliest event of the Klondike gold rush. The Chilkoot Trail, near Skagway, experienced multiple slides that day, including three with fatalities. The first fatal slide killed three people. The second one killed the entire Chilkoot Railroad and Transportation Company crew who were trying to evacuate an avalanche prone area further up the trail. The third slide occurred in about the same location as the second killing approximately 70 people who were following the trail left by the construction crew. The exact death toll is unknown because of the transient nature of those involved and inefficiencies in the identification process.

Late 1999 and early 2000 saw avalanches in Cordova, Valdez, Anchorage, Whittier, Cooper Landing, Moose Pass, Summit, Matanuska Susitna Valley, and Eklutna from the Central Gulf Coast Storm. As a result of more than 11 million dollars' worth of damage, a federal avalanche disaster was declared for the first time in U.S. history.

Previous Occurrences of Avalanches and Landslides

Between April of 1999 and March of 2009, four Cordovans were killed by avalanches.

April 15, 1999 a heavy-equipment operator died in an avalanche in a steep canyon north of the city, at the end of Power Creek Road. He was running a backhoe as part of the construction of a hydroelectric power plant when the slope gave way.

January 26, 2000. The most damaging avalanche in the winter of 1999-2000 (the year that AK declared an avalanche disaster) occurred in Cordova, near milepost 5.5 of the Copper River Highway, and was approximately ½ mile wide. It killed one resident (in her home) and severely injured another who was buried roughly 15 feet deep for more than six hours. Five houses and two warehouses were destroyed along with numerous outbuildings, cars, and boats. The Copper River Highway, the only road to the airport in a community accessible only by plane or boat, was blocked for more than 1000 feet and 1400 feet of transmission line was destroyed. It resulted in about one million dollars in damage. Avalanches had struck in that spot before, including one in 1971.

This event was the impetus for the urban avalanche rescue response, avalanche hazard mapping and mitigation analysis, zoning ordinance, and federal buyout assistance program. FEMA's Hazard Mitigation Grant Program helped relocate at-risk homes after the 2000 Cordova, AK avalanches. The response to this accident may set an important precedent for the inevitable future urban avalanche disasters in the United States.

On December 11, 2001 five snow machines were caught in an avalanche on Whitshed Rd. Two snowmobilers were buried; I killed, in that avalanche.

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Another Cordovan died on March 8, 2008, in an avalanche on Mount Eyak. He was a snow safety expert who warned that avalanche conditions in the mountains around Cordova over the weekend were "considerable" The same avalanche injured another Cordova man, while two people skied away safely. The four were checking snow conditions.

Three separate avalanches closed the Copper River Highway during the winter of 2012. On January 6th, 2012 avalanches simultaneously closed CRH at mile 2.5 and mile 5.5. On April 17th, CRH was again closed with a significant avalanche at mile 5.2. There were no associated damages or injuries from these avalanches.

There have been no reported incidents of landslide occurrences in Cordova. The Alaska State All Hazards Mitigation Plan (Table 6) identifies the extent to damage from a landslide event as limited. As denoted on Table 10, there are no critical facilities located in known landslide areas.

Avalanche/Landslide Hazard Vulnerability and Probability

Avalanches affecting infrastructure or transportation are a hazard primarily at Mile 2.3 Miles 5.3 and Mile 5.5 Copper River Highway, Shepard Point, and Power Creek Hydro Power Plant.

Areas of high avalanche hazard along major roadways include:

- Mile 2.3 Copper River Highway
- Miles 5.3 and 5.5 Copper River Highway
- Portions of New England Cannery Road

Considering Tables 6 and 8, the historical record, and completed mitigation projects (FEMA 2000 relocation), the probability for a damaging avalanche impacting Cordova is moderate or one in three years' time.

Avalanche/Landslides Mitigation Goals and Projects

Goals

- Goal 1. Reduce Cordova's vulnerability to avalanche and landslide hazards in terms of threat to life and property.**
- Goal 2. Have comprehensive information regarding avalanche and landslide hazards and unstable soils throughout Cordova's developed area, including areas that will be developed in the future.**
- Goal 3. Increase public awareness of avalanche and landslide dangers and hazard zones.**

Projects (listed numerically as A/L = AVALANCHE/LANDSLIDE)

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- **Project A/L-1. Prohibit new construction in avalanche zones.**
- **Project A/L-2: Utilize appropriate methods of structural avalanche control.**

Containment structures, depending on their design, can prevent snow loads from releasing and forming an avalanche, and/or protect structures by diverting or containing avalanche debris. Such structures include snow fences, diversion/containment structures, snow nets, and reforestation.

- **Project A/L-3. Enact buyout of homes in avalanche paths.**
- **Project A/L-4: Prohibit removal of vegetation in areas prone to landslides.**

Removal of vegetation from slopes can compromise the integrity of the soil and lead to landslides. Requests to remove vegetation should be handled through a permit process that involves an assessment of the area for landslide hazard.

- **Project A/L-5: Install warning signage in mapped landslide zones.**
- **Project A/L-6: Continue to educate public, specifically back country users, about avalanche and landslide hazards. Information can be disseminated to the public through the City web site, press releases, media ads, avalanche awareness classes, and other methods.**
- **Project A/L-7: Complete the avalanche mapping and mitigation alternatives overview of other avalanche areas within the City of Cordova, including Power Creek and Shepard Point**
- **Project A/L-8: Encourage good record-keeping of past, present, and future avalanche events affecting private land in the Cordova area. Such records are invaluable for planning and mitigation**
- **Project A/L-9: Add a Geologic Layer to Cordova's mapping system**

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Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Source	Estimated Timeframe
Avalanche/Landslide (A/L)						
Project A/L-1. Prohibit new construction in avalanche zones.	Life/Safety issue/Risk reduction Benefit to entire community No direct cost to implement State assistance available 1 – 5 years to adopt ordinance.	Political Support not determined. Private property issues. Staff time.	Medium DONE	City	City budget	Ongoing
Project A/L-2. Utilize appropriate methods of structural avalanche control.	Life/Safety issue/Risk reduction Benefit to entire community Federal or State assistance available	Engineering and structural design needed. Dollar cost not determined. >\$25,000 Long timeframe to implement, 5+ years.	Low	FEMA	PDMG HMGP	>5 years
Project A/L-3. Enact buyout of homes in avalanche paths.	Life/Safety issue/Risk reduction Benefit to entire community PDMG or HMPG projects.	Political Support not determined. Private property issues. Staff time. Expensive, >\$100k. Long timeframe 5+ years.	Low DONE 2000	FEMA	PDMG HMGP	>5 years

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Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Source	Estimated Timeframe
Avalanche/Landslide (A/L)						
Project A/L-4. Prohibit removal of vegetation in areas prone to landslides.	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available Could be an ongoing project	Staff time	High	City	City Budget	Ongoing
Project A/L-5. Install warning signage in mapped landslide zones.	Life/Safety issue/Risk reduction Benefit to entire community Federal and State assistance available	Mapped landslide zones do not exist at this time. 5+ years to implement. <\$10,000	Low	DHS&EM FEMA City	PDMG HMGP	Ongoing
Project A/L-6. Continue to educate public about avalanche and landslide hazards.	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive State assistance available Could be an annual event	Staff time /Emergency Management Coordinator	High	City	City Budget	Ongoing

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Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Source	Estimated Timeframe
Avalanche/Landslide (A/L)						
Project A/L-7 Complete the avalanche mapping and mitigation alternatives overview of other avalanche areas within the City of Cordova	Life/Safety issue/Risk reduction Benefit to entire community	Specialists needed. Dollar cost not determined. >\$25,000 Long timeframe to implement, 5+ years.	High	DHS&EM FEMA City	PDMG HMGP	>5 years
Project A/L-8. Encourage good record-keeping of past, present, and future avalanche events affecting private land in the Cordova area	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive	Staff time /Emergency Management Coordinator	High	City	City Budget	Ongoing
Project A/L-9. Add a Geologic Layer to Cordova's mapping system	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive	Staff time /Emergency Management Coordinator	High	City	City Budget	Ongoing

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Section 7. Technological, Public Health, Human-Caused, and Hazardous Materials Hazards

Hazard Description and Characterization

The hazards discussed in this section include:

- Technological and Cyber Threats
- Nuclear, Biological, or Chemical Attack/Materials
- Civil Disorder/Disturbance
- Public Health Emergencies
- Mass Transportation Accidents
- Hazardous Material Threats
- Oil Spills

Technological and Cyber Threats

Modern society functions through technology and cyber communications networks. Technological threats are defined as a potential loss or disruption in the City 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.

Nuclear, Biological, or Chemical Attack

Of all the possible disasters and hazards we can imagine, a strategic nuclear, biological, or chemical attack could be the most devastating and far-reaching in consequences. Regardless where the attack originated, domestic or foreign, the impact on life and property and preparedness, response, and recovery activities, are similar. While preventing an attack may be outside the capacity of the City 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.

Civil Disorder/Disturbances

There is little information on civil disorder events in Alaska. As with the hazard of terrorism, even in the absence of a historical record of events of this hazard, it has been included in the State Hazard Mitigation Plan (SHMP) because of the potential it could occur in the State. Thus, it is also included in Cordova's plan.

Public Health Emergencies

Public health emergencies can take many forms - disease epidemics, large-scale incidents of food or water contamination, or extended periods without adequate water and sewer services. There can also be harmful exposure to chemical, radiological, or

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biological agents, and large-scale infestations of disease-carrying insects or rodents.

This section focuses on emerging public health concerns and potential pandemics.

Public health emergencies can occur as primary events by themselves, or they may be secondary to another disaster or emergency, such as earthquake, flood, or hazardous material incident. 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.

Mass Transportation Accidents

For the purpose of this plan, mass transportation is defined as the means, or system, that transfers large groups of individuals from one place to another. This section simply addresses only the potential transportation accidents involving people, not materials.

Hazardous Materials Threats

Hazardous Air Quality

Some inhalable highly toxic hazardous substances can be released into the air as a gas, such as chlorine or ammonia. A flammable hazardous substance can produce toxic smoke. An airborne release would most likely occur from a stationary source or from a transportation incident. Airborne hazardous substances will generally have a limited vulnerability zone before it is dispersed into the atmosphere. The vulnerability zone is determined by changing wind speed and direction.

Contaminated Drinking Water Supply

If a liquid hazardous substance is released near a drinking water well or City reservoir, the entire City water system could be compromised. Polluted drinking water is a significant health threat that is sorely underreported and oft-ignored. There are a number of threats to drinking water: improperly disposed of chemicals; animal wastes; pesticides; human wastes; wastes injected deep underground; and naturally-occurring substances can all contaminate drinking water. Likewise, drinking water that is not properly treated or disinfected, or which travels through an improperly maintained distribution system, may also pose a health risk.

Contaminated Wastewater Disposal System

An onsite septic system, or a drain connected to city sewer, could be contaminated by the disposal of hazardous substances. If the groundwater becomes contaminated, the affected well and/or neighboring wells may also become contaminated.

Oil Spill Threats

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

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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.

Local Technological, Public Health and Human-Caused Hazard Identification

Specific sites in Cordova that could be affected by Technological, Public Health, Human-Caused, Hazardous Materials, or Oil Spill threats are as follows:

- Technological and Cyber Threat could affect All Critical Infrastructure and Key Resources. While the importance to Alaska's urban locations is clear, even Alaska's vast rural areas with isolated populations depend on technology for commerce, medical, and other vital services. In fact in some ways, Cordova's remoteness makes the City more dependent on technology for information, the Internet, telecommunications, and networked systems. Other targets for cyber terrorism include public works facilities, utilities, oil and gas, and transportation facilities such as airports, bridges and ferries, schools, medical facilities, other State, and Federal facilities within Cordova.
- Nuclear, Biological, or Chemical Attack/Materials could have city-wide impact upon the entire population. While the use of these weapons against Cordova 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.
- Civil Disorder/Disturbances could have city-wide impact upon the entire population. It is assumed that Cordova is not likely to experience civil disorder as a hazard, barring some extraordinary and unpredictable 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. Cordova does not fall into that category. However, a prolonged disaster, with serious shortages of food or supplies could create an environment of civil disorder anywhere.
- Public Health Emergencies could have city-wide impact upon the entire population. Public health emergencies can be statewide, regional, or localized in scope and

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magnitude. Each of the potential Public Health Emergencies would be handled in much the same way. Specific guidelines (specifically for Pandemic Flu, but can be used for any Public Health Emergency) can be found in Cordova Emergency Operations Plan, Annex L.

- Mass Transportation Accidents would be site specific and could occur anywhere along near the AK Marine Highway, Mile 13 Airport, City Airport, and school bus and tour bus routes. Mass transportation accidents in Cordova would include public airlines, tour buses, school buses, and the AK Marine Highway. The peak periods are related to seasonal population or special events or time of day (school bus runs).
- Hazardous Material Threats could have site specific impact in the canneries (ammonia, for example) or businesses, as well as city-wide impact upon the entire population, possibly requiring evacuation.
- Oil Spill Threats

Oil and hazardous substance handling poses a significant threat, both to Cordova's economy and environment. Much effort over the past 20 years has focused particularly upon oil spill mitigation and response. This plan defers entirely to that research and to those recommendations. For more information, refer to Cordova Emergency Operation Plan, Annex K.

Previous Occurrences of Technological, Public Health and Human-Caused Hazards

Historically, Cordova has been fortunate to not experience many significant episodes of these types of hazards. The exception to that is the 1989 Exxon Valdez Oil Spill, the worst human –caused disaster in Alaska's history, the impact of which was community wide and remains with Cordova to this day.

With regards to Hazardous Materials, The U.S. Environmental Protection Agency (EPA) has classified over 300 substances as Extremely Hazardous Substances (EHS). Some of these chemicals are commonly used in Cordova.

Technological, Public Health and Human-Caused Hazard Vulnerability

The Hazard Vulnerability Analysis for this section is often difficult to describe. In the absence of specific intelligence information on threats or historical hazard events, the degree of vulnerability to these hazards is difficult to assess. Vulnerability is based on general prediction and estimation, rather than on historical evidence of impact to the City's population, property, or environment. Thus, they have not been included in the

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formal Hazard Vulnerability Analysis. Nevertheless, given the potential for future loss, prudence dictates that the vulnerability to these hazards at least be considered.

Technological, Public Health and Human-Caused Mitigation Goals and Projects

Goals

- Goal 1: Mitigate the effects of these hazards by understanding the extent of the risk and the extent of the City capability to respond**
- Goal 2: Educate the public about the dangers of these hazards and how to prepare for the possible effects**
- Goal 3. Continue, as a community, to support all Oil Spill trainings/exercises**
- Goal 4: Enhance Local Hazmat Response Team capabilities**

Projects (listed numerically as TPHH = Technological, Public Health, Human-Caused, Hazardous Materials)

- Project TPHH-1: Identify and organize local resources**
- Project TPHH-2: Support community-wide mitigation training/education about non- natural hazards.**
- Project TPHH-3: Encourage improved training, education, planning and safety in the production, use and transportation of oil and hazardous substances. (Local Hazmat Response Team members)**
- Project TPHH-4: Participate in regional oil spill drills/exercises**

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HEALTH, HUMAN-

Table 11 Mitigation Projects	Benefits (pros)	Costs (cons)	Priority	Responsible Agency	Funding Sources	Estimated Timeframe
(TPHH)						
Project TPHH-1: Identify and organize local resources	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive	Staff time	High	City	City budget	<5 years
Project TPHH-2. Support community-wide mitigation training/education about non-natural hazards	Life/Safety issue/Risk reduction Benefit to entire community	Staff time	Medium	City	City budget	>5 years
Project TPHH-3. Encourage improved training, education, planning, and safety in the production, use, and transportation of hazardous substances	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive	Staff time	High	City DHS&EM	DHS&EM	<5 years
Project TPHH-4: Participate in regional oil spill drills/exercises	Life/Safety issue/Risk reduction Benefit to entire community Inexpensive Could be annual event	Staff Time/ EMPG staff	High DONE fall 2011	City	City Budget	< 5 years

Chapter 5: Mitigation Strategy

Benefit - Cost Review

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

The projects listed on Table 9, Benefit and Costs Listing, were prioritized using a listing of benefits and costs review method as described in the FEMA *How-To-Guide Benefit-Cost Review in Mitigation Planning* (FEMA 386-5).

Due to monetary as well as other limitations, it is often impossible to implement all mitigation actions. Therefore, the most cost-effective actions will receive the highest funding and implementation priority, as depicted in Table 11 throughout Chapter 4, not only to use resources efficiently, but also to make a realistic start toward mitigating risks.

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

1. Extent to which benefits are maximized when compared to the costs of the projects, the Benefit Cost Ratio must be 1.0 or greater.
2. Extent the project reduces risk to life-safety.
3. Project protects critical facilities or critical city functionality.
 - A. Hazard probability.
 - B. Hazard severity.

Other criteria used to developing the benefits – costs listing depicted in Table 11:

1. Vulnerability before and after Mitigation

Number of people affected by the hazard, area wide or specific properties.

Areas affected (acreage) by the hazard

Number of properties affected by the hazard

Loss of use

Loss of life (number of people)

Injury (number of people)

1. List of Benefits

Risk reduction (immediate or medium time frame)

Other community goals or objectives achieved

Easy to implement

Funding available

Politically or socially acceptable

2. Costs

Construction cost

Programming cost

Long time frame to implement

Public or political opposition

Adverse environmental effects

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

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

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

Glossary of Terms

A-Zones

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

Acquisition

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

Asset

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

Base Flood

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

Base Flood Elevation (BFE)

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

Base Floodplain

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

Building

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

Building Code

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

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

Community

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

Community Rating System (CRS)

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

Critical Facility

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

Designated Floodway

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

Development

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

Digitize

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

Disaster Mitigation Act (DMA)

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

Earthquake

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

Elevation

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

Emergency Operations Plan

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

Erosion

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

Federal Disaster Declaration

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

Federal Emergency Management Agency (FEMA)

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

Flood

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

Flood Disaster Assistance

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

Flood Elevation

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

Flood Hazard

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

Flood Insurance Rate Map

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

Flood Insurance Study

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

Floodplain

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

Floodplain Management

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

Floodplain Management Regulations

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

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

Flood Zones

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

Flood Zone Symbols

A - Area of special flood hazard without water surface elevations determined.

A1-30 - AE Area of special flood hazard with water surface elevations determined.

AO - Area of special flood hazard having shallow water depths and/or unpredictable flow paths between one and three feet.

A-99 - Area of special flood hazard where enough progress has been made on a protective system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes.

AH - Area of special flood hazard having shallow water depths and/or unpredictable flow paths between one and three feet and with water surface elevations determined.

B - X Area of moderate flood hazard.

C - X Area of minimal hazard.

D - Area of undetermined but possible flood hazard.

Geographic Information System

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

Governing Body

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

Hazard

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

Hazard Event

A specific occurrence of a particular type of hazard.

Hazard Identification

The process of identifying hazards that threaten an area.

Hazard Mitigation

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

Hazard Mitigation Grant Program

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

Hazard Profile

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

Hazard and Vulnerability Analysis

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

Mitigate

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

Mitigation Plan

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

National Flood Insurance

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

One Hundred (100)-Year

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

Planning

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

Repetitive Loss Property

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

Risk

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

Riverine

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

Riverine Flooding

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

Runoff

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

Seiche

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

Seismicity

Describes the likelihood of an area being subject to earthquakes.

State Disaster Declaration

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

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

Topography

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

Tribal Government

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

Tsunami

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

Vulnerability

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

Vulnerability Assessment

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

Watercourse

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

Watershed

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

Bibliography

1. *Alaska State Hazard Plan*. Prepared by and for DHS&EM. September 2004
2. *Cordova Comprehensive Plan*. Prepared by and for City of Cordova. 1995.
3. *Cordova Comprehensive Plan, Draft*. Prepared by and for City of Cordova. October 20, 2006.
4. *Cordova Coastal Management Plan 2007 Amendment*. Prepared by Bristol Engineering for the Cordova Coastal District, 2007.
5. *Cordova City Code*. Chapter 18.35, Avalanche District. Draft Version, 2000.
6. *DCRA Community Information*:
http://www.dkra.state.ak.us/dca/commdb/CF_COMDB.htm.
7. *Eyak River Flood Control Study*. Prepared by USCOE for the City of Cordova. July 14, 2003.
8. *FEMA Benefit-Cost Analysis Website*:
<http://www.fema.gov/government/grant/bca>.
9. FEMA How to Guides
 - Getting Started: Building Support For Mitigation Planning (FEMA 386-1)
 - Understanding Your Risks: Identifying Hazards And Estimating Losses (FEMA 386-2)
 - Developing The Mitigation Plan: Identifying Mitigation Actions And Implementing Strategies (FEMA 386-3)
 - Bringing the Plan to Life: Implementing the Hazard Mitigation Plan (FEMA 386-4)
 - Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)
10. *Flood Mitigation Plan*. Prepared by and for the City of Cordova. 1996.
11. *Flood Insurance Study*. Prepared by U.S. Department of Housing & Urban Development Federal Insurance Administration (now FEMA) for the City of Cordova. October 1978.

12. *Evaluation of Recent Channel Changes on the Scott River Near Cordova, Alaska.* Prepared by USDA-Forest Service Chugach National Forest Anchorage, Alaska, Blanchet, Hydrologist. December 1983.
13. Eyak Lake AMSA Plan (part of Cordova Coastal Management Plan)
14. Cordova Emergency Operation Plan May 2010

Web Sites

American Planning Association:	http://www.planning.org
Association of State Floodplain Managers:	http://www.floods.org
Developing the Implementation Strategy:	www.pro.gov.uk
Federal Emergency Management Agency:	http://www.fema.gov/fima/planning.shtm
Community Rating System:	http://www.fema.gov/nfip/crs.htm
Flood Mitigation Assistance Program:	http://www.fema.gov/fima/planfma.shtm
Hazard Mitigation Grant Program:	http://www.fema.gov/fima/hmgp
Individual Assistance Programs:	http://www.fema.gov/rrr/inassist.shtm
Interim Final Rule:	http://www.access.gpo.gov
National Flood Insurance Program:	http://www.fema.gov/nfip
Public Assistance Program:	http://www.fema.gov/rrr/pa

Appendix

- A. Community Outreach
- B. City Meeting Agendas & Minutes
- C. RiskMAP Discovery Meeting and Report

List of Maps

- Map 1. Cordova Regional Map
- Map 2. Cordova Flood Rate Insurance Map
- Map 3. Cordova Critical Infrastructure
- Map 4. Cordova Regional Critical Infrastructure
- Map 5. Tsunami Hazard Zones

Photos

- Photos 1. Orca Creek, 11/01/06
- Photos 2. Airport and Eyak Lake, 10/31/06
- Photos 3. Cordova Flood Pictures, 10/10/06
- Photos 4. Cordova Flood Pictures, 10/10/06
- Photos 5. Cordova Flood Pictures, 10/10/06
- Photos 6. Power Creek, October 2006
- Photos 7. Damage to Hydro Plant, 10/31/06
- Photos 8. Damage from Snow, January 2012
- Photos 9. Avalanche April 2012

CITY OF CORDOVA



March 13, 2013

Appendix A

To Whom It May Concern:

This letter is to ask for your input on the City of Cordova Local Hazard Mitigation Plan. The plan was originally written in 2007 and accepted by the State of Alaska, FEMA and the Cordova City Council in 2008. The State of Alaska and FEMA requires an update of the plan every 5 years, and encourages the input of local stakeholders in the process. Thus this letter; we are asking for your consideration in the matter and, if you are inclined, your suggestions for updating the Local Hazard Mitigation Plan

The scope of this plan is to describe the natural hazards that could potentially occur in Cordova and to provide mitigation projects to prevent or minimize the damage from those hazards. The approved plan allows the City of Cordova to be eligible to apply for grants after State and/or Federal declared disasters.

The plan is available for review on the city web page (found under the Government Section, Planning, local Hazard Mitigation Plan); the link is below. Input can be given to the city planning department either by email or mail. Both addresses are below.

Also the plan and draft update will be discussed at future Planning and Zoning meetings, where input could also be given by public. Planning and Zoning meetings are on the second Tuesday of the month and agendas are on the web page the Thursday prior to the meeting.

The Hazard Mitigation can be found here:

www.cityofcordova.net

Comments can be sent to
City of Cordova, Planning Department
PO Box 1210
Cordova, AK 99574

Or

planning@cityofcordova.net

Thank you for your time and consideration in this matter.

Sincerely

Samantha Greenwood
Samantha Greenwood, City Planner

Joanie Behrends
Joanie Behrends, Emergency Management Planner

Planning Commission
REGULAR MEETING
CITY HALL CONFERENCE ROOM
TUESDAY, JULY 10, 2012
MINUTES

In those matters coming before the Cordova Planning Commission at 6:30 p.m., Tuesday, July 10, 2012, in the City Hall Conference Room, 602 Railroad Road Cordova, Alaska, are as follows:

- A. **Call to order**—
- B. **Roll Call** Present for roll call were Chairman Tom Bailer, David Reggiani, John Greenwood, Roy Srb, Greg LoForte and Tom McGann.
Also present were City Planner Samantha Greenwood and Assistant Planner Faith Wheeler-Jeppson.
There were 11 people in the audience.
- C. **Approval of Agenda**
M/Reggiani S/Srb
Upon voice vote, motion passed, 6-0
- D. **Approval of Consent Calendar**
Minutes from the June 12, 2012 Regular Meeting
M/Reggiani S/Greenwood
Upon voice vote, motion passed, 6-0
- E. **Record Absences**
Greg LoForte was excused from the June 12, 2012 Regular Planning Commission meeting.
David Reggiani was unexcused from the June 12, 2012 Regular Planning Commission meeting.
Roy Srb was unexcused from the June 12, 2012 Regular Planning Commission meeting.
- F. **Disclosure of Conflict of Interest**
Tom McGann disclosed that he may have a conflict of interest because he works for the Kelly's. Chairman Bailer stated that we would deal with that when we get there.
- G. **Correspondence**
None
- H. **Communication by and Petitions from Visitors**
1. Guest Speakers
None
2. Audience comments regarding items in the agenda
Carol Hoover ~ We have a letter in here for Lot 2, Block 3 on Seafood Lane. I know we were all talking about it for putting snow on it and everything, but we have been interesting in that piece of property for quite some time as we were associated with the Cordova Kitchen. We would like to revive that concept for Cordova, we have a planning grant to do so, we have a model and interest in a planning group and we'd like to see if we could revive the offer that the City had with that lot. I think it was a dollar a year for three years and then they had to buy it, I'm not sure of all of the details of that particular situation that you had with the Cordova Kitchen. We would like to express our interest in that piece of land again for a Cordova Community Cold Storage, a nonprofit community run facility.
CamTu Ho ~ We are beside HarborSide Pizza and we try to be friendly with him, we try to be good neighbors with him and he still keeps giving us hard times. We want to put the snow stops on the roof and he won't let us come in and do it. The last time we tried he said just talk with the lawyer, so I don't know what we do now. Sorry to bother you with this. We're really trying to make him happy, but it's not working.
Mary Anne Bishop ~ I am representing the Prince William Sound Audubon Society, a local organization of which I am President. On behalf of Audubon, I am here tonight to once again urge Planning and Zoning to begin a public process that will lead to a comprehensive waterfront plan. Why? Because there seems to be many ideas by our City Council and the public about where this city should go on future waterfront planning, including the waterfront property Lot 6, Block 2, South Fill DP, which is

Memorandum

To: Planning and Zoning
From: Planning Department Staff
Date: 8/8/2012
Re: Hazard Mitigation Plan

PART I. GENERAL INFORMATION:

The Cordova Hazard Mitigation Plan was completed in 2008 by a contractor. The State of Alaska and FEMA require an update every 5 years. Having an approved plan allows the City to apply for state and federal grants.

PART II. BACKGROUND:

Currently Joanie Behrends and I are working on updating the Hazard Mitigation plan. The State has provided criteria that need to be followed for the update to be accepted by the State and FEMA. One of these requirements is public meeting where input can be provided. The Hazard Mitigation Plan is over 100 pages with that said, we will print a copy for any person of the public or commissioner who would like one upon request but for the packet the plan will be placed on the Planning and Zoning page on the city web page. Follow this link to read the document. Any input would be appreciated.

<http://www.cityofcordova.net/boards-commissions/planning-zoning/>

**Planning Commission Agenda
REGULAR MEETING
CITY HALL CONFERENCE ROOM
TUESDAY, AUGUST 14, 2012**

Chairman

Tom Bailer

Commissioners

David Reggiani
John Greenwood
Roy Srb
Greg LoForte
Thomas McGann
Scott Pegau

City Planner

Samantha Greenwood

Assistant Planner

Faith Wheeler-Jeppson

In those matters coming before the Cordova Planning Commission at 6:30 p.m.;
Tuesday, August 14, 2012 in the City Hall Conference Room, 602 Railroad Ave, Cordova,
Alaska, are as follows:

- A. CALL TO ORDER
- B. ROLL CALL
Chairman Tom Bailer, Commissioner David Reggiani, John Greenwood,
Roy Srb, Greg LoForte, Tom McGann and Scott Pegau.
- C. APPROVAL OF AGENDA
- D. APPROVAL OF CONSENT CALENDAR (Pages 1-6)
Minutes from the July 10, 2012 Regular Meeting
- E. RECORD ABSENCES
Unexcused absence for Scott Pegau for the July 10, 2012 Regular Meeting
- F. DISCLOSURE OF CONFLICT OF INTEREST
- G. CORRESPONDENCE
- H. COMMUNICATIONS BY AND PETITIONS FROM VISITORS
 - 1. Guest Speakers (10-15 minutes per item)
 - 2. Audience comments regarding items on the agenda (3 minutes per speaker)
 - 3. Chairpersons and Representatives of Boards and Commissions
- I. PLANNERS REPORT (Page 7)
- J. New Business
 - 1. Utility Easement vacation for Lot 7, Knute Johnson Subdivision (Pages 8-9)
 - 2. Replat of Utility Easement for Lot 7, Knute Johnson Subdivision (Pages 10-11)
 - 3. Lease request by the Prince William Sound Community College (Pages 12-15)
 - 4. Hazard Mitigation Plan (Printed copy can be made available upon request) (Page 16)
- K. Old Business
- L. Miscellaneous Business
None
- M. Pending Calendar
 - August 2012 Calendar (Pages 17)
 - September 2012 Calendar (Pages 18)
- N. Audience Participation
- O. Commission Comments
- P. Adjournment

If you have a disability which makes it difficult for you to participate in City-sponsored functions,
Please contact 424-6200 for assistance.

**Planning Commission Agenda
REGULAR MEETING
CITY HALL CONFERENCE ROOM
TUESDAY, OCTOBER 09, 2012**

Chairman

Tom Bailer

Commissioners

David Reggiani
John Greenwood
Roy Srb
Greg LoForte
Thomas McGann
Scott Pegau

In those matters coming before the Cordova Planning Commission at 6:30 p.m.; Tuesday, October 9, 2012 in the City Hall Conference Room, 602 Railroad Ave, Cordova, Alaska, are as follows:

City Planner

Samantha Greenwood

Assistant Planner

Faith Wheeler-Jeppson

- A. **CALL TO ORDER**
- B. **ROLL CALL**
Chairman Tom Bailer, Commissioner David Reggiani, John Greenwood, Roy Srb, Greg LoForte, Tom McGann and Scott Pegau.
- C. **APPROVAL OF AGENDA**
- D. **APPROVAL OF CONSENT CALENDAR**
Minutes from the September 11, 2012 Public Hearing (Pages 1-3)
Minutes from the September 11, 2012 Regular Meeting (Pages 4-13)
Minutes from the September 17, 2012 Special Meeting (Pages 14-15)
- E. **RECORD ABSENCES**
Unexcused absence for John Greenwood for the September 11, 2012 Regular Meeting
- F. **DISCLOSURE OF CONFLICT OF INTEREST**
- G. **CORRESPONDENCE**
- H. **COMMUNICATIONS BY AND PETITIONS FROM VISITORS**
 - 1. Guest Speakers (10-15 minutes per item)
 - 2. Audience comments regarding items on the agenda (3 minutes per speaker)
 - 3. Chairpersons and Representatives of Boards and Commissions
- I. **PLANNERS REPORT** (Page 16)
- J. **NEW BUSINESS**
 - 1. Review of proposals for Lot 6, Block 2, South Fill Development Park (Pages 17-41)
 - 2. Review of proposals for Lot 2, Block 3, Cordova Industrial Park (Pages 42-66)
 - 3. Review of Lot 3A, Block 8, North Fill Industrial Park (Pages 67-68)
- K. **OLD BUSINESS**
 - 1. Hazard Mitigation Plan (Page 69)
- L. **MISCELLANEOUS BUSINESS**
None
- M. **PENDING CALENDAR**
October 2012 Calendar (Page 70)
November 2012 Calendar (Page 71)
- N. **AUDIENCE PARTICIPATION**
- O. **COMMISSION COMMENTS**
- P. **ADJOURNMENT**



Project Name:	<i>FEMA Region X Discovery</i>
Meeting:	<i>City of Cordova Discovery Meeting</i>
Date and Time:	<i>Friday, March 4, 2011, 9 am – 12 pm AKST</i>
Place:	<i>USFS Courtroom, 612 2nd Street, Cordova, AK 99574</i>
Facilitator:	<i>David Ratte, FEMA</i>

Discovery Meeting Notes

Attendees

- Samantha Greenwood, City of Cordova Floodplain Administrator and City Planner
- Ken Hodges, U.S. Forest Service, Cordova Ranger District, Fisheries Biologist
- Dale Murna, City of Cordova, Harbormaster/Port Director
- Wendy Shaw, U.S. Army Corps of Engineers, Alaska District Lead(via telephone)
- Taunnie Boothby, Alaska NFIP Coordinator (via telephone)
- David King, Alaska DHS&EM, Program Manager
- David Ratte, FEMA RX Discovery Engineer
- Tom Tufts, STARR Project Manager
- James Huffines, STARR GIS Analyst

Introductions

David Ratte opened the meeting and all attendees introduced themselves. A pre-populated sign-in sheet was distributed for attendees to initial their attendance and check and correct contact information. Mr. Ratte described the RiskMAP program and objectives.

Coastal Risk MAP and Discovery Products

Mr. Ratte mentioned that the primary focus of all new studies was coastal as set forth by FEMA Headquarters and Congress. He also stated that we would still look at areas of riverine and lacustrine flooding and determine if they could be included in future studies.

City of Cordova Flooding Areas of Concern Conversations

James Huffines displayed the GIS data for the areas of need discussion. Tom Tufts and Samantha Greenwood discussed the coastal areas of need. The community reported that waves from the north are entering into the mouth of the harbor and causing damage to boat slips. It was also determined from these discussions that the surge events and wind events were decoupled. Surge events are seen mainly in the fall with large low pressure systems in the Gulf of Alaska, while the large wind events are seen in the winter when the winds are strong out the of the north passes into the bay. Three coastal study areas were identified as *needing a detailed study – at the northern end of Cannery Road near the loop, along Cannery Road where Fleming Creek reaches the coast, and along Seafood Lane.*

Dale Murna explained issues with the wave action into the harbor. He stated the harbor was expanded by the U.S Army Corps of Engineers (USACE) in 1984 to the current layout. Swells propagate into the harbor from the north during winter months. Docks are damaged by up to 3-foot swell action. The USACE has performed studies of the problem. A design consisting of a 45 degree dogleg extension to the north side of the harbor near the T-dock has been completed and



construction is awaiting a feasibility analysis by the USACE. The community explained that funding to complete the *Harbor Breakwater Extension mitigation project* was needed. No major concerns were noted for the Odiak Slough area. A wastewater treatment plant is located south of the slough along Whitshed Road, but should be at an adequately safe elevation. The community indicated no concerns with coastal erosion. *One potential risk assessment product could potentially include a comparison of the effects of the breakwater improvement project on the wave action through the marina.*

The group also discussed riverine and lacustrine flooding areas of concern. The community explained that there is wave action during the autumn months on Eyak Lake, with winds peaking at 90-100 mph. The most recent severe event for flooding in the lake was in 2006. The City reported flooding and wave action near the city landing strip on the northwest corner of the lake along Power Creek Road. The community identified a reach along the most western edge of *Eyak Lake as needing an approximate study.*

The City discussed past mitigation efforts to remove homes from an avalanche zone on the southeast side of Eyak Lake, and discussed a desire to *replace the weir/dam structure between Eyak Lake and Eyak River.*

The community identified the Eyak River near the 6-Mile Subdivision as a high priority study area, discussing flooding issues in the area between the airport and city accompanied by glacial outwash. Ms. Greenwood pointed out there were hydroelectric dams/weirs located within the watershed that have seen flood damage. The Eyak River may be subject to some channel migration. The community identified the need for *a detailed study along the Eyak River* near the subdivision, and an approximate study on *Ibek Creek.*

East of the airport beyond city limits, the highway has been washed out; however, no inhabitants are located beyond the airport.

Upstream on Powell Creek on the north side of Eyak Lake, a dam provides hydroelectric power. Presumably an EAP exists for the facility; however, inundation mapping may not be a significant concern.

Summary of Desired Mitigation Projects

- Harbor Breakwater Extension – the city desires funding for the extension of the northern harbor breakwater to mitigate wind swell propagation into harbor.
- Eyak Lake Weir – the city desires funding to improve or replace the weir/dam structure between Eyak Lake and Eyak River.

Summary of Mapping Needs

Some areas were identified as needing a detailed coastal, detailed riverine, or approximate study. These locations are generally described and are shown on the Final Discovery Map.

- Cannery Road Loop - New VE study for 1/4 mile near loop at northern end of Cannery Road
- Cannery Road/Fleming Creek - New VE study for 1/2 mile of coastline near Fleming Creek
- Seafood Lane – New VE study for reach along Seafood Road for 1/2 mile of coastline
- Eyak Lake – New approximate study for 2.7 miles of shoreline on the west end
- Eyak River – New detailed study for 1 mile near the lake
- Ibek Creek – New approximate study for 1.2 miles at the confluence with Eyak River



FEMA



Next Steps

Mr. Ratte explained that meeting notes will be prepared, along with a draft Discovery Map showing the identified mapping needs, contact information, and outreach materials, and shared for review. Current plans include to collect LiDAR in 2011 and fund production in 2012 and are subject to funding. Mr. Ratte inquired about possible LiDAR partnerships. Sam indicated that the following parties could be interested: Ducks Unlimited, USFS – Contacts Mike Riley and Tim Joyce, Ecotrust, and the city of Cordova. Sam offered to be the local POC on helping coordinate discussion on potential partnerships.

Discovery Report

FEMA Region X

Cordova Coastal, Alaska



FEMA

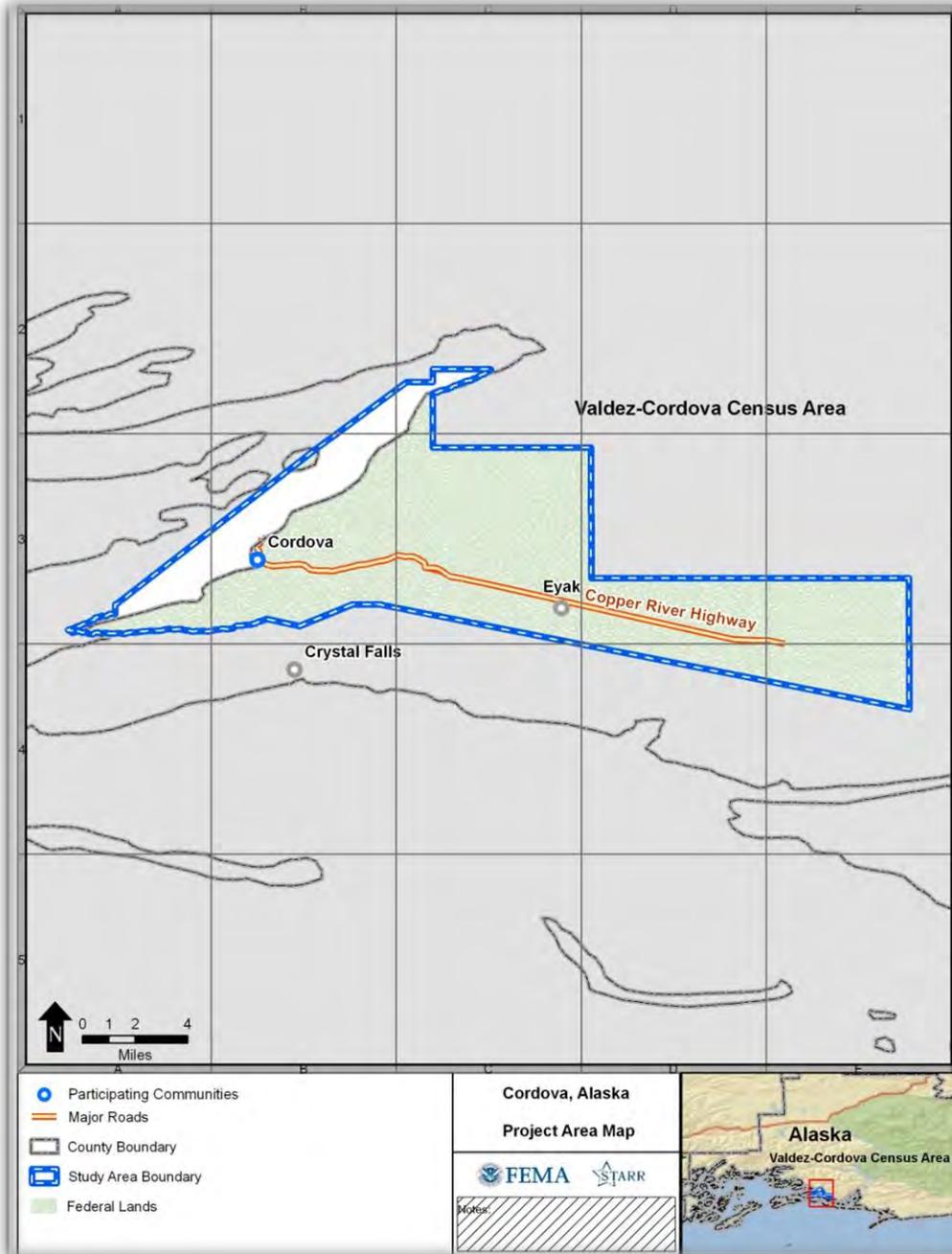
Prepared by



I. Watershed Description

Cordova is a small National Flood Insurance Program participating community located near the mouth of the Copper River in the Valdez-Cordova Census Area, Alaska. The city is at the head of Orca Inlet on the east side of Prince William Sound. Cordova is located within the Chugach National Forest. The city has a total area of 75.6 square miles, of which, 61.4 square miles of it is land and 14.3 square miles of it is water.

Map 1: Image of Cordova Coastal Project Area Map (full size maps in appendix)



II. Project Description and Methodology

Discovery is the process of data collection, including information exchange between all governmental levels of stakeholders, spatial data presentation, and cooperative discussion with stakeholders to better understand the area, decide whether a flood risk project is appropriate, and if so, to collaborate on the project planning in detail. At this time, Discovery processes and requirements are still being defined; however, draft guidance is available from the draft *Appendix I – Discovery (fall 2010)*, and the draft *Meetings Guidance for FEMA Personnel (October 2010)*. In addition, there are several draft tools and templates at various stages of completion that were used to support the effort.

Region X initiated an extensive Discovery project in October 2010, with the Discovery of 24 watersheds/project areas in Idaho, Oregon, Washington, and Alaska, involving almost 200 communities. Essentially a pilot project for the Discovery process itself, RX Discovery involved data collection, community interviews, a meeting with stakeholders in the watershed, and development of recommendations based on an analysis of data and information gathered throughout the process.

Figure 1. Data Sources for Region X Discovery (project-specific data sources in Appendix)

Alaska State Geospatial Data Clearinghouse	FEMA Regional Office	National Oceanic and Atmospheric Administration (NOAA)
Oregon Department of Transportation	FEMA Map Service Center	NOAA Fisheries Service
Idaho Department of Transportation	FEMA Publications	NOAA National Geophysical Data Center
Idaho State Geospatial Data Clearinghouse	FEMA Community Information System	U.S. Army Corps of Engineers National Levee Database
Washington State Department of Transportation	FEMA Coordinated Needs Management System (CNMS)	U.S. Census Bureau
Community data, where available	FEMA HAZUS	U. S. Census - TIGER
Local, Regional, State website search	FEMA RX Inventory	U.S. Department of Agriculture
Developed based on community interview/meeting	FEMA Legacy Data	U.S. Fish and Wildlife Service
STARR	Data.gov	U.S. Geologic Survey
ESRI	National Atlas of the United States	

The Region X Discovery data collection entailed a massive collection of tabular and spatial data for all communities from Federal and State sources, as well as information collected through interviews with each community. The tabular data file in the Appendix provides detailed information about the data and its use in Discovery for this specific watershed. Data was used primarily in two ways – tabular data was documented on a Community Fact Sheet,

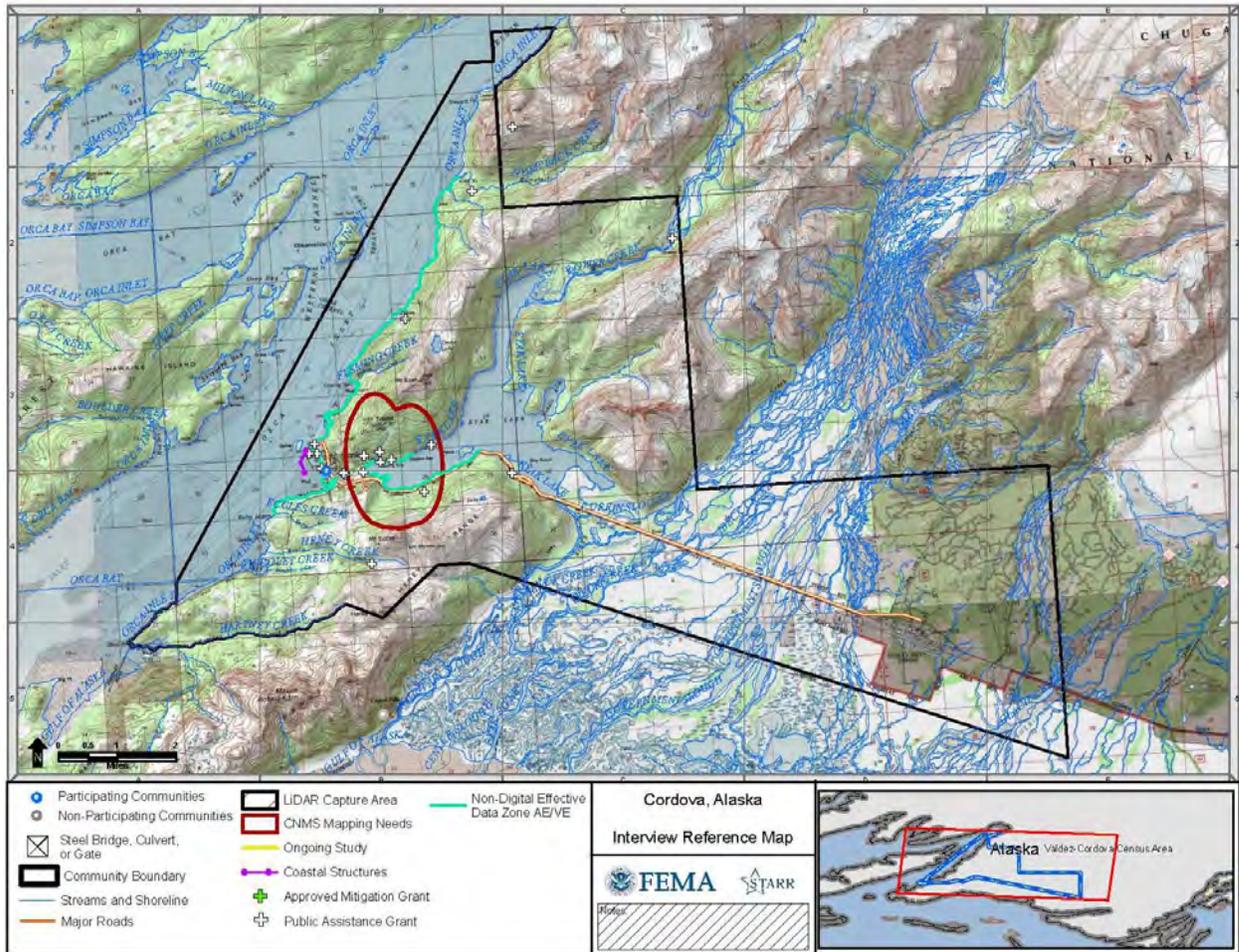
and spatial data was included in the Discovery Geodatabase, and is displayed on the Discovery maps, where appropriate. Full-sized Discovery maps are included in the appendix.

The second phase of the Region X Discovery effort involved a review of the collected data with community officials through a phone interview, and a request for additional information. Prior to the interview, community officials received information about the Discovery process, and a Fact Sheet and Interview Reference Map for their community. Communities were asked to identify “Areas and Points of Concern” based on their local knowledge and analysis of the data shown on the map. The Areas and Points of Concern (mapping needs, desired mitigation projects, etc.) were documented in the Discovery Geodatabase and discussed during the Discovery Meeting.

Figure 2. Fact Sheet, page 1, for Cordova. (tabular data in appendix)

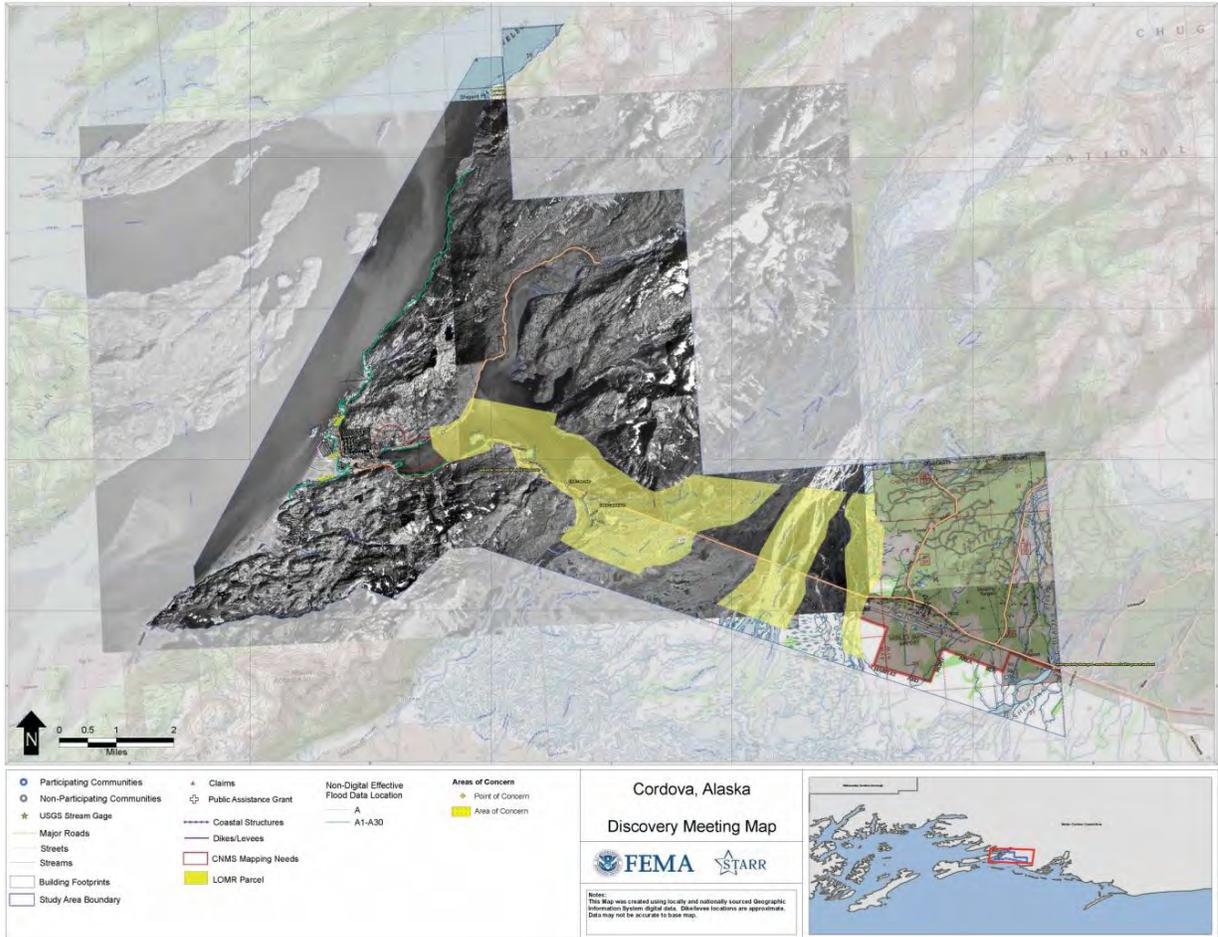
RX Discovery 2010: Cordova Coastal		Page 1	
Fact Sheet: Cordova, Alaska			
CID:	020037	FIS/IRM:	Effective Date: 10/1/1978 Level of Study: Detailed Study, A4/AW Zones Last Community Meeting: unknown
LOMCs:	5	Last CAV/CAC Date:	04/10/2003
CRS Status			
Class:	n/a	SFHA Discount:	n/a
Effective:	n/a	Non-SFHA Discount:	n/a
Demographics		Social Characteristics	
Population:	3,454	Non-English Speakers:	8%
Median Age:	37	High School+ Education:	89%
Elderly (65+):	7%	Bachelors+ Education:	21%
Native:	10%		
Industrial			
Population in labor force:	62.6%		
Median income:	\$50,114		
Top 5 Industries:			
	16%	Educational, health and social services	
	14%	Agriculture, forestry, fishing and hunting, and mining	
	10%	Transportation and warehousing, and utilities	
	10%	Retail trade	
	9%	Manufacturing	
Presidentially Declared Disasters			
Flood-related total:	10	(August 1967 - October 2009)	
Recent flood related:	10	(April 2002 - October 2009)	
Other hazards:	Earthquake, Fire, Severe Storms, Landslides, Mudslides, Tidal Surges, Severe Winter Storms, Coastal Erosion, High Winds, Severe freezing, Heavy rains and landslide, Avalanches		
Insurance			
Total Premiums:	\$ 8,961	Variances:	0
Total Coverage:	\$ 2,203,500	Rep Losses:	0
Total Policies:	10	BCX Zone Claims:	1
A Zone Policies:	2	A Zone Claims:	0
V Zone Policies:	0	AE/A# Zone Claims:	0
Retention:	2 policies, \$64,529 coverage	V Zone Claims:	0
		D Zone Claims:	0
Mitigation Projects and Other Grants			
Mitigation Project:	Severe winter storm and avalanches produced a declared disaster in 2000. Acquisition/relocation of private structures - riverine - \$738,920, 25% local cost share. (Disaster # 1316)		
Mitigation Project:	Earthquake in 2002: 205.4; Non Structural Retrofitting/Rehabilitating Public Structures - Seismic; Anchor lights in district buildings - \$17,350, 25% local cost share. (Disaster # 1440)		
Mitigation Plans:			
	City of Cordova, Local Hazard Mitigation Plan		
	Effective: September 2008		
	Expires: September 2013		
Other Plans:			
	Alaska State Hazard Mitigation Plan, October 2010.		
Levees and Other Flood Control Structures			
Identifier:	None known to be 65.30 compliant		
Accreditation Status:			
Environmentally Sensitive Areas:			
Critical Species:			
Environmentally Sensitive Index:			
Wetlands:			
CoBRAs:	n/a		
OPAs:	n/a		

Map 2. Image of Interview Reference Map for Cordova



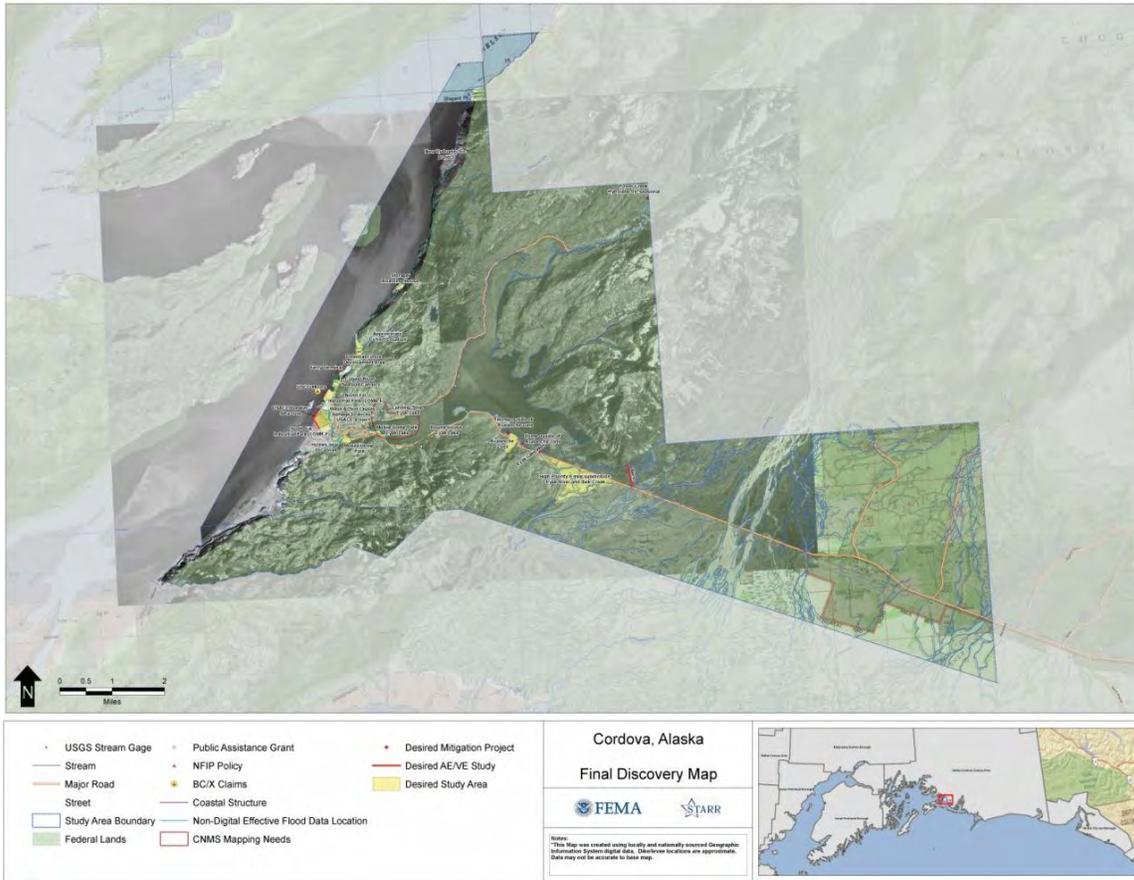
The third step was to hold a watershed-wide Discovery Meeting and facilitate discussion and data analysis of study needs, mitigation project needs, desired compliance support, and local flood risk awareness efforts. The discussion was stimulated using the Discovery Geodatabase display of relevant data. Attendees, including all affected communities and selected other stakeholders, cooperatively identified possible solutions for the Areas and Points of Concern shown on the Discovery Meeting Map. Solutions included recommendations of floodplain studies, mitigation projects, compliance issues, and ideas on how to improve the local flood risk communication programs.

Map 3. Image of the Cordova Coastal Discovery Meeting Map



The fourth phase of the Discovery effort involved an analysis of the data and information collected and discussed at the meeting, and recommendations as to the future relationship and activities between FEMA and the watershed communities. The Final Discovery Map indicates desired study areas and mitigation project locations, and the Discovery Report documents the results of data collection and conversation. If a Risk MAP project is to be initiated in this watershed, Discovery will be concluded with the finalization of a project scope and signed Project Charters, which indicate that all affected stakeholders agree to the terms of a funded project, including communication and data responsibilities.

Map 4. Image of Cordova Coastal Community Final Discovery Map



III. Risk MAP Needs

The results of the data collection and interviews were thoroughly discussed at the Discovery Meeting. The following sections include issues and situations that exist in Cordova that can be considered Risk MAP Needs, to be addressed with Risk MAP projects. Details and background on all issues can be found in the interview notes, meeting notes, and other files included in the appendix.

i. Floodplain Studies

Cordova’s Flood Insurance Study and Flood Insurance Rate Map (FIRM) were last updated in 1978. Cordova has both detailed and approximate coastal and riverine analysis. The date of last community meeting is unknown.

The Final Discovery Map should be referenced to view spatial data that may be indicative of study needs. The CNMS data suggested that a portion of one flooding source should be updated, though the community identified other, different areas for update. One claim has been identified in the B, C, or X zones and five LOMAs have been issued.

No LiDAR has been collected for the area but the City indicated that they have a high level of interest in obtaining topographic data, so there may be potential for a cost share.

In 1984, Cordova’s harbor was expanded by the U.S. Army Corps of Engineers. This expansion encourages swell propagation into the mouth of the harbor. A breakwater structure was then constructed along the south, west, and northwest portion of the harbor to alleviate swell influences that resulted from that harbor widening. No levees were identified in the community.

Some areas were identified by community officials as needing a detailed coastal study or approximate study. The desired study areas are shown on the Final Discovery Map and listed below.

Table 2: Cordova Mapping Needs

STUDY AREA	STUDY LENGTH (miles)	LOCATION DESCRIPTION	STUDY TYPE
Cannery Road Loop	0.25	Near the loop at northern end of Cannery Road	Detailed Coastal
Cannery Road/ Fleming Creek	0.5	Coastline near Fleming Creek	Detailed Coastal
Seafood Lane	0.5	Coastline along Seafood Lane	Detailed Coastal
Eyak Lake	2.7	Shoreline study along the west end of the lake	Approximate
Eyak River	1	Near the lake	Detailed
Ibek Creek	1.2	The confluence of Ibek Creek and Eyak River	Approximate

ii. Mitigation Projects

The Cordova Mitigation Plan, prepared by the City of Cordova, became effective in September 2008 and will expire in September 2013. In addition to the mitigation projects identified in the plan, two other potential mitigation projects were discussed during Discovery:

Harbor Breakwater Extension – the city desires funding for the extension of the northern harbor breakwater to mitigate wind swell propagation into harbor.

Eyak Lake Weir – the city desires funding to improve or replace the weir/dam structure between Eyak Lake and Eyak River.

iii. Compliance

Data collected from CIS indicated that Cordova has not issued any variances to their floodplain management ordinances, so it may be assumed that the community is regulating to at least the minimum criteria required by FEMA. The most recent Community Assistance Visit was in April 2003.

iv. Communications

During the interview, the community indicated that they were interested in learning more about Risk MAP's communications support, and were open to a future meeting with FEMA to learn about how they can improve their flood risk communication programs. Currently, the community does not participate in the Community Rating System program.

Cordova is comprised of approximately 2,454 residents (U.S. Census, 2000). The median age in Cordova is 37 years, with approximately 7% of the population over 65 years, an average of 8% non-English speakers, and 10% Native Americans. An average of 62.6% of the population holds a high school diploma, and around 21% have a college degree. As of 2000, approximately 63% of residents over age 16 that desired employment were working, with a median annual income of approximately \$42,000. Residents work in educational, health, and social services; agriculture, forestry, fishing and hunting, and mining; and transportation, warehousing, and utilities.

Given the high population of non-English speakers and Native Americans, there may be a need for special outreach strategies for the City of Cordova. The local officials were interested in learning more about how to provide flood risk information to residents.

IV. Close

Local officials in the communities were interested in the Discovery process and Risk MAP, and are open to learning more about how they can begin to develop resiliency to flood events. They identified several areas for map updates and areas in which they could use additional FEMA support. It is recommended that the guidance document outlining the types of Mitigation Planning Technical Support that can be included in Risk MAP projects be evaluated with communities, once finalized. The local officials in Cordova would benefit from the implementation of Risk MAP projects.

V. Appendix – Discovery Files

Communications

- Contacts
 - Stakeholders: Names, Titles, Phone, Email, Website
 - Notification Dates
- Notifications/Invitations
 - A National Notification
 - B Regional Notification
 - C State Legislator Notification
 - C Congressional Notification
 - D Community Notification
 - E Floodplain Administrator Interview Request
 - Meeting Notes Distribution

Community Interviews

- Fact Sheet
- ***Interview Reference Maps***
- Interview Notes
- Locally-Provided Documents

Discovery Meeting

- Agenda
- Presentation
- Sign-In Sheet
- ***Discovery Meeting Map***
- Meeting Notes
- Draft Project Charter

Report

- Report
- ***Project Area Map***
- ***Final Discovery Map***
- Tabular Data, including Data Sources and Mapping Needs
- Geodatabase
- Database Updates

Memorandum

To: Planning and Zoning
From: Planning Department Staff
Date: 10/4/2012
Re: Hazard Mitigation Plan

PART I. GENERAL INFORMATION:

The Cordova Hazard Mitigation Plan was completed in 2008 by a contractor. The State of Alaska and FEMA require an update every 5 years. Having an approved plan allows the City to apply for state and federal grants.

PART II. BACKGROUND:

The State has provided criteria that need to be followed for the update to be accepted by the State and FEMA. One of these requirements is public meeting where input can be provided. We have a draft of the updated Hazard Mitigation Plan and would request that you review and provide and any comments that you might have.

The project portion of the document is important part of the document, these projects since they are included in the plan, could be potentially funded by state and federal grants. Any thoughts on projects that will help eliminate or lessen the effects of hazards that occur in Cordova can be included. Additional projects can be added or projects edited during the update, please feel free to provide new projects or edit existing projects.

The Hazard Mitigation Plan and the draft update is over 100 pages with that said, we will print a copies for any person of the public or commissioner who would like one upon request but for the packet the plan will be placed on the Planning and Zoning page on the city web page.

Follow this link to read the update.

<http://www.cityofcordova.net/boards-commissions/planning-zoning/>

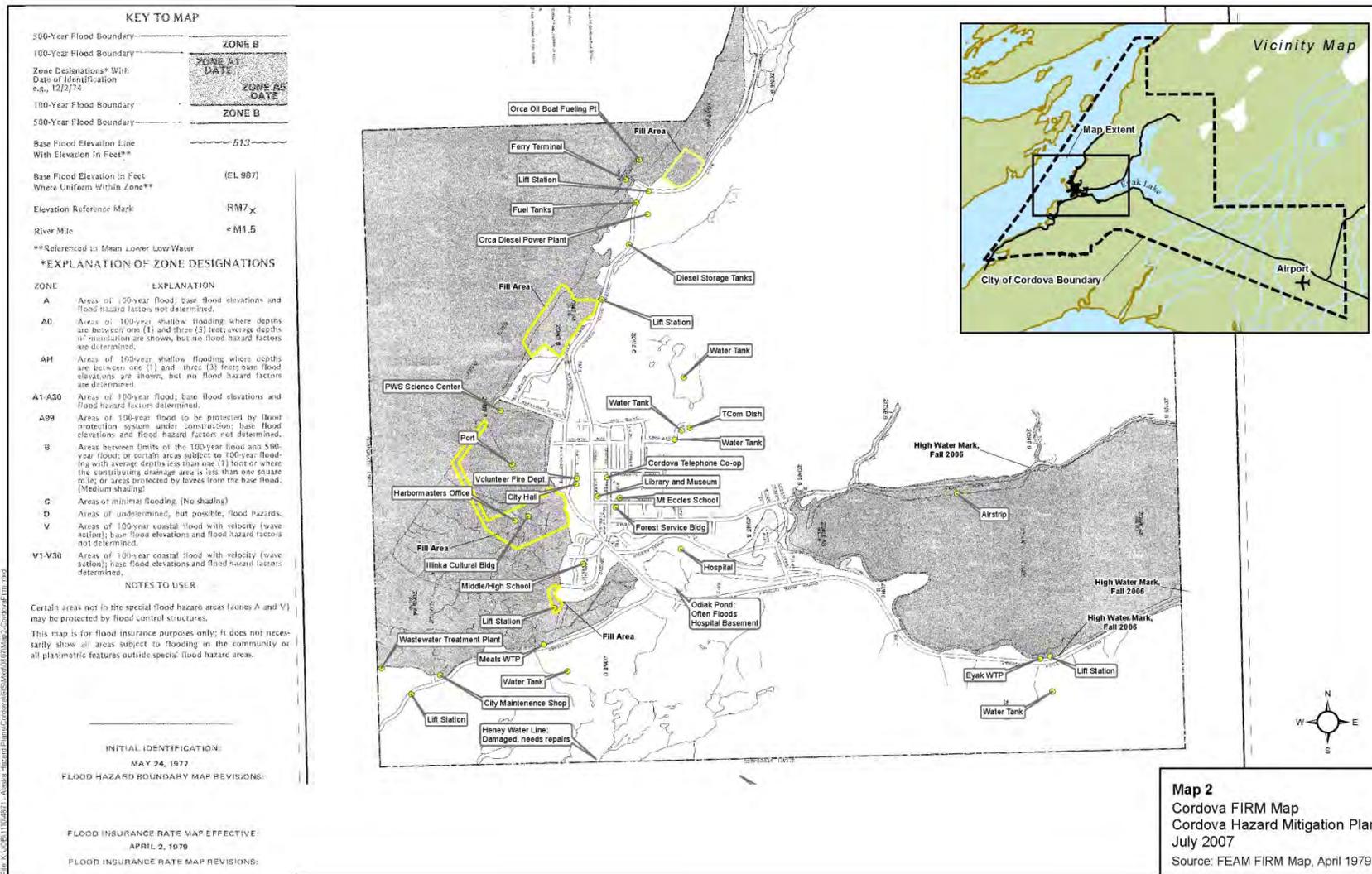
Follow this link to read the 2008 plan.

<http://www.cityofcordova.net/city-administration/planning-department/>

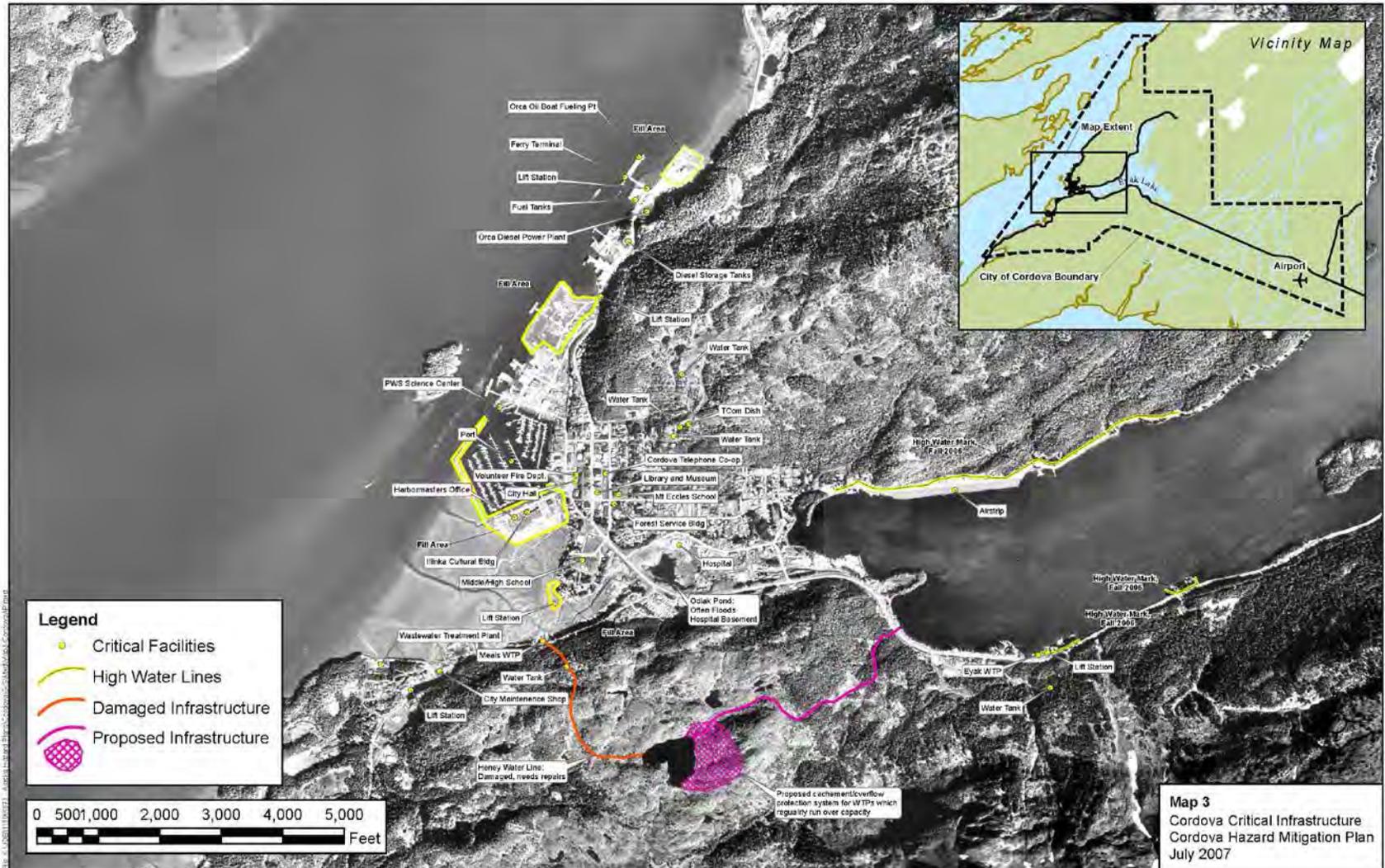
Map 1. Cordova Regional Map



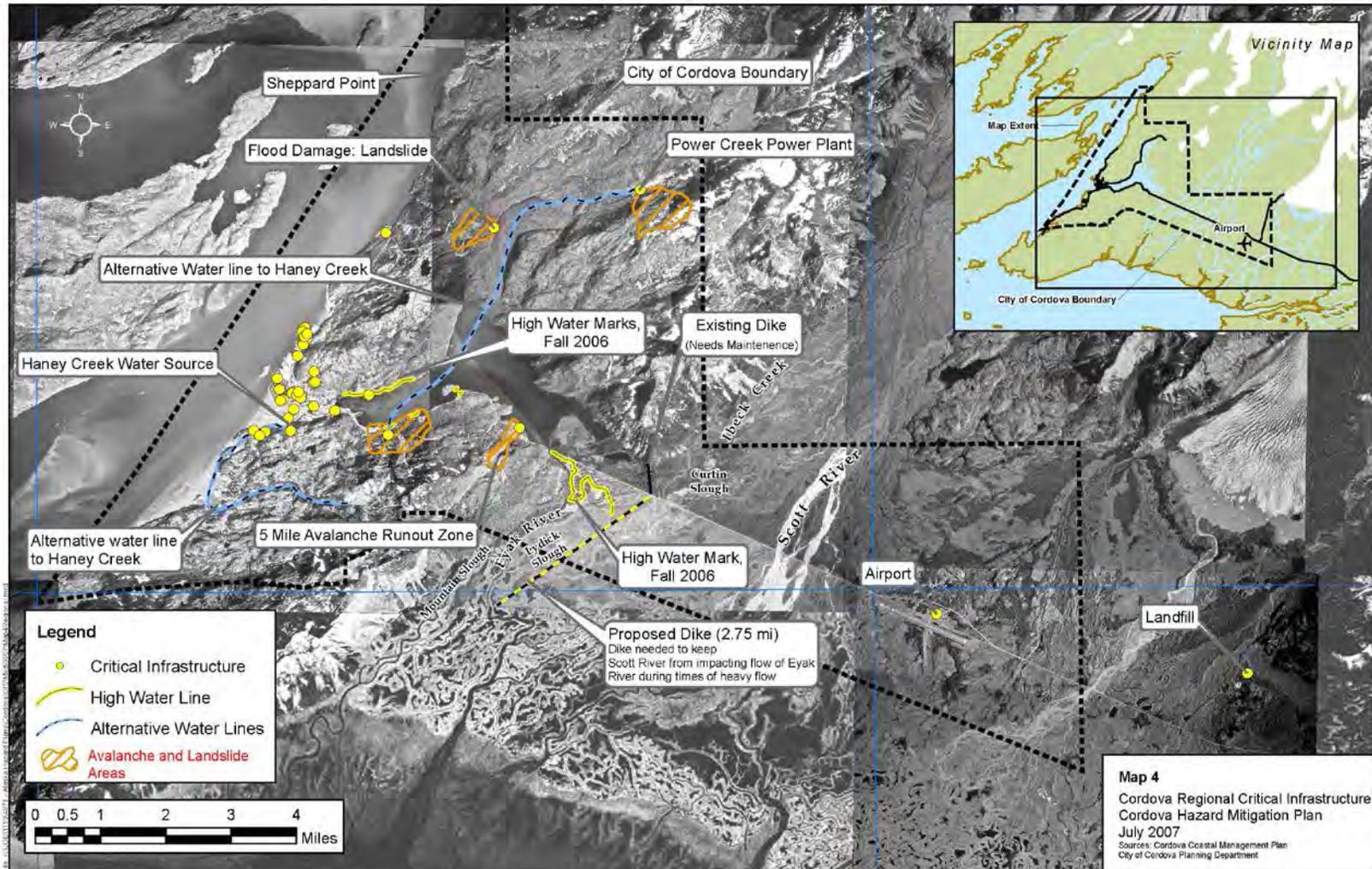
Map 2. Cordova Flood Rate Insurance Map



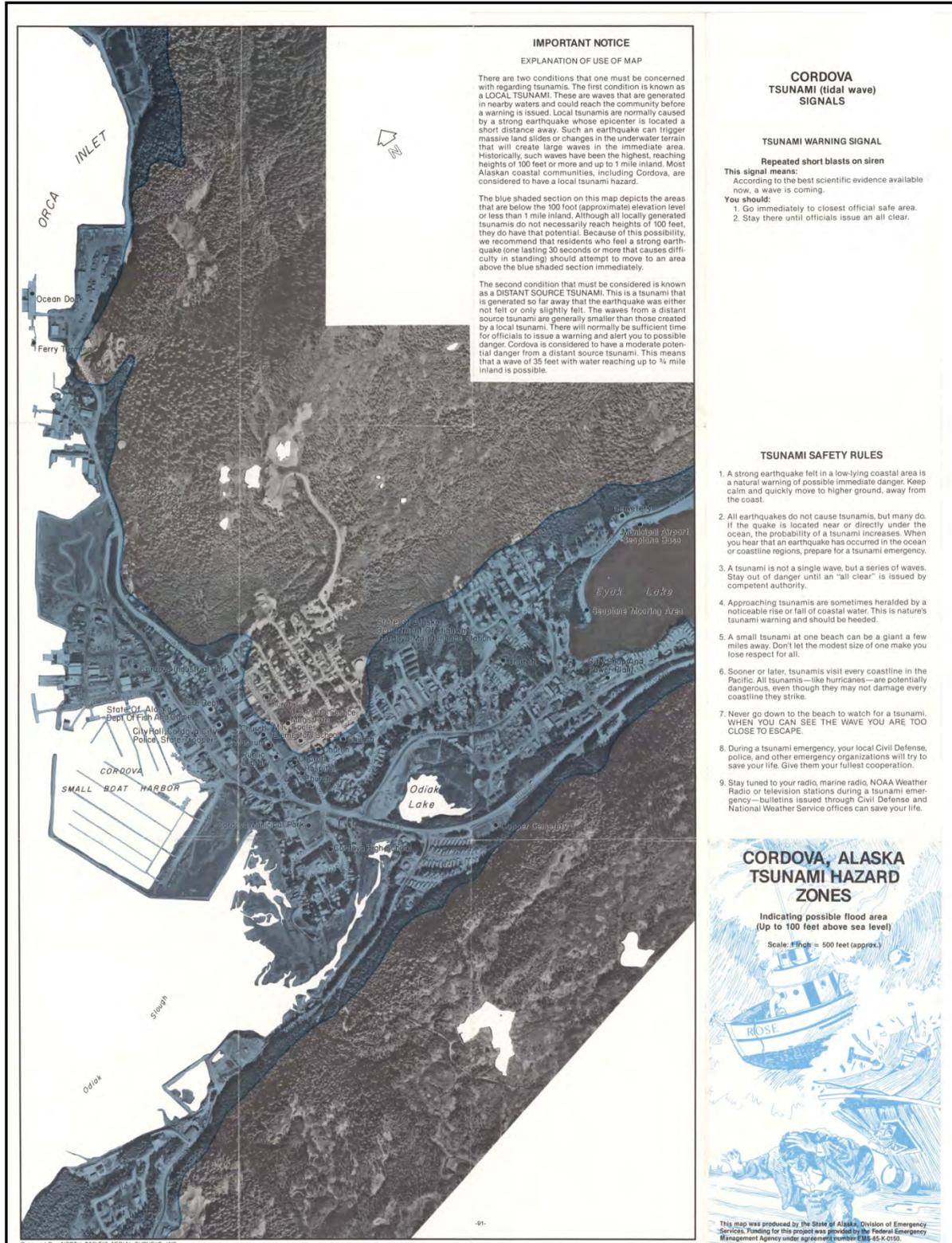
Map 3. Cordova Critical Infrastructure



Map 4. Cordova Regional Critical Infrastructure



Map 5. Tsunami Hazard Zones



IMPORTANT NOTICE

EXPLANATION OF USE OF MAP

There are two conditions that one must be concerned with regarding tsunamis. The first condition is known as a LOCAL TSUNAMI. These are waves that are generated in nearby waters and could reach the community before a warning is issued. Local tsunamis are normally caused by a strong earthquake whose epicenter is located a short distance away. Such an earthquake can trigger massive land slides or changes in the underwater terrain that will create large waves in the immediate area. Historically, such waves have been the highest, reaching heights of 100 feet or more and up to 1 mile inland. Most Alaskan coastal communities, including Cordova, are considered to have a local tsunami hazard.

The blue shaded section on this map depicts the areas that are below the 100 foot (approximate) elevation level or less than 1 mile inland. Although all locally generated tsunamis do not necessarily reach heights of 100 feet, they do have that potential. Because of this possibility, we recommend that residents who feel a strong earthquake (one lasting 30 seconds or more that causes difficulty in standing) should attempt to move to an area above the blue shaded section immediately.

The second condition that must be considered is known as a DISTANT SOURCE TSUNAMI. This is a tsunami that is generated so far away that the earthquake was either not felt or only slightly felt. The waves from a distant source tsunami are generally smaller than those created by a local tsunami. There will normally be sufficient time for officials to issue a warning and alert you to possible danger. Cordova is considered to have a moderate potential danger from a distant source tsunami. This means that a wave of 35 feet with water reaching up to ¼ mile inland is possible.

CORDOVA TSUNAMI (tidal wave) SIGNALS

TSUNAMI WARNING SIGNAL

Repeated short blasts on siren

This signal means:
According to the best scientific evidence available now, a wave is coming.
You should:
1. Go immediately to closest official safe area.
2. Stay there until officials issue an all clear.

TSUNAMI SAFETY RULES

1. A strong earthquake felt in a low-lying coastal area is a natural warning of possible immediate danger. Keep calm and quickly move to higher ground, away from the coast.
2. All earthquakes do not cause tsunamis, but many do. If the quake is located near or directly under the ocean, the probability of a tsunami increases. When you hear that an earthquake has occurred in the ocean or coastline regions, prepare for a tsunami emergency.
3. A tsunami is not a single wave, but a series of waves. Stay out of danger until an "all clear" is issued by competent authority.
4. Approaching tsunamis are sometimes heralded by a noticeable rise or fall of coastal water. This is nature's tsunami warning and should be heeded.
5. A small tsunami at one beach can be a giant a few miles away. Don't let the modest size of one make you lose respect for all.
6. Sooner or later, tsunamis visit every coastline in the Pacific. All tsunamis—like hurricanes—are potentially dangerous, even though they may not damage every coastline they strike.
7. Never go down to the beach to watch for a tsunami. WHEN YOU CAN SEE THE WAVE YOU ARE TOO CLOSE TO ESCAPE.
8. During a tsunami emergency, your local Civil Defense, police, and other emergency organizations will try to save your life. Give them your fullest cooperation.
9. Stay tuned to your radio, marine radio, NOAA Weather Radio or television stations during a tsunami emergency—bulletins issued through Civil Defense and National Weather Service offices can save your life.

CORDOVA, ALASKA TSUNAMI HAZARD ZONES

Indicating possible flood area (Up to 100 feet above sea level)

Scale: 1 Inch = 500 feet (approx.)



This map was produced by the State of Alaska, Division of Emergency Services. Funding for this project was provided by the Federal Emergency Management Agency under agreement number E-88-45-K-0150.

Photos 1. Orca Creek, 11/01/06

**Cordova – Orca Creek
November 1, 2006
Water Supply Intake Clogged, Holding Pond filled with Bedload**



Photos 2. Airport and Eyak Lake, 10/31/06

**Cordova – Dept. of Transportation
October 31, 2006 Flood Pictures**



Cordova Municipal Airport



Repaired



Eyak Lake Erosion



Eyak Lake Erosion - Repaired

Photos 3. Cordova Flood Pictures, 10/10/06

Cordova – October 10, 2006 Flood



Photos 4. Cordova Flood Pictures, 10/10/06

Cordova – October 10, 2006 Flood



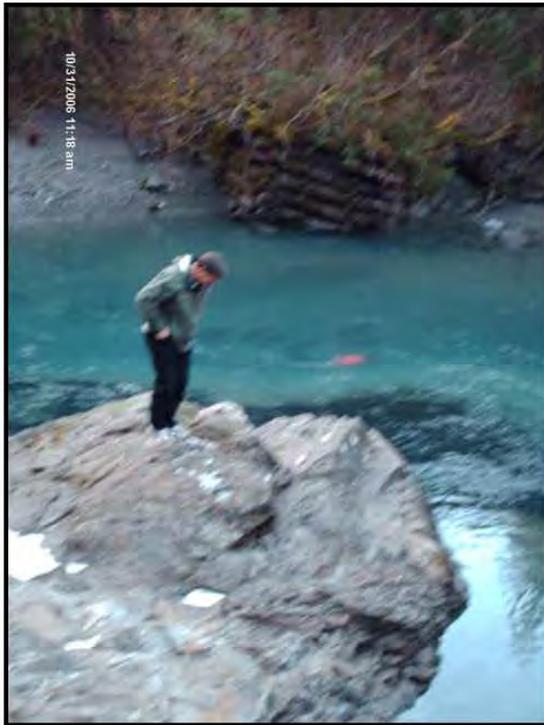
Photos 5. Regional Flood Pictures, 10/10/06

Cordova – October 10, 2006 Flood



Photos 6. Power Creek, October 2006

**Power Creek, October 2006
USGS Survey Mark and Gage Site**



Photos 7. Damage to Hydro Plant, 10/31/06

Cordova – October 31, 2006
Damage to Humpback Creek Hydro plant



Photos 8. Damage from Snow, January 2012



Photos 9. Avalanche, April 2012

