



City of Seldovia Local Hazard Mitigation Plan

January 2012

City of Seldovia Hazard Mitigation Plan

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City of Seldovia Hazard Mitigation Plan

Chapter 1 – Introduction

Purpose and Scope

Purpose

The purpose of the Hazard Mitigation Plan is to fulfill the FEMA requirement under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act), Section 322, Mitigation Planning enacted by Section 104 of the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390). The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d), as implemented through 44 CFR Part 201.6 requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifying and prioritizing mitigation actions, encouraging development of local mitigation and providing technical support for those efforts.

The purpose of this plan is to produce a program of activities through actions and projects that will best deal with the hazards facing the City of Seldovia, while meeting other community needs. This plan will accomplish the following objectives consistent with FEMA planning process guidelines:

- Describe the planning process to include public involvement;
- Conduct an assessment of the risks;
- Determine what facilities, or portions of infrastructure, are vulnerable to a disaster;
- Develop a mitigation strategy to reduce potential losses and target resources;
- Describe how each entity will periodically evaluate, monitor maintain and update the plan; and,
- Describe the process for implementing the plan after adoption by the local governing body of the community and receiving FEMA approval.

Scope

The Seldovia Local Hazard Mitigation Plan (LHMP) includes the following required information:

- A list of identified hazards.
- A summary of each hazard and their impacts.
- A list of vulnerable structures and critical facilities.
- A list of the number of inhabitants in vulnerable structures whether public or private.
- An estimate, for each hazard, of the potential losses to the identified vulnerable structure.
- Information about land use and development trends, with a focus on known hazard areas.
- A description of future mitigation goals, objective and proposed activities and task action.

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Methodology

The approach used for the development of the City of Seldovia Hazard Mitigation Plan consisted of the following tasks:

- Coordinate with other agencies and organization
- Solicit public involvement
- Conduct hazard area inventory
- Review and analyze previous and future mitigation activities
- Describe the update and review process and schedule for plan maintenance
- Coordinate the Plan with the Kenai Peninsula Borough and State Hazard Mitigation Plans
- Submit to the State Hazard Mitigation Officer for Review
- Submit to FEMA Region 10 for Review and Approval
- Adoption of the Plan by the City of Seldovia

This Local Mitigation Plan Revision contains a list of potential goals and activities with a brief rationale or explanation of how each project or group of projects contributes to the overall mitigation strategy outlined in the plan.

This plan summarizes the activities outlined above to assess the effects of hazards in the City of Seldovia and recommends mitigation strategies and activities.

The mitigation plan will be evaluated and updated every five years. In addition, the plan will be updated, as appropriate when a declared disaster occurs that significantly affects the City of Seldovia, whether or not it receives a Presidential Declaration. The update will be completed as soon as possible, but no later than 12 months following the date the disaster declaration occurs.

Routine maintenance of the plan will include updating historical hazard information, completing hazard analysis and adding projects as new funding sources become available, or taking projects off the list when they are accomplished.

Background

The following information was obtained from the DCED Alaska Community Database at this website:

http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

and from the Seldovia Comprehensive Plan at:

<http://www.cityofseldovia.com/seldoviacomprehensiveplan2005.pdf>.

General Location

Seldovia is located on the south shore of Kachemak Bay on the southwestern

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edge of the Kenai Peninsula. Seldovia is a 15-minute flight across from Homer and a 45-minute flight from Anchorage. It lies at approximately 59.438060 North Latitude and -151.711390 West Latitude. (Section 32, Township 8 South, Range 14 West, Seward Meridian.) Seldovia is located in the Seldovia Recording District. The area encompasses 0.4 square miles of land and 0.2 square miles of water.

Climate

Seldovia lies in the maritime climate zone. During the winter, temperatures range from 12° F to 21° F; summer temperatures vary from 48° F to 65° F. Average annual precipitation is 34.5 inches.

History

Native residents of Seldovia are mixed Dena'ina Indian, Aleut, and Sugpiaq Eskimo (also known as Alutiiq). Seldovia was originally named Zaliv Seldevoy, or Herring Bay. Soon after a coal mine was discovered near Seldovia in 1790, Russian settlers began to arrive in the area. The Portlock Mine produced coal into the 1800s for the Russian fleet, and Seldovia housed a trading post between 1869 and 1882, as its economy also included fur trapping, timber, and fish processing. The Seldovia post office was established in 1898. Seldovia became a stop for prospectors bound for the Interior in the early 1900s. The first school was established in 1908. Development then began around commercial fishing and fish processing, with a salmon cannery opening around 1911 and several herring processing plants constructed shortly after. Seldovia became the major shipping center for south central Alaska in the 1920's and was incorporated as a city in 1945. After the earthquake of 1964, the land subsided four to five feet, resulting in the high tides flooding buildings and destroying three fish-processing operations, in addition to much of the city's business infrastructure. Although the last fish-processing facility closed in 1991, Seldovia still houses an independent fishing fleet and a prominent sports fishing charter community.

Culture

The City of Seldovia is not connected to the road system and most residents rely on subsistence activities to supplement their diets. Many residents follow traditional Native practices. Local residents rely heavily on the sea, as charter fishing, charter sightseeing, and commercial fishing all hold significant weight in sustaining the community. Tourism is a vital part of Seldovia's community, with activities and events such as the Seldovia Summer Solstice Music Festival, the Seldovia Craft Invitational Chainsaw Carving Competition, and the annual Fourth of July celebration (its most popular attraction) drawing visitors.

Population and Economy

The Department of Community and Economic Development certified Seldovia's population at 265 in 2010. Note that this number does not include the residents outside city limits, who are counted in the separate census district Seldovia Village.

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Seldovia is incorporated as a first-class city. Seldovia enjoys a considerable seasonal visitor industry, and is a commercial fishing and a shellfish farming village, with 46 residents holding commercial fishing permits in 2010. Top employers include the Seldovia Village Tribe, the City of Seldovia, and the Kenai Peninsula Borough School. In 2009, the main industry was Local Government, which employed 39% of the area's workers.

The annual average unemployment rate from 1990 to 2002 for the Kenai Peninsula Borough has fluctuated between a low of 9.7% in 2001, to a high of 15.5% in 1992 (reported by the State Department of Labor Research and Analysis website).

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Employment by Occupation and Industry in Seldovia (U.S. Census Bureau, 2005-2009 American Community Survey)

Occupation		Industry	
Management/Professional	34	Agriculture/Forestry/Fishing/Mining	25
Sales & Office	27	Construction	10
Farming/Fishing/Forestry	8	Manufacturing	7
Construction/Extraction/Maintenance	18	Wholesale Trade	0
Production/Transportation	17	Retail Trade	25
Service occupations	23	Transportation/Warehousing/Utilities	10
		Information	0
		Finance/Insurance/Real Estate/Rental/Leasing	3
		Professional/Scientific/Management, Administration/Waste Management Services	13
		Education/Health/Social Services	13
		Arts/Recreation/Food & Lodging	11
		Other	0
		Public Administration	10
2005-2009 Totals	127		127

Facilities

Over 90% of homes are fully plumbed. Water is derived from the Upper Dam and Reservoir and is then treated with chlorine, stored in a welded steel storage tank, and piped via 33,000 feet of water mains to the majority of homes in the City. Residents outside City limits have private wells and/or haul water from town. City sewage is piped to a community septic tank for primary treatment then discharged to an ocean outfall. 175 homes are served by the system; all homes are plumbed. Residents carry refuse to Rocky Ridge Landfill, where residents can also burn and recycle refuse. Homer Electric Association operates the Bradley Lake Hydroelectric Plant and is part owner of the Alaska Electric Generation & Transmission Cooperative, which operates a gas turbine plant in Soldotna. It also purchases electricity from Chugach Electric.

Transportation

Seldovia is accessible by boat or plane. A state-owned 1,845' long by 60' wide gravel airstrip and a seaplane base are available. The City is served by several scheduled and chartered aircraft services. The Alaska Marine Highway connects Seldovia to Homer, where the Sterling Highway provides road access. Several water taxis and ferry charters also provide service to the community. A harbor, boat washdown, and boat haul-out facility are available, including a harbormaster and two launching ramps.

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Chapter 2 – Adoption Process and Documentation

The City of Seldovia Hazards Mitigation Plan was developed as an Annex to the Kenai Peninsula Borough All-Hazard Mitigation Plan. The Plan was adopted by the Seldovia City Council and by the KPB Assembly on January 25, 2012.

CITY OF SELDOVIA

RESOLUTION 12-14

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SELDOVIA
ADOPTING THE CITY OF SELDOVIA AND KENAI PENINSULA BOROUGH
MULTIJURISDICTIONAL ALL-HAZARDS MITIGATION PLAN**

WHEREAS: the Federal Emergency Management Agency (FEMA) requires that all states and local governments submit an approved Hazard Mitigation Plan to be eligible for FEMA mitigation funding; and

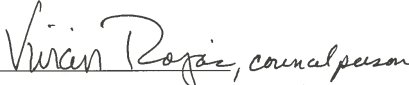
WHEREAS: the City of Seldovia, in cooperation with the State of Alaska Division of Homeland Security and Emergency Management (DHS&EM), updated their local hazard mitigation plan as an annex to the Kenai Peninsula Borough multi-jurisdictional hazard mitigation plan which includes the Borough and other incorporated communities within the Borough; and

WHEREAS: with this effort, the Kenai Peninsula Borough and incorporated communities can be eligible for FEMA mitigation grants administered by DHS&EM by adopting the Kenai Peninsula Borough Multi-Jurisdictional Hazard Mitigation Plan;

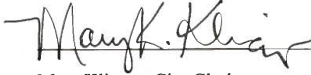
NOW, THEREFORE, BE IT RESOLVED by the City of Seldovia and the Kenai Peninsula Borough Multi-Jurisdictional Hazard Mitigation Plan is hereby adopted.

PASSED AND APPROVED by a duly constituted quorum of the City Council of the City of Seldovia on this 25th day of January, 2012

APPROVED:


Keith Gain, Mayor *council person
acting mayor*

ATTEST:


Mary Klinger, City Clerk



City of Seldovia Hazard Mitigation Plan

Chapter 3 – Planning Process

Planning Process

The City of Seldovia Administration and Contractor and representatives from the Seldovia Volunteer Fire Department, Planning and Zoning Commission, Seldovia Village Tribe, and private businesses coordinated with the Alaska Division of Homeland Security & Emergency Management and the Kenai Peninsula Borough Office of Emergency Management. These agencies provided information from existing plans including; Alaska State All Hazard Mitigation Plan and the Kenai Peninsula Borough Hazard Mitigation Plan. Other city staff and employees provided support and review services of the draft documents and provided helpful feedback to the committee.

The Hazard Mitigation Plan Update/Revision Final Draft was then reviewed by the Seldovia City Council and public comment was sought regarding the drafted plan. The Final Draft was also posted on the City of Seldovia Web-site to solicit public comment and copies were provide key Stakeholders within the City of Seldovia requesting review and comment. The City of Seldovia also relied on information provided by the Kenai Peninsula Borough and the State of Alaska.

Contributors

The City of Seldovia Volunteer Fire Department, Planning and Zoning, Alaska Department of Transportation, Kenai Peninsula Office of Emergency Management, Alaska Division of Homeland Security and Emergency Management, Seldovia City Council and Mayor, the general public, and private sector businesses and non-profit organizations contributed to the development, review, and submission of this document.

Public Opportunity for Involvement

In order to inform the City Council and general public of the City of Seldovia Hazard Mitigation Plan project, the City's Contractor presented a project overview and proposed timeline during the July 27, 2011 City Council meeting. Bretwood Higman (City's Contractor) touched on the draft Hazard Matrix and reviewed the hazard identification and critical infrastructure process. Mr. Higman invited the Council and public to the working group meeting on July 28, 2011.

Public input was solicited through a series of one-on-one interviews during local senior citizen's luncheons and compiled with additional online comments and suggestions. When appropriate and/or necessary, subject matter experts were contacted for direct input on project specifics.

Drafts of the Plan and Matrix were posted to a project Website with a feedback mechanism provided for public comment. Input for the plan was also solicited from local stakeholders including: Homer Electric Association

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and Alaska Communication Systems.

The public was informed of the July 28 and August 18 working group meetings via email, website announcement, public flyer posting, online newspaper posting, and in person invitation. Project comments were compiled by the City's contractor for Plan development, and a record of all public comment (written and oral) was established as part of the project record. These meetings were advertised pursuant to Seldovia City Code and State of Alaska Open Meeting laws.

Documentation from public meetings is included in Appendix A to this plan.

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Chapter 4 – Hazard Identification & Risk Assessment

Hazard Identification

The table below identifies those hazards that were considered for this analysis. Hazards shown in **bold** are those to which the City of Seldovia is most vulnerable.

Hazard Identification:

- Y: Hazard is present in jurisdiction but probability unknown
- N: Hazard is not present
- U: Unknown if the hazard occurs in the jurisdiction

Risk:

- L: Hazard is present with a low probability of occurrence within the next ten years. Event has up to 1 in 10 year’s chance of occurring.
- M: Hazard is present with a moderate probability of occurrence within the next three years. Event has up to 1 in 3 year’s chance of occurring.
- H: Hazard is present with a high probability of occurrence within the calendar year. Event has up to 1 in 1 year chance of occurring.

Flood	Fire	Weather	Landslide	Land Subsidence	Erosion
Y-L	Y-L	Y-M	Y-L¹	Y-L	Y-L
Earthquake	Tsunami	Volcano	Manmade	Avalanche	
Y-H	Y-M	Y-H	Y-M	Y-L	

Floods

Description of Hazard

Fresh-water floods occur when running or standing fresh water overtop their usual basins and channels. When flooding occurs in areas where people live or development is concentrated, it can threaten life, safety and health, disrupt essential services, or cause extensive property loss. Nationally, on average floods kill about 140 people each year and cause \$6 billion in

¹ Despite low probability of Landslide occurring, it is included in the hazard mitigation activities (Chapter 5) because of the potential for a landslide to impact the City water supply.

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property damage.

City of Seldovia Vulnerability

For this plan we considered several types of flooding: rainfall-runoff floods, snowmelt floods, ground-water flooding, and stream/creek flash floods. Seldovia also experiences coastal flooding from storm surge but this will be discussed in the Weather section. These are not exclusive categories as a flood event could have elements of more than one type.

Rainfall-Runoff Floods

A typical rainfall event occurs in mid to late summer and early fall. The rainfall intensity, duration, distribution and geomorphic characteristics of the watershed all play a role in determining the magnitude of the flood. They usually result from weather systems that have prolonged rainfall associated with them.

Snowmelt Floods

Snowmelt floods can occur any time snow is on the ground at low elevations. The depths of the snowpack and weather patterns influence the magnitude of river and stream flooding. Since storm drainage systems can be plugged by ice and slush, an extreme snowmelt event could pose a flooding hazard on city streets.

Ground-water Floods

Ground-water flooding occurs when the water-table rises and floods low-lying areas, including homes, septic tanks, and other facilities.

Flash Floods

These floods are characterized by a rapid rise in water along a stream course. They are often caused by heavy rain on small stream basins, ice jam formation or by dam failure. They are usually swift moving and debris filled, causing them to be very powerful and destructive. Steep coastal areas in general are subject to flash floods. Debris slides are often associated with heavy rains. A flash flood that impacted the Seldovia city water supply dam could conceivably lead to dam failure and violent downstream flooding.

Overall Hazard Assessment

Historically, flooding has not been a problem for the City of Seldovia. While the potential for any type of flooding to occur in the City does exist, the most probably scenario that could cause flooding in Seldovia would be snowmelt floods that occur when storm drain systems become flooding and stormwater floods back into City Streets.

Because of the low probability of flooding occurring in Seldovia, this hazard is not included in the discussion of mitigation in Chapter 5.

Seldovia does not participate in the National Flood Insurance Program (NFIP).

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Fires

Description of Hazard

Structural fires originate in and burn a building, shelter or other structure. These may subsequently spread to adjacent wildlands. Structural fires that impact a single building or dwelling do not typically constitute a local disaster, however a conflagration fire (structural fire that spreads to multiple structures or dwellings) can create an emergency.

Wildland fire is any non-structure fire, other than prescribed fire, that occurs in the wildland. Wildland fires typically constitute a local emergency when they infringe on populated areas or create harmful smoke plumes that may threaten public health and the environment. Wildland-Urban Interface fires are fires that burn within the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The potential exists in areas of wildland-urban interface for extremely dangerous and complex fire burning conditions which pose a tremendous threat to public and firefighter safety.

City of Seldovia Vulnerability

Seldovia sits on the edge of the rainforest belt, where wildfires are rare. However, small out-of-control fires have occurred in the past, particularly those that spread through organic-rich forest duff. Though Seldovia has not seen the same extent of spruce bark beetle damage as the rest of the Kenai Peninsula, the increase of dead trees in some areas increases fire risk. The vast majority of wildland fires on the Kenai Peninsula are the result of human activities: open burning the most prevalent. Lightning caused fires are infrequent. There is no known evidence of wildfires in the past around Seldovia.

Overall Hazard Assessment

Neither conflagration nor wildland fires have caused major emergencies in the City of Seldovia in the past. During times of heightened fire risks, the City of Seldovia Volunteer Fire Department does occasionally establish burn restrictions as a preventive/mitigative measure.

The area considered to be most vulnerable to a conflagration or wildland-urban interface fire within the City is the hillside area between the School and the Fuel and Lube. While unusual conditions would need to be in place for a major fire to occur here and impact the city, it is possible. Lightning strikes could also cause unexpected fires during unusually dry conditions.

Because the probability of fires in Seldovia is low and the City already has some prevention/mitigation measures in place, this hazard is not included in the mitigation strategies in Chapter 5.

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Weather

Description of Hazard

Many facets of Alaska weather can cause a potential emergency or disaster to local communities depending upon the timing and severity of events. The types of weather hazards most likely to impact the City of Seldovia include heavy snow, ice storms, high winds, and storm surge.

Heavy Snow

Heavy snow can immobilize a community, if plowing cannot keep up with accumulation on the roads. Plane travel is also difficult or impossible until the snow stops falling. 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. In the mountains, heavy snow can lead to avalanches. A quick thaw after a heavy snow can cause substantial flooding, especially along small streams and in urban areas. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns.

Injuries and deaths related to heavy snow usually occur as a result of vehicle accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

Heavy warm snow can also topple trees over wide areas, breaking power lines, blocking roads, and damaging structures. This requires particular circumstances where snow adheres to branches, but these conditions do occur often in Seldovia's maritime climate.

Ice Storms

The term ice storm is used to describe occasions when freezing rain leads to damaging accumulations of ice. They are often the cause of automobile accidents, power outages and personal injury. Ice storms result from the accumulation of freezing rain, which is rain that becomes super-cooled and freezes upon impact with cold surfaces. Freezing rain most commonly occurs in a narrow band within a winter storm that is also producing heavy amounts of snow and sleet in other locations.

High Winds

In Alaska, high winds (winds in excess of 60 mph) occur rather frequently over the coastal areas along the Bering Sea and the Gulf of Alaska. High winds can also combine with loose snow to produce blinding blizzard conditions and dangerous wind chill temperatures. They can reach hurricane force and have the potential to seriously damage port facilities, the fishing industry and community infrastructure (especially above ground utility lines). They also damage structures and blow down trees, cutting off power.

Storm Surge

Storm surges, or coastal floods, occur when ocean water and waves inundate coastal areas as a result of a combination of high-tide, low atmospheric

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pressure, wind shear on surface water, and wave set-up. Storm surges are associated with high winds, resulting in rough water and strong swells, adding to their destructive power. During a storm surge event in fall 1994 waves sent salt spray over the top of 50 foot cliffs, a process that could prove more destructive as cliff-top houses are increasingly built as vacation homes.

City of Seldovia Vulnerability

In Seldovia, there is potential for weather disasters. Wind-driven waves from intense storms produce coastal flooding and erosion. High winds, common on the Kenai Peninsula can topple trees, damage roofs and windows, and result in power outages. Heavy snow can cause avalanches, power outages, or collapse roofs of buildings. Storms can cut off plane and/or boat travel across Kachemak Bay, isolating Seldovia for the duration of the storm. In early November of 2010 a series of snow events lead to widespread tree damage between 500 and 1000 feet, breaking power lines and blocking access to the Seldovia water supply dam. If such conditions occurred at lower elevations they could have much greater human impact.

Extreme weather is most prevalent during the winter, when winter storms can any combination of cold temperatures, strong winds, storm surge, and heavy snow. Also temperature can swing through freezing creating the potential for ice storms and snowmelt floods (covered above under flooding.)

Overall Hazard Assessment

Based on past occurrences and the potential for future weather events to adversely impact the City of Seldovia, mitigation strategies will be beneficial to the City of Seldovia, as discussed in Chapter 5. Interruption to electricity, communications, and fuel supply during or after severe weather events are one of the most important aspects of a weather emergency, and many of the mitigation activities described in Chapter 5 focus on minimizing the adverse impacts to Seldovia residents during energy interruptions caused by harsh weather.

Landslides

Description of Hazard

Landslide is a generic term for a variety of downslope movements of earth material under the influence of gravity. Some landslides occur rapidly, in mere seconds, while others might take weeks or longer to develop.

Landslides usually occur in steep areas. They can occur as ground failure of river bluffs or ocean bluffs, cut-and-fill failures associated with road and building excavations, and slope failures associated with quarries. Underwater landslides usually involve areas of high underwater relief.

Landslides can occur naturally or be triggered by human activities. They occur naturally when inherent weaknesses in the rock or soil combine with one or more triggering events such as heavy rain, snowmelt, changes in

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groundwater level, and seismic activity. They can be caused by long-term climate change that results in increased precipitation, ground saturation and a rise in groundwater level, which reduces the shear strength and increases the weight of the soil. Ongoing weathering, which increases with temperature, also weakens soil and bedrock. Erosion that removes material from the base of a slope can also cause naturally triggered landslides.

Human activities that trigger landslides are usually associated with construction, such as undercutting slopes or loading slopes with new material.

City of Seldovia Vulnerability

The Seldovia area includes homes and properties on steep bluffs overlooking the ocean, which are at risk of topples, a natural type of landslide where rock undercut by the ocean collapses onto the beach. None of these areas are within city limits. Most potential landslide scenarios would likely impact a single residence.

The City water supply is also potentially vulnerable to landslides, and although there is a low likelihood of this event occurring, a landslide that impacted the city water supply could cause a local emergency.

Overall Hazard Assessment

Although the probability of a landslide impacting public or private property within City limits is extremely low, there is a small possibility that a landslide could affect the city water supply/reservoir. Chapter 5 discusses mitigation activities that focus specifically on the city water supply.

Land Subsidence

Description of Hazard

Land subsidence is any sinking or downward settling of the earth's surface. Tectonic deformation during earthquakes, sediment compaction, underground mining for minerals, ground water or petroleum, and drainage of organic materials are typical causes of subsidence.

City of Seldovia Vulnerability

In Seldovia, the only cause that is likely to broadly impact the community is earthquake subsidence. The Seldovia area subsided four to five feet (accounts vary) during the 1964 Good Friday Earthquake, resulting in inundation of a large portion of the town, which was built on coastal boardwalks at the time.

Overall Hazard Assessment

Since land subsidence threatens the City of Seldovia primarily as a result of an earthquake and not as a discrete hazard, it is considered in Chapter 5 as part of earthquake mitigation, and not as a separate hazard.

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Coastal Erosion

Description of Hazard

Coastal erosion is a process that involves the wearing away of land adjacent to the ocean. Erosion is driven by wave action, rain and wind, high tides, and the freeze-thaw loosening of soils.

City of Seldovia Vulnerability

Coastal erosion is relatively gradual in the Seldovia area, but can impact some areas, primarily beyond City limits. Coastal erosion of city property along the Outside Beach has resulted in damage to a road and has the potential to impact other facilities there.

Overall Hazard Assessment

Because of the low probability of coastal erosion impacting facilities or infrastructure within the City of Seldovia, this hazard is not included in the mitigation strategies discussed in Chapter 5.

Earthquake

Description of Hazard

Seismic hazards in Alaska come from several sources. The largest earthquakes in the state are caused by subduction of the Pacific plate beneath Alaska. In a recent evaluation of the seismic potential in Alaska, researchers indicated that several subduction zone segments may be ready to rupture soon. The Yakataga gap and the region between Kodiak Island and the Shumagin Islands are areas where magnitude 8+ events are possible. A second type of hazard comes from the smaller magnitude 6.8 to 8.0 earthquakes, which occur in many regions of Alaska. These events, while smaller, occur at more frequent intervals and can produce higher frequency shaking that damages smaller buildings. The faults that can cause these smaller earthquakes are in some cases well mapped, but in others they are unknown. One such fault, the Border Ranges fault, runs right through the Seldovia area, though it is not known if this fault is active. Other undiscovered faults are likely to be present. On average, Alaska has a magnitude 7.0 or larger earthquake about every two years.

The dangers associated with earthquakes include ground shaking, ground-surface offset, ground failures, snow avalanches, seiches and tsunamis (covered below). The extent of damage is dependent on the magnitude of the earthquake, the geology of the area, distance from the epicenter and structure design and construction.

Earthquake-induced ground failure is often the result of liquefaction, which occurs when soil (usually sand and coarse silt with high water content) loses strength as a result of the shaking and acts like a viscous fluid. Liquefaction causes three types of ground failures: lateral spreads, flow failures, and loss of bearing strength. In the 1964 earthquake, over 200 bridges were destroyed or damaged due to lateral spreads. Flow failures damaged the port

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facilities in Seward, Valdez and Whittier. Similar ground failures can result from loss of strength in saturated clay soils, as occurred in several major landslides that were responsible for most of the earthquake damage in Anchorage in 1964.

City of Seldovia Vulnerability

Local conditions can have a large impact on how damaging an earthquake is. Basins filled with soft sediment can amplify seismic waves, while local topographic features and underground structures can focus seismic energy. These effects can lead to significantly different shaking over distances less than a mile. Accurately assessing such variation requires detailed studies that have not been conducted for Seldovia.

Overall Hazard Assessment

The 1964 earthquake caused significant damage to the City of Seldovia, and the City remains vulnerable to future earthquakes in the region, which are low probability but high impact events. Although major earthquakes occur relatively infrequently, the City remains vulnerable to significant damages from an earthquake. Earthquake mitigation is included in the discussion in Chapter 5.

Tsunamis

Description of Hazard

Tsunamis are surface waves in water, generated by a sudden displacement of water surface at the source. They are typically generated by co-seismic uplift or drop in the ocean floor, volcanic avalanches or pyroclastic flows, meteor impact, or landslides originating either above or under the sea surface.

Tsunamis can flood onland and that flooding is often associated with strong currents. Commonly structures and facilities are damaged by pressure from the flowing water, collision with floating debris, and buoyant forces.

Tsunami risk is highly influenced by the state of the tide. The large tidal range in Seldovia confers significant protection from smaller tsunamis, which will be most dangerous only if they happen to occur at an extreme high tide.

There are several different types of tsunamis.

Volcanic tsunamis

Violent eruptions can generate tsunamis in several different ways, including water displacement from volcanic avalanches, and depression of the water surface by pyroclastic flows. There are oral and instrumental records of a tsunami in 1883 generated by Augustine volcano, which reportedly caused damage and death in Nanwalek, a village located approximately 8 miles southwest of Seldovia on Kachemak Bay. There is geologic evidence of older tsunamis generated by volcanic eruptions along the Alaska Peninsula and in the Aleutians. The volcanoes along Cook Inlet all have the potential to generate tsunamis, with Augustine posing by far the greatest risk.

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Seismically-generated local tsunamis

These tsunamis can happen any time an earthquake occurs that deforms the sea floor. Local tsunamis likely pose the greatest risk to Seldovia for the near future, and might occur on the known Border Ranges fault or on some other unknown fault. Such tsunamis can arrive onland very quickly, in as little as a few minutes, so typically no official warning could be issued.

Landslide-generated tsunamis

Submarine and subaerial landslides can generate large tsunamis. These are triggered most commonly by earthquakes, and are usually confined to the bay or lake of origin. A number of destructive and deadly landslide tsunamis have been generated in Alaska, including the 1958 Lituya Bay tsunami, and a number of tsunamis generated by landslides during the 1964 earthquake including those in Valdez, Seward, and Homer. The tsunamis in 1964 in Seward and Valdez were particularly destructive because they were large and triggered by landslides immediately adjacent to the towns, providing no time for evacuation.

Tele-tsunami

Tele-tsunami is the term for a tsunami observed at places 1,000 kilometers or more from the source. In many cases, tele-tsunamis can allow for sufficient warning time and evacuation. No part of Alaska is expected to have significant damage due to a tele-tsunami. There is a slight risk in the western Aleutians and some parts of Southeast Alaska.

City of Seldovia Vulnerability

The City of Seldovia is vulnerable to volcanic, seismically-generated, and landslide-generated tsunamis. Although all tsunamis are relatively infrequent events whose impacts to the City of Seldovia would be highly dependent upon the type and location of the tsunami, the potential for damage is significant.

Overall Hazard Assessment

A tsunami that impacts the City of Seldovia has a moderate overall probability, but could cause significant local damage and injury. Tsunami mitigation measures are included in the discussion in Chapter 5.

Volcanoes

Description of Hazard

Alaska is home to 41 historically active volcanoes stretching across the entire southern portion of the State from the Wrangell Mountains to the far Western Aleutians. An average of 1-2 eruptions per year occurs in Alaska. In 1912, the largest eruption of the 20th century occurred at Novarupta and Mount Katmai, located in what is now Katmai National Park and Preserve on the Alaska Peninsula.

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Volcanic Ash

Volcanic ash, also called tephra, is fine fragments of solidified lava ejected into the air by an explosion or rising hot air. The fragments range in size, with the larger falling nearer the source. Ash is a problem near the source because of its high temperatures (may cause fires), burial (the weight can cause structural collapses), and impact of falling fragments. Further away, the primary hazard to humans is decreased visibility and inhaling the fine ash, but lightning in large ash clouds can also pose a hazard. Ash will also interfere with the operation of mechanical equipment including aircraft. In Alaska, this is a major problem as many of the major flight routes are near historically active volcanoes. Ash accumulation may also interfere with the distribution of electricity due to shorting of transformers and other electrically components (ash is an excellent conductor of electricity).

The largest volcanic eruption of the 20th century occurred at Novarupta Volcano in June 1912. It started by generating an ash cloud that grew to thousands of miles wide during the three-day event. Within four hours of the eruption, ash started falling on Kodiak, darkening the city. It became hard to breathe because of the ash and sulfur dioxide gas. The water became undrinkable and unable to support aquatic life. Roofs collapsed under the weight of the ash. Some buildings were destroyed by ash avalanches while others burned after being struck by lightning from the ash cloud. Similar conditions could be found all over the area. Some villages ended up being abandoned, including Katmai and Savonoski villages. The ash and acid rain also negatively affected animal and plant life. Large animals were blinded and many starved because their food was eliminated.

The ash fall from this eruption was significantly greater than the recent eruptions of Redoubt, Spurr and Augustine Volcanoes. Fourteen earthquakes of magnitude 6 to 7 were associated with this event.

The responsibility for hazard identification and assessment for the active volcanic centers of Alaska falls to the Alaska Volcano Observatory (AVO) and its constituent organizations (USGS, DNR/DGGS, and UAF/GI). AVO has published hazard assessments for local volcanoes, including Spurr, Redoubt, Iliamna, Augustine, and the Katmai Group, and provides warnings of likely eruptions.

City of Seldovia Vulnerability

Seldovia has been recently impacted by volcanic ashfall events, the only local volcanic hazard other than tsunamis (covered above). These ashfall events followed eruptions of Mt. Augustine and Redoubt volcanoes. Larger eruptions occurred in the geologic past, leaving dramatic layers of ash in the soil around Seldovia.

An ashfall that disrupted local air traffic across Kachemak Bay could isolate the Seldovia community.

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Overall Hazard Assessment

Very large eruptions like Novarupta are very rare, but if one were to happen at one of the Cook Inlet volcanoes, particularly Augustine, it could have severe effects on Seldovia. Seldovia is closer to Augustine than Kodiak is to Novarupta. Because Seldovia has recently experienced volcanic ashfall from one of several active volcanoes that are relatively close to the City, the potential for volcanic ashfall to impact the City is high. The mitigation activities discussed in Chapter 5 focus on volcanic ash as the primary volcano-related hazard facing the City of Seldovia. Tsunamis that are generated by volcanic eruptions are discussed as part of the mitigation for tsunamis.

Manmade

Description of Hazard

Manmade hazards may include terrorism (deliberate acts of violence or sabotage) or oil spills from shipwrecks, storage facilities, production, vessels, or other sources.

Manmade disasters can impact the environment, human health, and the socio-economy of a region.

City of Seldovia Vulnerability

The City of Seldovia has a very low potential vulnerability to acts of terrorism due to its isolation and very small population base. The City is vulnerable to the impacts from oil spills that either directly impact the land and waters of the city, or that impact adjacent coastal and marine areas that are used by Seldovia residents for fishing, recreation, and subsistence. The 1989 Exxon Valdez oil spill had significant negative impacts to local residents. Smaller local events such as the Husky II incident (where a derelict vessel in Seldovia Harbor posed an oil spill risk from fuel stored onboard for a period of years before the vessel could finally be removed by the Coast Guard and the State of Alaska) highlight the potential for oil spills within the harbor.

Overall Hazard Assessment

The hazard mitigation strategies discussed in Chapter 5 focus specifically on oil spills as the main type of manmade hazard with the potential to impact Seldovia.

Avalanche

Description of Hazard

An avalanche is a sudden rapid flow of snow down a slope, occurring when either natural triggers or human activity causes a critical escalating transition from the slow equilibrium evolution of the snow pack. Typically occurring in mountainous terrain, an avalanche can mix air and water with the descending snow. Powerful avalanches have the capability to entrain ice, rocks, trees, and other material on the slope. In contrast to other natural

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events which can cause disasters, avalanches are not rare or random events and are endemic to any mountain range that accumulates a standing snow pack. In mountainous terrain avalanches are among the most serious objective hazards to life and property, with their destructive capability resulting from their potential to carry an enormous mass of snow rapidly over large distances.

Avalanche hazards in Alaska include the potential to impact roads or other infrastructure. Avalanches can also create a life safety risk to skiers, snowmobilers, and other winter recreationists.

City of Seldovia Vulnerability

Avalanches have occurred in the hillside areas outside of the City of Seldovia, but the potential for an avalanche to occur within City limits is extremely unlikely.

Overall Hazard Assessment

Because of the low probability of an avalanche impacting the City of Seldovia, avalanches are not included in the hazard mitigation activities discussed in Chapter 5.

Vulnerability Assessments

Hazard Vulnerabilities

Based on the input from the public, private sector and city administration (as summarized in the Hazard Matrix), the City of Seldovia is most vulnerable to the following hazards:

- Weather
- Landslide (impacting water supply)
- Earthquake
- Tsunami
- Volcanic Ashfall
- Oil spill
- Conflagration Fire

The mitigation goals, objectives, and strategies described in Chapter 5 focus on these seven hazards.

Identification of Assets

The Hazard Matrix below includes a comprehensive list of facilities and/or structures that have been determined to be vulnerable to hazards facing Seldovia. Damage to these structures or facilities could seriously impact not only the quality of life in Seldovia but also the sustainability and survivability of Seldovia residents. This list was generated during a public meeting with input from Seldovia residents. Facilities deemed critical are bold in the Hazard Matrix.

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Critical Facilities include:

- Essential facilities, which are necessary for the health and welfare of an area and are essential during the response and recovery phase of a disaster such as: public safety facilities, hospital, schools.
- Transportation systems such as: airport, port and harbor, highway and roads.
- Lifeline utility systems such as: potable and waste water treatment plants, electrical
- generation facilities and power grid and communications systems.

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Hazard Matrix

Facility	Flood	Fire	Storm	Land-slide ²	Land Subsidence	Erosion	Earth-quake	Tsunami	Volcano	Man-made	Avalanche
COMMUNICATIONS INFRASTRUCTURE											
TV Tower			H	L			H		L		
Communications Systems		L	H	L			H	H	H		
ENERGY INFRASTRUCTURE											
Seldovia Fuel & Lube Tank Farm	L	H					H	L	L	L	
HEA Generators		L					H	L	H		
STRUCTURES											
City buildings		L	H		H		H	H	L		
State shop	L ¹	L	H		H		H	H	L		
US Post office	L	L	H		H		H	H	L		
School		L					H		L		
SV Tribe buildings	L	L	H		H		H	H	L		
Restaurants, Hotels, B&Bs	L	L	H		H		H	H	L		
Private Residences	L	L	H		H		H	H	L		
Community center		L					H		L		
Outside Beach shelter			H		H	H	H	H	L		
School shop		L					H		L		
Churches	L	L					H	L	L		
Seldovia House		L			H		H	H	L		
Boardwalk		L	H		H	L	H	H			

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Facility	Flood	Fire	Storm	Land-slide ²	Land Subsid-ence	Erosion	Earth-quake	Tsunami	Volcano	Man-made	Avalanche
TRANSPORTATION INFRASTRUCTURE											
City Streets	L		L		H	L	H	H			
Airport				L	H	L	H	H			
Bridges	L	L	L		H	L	H	H			
Harbor, ramps & SVT/Jackalof docks		H	H		H	H	H	H	H		
City dock		H	H		H	H	H	H		L	
Marine Vessels		H	H				L	H	H	H	
City boat yard		H	L	L	L		H	H			
Planes			H					H	H		
Wheeled Vehicles								H	H		
WATER SYSTEM											
Water & Sewer	H		H		H	L	H	H	H		
Watershed	H	H		L					H		
Dams	H			H		L	H		H		H
Reservoir*				H			H				
* Group agreed to find a specific person with more detailed knowledge of the water/reservoir system											
¹ Specific flood scenario for state shop, fish culvert ice damn cause flood waters to reach state shop											
² Landslides probable in Barabara Heights Subdivision, which is outside of City of Seldovia limits											

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Development Trends

The City has several zoning districts:

- Commercial Marine
- Commercial Residential
- Commercial
- Waterfront Commercial Residential
- Residential & Special Multi-Family
- Industrial
- Public / City

In 2005 the City received funding for preliminary Water and Sewer Pipe Replacement and Upgrades and together with the 2009 Design and Construction of Water and Sewer Facilities funds, the City's water and sewer system upgrade should be completed in FY 2014. Also in 2010 the Seldovia Harbor Improvements – Design and Construction project was funded to \$1M; the City is still seeking matching funds before continuing beyond the planning phase.

From 2008 to present the City of Seldovia commercial and residential building permit numbers have held mostly steady, but estimated cost in dollars has fluctuated based on available funding and project type for each building season.

Residential: In the past three years the majority of residential permitting has been for outbuildings or additions to completed structures. However, in each of the last three years at least one permit was issued for new single-family residence build and in 2009 three new residence permits were issued.

Commercial: Current funding for public projects includes City Water and Sewer System / Facility upgrades and Seldovia Harbor Improvements. As of August 2011, there are no other commercial building projects in Seldovia; however, proposals have been submitted for development of the City's cannery property.

	2008	2009	2010
Number of Zoning Permits Issued	8	8	9
Number of Permits in Dollars	\$135.5 K	\$38.5 K	\$897.42 K

Chapter 5 – Mitigation Goals, Objectives, and Strategies

This chapter describes the hazard mitigation goals, objectives, and strategies identified by the participants in the Hazard Mitigation Plan development process (Chapter 3). This chapter discusses the types of mitigation projects and activities that are considered to be priorities to Seldovia residents. For each of the six hazards that have been identified as high priority for the City of Seldovia, mitigation activities are organized into four broad categories:

- **Additional studies, research and planning:** areas where more information is needed to better understand the vulnerabilities and consequences associated with various hazards. Studies may include hazard mapping, scientific studies, additional research into historical occurrences, or other research projects. Planning may include development of prevention or contingency plans, or conducting training or drills.
- **Public education and outreach:** areas where publication or dissemination of information to local residents may help to reduce the potential adverse impacts of a hazard to the community, the environment, and local residents.
- **Infrastructure or facility improvement projects:** areas where engineering, construction, or other types of projects could be used to reduce the potential for hazards to impact the infrastructure or critical facilities that are vulnerable to damages.
- **Other:** other types of activities not covered in the three categories above. These may include participation in state or federal projects not directly related to the categories above or other types of local initiatives.

In addition to the hazard-specific mitigation activities, “general” hazard mitigation activities (geared toward more than one type of hazard, or not hazard-specific) are also discussed.

The order in which mitigation activities are discussed does not represent any prioritization. At the end of each hazard-specific mitigation measure discussion, additional resources are listed that may provide help in securing grants or programmatic support for future mitigation activities in Seldovia.

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General Hazard Mitigation Activities

City of Seldovia residents identified a number of general hazard mitigation activities that could be undertaken to reduce the potential for hazards to impact the city and its residents. These “general” activities would provide a mitigation benefit for more than one type of hazards, and are therefore separated from the hazard-specific mitigation measures.

Additional Studies, Research and Planning

- G1. Identify vulnerabilities in emergency transportation routes out of Seldovia – air, land, water.
- G2. Develop emergency e-mail list in conjunction with KPB emergency cell phone list.
- G3. Characterize secondary Upper Dam and Reservoir water source – is this source usable during a disaster?
- G4. Evaluate School as emergency shelter/evacuation facility, possibly upgrading the generator to the point where the school can be completely functional under its own power.
- G5. Investigate alternate airport access from the north.
- G6. Coordinate emergency response planning between City of Seldovia and Seldovia Village Tribe Barbara Heights VFD.

Public Education and Outreach

- G7. Develop a community information brochure/disaster preparedness pamphlet or other informational resources.
- G8. Add information to the Seldovia Visitors Guide about disaster preparedness – particularly by identifying the school as the evacuation facility.
- G9. Distribute personal disaster kits or facilitate group ordering of disaster supplies.
- G10. Distribute public information about keeping personal fuel storage/supply safe and disaster-ready.
- G11. Conduct a disaster response exercise

Infrastructure or Facility Improvement Projects

- G12. Develop a strategy to ensure that the fuel truck (2200 gallons), ambulance, and fire trucks are moved to a safe and accessible location before a disaster strikes, or at the first opportunity during a developing disaster.
- G13. Upgrade or replace the fuel storage facility to maximize its security and utility during disaster scenarios.
- G14. Improve the reliability of communications systems by securing key facilities (e.g. cell phone towers), expanding battery-powered radio communications, and establishing a plan to make communications resources available to the community during a disaster.
- G15. Improve Jakalof Road to make it less vulnerable to landslides triggered by extreme weather or earthquakes.
- G16. Install manual power controls for HEA generators.

Weather Mitigation

Winter storms, bringing some combination of heavy snow and rain, cold temperatures, high winds, and storm surge were identified as the primary weather

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threat to Seldovia.

Public Education and Outreach

- W1. Include a discussion of weather-related emergencies on public outreach/emergency preparedness information.

Additional Information Sources

FEMA - <http://www.fema.gov/hazard/winter/index.shtm>

National Weather Service - <http://www.nws.noaa.gov/>

National Weather Service (Fairbanks) - <http://pafg.arh.noaa.gov/>

Landslide Mitigation (City Water Supply)

The city water supply was identified as the primary City of Seldovia resource that may be negatively impacted by landslides. Other areas outside of the City are vulnerable to landslides, and mitigation for these areas is managed by the Kenai Peninsula Borough.

Additional Studies, Research and Planning

- L1. Conduct a slope stability study to assess the vulnerability of city water supply to a landslide, and identify any mitigation measures that could be put in place.

Public Education and Outreach

- L2. Include a discussion of potential risks to city water supply in public outreach/emergency preparedness information.

Infrastructure or Facility Improvement Projects

- L3. Undertake improvement or infrastructure projects to mitigate landslide risks to water supply as indicated by slope stability study.

Additional Information Sources

United States Geological Survey – USGS

<http://landslides.usgs.gov>

FEMA - <http://www.fema.gov/hazard/landslide/index.shtm>

Alaska Dept. of Homeland Security and Emergency Management

<http://ready.alaska.gov/plans/mitigation/landava.htm>

Earthquake Mitigation

Additional Studies, Research and Planning

- E1. Conduct a geologic study of possibly active faults in the Seldovia area.
- E2. Assess seismic engineering of critical infrastructure – particularly school/shelter and other important city buildings. Consider the possibility of the pool, which serves as an emergency water supply, failing during an earthquake.

Public Education and Outreach

- E3. Include a discussion of earthquake preparedness in public outreach/emergency preparedness information.

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Infrastructure or Facility Improvement Projects

E4. Determine whether retrofits may make fuel facility more seismically sound.

Additional Information Sources

United States Geological Survey – USGS –

<http://www.usgs.gov/hazards/earthquakes/>

FEMA – <http://www.fema.gov/hazard/earthquake/index.shtm>

Alaska Earthquake Information Center - <http://www.aeic.alaska.edu/>

Alaska Sea Grant Program - <http://seagrant.uaf.edu/features/earthquake.php>

Tsunami Mitigation

Additional Studies, Research and Planning

T1. Revise tsunami inundation mapping for Seldovia; current inundation maps are not accurate.

T2. Assess the hazard posed by a subduction zone tsunami coming from the area around the Shumagin Islands.

Public Education and Outreach

T3. Include information about tsunami evacuations in public outreach/emergency preparedness information.

Infrastructure or Facility Improvement Projects

T4. Develop and post tsunami evacuation signs/routes.

T5. Improve tsunami siren activation system so as to minimize false alarms.

Additional Information Sources

FEMA - <http://www.fema.gov/hazard/tsunami/index.shtm>

National Oceanic Atmospheric Administration (NOAA) Pacific Tsunami Warning Center - <http://www.prh.noaa.gov/ptwc/>

Univ. of Washington - <http://www.ess.washington.edu/tsunami/index.html>

Alaska Sea Grant Program - <http://seagrant.uaf.edu/features/earthquake.php>

National Weather Service/West Coast and Alaska Tsunami Warning Center - <http://wcatwc.arh.noaa.gov/events/eventmap.php>

Volcanic Ash Mitigation

Additional Studies, Research and Planning

V1. Determine water usage levels and filtration limits of current system, to determine whether water rationing may be necessary in the event ashfall impacts drinking water supply.

Public Education and Outreach

V2. Develop public outreach materials regarding electric discharge, fuel, engines.

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Infrastructure or Facility Improvement Projects

V3. Improve water supply infrastructure to reduce need for water rationing or other emergency measures during ashfall, as determined by the study recommended above.

Other

V4. Ensure a local supply of ash masks and store at evacuation facility.

V5. Ensure preparedness to assist those with respiratory illnesses that might be exacerbated by ashfall

Additional Information Sources

United States Geological Survey – USGS - <http://volcanoes.usgs.gov>

FEMA - <http://www.fema.gov/hazard/volcano/index.shtm>

Alaska Volcano Observatory - <http://www.avo.alaska.edu>

Conflagration Fire Mitigation

There is a general feeling that Seldovia's fire preparedness is sufficient. Retaining this readiness requires active maintenance and upgrade of firefighting equipment, training of personnel, and updating of plans to reflect changes in fire risks and vulnerabilities.

Public Education and Outreach

F1. Develop public information information regarding fire prevention – target children/schools.

F2. Promote household fire safety to reduce risk of conflagration fires.

Infrastructure or Facility Improvement Projects

F3. Install fire carts and pumps at Jakalof Dock (UAF Lab?)

Additional Information Sources

Fire Ready - <http://fireready.com/>

Firewise - <http://www.firewise.org/>

Chapter 6. City of Seldovia Mitigation Strategy

Benefit-Cost Review

This chapter outlines an overall strategy to reduce vulnerability to the effects of the hazards profiled in Chapters 4 and 5. Currently the planning effort is limited to the hazards determined to be of the most concern: weather; landslides impacting the city water supply; earthquakes; tsunamis, volcanic ashfall; and conflagration fires. Mitigation strategies will be updated as outlined in, and as additional hazard information is added and new information becomes available.

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

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

Due to the dollar value associated with both life-safety and critical facilities, the prioritization strategy represents a special emphasis on benefit-cost review because the factors of life-safety and critical facilities steered the prioritization towards projects with likely good benefit-cost ratios. (FEMA 386-6)

Potential projects will need to be evaluated using a Benefit-Cost Analysis (BCA) during the grant application process after the plan has been approved. The following criteria are used in the evaluation:

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

A Benefit-Cost review listing method supports the principle of benefit-cost review by using a process that demonstrates a special emphasis on maximization of benefits over costs. Potential projects that demonstrate benefits over costs and that can start immediately were given the highest priority. Projects that the costs somewhat exceed immediate benefit and that can start within five years (or before the next update) were given a description of medium priority, with a timeframe of one to five years. Projects that are very costly without known benefits, probably cannot be pursued during this plan cycle, but are important to keep as an action, were given the lowest priority and designated as long term (FEMA 386-6).

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Benefit-Cost Analysis

The methodology for conducting this benefit-cost analysis follows a template prepared by FEMA, which explains how to perform a BCA. The complete guidelines document, a BCA document and BCA technical assistance are available online <http://www.fema.gov/government/grant/bca>.

After the MHMP has been approved, the projects must be evaluated using a BCA during the funding cycle for disaster mitigation funds from DHS&EM and FEMA. A description of the FEMA BCA process is included in the FEMA guidance referenced above. Briefly, BCA is the method by which the future benefits of a mitigation project are determined and compared to its cost. The result is a Benefit-Cost Ratio (BCR), which is derived from a project's total net benefits divided by its total cost. The BCR is a numerical expression of the cost-effectiveness of a project. Composite BCRs of 1.0 or greater have more benefits than costs, and are therefore cost-effective.

Benefit-Costs Review Listing Table

The BCR Listing Table below lists the benefits (pros) and costs (cons) of some potential projects. The review method is further described in the FEMA *How-To-Guide Benefit-Cost Review in Mitigation Planning* (FEMA 386-5).

This table also lists potential resources that may be available to support these projects, as well as a timeline for accomplishment. Timelines are obviously vulnerable to funding availability and staffing constraints, particularly because Seldovia is a small municipality with limited staff support.

Priority Definitions are as follows:

High = Clearly a life/safety project, or benefits clearly exceed the cost or can be implemented 0 – 1 year.

Medium = More study required to designate as a life/safety project, or benefits may exceed the cost, or can be implemented in 1 – 5 years.

Low = More study required to designate as a life/safety project, or not known if benefits exceed the costs, or long-term project, implementation will not occur for over 5 years.

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Benefit-Cost Review Listing Table

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
G1. Identify vulnerabilities in emergency transportation routes out of Seldovia – air, land, water Lead department: City manager	Life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits	Staff or contractor time and expense	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	< 1 year
G2. Develop emergency e-mail list in conjunction with KPB emergency cell phone list Lead department: City Clerk	Life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits	Staff time	High	FEMA Pre-Disaster Mitigation (PDM)	<1 year
G3. Characterize secondary Upper Dam and Reservoir water source – is this source usable during a disaster? Lead department: Planning Commission	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits	Would require outside contractor expertise and costs.	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	>1 year
G4. Evaluate school as emergency shelter/evacuation facility, possibly upgrading generator to the point where the school can completely function under its own power. Lead department: City manager	Life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits	Would require outside contractor expertise and costs. Also costs associated with purchasing and maintaining generator.	High	FEMA Pre-Disaster Mitigation (PDM)	<1 year

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
G5. Investigate alternative airport access from the north Lead department: Planning Commission	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits	Staff time, expense. Possible contractor support	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	>1 year
G6. Coordinate emergency response planning between City of Seldovia and Seldovia Village Tribe Barbara Heights VFD. Lead department: Seldovia Emergency Services (Police & Fire)	Improved emergency preparedness. Risk and damage reduction. State assistance available for emergency operations planning.	Staff time, expense. Possible contractor support	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) ADHS&EM Emergency Operations Planning support	<1 year
G7. Develop a community information brochure/disaster preparedness pamphlet or other informational resources. Lead department: City clerk	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available	Staff time, expense. Printing costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials	<1 year
G8. Add information to the Seldovia Visitors Guide about disaster preparedness – particularly school as evacuation facility. Lead department: City clerk	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits	Staff time, expense. Printing costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials	<1 year

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
<p>G9. Distribute personal disaster kits or facilitate group ordering of disaster supplies</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	<p>Improved emergency preparedness. Risk reduction.</p>	<p>Staff time. Purchasing costs.</p>	<p>Medium</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Red Cross or other aid organizations</p>	<p>>1 year</p>
<p>G10. Distribute public information about keeping personal fuel storage/supply safe and disaster-ready</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	<p>Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits Could include in emergency brochures</p>	<p>Staff time, expense</p>	<p>High</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials</p>	<p><1 year</p>
<p>G11. Conduct a disaster response exercise</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	<p>Improved emergency preparedness. Risk and damage reduction. Could be done in conjunction with emergency operations planning (state assistance available)</p>	<p>Staff time, expense. Possible need to contract support.</p>	<p>High</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) ADHS&EM Emergency Operations Planning support</p>	<p>>1 year (after EOP completion)</p>

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
<p>G12. Develop a strategy to ensure that the fuel truck, ambulance, and fire trucks are moved to safe location before/during disaster.</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	<p>Improved emergency preparedness. Risk and damage reduction. Could be done in conjunction with emergency operations planning (state assistance available)</p>	<p>Staff time, expense. Possible need to contract support.</p>	High	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) ADHS&EM Emergency Operations Planning support</p>	<1 year
<p>G13. Upgrade or replace the fuel storage facility to maximize its security and utility during disasters.</p> <p>Lead department: City manager</p>	<p>Improved emergency preparedness. Risk and damage reduction.</p>	<p>Significant capital costs</p>	High	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Private funding?</p>	<5 years
<p>G14. Improve reliability of communications systems</p> <p>Lead department: City manager</p>	<p>Improved emergency preparedness. Risk and damage reduction.</p>	<p>Moderate to significant capital costs</p>	Medium	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Private funding?</p>	<5 years
<p>G15. Improve Jakalof Road to make it less vulnerable to landslides triggered by weather or earthquake.</p> <p>Lead department: Planning Commission</p>	<p>Improved emergency preparedness. Risk and damage reduction. Benefit to city residents and others in area.</p>	<p>Significant capital costs</p>	Medium	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)</p>	<5 years

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
G16. Install manual power controls for HEA generators. Lead department: HEA	Improved emergency preparedness. Risk and damage reduction. Benefit to city residents and others in area.	Moderate capital costs	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Private funding?	<2 years
Weather (W)					
W1. Include a discussion of weather-related emergencies on public outreach/emergency preparedness information. Lead department: City clerk	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits. State assistance available.	Staff time, expense. Printing costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials FEMA Storm Ready	<1 year
Volcanic Ash Mitigation					
V1. Determine water usage levels and filtration limits of current system, to determine whether water rationing may be necessary in the event ashfall impacts drinking water supply. Lead department: City manager	Life/Safety issue/Risk reduction Benefit to City & outlying regions State assistance available	Staff time, expense.	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	<2 years

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
<p>V2. Develop public outreach materials regarding electric discharge, fuel, engines.</p> <p>Lead department: City clerk</p>	<p>Life/Safety issue/Risk reduction Benefit to City & outlying regions State assistance available</p>	<p>Staff time, expense.</p>	<p>Medium</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials</p>	<p><1 year</p>
<p>V3. Improve water supply infrastructure to reduce need for rationing or other measures during ashfall (based on V1 study)</p> <p>Lead department: City manager</p>	<p>Life/Safety issue/Risk reduction Benefit to City & outlying regions</p>	<p>Staff time, expense. Contractor time, expense. Possible capital costs.</p>	<p>Medium</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)</p>	<p><5 years</p>
<p>V4. Ensure a local supply of ask masks and store at evacuation facility.</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	<p>Life/Safety issue/Risk reduction</p>	<p>Staff time, capital costs</p>	<p>High</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)</p>	<p><1 year</p>
<p>V5. Ensure preparedness to assist those with respiratory illnesses that might be exacerbated by ashfall.</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	<p>Life/Safety issue/Risk reduction State assistance available</p>	<p>Staff time, possible capital costs</p>	<p>High</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) ADHS&EM Emergency Operations planning support</p>	<p><1 year</p>

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
Tsunami (T)					
<p>T1. Revise tsunami inundation mapping for Seldovia as current maps are not accurate.</p> <p>Lead department: Planning Commission</p>	<p>Life/Safety issue/Risk reduction Benefit to City and outlying areas. State assistance available</p>	<p>Significant capital costs.</p>	<p>High</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Alaska universities NWS</p>	<p><3 years</p>
<p>T2. Assess the hazard posed by a subduction zone tsunami coming from the area around the Shumagin Islands</p> <p>Lead department: Planning Commission</p>	<p>Life/Safety issue/Risk reduction Benefit to City and outlying areas. State assistance available</p>	<p>Contractor costs for study.</p>	<p>Medium</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Alaska universities NWS</p>	<p><5 years</p>
<p>T3. Include information about tsunami evacuations in emergency preparedness/outreach information.</p> <p>Lead department: City clerk</p>	<p>Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available</p>	<p>Staff time, expense. Printing costs</p>	<p>High</p>	<p>FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials NWS Tsunami Ready</p>	<p><1 year</p>

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
T4. Develop and post tsunami evacuation signs/routes. Lead department: Emergency Services (Police & Fire Depts)	Life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available	Staff time, expense.	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) NWS Tsunami Ready	<1 year
T5. Improve tsunami siren activation system so as to minimize false alarms. Lead department: Emergency Services (Police & Fire Depts)	Life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available	Staff time, expense.	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) NWS Tsunami Ready	<1 year
Earthquake (E)					
E1. Conduct a geologic study of possibly active faults in Seldovia area Lead department: Planning Commission	Life/Safety issue Risk reduction Benefit to entire Borough State assistance available	Contractor time, expense. May be lack of data available	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) Alaska universities	<5 years
E2. Assess seismic engineering of critical infrastructure. Lead department: City manager	Life/Safety issue Risk reduction Benefit to entire Borough State assistance available	Staff time, contractor time and expense	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	2-4 years

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
E3. Include a discussion of earthquake preparedness in public outreach/emergency preparedness information. Lead department: City clerk	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available	Staff time, expense. Printing costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials	<1 year
E4. Determine whether retrofits may make fuel facility more seismically sound. Lead department: City manager	Risk and damage reduction.	Contractor time, expense. Possible capital costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	2-4 years
Landslide Mitigation - City Water Supply (L)					
L1. Conduct a slope stability study to assess the vulnerability of city water supply to landslide, and identify any mitigation measures. Lead department: Planning Commission	Possible life/Safety issue – needs more study Risk reduction State assistance available	Contractor time, expense.	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	2-4 years
L2. Include a discussion of potential risks to city water supply in public outreach/emergency preparedness information. Lead department: City clerk	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available	Staff time, expense. Printing costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials	<1 year

City of Seldovia Hazard Mitigation Plan

Mitigation Projects & Lead	Benefits (pros)	Costs (cons)	Priority*	Resources	Timeline
<p>L3. Undertake improvement or infrastructure projects to mitigate landslide risks to water supply as indicated by slope stability study.</p> <p>Lead department: City manager</p>	Life/Safety issue/Risk reduction	Staff time, expense. Contractor time, expense. Possible capital costs.	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM)	2-4 years
Conflagration Fire Mitigation (F)					
<p>F1. Develop public information regarding fire prevention – target schools/children.</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	Possible life/Safety issue/Risk reduction Benefit to City residents as well as those outside city limits State assistance available	Staff time, expense. Printing costs	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials	<1 year
<p>F2. Promote household fire safety to reduce risk of conflagration fires.</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	Life/Safety issue/Risk reduction	Staff time	High	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials State fire marshal	<1 year
<p>F3. Install fire carts and pumps at Jakalof Dock</p> <p>Lead department: Emergency Services (Police & Fire Depts)</p>	Life/Safety issue/Risk reduction	Moderate capital costs	Medium	FEMA Hazard Mitigation Grant Program (HMGP) FEMA Pre-Disaster Mitigation (PDM) FEMA & ADHS&EM materials	>1 year

City of Seldovia Hazard Mitigation Plan

Mitigation Projects Table

Error! Reference source not found. presents a strategy for mitigation of the natural hazards faced by the communities and includes a brief description of the projects, lead agencies, costs, potential funding sources and an estimated timeframe for each project. The final column allows for the communities to make note of specific progress on projects during the 5-year life of the plan.

Mitigation Projects	Responsible Agency	Cost	Funding Sources	Estimated Timeframe	Annual Review
Earthquake (E)					
E-1. Identify buildings and facilities that must be able to remain operable during and following an earthquake event.	Communities Borough DHS&EM FEMA	Staff Time	State Grants FEMA	>1 year	
E-2. Conduct mock emergency exercises to identify response vulnerabilities.	Communities Borough DHS&EM FEMA	>25,000	State Grants FEMA	ongoing	
E-3. Nonstructural mitigation projects (i.e. assessing whether heavy objects are tied down).	Communities Borough DHS&EM FEMA	>\$25,000	FEMA PDM HMGP Local funds	>1 year	

Acronyms used on this table:

HMGP Hazard Mitigation Grant Program
 NTHMP National Tsunami Hazard Mitigation Program
 NOAA National Oceanographic and Atmospheric Administration
 NWS National Weather Service
 PDM Pre-Disaster Mitigation (Grant)

City of Seldovia Hazard Mitigation Plan

Chapter 7– Implementation & Maintenance Procedures

Implementation

The City of Seldovia will implement this plan by applying mitigation actions within our Comprehensive Plan, Capital Improvement Plan, and other plans to pursue our mitigation goals. Our various community plans will consider best mitigation practices to maximize the benefit to the community. We will consider projects that show they are cost effective by ensuring that every dollar spent will reduce loss of life or property damage. We will prioritize projects that promote life safety.

Maintenance

The City of Seldovia Hazard Mitigation Plan will be reviewed annually and will be updated at a minimum of every five years or 90 days after a Presidential declared disaster. The City Manager will be responsible for ensuring that reviews are completed. The Planning and Zoning commission and the general public will be notified of opportunities to review the plan by written invitation, use of newspaper, radio, television, brochures or flyers to advertise this opportunity and solicit involvement. Public involvement is essential to ensure that the mitigation goals, objectives and action items are addressing the community's needs.

City of Seldovia Hazard Mitigation Plan

Appendix A: Documentation of Public Involvement

This appendix includes copies of public meeting announcements, agendas, and meeting summaries from outreach meetings held during the course of this plan development, including City Council agendas for meetings where the plan was discussed.

Also included is the e-mail distribution list used to broadcast information about the project to known stakeholders.

Most of these materials are also available online on the project website at: <http://www.nukaresearch.com/projects/seldoviaHMP/index.html>

City of Seldovia Hazard Mitigation Plan

Public Meeting Agendas

City of Seldovia Hazard Mitigation Plan Workgroup Meeting

**Multi-Purpose Room / Council Chambers
Seldovia, Alaska
Thursday, July 28, 2011
7:00 PM – 9:00 PM**

**Teleconference Information: 1.866.625.9936
Access Code: 7664222#**

PURPOSE: To compile local input into the initial hazard identification and vulnerability assessment.

Agenda

- 7:00 PM** **Introductions** Bretwood Higman, Nuka Research
- 7:15 PM** **Overview of the Hazard Mitigation Plan Process** Bretwood Higman, Nuka Research
- 7:30 PM** **Identify Critical Infrastructure & Potential Hazards in Seldovia** Group
- 8:00 PM** **Evaluate Vulnerability Assessment** Group
- 8:45 PM** **Review Action Items / Set Next Meeting Date** Group
- 9:00 PM** **Adjourn**

Project Website: <http://www.nukaresearch.com/projects/seldoviaHMP/>

Contact person for additional information: Amy Gilson 907.234.7821 or sov.hmp@nukaresearch.com

City of Seldovia Hazard Mitigation Plan

**City of Seldovia
Hazard Mitigation Plan
Workgroup Meeting**

**Multi-Purpose Room / Council Chambers
Seldovia, Alaska
Thursday, August 18, 2011
7:00 PM – 9:00 PM**

**Teleconference Information: 1.866.625.9936
Access Code: 7664222#**

PURPOSE: To review Hazard Matrix and draft Hazard Mitigation Plan and identify community priorities for local hazard mitigation.

Agenda

- 7:00 PM** **Introductions** Bretwood Higman, Nuka Research
- Review of the July 28 meeting** Bretwood Higman, Nuka Research
- Review Hazard Matrix & Draft Hazard Mitigation Plan** Group
- Identify Community Priorities for Local Hazard Mitigation** Group
- Review the Plan Approval Process** Group
- Review Action Items** Group
- 9:00 PM** **Adjourn**

Project Website: <http://www.nukaresearch.com/projects/seldoviaHMP/>

Contact person for additional information: Amy Gilson 907.234.7821 or sov.hmp@nukaresearch.com

City of Seldovia Hazard Mitigation Plan

Public Meeting Announcements

July, 28 – Public Meeting Announcements

Email Sent to Seldovia Hazard Mitigation Plan – Public Distribution List
Friday July 22 – 2011

Same email notice was sent on Wednesday, July 27 as a meeting reminder

**Public Meeting Announcement
Seldovia Hazard Mitigation Plan
Thursday, July 28 - 2011
7:00 PM - 9:00 PM
Multi-Purpose Room / Council Chambers**

This is an email regarding a current City of Seldovia grant funded project.

The City of Seldovia received grant funding to develop a Local Hazard Mitigation Plan (LHMP) for the City. The plan will fulfill the FEMA criteria for a local hazard mitigation plan – FEMA requires local jurisdictions to prepare these plans in order to qualify for other types of grants and federal support. The Seldovia LHMP will contain information about the identified hazards facing the City of Seldovia, the vulnerabilities to all types of hazards and a description of local goals and priorities for mitigation of natural and man-made hazards. The types of hazards that may be included range from natural disasters like earthquakes and floods to man-made emergencies like oil spills or extended power outages.

Input from local residents is important to the plan development process, and FEMA requires public participation and review. The critical steps in the process that will be covered at this meeting are:

- o * Identify the hazards that face the City of Seldovia.
- o * Identify the vulnerable buildings, systems, population, and infrastructure in the City of Seldovia and describe how they may be impacted by each type of hazard.
- o * Describe mitigation strategies, goals, and priorities of the local community to minimize the potential adverse impacts from identified hazards.

A public meeting will be held on **July 28, 2011 from 7:00 PM – 9:00 PM at the Multi-Purpose Room / Council Chambers** to compile local input into the initial hazard identification and vulnerability assessment. If you cannot attend the meeting but would like to provide input or comments, please contact Amy Gilson at Nuka Research [907-234-7821](tel:907-234-7821) or email comments to sov.hmp@nukaresearch.com

For background information or project updates, visit the project website at <http://www.nukaresearch.com/projects/seldoviaHMP/>

If you wish to be removed from this email list, please reply to this email and type Remove in the subject line.

City of Seldovia Hazard Mitigation Plan

August 18 – Public Meeting Announcements & Project Update

Email notification sent to Seldovia Hazard Mitigation Public Distribution List as a project update, sent on August 5, 2011

Thank you once again for taking time out of your busy summer schedules to participate in the Hazard Mitigation Plan workshop last week. Together we tackled quiet a bit of material in a couple of hours and in the end came out with a fairly comprehensive overview of potential hazards affecting Seldovia.

Attached is the workgroup meeting summary and the matrix compiled during the meeting; the matrix has been streamlined a bit for reading ease.

Please take some time to review both documents and forward any comments to sov.hmp@nukaresearch.com or directly to me (amy@nukaresearch.com). Both documents will be available for download from the project website:

City of Seldovia: Hazard Mitigation Plan

<http://www.nukaresearch.com/projects/seldoviaHMP/>

At this point we are working assessing our public outreach options and continuing to draft the Hazard Mitigation Plan document. Our goal is to have a draft version out to you, the general public, and City Council Members prior to the next public meeting scheduled for:

Thursday, August 18 - 7:00 PM to 9:00 PM

If you have any questions please feel free to contact anyone on the project team: Bretwood (Hig), Amy, Chelsea, or Elise.

Email Sent to Seldovia Hazard Mitigation Plan – Public Distribution List
Friday, August, 5 – 2011

This is an update regarding the City of Seldovia - Hazard Mitigation Plan. On Thursday, July 28 we held the a public project/workgroup meeting in Seldovia to compile input into the initial hazard identification and vulnerability assessment. The group tackled quiet a bit of material in a couple of hours and in the end came out with a fairly comprehensive overview of potential hazards affecting Seldovia. Attached is the workgroup meeting summary and the matrix compiled during the meeting. Please take some time to review both documents and forward any comments to sov.hmp@nukaresearch.com or directly to me (amy@nukaresearch.com). Both documents are available for download from the project website:

City of Seldovia: Hazard Mitigation Plan

<http://www.nukaresearch.com/projects/seldoviaHMP/>

City of Seldovia Hazard Mitigation Plan

At this point we are continuing to draft the Hazard Mitigation Plan document. Our goal is to have a draft version for public review prior to the next public workgroup meeting scheduled for:

**Thursday, August 18
7:00 PM to 9:00 PM
Mutli-purpose Room / Council Chambers
Seldovia, Alaska**

All are welcomed to attend!

This is not a comprehensive email list so please forward this information to any community member you think may be interested or may have input. Please email me if you wish to be removed from this distribution list.

Email Sent to Seldovia Hazard Mitigation Plan – Public Distribution List
Thursday, August, 11 – 2011

Same email notice was sent on Wednesday, August 17 as a meeting reminder

**Public Meeting Announcement
Seldovia Hazard Mitigation Plan
Thursday, August 11 - 2011
7:00 PM - 9:00 PM
Multi-Purpose Room / Council Chambers
Teleconference: [1.866.625.9936](tel:1.866.625.9936)
Access Code: 7664222#**

This is an email regarding a current City of Seldovia grant funded project. The City of Seldovia received grant funding to develop a Local Hazard Mitigation Plan (LHMP) for the City. The plan will fulfill the FEMA criteria for a local hazard mitigation plan – FEMA requires local jurisdictions to prepare these plans in order to qualify for other types of grants and federal support.

During the public meeting on July 28, the project working group identified the potential hazards and infrastructure in Seldovia. The group also ranked the potential impacts on the City, categorizing each High, Low or None. This meeting will cover the following topics:

Review the Hazard Matrix and draft City of Seldovia Hazard Mitigation Plan, in preparation for public and City Council comment period.

Identify community priorities for local hazard mitigation.

Discuss the project timeline and address any outstanding action items or working group considerations.

If you cannot attend the meeting but would like to provide input or comments, please contact Amy Gilson at Nuka Research [907-234-7821](tel:907-234-7821) or email comments to sov.hmp@nukaresearch.com

City of Seldovia Hazard Mitigation Plan

For background information or project updates, visit the project website at <http://www.nukaresearch.com/projects/seldoviaHMP/>

If you wish to be removed from this email list, please reply to this email and type Remove in the subject line.

Hazard Mitigation Plan – Comment Period Announcement

Email Sent to Seldovia Hazard Mitigation Plan – Public Distribution List
Monday, September 5 – 2011

This is an update regarding the City of Seldovia - Hazard Mitigation Plan. The second public working group meeting was on Thursday, August 18 in Seldovia. The group reviewed the draft Hazard Matrix and compiled input for hazard identification, vulnerability assessment, and potential mitigation measures. The City's contractor then placed this information into the draft Hazard Mitigation Plan, which is now ***open for public comment until Tuesday, September 13***. Please take some time to review the draft plan and forward any comments to sov.hmp@nukaresearch.com or directly to me (amy@nukaresearch.com). The draft Hazard Mitigation Plan is available for download from the project website or you may view the email attachment:

City of Seldovia: Hazard Mitigation Plan
<http://www.nukaresearch.com/projects/seldoviaHMP/>

**Draft Hazard Mitigation Plan
Public Comment Period Open
Comment Deadline EOD: Tuesday, September 13 - 2011**

Our goal is to have all comments compiled and a final Hazard Mitigation Plan presented to the City Council on Wednesday, September 14.

Please contact Amy Gilson (amy@nukaresearch.com) if you have trouble downloading the draft plan or would prefer a hard copy for review. All input is welcomed!

City of Seldovia Hazard Mitigation Plan

Public Meeting Flyers

All flyers were posted to the Community Bulletin Boards in Seldovia, Seldovia Gazette (local online newspaper), and meeting dates posted to SeldoviaCalendar.com.

City of Seldovia Hazard Mitigation Plan

Public Meeting Summaries

Summary of Meeting

City of Seldovia – Hazard Mitigation Plan Working Group Meeting

Thursday, July 18 – 2011
7:00 PM – 9:00 PM

Meeting Attendees

Michael Opheim	Seldovia Village Tribe – Environmental Protection
Dan Blogett	Seldovia Fuel & Lube / City Planning Commission
Tracie Merrill	Seldovia Village Tribe – Environmental Protection
Pauli Carluccio	Seldovia Central Suites / City Planning Commission
Bretwood Higman	Nuka Research & Planning Group, LLC
Chlesea Suydam	Nuka Research & Planning Group, LLC
Amy Gilson	Nuka Research & Planning Group, LLC

The purpose of the meeting was to compile local input in the initial hazard identification and vulnerability assessment.

Introductions / Overview of the Hazard Mitigation Plan Process

Bretwood Higman greeted attendees and began group introductions. Mr. Higman then gave an overview of what a Hazard Mitigation Plan is and outlined the steps the City needs to fulfill in order to complete their plan, receive grant monies, and comply with timeline associated with the grant. At this point the attendees had a general discussion regarding what public outreach had been made and agreed on the need for more public outreach and input. The following ideas were put forth by the working group:

- In addition to the two scheduled public working meetings, hold informational presentations around town
 - Senior Meals – both City & Seldovia Village Tribe
 - Seldovia House
 - Other
- Meet with individual City Council Members for project communication & input
- Identify specific community members who may have valuable input into the Hazard Mitigation Plan
- Have attendees inform anyone they think would be interested or may have input.

Identify Critical Infrastructure & Potential Hazards in Seldovia

The group reviewed the draft hazard matrix Mr. Higman presented and focused on missing critical infrastructure and potential hazards in Seldovia, as well as removing items not applicable to the City of Seldovia. This process continued through out the meeting as group ideas and

City of Seldovia Hazard Mitigation Plan

discussions were had. The group agreed to add the following infrastructure to the matrix for evaluation:

- Seldovia Village Tribe – M/V Voyager Dock
- City of Seldovia – Jakalof Bay Dock
- City of Seldovia - Seldovia Fuel & Lube Storefront (included in City Buildings)
- Cook Inlet Housing Association - Seldovia House (multi-family residence)
- City of Seldovia - Future Water Treatment Plant
- Homer Electric Association – generators
- TV Tower – communications
- Alaska Communication Systems & Spit w Spots – communication systems
- On ground airplanes
- Wheeled vehicles
- City of Seldovia – Historic Boardwalk area
- City of Seldovia – NOAA tide-station (included with the City Dock)

The group agreed to add the following potential hazards to the draft matrix:

- Include Vandalism in Manmade Hazards
- Add Snow Avalanche to matrix

In addition to these changes the group also asked that the following questions be addressed:

- Since ultimately the City of Seldovia Hazard Mitigation Plan will be adopted into the Kenai Peninsula Borough Hazard Mitigation Plan, should the Barabara Creek Bridge and the Rocky Ridge Landfill be included in the planning process for Seldovia?
- Do the plan requirements include all City infrastructure and properties, even if they are outside the city limits proper (i.e. Jakalof Bay Dock, Wilderness R/V Park)?

Evaluate Vulnerability Assessment

Once the edits were incorporated, the group reviewed the draft hazard matrix evaluating each hazard separately and identifying what infrastructures could potentially be at risk from specific hazard. Each infrastructure was ranked according to level of perceived risk/hazard:

Blank – no perceived risk

L – some perceived risk, worth noting but not critical

H – very serious perceived risk, worth evaluating possible mitigation measures

(ranking outcomes included in attached spreadsheet)

The group agreed there were a few areas that needed additional information before ranking, mostly pertaining to the Watershed / Dam / Reservoir infrastructure and original building specifications. Nuka Research will track down and distribute this information to working group members.

After satisfactory completion of the matrix the group discussed the way forward and set the next meeting date for Thursday, August 18 at 7:00 PM – 9:00 PM (Multi-purpose Room).

City of Seldovia Hazard Mitigation Plan

Review of Action Items

- ⇒ Nuka Research will pursue additional public outreach and schedule informational briefings before the next working group meeting and as the project timeline allows.
- ⇒ Nuka Research will continue to edit the draft matrix in response to public comments.
- ⇒ Nuka Research will contact specific City Council Members for project updates & input.
- ⇒ Nuka Research will find Watershed / Dam / Reservoir infrastructure and original building specifications to include in the plan.
- ⇒ Nuka Research will address the following questions:
 - Since ultimately the City of Seldovia Hazard Mitigation Plan will be adopted into the Kenai Peninsula Borough Hazard Mitigation Plan, should the Barabara Creek Bridge and the Rocky Ridge Landfill be included in the planning process for Seldovia?
 - Do the plan requirements include all City infrastructure and properties, even if they are outside the city limits proper (i.e. Jakalof Bay Dock, Wilderness R/V Park)?
- ⇒ Nuka Research will research communication and utility Hazard Mitigation Plans already in place for ACS and HEA.

Schedule Next Meeting

**Thursday, August 18 -2011
7:00 PM – 9:00 PM
Multi-purpose Room / Council Chambers
Seldovia, Alaska**

City of Seldovia Hazard Mitigation Plan

Summary of Meeting

City of Seldovia – Hazard Mitigation Plan

Working Group Meeting

Seldovia – Alaska

Thursday, August 18 – 2011

7:00 PM – 9:00 PM

Meeting Attendees

John Colberg	City Council Member
Robert Purpura	City Council Member
Traci Merrill	Seldovia Village Tribe Environmental Protection
Michael Opheim	Seldovia Village Tribe Environmental Protection
Chelsea Suydam	Nuka Research & Planning Group, LLC
Tim Dillon	City of Seldovia, City Manager
Vivian Rojas	City Council Member
Amy Gilson	Nuka Research & Planning Group, LLC
Bretwood Higman	Nuka Research & Planning Group, LLC

The purpose of the meeting was to review the Hazard Matrix; draft Hazard Mitigation Plan; and identify community priorities for local hazard mitigation.

Introductions / Review of the July 28 meeting

Bretwood Higman greeted attendees and began group introductions. Mr. Higman then reviewed the material covered during the last meeting, highlighting the draft Hazard Matrix included in the meeting materials and project outreach completed thus far.

He summarized the outcomes of the prior meeting as categorizing hazards facing Seldovia and what we, as a community can, do about it. Mr. Higman also reminded the group that the effort contributed to this project will help qualify the City to receive future funding for infrastructure upgrades and studies. Group had a few overall questions regarding the scope of the project and whether it included only City limits or also City owned infrastructure outside of city limits and/or Barabara Heights Subdivision/Seldovia Village area. Mr. Higman said the Contractor would look into this formation for definitive answer.

Review Hazard Matrix & Draft Hazard Mitigation Plan

The working group then briefly reviewed the draft Hazard Matrix discussing the potential hazards and possible affected infrastructure and which of these would carry on into the local mitigation portion of the plan. Mr. Higman reminded the group that disaster mitigation events are events that overwhelm the community's ability to respond in a reasonable manner and the plan should reflect these scenarios.

City of Seldovia Hazard Mitigation Plan

Aside from approving the draft Hazard Matrix, the group agreed to the following list of items to be noted and/or changed in the Seldovia plan but not necessarily promote to the local mitigation level:

- Barabara Heights Subdivision potential landslide and erosion – noted as the only major hazards difference from city limits.
- Road issue – Jakalof Dock, within scope to discuss improvements to road mitigation? Yes or no?
- Barabara Creek Bridge – worth noting as transportation source to City owned docking facility at Jakalof Bay.
- Fire scenario – multi structure fire, exceeds the resources to respond and should be noted as such on the matrix. Because multi-structure fires were deemed unlikely but not impossible, structures were rated "low" hazard.
- Change fire hazard ranking from high to low for the damn / reservoir
 - Still a question regarding knowledge of the damn / reservoir (i.e. there is currently a bilateral agreement with ADEC for improvements in the future).
 - Could volcanic ash cause turbidity issues?
 - Is flooding an issue to the tank / stilling system?
- A flood related to failure of the water supply dam could potentially overtop the gully and affect the hangers at the airport.
- Fish Creek – secondary water source? Could be used in an emergency / what would need to be done in order to make it work in an emergency?
- Dam blowout (small dam) would overtop the road.

Identify Community Priorities for Local Hazard Mitigation

Mr. Higman presented the list of potential hazards to use as an outline for the mitigation discussion and asked if there were any issues with the presented hazards (list below). The group had no comments at this time. To lead into the discussion, he asked what mitigation strategies are feasible for each category that may reduce the risk up to and including during disaster?

The following items were discussed and included in the draft mitigation measures section of the plan.

The group decided more information was needed regarding the Susan B. English school and the emergency capabilities of the generators for heat, lights, housing, fuel and water resources. It was also mentioned to inquire about any seismic study or informational rating of the pool.

Council Member John Colberg provided the following information regarding winter fuel consumption of the school generators.

School generators – will currently power emergency lights and boiler but unsure of duration with present fuel capacity.

Capacity - 4000 gallons total

Estimated winter consumption during a cold week - 1700 gallon per week

Estimated 50-100 gallons burned per hour under load (emergency lights and boiler)

City of Seldovia Hazard Mitigation Plan

The group then engaged in a discussion defining potential hazard mitigation measures for the community. As the meeting carried on, it became clear that for the City of Seldovia an overall plan would be more beneficial and specific infrastructure-hazard considerations would be noted in addition to the overall plan.

Overall

- Strategy to maintain Fuel Truck (2200 gallons), Ambulance, Fire Trucks & fuel storage
- Plan a Community Emergency/Disaster Drill in coordination with Fire & EMS
- Community Informational Brochure – in tour guide/visitor/website
- Disaster Preparedness Pamphlet and or map
- Disaster Communications – radios
- Upgrade communications – VHF, NOAA weather radios, SSB, HAM Radio
- Personal Disaster Kit Distribution or bulk order
- Improve Jakalof Road as transportation route: landslides, earthquakes
- Public Education and outreach about safe home fuel supply and storage
- Emergency transportation out of Seldovia – identify land, air, water
- Emergency email list (in conjunction with the KPB emergency cell phone list)
- Evaluate school as emergency shelter/evacuation facility
- Propose alternate airport access
- Manual power control for the HEA generators
- Secondary water source infrastructure and planning
- Seismic assessment on pool (emergency water source)

Weather

- Heavy Snow events – transportation cut off
- Communication Plan
- Equipment Staging
- Critical Incident Plan – school has one

Landslide (City Water Supply)

- Slope stability study

Earthquake

- Study of past earthquakes
- Assessment of seismic preparation of structures - school
- Decommission seismically unsafe fuel tanks

Tsunami

- Redo of tsunami hazard map
- Evacuation Signage (locally produced)
- Review tsunami section re: shumagin tele-tsunami
- Tsunami education

Volcanic Ash

- Public education about electric discharge, fuel, engines

City of Seldovia Hazard Mitigation Plan

Local supply of ash masks (including at the evacuation facility)
Oxygen (wellness impacts of ashfall)
Water usage plan: what is the exact water route and how much can the current system filter?
Reservoir-clay valve-tank

Oil Spill

Maintain SOS preparedness training
Equipment upgrades

Fire (Conflagration)

Maintain preparedness
Fire carts and pumps at Jakalof Dock (UAF Lab?)
Public education (targeting kids)
Note mitigating household fires is a facet of mitigating conflagration

Review the Plan Approval Process

The group reviewed the project timeline and briefly discussed a way forward to present the plan to the City Council for review. It was decided that more definitive dates would be necessary to finalize this process. Amy Gilson agreed to forward the exact timeline to the project team (information provided below).

Project Kickoff	7/1/11	
Present to Seldovia City Council	7/27/11	
First Public Meeting	7/28/11	
Public input/information gathering	7/1/11	8/31/11
First Draft Plan for Public Review	8/15/11	
Second Public Meeting	8/22/11	
Public Review & Comment Period	8/15/11	9/12/11
Public Comment Period Closes	9/12/11	
City Council adopts plan & approves to forward to AK/Fed for final approval	9/14/11	
Nuka sends draft plan to ADHS & EM for review	9/20/11	
Revisions to plan per State ADHS & EM review	10/6/11	
Resubmit revisions to ADHS & EM, forward to FEMA for review/approval	10/10/11	
FEMA approves within 45 days of receipt	11/31/2011	
Grant close out by ADHS & EM	12/30/11	

Action Items

Group had a few overall questions regarding the scope of the project and whether it included only City limits or also City owned infrastructure outside of city limits and/or Barabara Heights Subdivision/Seldovia Village area – Nuka Research

City of Seldovia Hazard Mitigation Plan

Road issue – Jakalof Dock, within scope to discuss improvements to road mitigation? Yes or no?
– Nuka Research

Change fire hazard ranking from high to low for structures, and adding the damn / reservoir for landslide hazards – Nuka Research & City

- Still a question regarding knowledge of the damn / reservoir. There is currently a bilateral agreement with ADEC for improvements in the future that will lead to improved water treatment capabilities.
- Could turbidity from volcanic ash prevent the filtration system from working?
- Is flooding an issue to the tank / stilling system?

Fish Creek – secondary water source? Could be used in an emergency / what would need to be done in order to make it work in an emergency? – Nuka Research & City

Questions about the preparedness of the school as an evacuation facility:

- Seismic assessment on pool (emergency water source) – Nuka Research & KPB (V Rojas)
- How much power can the backup generator deliver, and what would be required to get it to the point where it could keep the kitchen and other facilities working?

Review tsunami section re: shumagin tele-tsunami – Nuka Research (B Higman)

45 minute work session with council: city managers report next week and come up with plan for addressing council – Tim Dillon/Bretwood Higman

Provide exact dates for project timeline to Tim Dillon for planning the City Council approval process – Nuka Research (A Gilson)

Continue to contact specific community experts regarding needed pieces of information – pool, school generators, HEA, dam/reservoir/stilling tank – Nuka Research

City of Seldovia Hazard Mitigation Plan

City of Seldovia – City Council Agenda

FRIDAY, SEPTEMBER 09, 2011

city council agenda 9-14-11

AGENDA FOR A REGULAR MEETING
OF SELDOVIA CITY COUNCIL
COUNCIL CHAMBERS

Sept. 14, 2011

7:30pm

- A. Call to Order & Roll Call:
- B. Pledge of Allegiance:
- C. Excused Absences:
- D. Agenda Approval:
- E. Approval of Minutes: Minutes of the Regular Council Meeting, Aug. 24, 2011
- F. Treasurer's Report: (second meeting of the month)
- G. Ordinance Introduction: None
- H. Proclamations: None
- I. Public Presentation Prior Notice:
- J. Public Presentation for Items not on Agenda:
- K. Committee and Advisory Board Reports:

- L. Old Business:
 - 1. Proposal to Relocate CISPRI's Sea Otter Rehabilitation Center to the City of Seldovia, Update
 - a. Presentation by Staff or Council
 - b. Public Presentation
 - c. Council Discussion
 - d. Action/Disposition

 - 2. City Manager Contract
 - a. Presentation by Staff or Council

City of Seldovia Hazard Mitigation Plan

- b. Public Presentation
- c. Council Discussion
- d. Action/Disposition

M. New Business:

1. Review of current water and sewer rates. (Lent)

- a. Presentation by Staff or Council
- a. Public Presentation
- b. Council Discussion
- c. Action/Disposition

3. Review of Draft Hazard Mitigation Plan

- a. Presentation by Staff or Council
- b. Public Presentation
- c. Council Discussion
- d. Action/Disposition

N. Informational Items Not Requiring Actions:

O. City Manager's Report:

P Council and Mayor Comments Concerning Items Not on the Agenda:

Q. Next Meeting: Sept.28, 2011

R. Adjournment:

* IF YOU REQUIRE SPECIAL ASSISTANCE TO ATTEND THE MEETING, PLEASE NOTIFY THE CITY OFFICE 24 HOURS IN ADVANCE AND ARRANGEMENTS WILL BE MADE *

City of Seldovia Hazard Mitigation Plan

Seldovia Hazard Mitigation Plan – Public Contacts List

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City of Seldovia Hazard Mitigation Plan

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Harbor's Edge	B & B	Seldovia Business	seaseldovia@acsalaska.net
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