

City of Florence

Multi-Jurisdictional Natural Hazards Mitigation Plan

Report for:

City of Florence, Oregon

And Dunes City, Oregon

Prepared by:

Gregory M Butler

Resource Assistance for Rural
Environments (RARE)

And

**The Oregon Partnership for
Disaster Resilience**

1209 University of Oregon
Eugene, OR 97403

October 2008





February 26, 2009

Honorable Phil Brubaker
Mayor, City of Florence
250 Hwy 101
Florence, Oregon 97439

Dear Mayor Brubaker:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the *City of Florence Multi-Jurisdictional Natural Hazards Mitigation Plan and Dunes City Addendum* as a multi-jurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants and Flood Mitigation Assistance project grants through February 26, 2009:

City of Florence

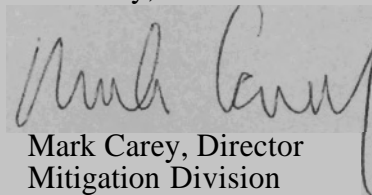
City of Dunes City

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

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

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

Sincerely,



Mark Carey, Director
Mitigation Division

cc: Eric Hauptman, Mayor, Dunes City
Dennis Sigrist, Oregon Emergency Management

Enclosure

KM:bb

Special Thanks & Acknowledgements

This Natural Hazards Mitigation Plan was developed through a regional partnership funded by the Federal Emergency Management Agency's Pre-Disaster Mitigation Competitive Grant Program. The Oregon Coast Region grant was awarded to support the development of natural hazard mitigation plans for the region. The City of Florence's planning process occurred in four-phases, and was supplemented with plan templates and plan development support provided by the Oregon Partnership for Disaster Resilience at the University of Oregon.

Regional partners include:

Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center

Oregon Emergency Management

FEMA Region X

Project Steering Committee:

Western Lane Ambulance District Director -Henry Hanf

City of Florence, City Manager - Bob Willoughby

City of Florence, Assistant to the City Manager - Jacque Morgan

Siuslaw Valley Fire and Rescue Chief - John Buchanan

City of Florence, Police Chief - Maury Sanders

Confederated Tribal Police - Chief Brad Kneaper

Dunes City Manager - Bret Feingold

Port of Siuslaw - Mark Freeman

City of Florence, Public Works Director - Mike Miller

Project Managers:

Gregory Butler, RARE Participant

Jacque Morgan, Assistant to the City Manager, City of Florence

Community Service Center Staff:

Andre LeDuc, Executive Director, Oregon Partnership for Disaster Resilience

Krista Dillon, Associate Director, Oregon Partnership for Disaster Resilience

Megan Findley, Program Manager, Oregon Partnership for Disaster Resilience

City of Florence
Natural Hazards Mitigation Plan
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Executive Summary

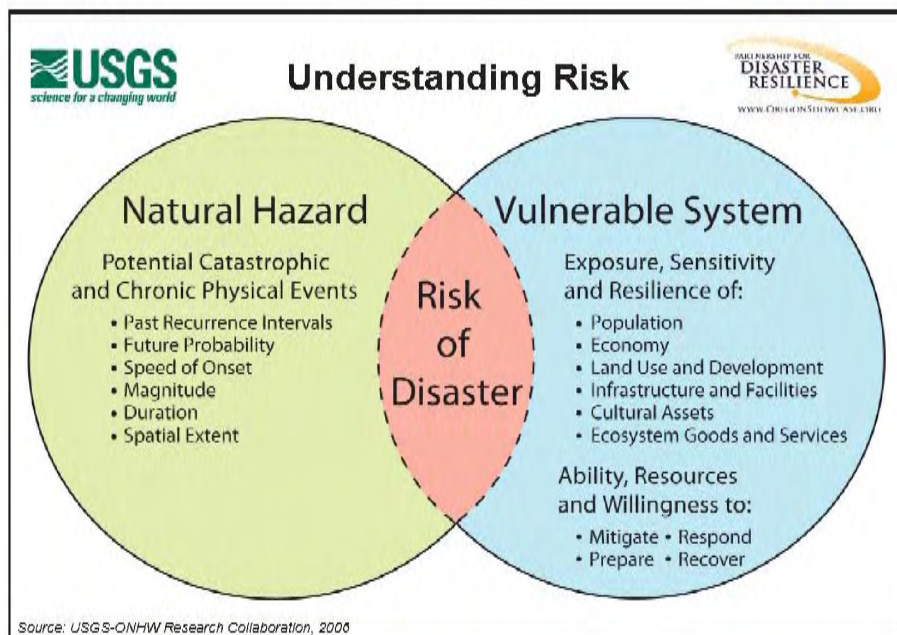
The City of Florence and Dunes City, Oregon, developed this Multi-Jurisdictional Natural Hazards Mitigation Plan in an effort to reduce future loss of life and damage to property resulting from natural hazards. It is impossible to predict exactly when these hazards will occur, or the extent to which they will affect communities. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

Natural hazard mitigation is defined as a method of permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances, projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Natural hazard mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.

Why Develop this Mitigation Plan?

This natural hazards mitigation plan is intended to assist the City of Florence and Dunes City in reducing the risk from natural hazards by identifying resources, information, and strategies for risk reduction. It will also help guide and coordinate mitigation activities throughout the area. The figure below is utilized throughout the plan to illustrate the concept of risk reduction.

Figure i.1 Understanding Risk



Source: USGS-Partnership for Disaster Resilience Research Collaborative, 2006

A natural hazards mitigation plan can assist jurisdictions in understanding what puts the community at risk. By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capacity, citizens in Florence and Dunes City become better equipped to identify and implement actions aimed at reducing the overall risk to natural hazards.

Who Participated in Developing the Plan?

In the fall of 2007, the Oregon Partnership for Disaster Resilience (The Partnership/OPDR) at the University of Oregon's Community Service Center partnered with Oregon Emergency Management (OEM) and Resource Assistance for Rural Environments (RARE) to develop a Pre-Disaster Mitigation Planning Grant proposal to create and/or update existing natural hazards mitigation plans for Oregon's southern coastal cities. FEMA awarded the southern coastal region a grant to support the development of the natural hazards mitigation plans for cities in the region. OPDR, OEM and the communities were awarded the grant in the fall of 2007 and local planning efforts in this region began in the fall of 2007.

The Florence Multi-Jurisdictional Natural Hazards Mitigation Plan is the result of a collaborative effort between cities, special districts, citizens, public agencies, non-profit organizations, the private sector and regional organizations. A project steering committee guided the plan development process. The steering committee, known as the West Lane Emergency Operations Group, was comprised of representatives from the following organizations.

- City of Florence
- Dunes City
- West Lane Ambulance District
- Siuslaw Valley Fire & Rescue District
- Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians
- Port of Siuslaw
- West Lane ARES/RACES
- Siuslaw School District (SJ9)
- Florence Area Chamber of Commerce and Visitor's Center
- Greentrees Homeowners Association
- Peace Harbor Hospital
- Florence Area Humane Society
- Senior and Disabled Services
- Mapleton Fire District

The West Lane Emergency Operations Group Chair was designated as the plan's convener and will take the lead in implementing, maintaining and updating the plan.

Public participation played a key role in the development of goals and action items.

What is the Plan's Mission?

The mission of the Florence Natural Hazards Mitigation Plan is two-fold. First the Plan aims to identify all assets within the city limits that are at risk to natural hazards, and to identify potential action items that will mitigate the risk of each. Secondly, the Plan will act as a needs analysis to establish a five year strategic plan for the West Lane Emergency Operations Group.

The mission statement was formed by the RARE Participant based on discussions of the West Lane Emergency Operations Group at the June 2008 meeting.

What are the Plan Goals?

The plan goals describe the overall direction that the participating jurisdiction's agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal 1: Protect Human Life, Commerce, Property, and Natural Systems;

Goal 2: Enhance Emergency Services;

Goal 3: Improve Partnerships for Communication and Coordination to Ensure the Implementation of Mitigation Measures;

Goal 4: Increase Awareness among Citizens; Local and Regional Agencies; Non-Profit Organizations; and Businesses.

How are the Action Items Organized?

The action items are organized within an action matrix (located at the end of this Summary), which lists all the multi-hazard and hazard-specific action items included in the mitigation plan. Data collection, research and the public participation process resulted in the development of these action items. The Action Item Matrix portrays the overall plan framework and identifies linkages between the plan goals and actions. The matrix documents the title of each action along with the coordinating organization, timeline, and the plan goals addressed.

How will the plan be implemented?

The plan maintenance section details the formal process that will ensure that the Florence Natural Hazards Mitigation Plan remains an active and relevant document. The plan will be implemented, maintained and updated by a designated convener. The convener is responsible for overseeing annual review processes. Cities and special districts developing addendums to the plan will also designate a convener and will work closely with the Florence Plan convener to keep the plans coordinated. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually, and producing a plan revision every five years. This section describes how the communities will integrate public participation throughout the plan maintenance process.

Plan Adoption

After the Plan is locally reviewed and deemed complete, the City of Florence will be responsible for submitting it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management will then submit the Plan to the Federal Emergency Management Agency (FEMA - Region X) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA the City will adopt the plan via resolution. Jurisdictions included as addenda will also adopt the plan via resolution. The individual jurisdiction's conveners will be responsible for ensuring local adoption of the Florence Natural Hazards Mitigation Plan and providing the support necessary to ensure plan implementation. At that point the City and jurisdictions included in the plan will gain eligibility for funding with the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance program.

The accomplishment of the Natural Hazards Mitigation Plan goals and actions depends upon the maintenance of a competent Steering Committee and support from the City and city departments. Together, the Steering Committee and the City should work to incorporate the Plan's action items into existing city plans and procedures. It is hereby directed that the appropriate city departments and programs implement and maintain the concepts in this plan. Thorough familiarity with this Plan will result in the efficient and effective implementation of appropriate mitigation activities and a reduction in the risk and the potential for loss from future natural hazard events.

Section1: Introduction

What is Natural Hazard Mitigation?

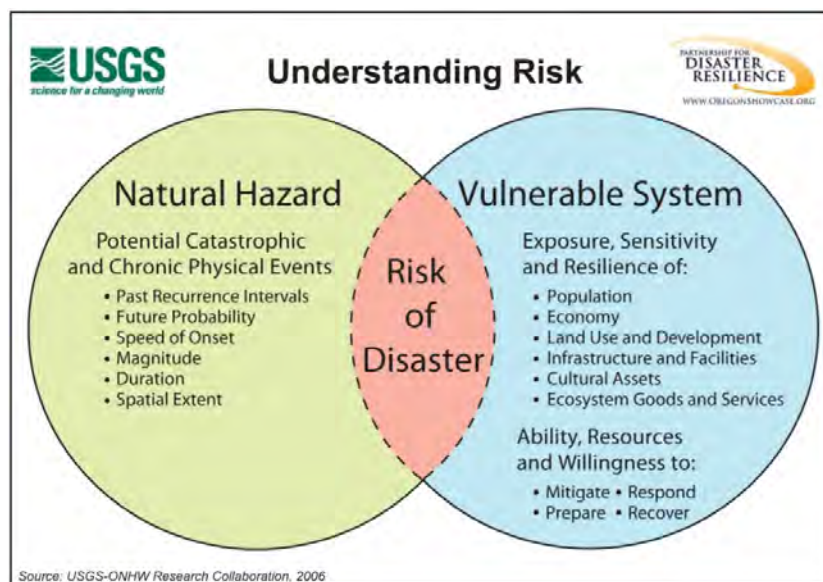
Natural hazard mitigation is defined as permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; education and outreach to targeted audiences, such as Spanish speaking residents, or the elderly. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.

Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why Develop a Mitigation Plan?

The City of Florence developed this Multi-Jurisdictional Natural Hazards Mitigation Plan in an effort to reduce future loss of life and damage to property resulting from natural hazards. This plan was developed with and for the Cities of Florence and Dunes City. It is impossible to predict exactly when these disasters will occur, or the extent to which they will affect communities. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

Figure 1.1ⁱ below is utilized throughout the plan to illustrate the concepts of risk reduction.



A natural hazard mitigation plan can assist the community in understanding what puts the community at risk. By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capabilities, the City of Florence and Dunes City become better equipped to identify and implement actions aimed at reducing the overall risk of hazards.

This plan focuses on the primary natural hazards that could affect Florence, Oregon, which include coastal erosion, drought, earthquake, flood, landslide, tsunami, volcanic eruption, wildfire, and wind & winter storms. The Dunes City addendum addresses the primary natural hazards that affect Dunes City. The dramatic increase in the costs associated with natural disasters over the past decades has fostered interest in identifying and implementing effective means of reducing vulnerability. A report submitted to Congress by the National Institute of Building Science's Multi-hazard Mitigation Council (MMC) highlights that for every dollar spent on mitigation, society can expect an average savings of \$4.ⁱⁱ This multi-jurisdictional Natural Hazards Mitigation Plan is intended to assist all participating jurisdictions in reducing its risk from natural hazards by identifying resources, information, and strategies for risk reduction.

The plan is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the City; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other County and City plans and programs including the Lane County Natural Hazard Mitigation Plan, the Florence Comprehensive Plan, the Lane County Community Wildfire Protection Plan, the Florence City Codes, and the City of Florence Storm Water Management Plan, as well as the State of Oregon Natural Hazards Mitigation Plan.

The plan provides a set of actions to prepare for and reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and the implementation of preventative activities such as land use or watershed management programs. The actions described in the plan are intended to be implemented through existing plans and programs within the City.

Policy Framework for Natural Hazards in Oregon

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the jurisdiction's Comprehensive Plan, and helps each jurisdiction meet the requirements of statewide land use planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Oregon Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

The Disaster Mitigation Act of 2000 (DMA 2000) is the latest federal legislation addressing mitigation planning. It reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels. State and local jurisdictions must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

How was the Plan Developed?

In the spring of 2004, the City of Florence began the development of a natural hazard mitigation plan. The City of Florence's Hazard Mitigation Planning Task Force (HMPTF) developed the City's first draft mitigation plan. HMPTF members were appointed by the Mayor, and included representatives from the following organizations:

- Siuslaw Fire District
- Port of Siuslaw
- Coast Real Estate
- Peace Harbor Hospital
- City Residents (2)
- Public Works Department
- Community Development Department

The HMPTF held monthly meetings to facilitate the planning process. Meetings were publicly advertised, and were held between April and September 2004. The HMPTF collected data and compiled research on five hazards: flood, severe weather, earthquake, volcanic eruption, and landslide. A final plan was not completed and/or sent to FEMA for review.

In the fall of 2007, the Oregon Partnership for Disaster Resilience (The Partnership/OPDR) at the University of Oregon's Community Service Center partnered with Oregon Emergency Management (OEM) and Resource Assistance for Rural Environments (RARE) to develop a Pre-Disaster Mitigation Planning Grant proposal to create and/or update existing natural hazard mitigation plans for Oregon's southern coastal cities. OPDR, OEM and the communities were awarded the grant in the fall of 2007 and local planning efforts in this region began in the fall of 2007. The City of Florence's planning process built upon existing resources from the 2004 planning effort, and a final plan was completed in September, 2008.

The Partnership provided the City of Florence with print and web-based resources and facilitated a quarterly series of plan development work sessions that focused on the four phases of the mitigation planning process. In addition, The Partnership provided Florence with a number of regional mitigation products to be utilized in the local process. Those products include:

- Plan Templates;
- Training Manual;
- Regional Profile and Risk Assessment; and
- Household Preparedness Survey Report.

Florence was responsible for facilitating the mitigation planning process locally, with the assistance of a Resources Assistance for Rural Environments (RARE) Participant. Additionally, Florence utilized resources provided by The Partnership, OEM and other state partners. Participating jurisdictions reviewed the resources provided by the various organizations and applied local knowledge, information and data about community characteristics, assets and resources in order to identify potential mitigation actions aimed at reducing overall risk.

The planning process and associated resources used to create The City of Florence's multi-jurisdictional Natural Hazards Mitigation Plan were developed by The Partnership. The planning process was designed to: (1) result in a plan that is DMA 2000 compliant; (2) coordinate with the State's plan and activities of The Partnership; and (3) build a network of jurisdictions and organizations that can play an active role in plan implementation. The planning process included the review and incorporation of existing plans, studies, reports and technical information that was appropriate to the Natural Hazards Mitigation Plan's development. In general, the following regional resources were reviewed and local resources have been cited throughout the plan.

- State of Oregon Natural Hazards Mitigation Plan – Regional Profiles and Hazard Assessments;
- Oregon Technical Resource Guide;
- Oregon Natural Hazards Workgroup Training Manual;
- The Oregon Atlas; and
- The Oregon Weather Book.

The following is a summary of major activities included in the planning process for the City of Florence. A summary of the major activities included in the planning process for the Dunes City Addendum can be found in Volume III of Florence's Multi-Jurisdictional Natural Hazards Mitigation Plan.

Phase I: Getting Started

In June, 2007, the City of Florence applied for a participant from the University of Oregon's Resource Assistance for Rural Environments (RARE) program to assist in the completion of the Natural Hazards Mitigation Plan in 2007/2008. The RARE Participant worked closely with the West Lane Emergency Operations Group in developing the Plan.

The West Lane Emergency Operations Group (WLEOG) is an existing organization that was formed in 2007. The mission of the WLEOG is as follows:

The mission of the West Lane Emergency Operations Group, as a collaborative group effort between governmental entities and associated private citizen groups, is to identify, productively plan for, mitigate the impact of, react to, and recover from natural or manmade disasters in Western Lane County.

The WLEOG consists of leaders from various local entities with an interest in protecting lives and property in the event of a disaster. Members include the City of Florence, Dunes City, the Western Lane Ambulance District, the Siuslaw Valley Fire & Rescue Department, and the Confederated Tribes of the Coos, Lower Umpqua and the Siuslaw Indians. The Group also consists of various associate members, including the Siuslaw School District and Peace Harbor Hospital.

In October of 2007, the WLEOG was selected as Florence's Natural Hazard Mitigation Plan Steering Committee. The WLEOG meets monthly, and natural hazard mitigation plan work-sessions were planned for four of those meetings throughout the year. On February 11, 2008 Greg Butler developed and facilitated an initial 'kick-off' meeting with the WLEOG to describe: 1) the major components of a natural hazard mitigation planning process; 2) the roles, responsibilities and expectations of the groups involved; 3) the overall mission of the project as well as the plan's goals; and 4) a project timeline. Agendas and meeting minutes for all WLEOG natural hazard work sessions can be found in Appendix B, Public Process.

Public participation played a key role in the development of Florence's Natural Hazards Mitigation Plan. The West Lane Emergency Operations Group opened all meetings to the public and posted agendas in concurrence with Oregon state law. The local newspaper, The Siuslaw News, posted stories throughout the planning process, and the Plan was posted on the City's website for review and comment. Public involvement was also achieved through an open house held at the City's Community Development Department on July 16, 2008. The Open House and its purpose were advertised via local print and radio media. Finally, the RARE Participant presented the Plan at a City Council meeting on August 4, 2008. The Council meeting was broadcast via internet, and was also shown on local television.

As part of the regional Pre-Disaster Mitigation grant, *The Partnership* implemented a region-wide household preparedness survey in January 2008 to engage the public in disaster planning. The survey gauged household knowledge of mitigation tools and techniques and assessed household disaster preparedness. The survey results improve public/private coordination of mitigation and preparedness for natural hazards by obtaining more accurate information on household understanding and needs. While the survey gathered information on community members' attitudes of household risks to natural hazards, the survey also served to remind residents of the need to prepare for natural hazard events. Results of the survey are documented in an independent report in Appendix D.

The City's project webpage located on *The Partnership* website (www.OregonShowcase.org) also served as an outreach tool to the communities. The webpage was used to provide local contact information and updates on the planning process. The final adopted and approved plan will be posted on the University of Oregon Libraries' Scholar's Bank Digital Archive.

Phase II: Risk Assessment

Phase II of the planning process focused on identifying and understanding the relationship between natural hazards, vulnerable systems within the community, and existing capabilities. To begin the risk assessment process, the RARE Participant reviewed existing research concerning the causes and characteristics of potential natural hazards, as well as their probabilities of occurrence and potential impacts. Resources included Oregon's Technical Resource Guide, and reports produced by the Department of Geology and Mineral Industries (DOGAMI) among others. Please see Volume II, Hazard Annexes, for hazard-specific resources and information.

On March 17, 2008 Greg Butler conducted a risk assessment exercise with the West Lane Emergency Operations Group. In addition to discussing the effects of previous hazard events, the committee identified community assets and potential vulnerabilities within the City. The West Lane Emergency Operations Group identified nine hazards as a potential threat to the City of Florence, and analyzed each one to determine how Florence has been, or could be, impacted. The nine hazards include:

1. Coastal Erosion
2. Drought
3. Earthquake
4. Flood
5. Landslide
6. Tsunami
7. Volcanic Eruption
8. Wildfire
9. Wind & Winter Storm

Using a map of Florence, WLEOG members identified hazard-specific locations within the community. Once all hazard areas were defined, the group then identified community assets that fell within these areas including human assets, economic assets, cultural assets, infrastructure, and environmental assets. The results were then compared to existing local plans and documents including the Florence Storm Water Management Plan, Lane County Community Wildfire Protection Plan, the City of Florence Comprehensive Plan, and the DOGAMI Tsunami Inundation Map. Data from USGS, DOGAMI, and the Oregon Technical Resource Guide was also incorporated, and the information gleaned from these three arenas serve as the basis for the hazard annexes.

The RARE Participant documented information provided by the WLEOG and created the Hazard Annexes found in Volume II. On April 28, 2008 The RARE Participant presented the West Lane Emergency Operations Group with the nine hazard annexes for review. WLEOG members reviewed and edited the Hazard Annexes during the months of May and June, 2008. Agendas from the March 17th and April 28th meetings can be found in Appendix B, Planning and Public Process, along with minutes from the April 28th meeting.

Phase III: Developing a Mission, Goals and Action Items

The Plan's mission statement and goals direct the Plan's action items and reflect the priorities found in the community. The mission of the Florence Natural Hazards Mitigation Plan is two-fold. First, the Plan aims to identify all assets within the city limits that are at risk to natural

hazards, and to identify potential action items that will mitigate the risk of each. Secondly, the Plan will act as a needs analysis to establish a five year strategic plan for the West Lane Emergency Operations Group. The mission statement was formed by the RARE Participant based on discussions with the West Lane Emergency Operations Group at the June 2008 meeting.

At the WLEOG's first meeting, the group decided to adopt goals that were initially agreed upon during the 2004 planning process. Those goals are as follows:

Goal 1: Protect Human Life, Commerce, Property, and Natural Systems;

Goal 2: Enhance Emergency Services;

Goal 3: Improve Partnerships for Communication and Coordination to Ensure the Implementation of Mitigation Measures;

Goal 4: Increase Awareness among Citizens; Local and Regional Agencies; Non-Profit Organizations; and Businesses.

On May 19, 2008 Megan Findley, with the Oregon Partnership for Disaster Resilience, provided the West Lane Emergency Operations Group with an overview of the mitigation action item development process. Megan provided the WLEOG with action item worksheets, and gave an overview of the types of mitigation actions that communities could implement to reduce their risks to natural hazards. WLEOG members were asked to think of actions before their next meeting on June 16, 2008. On June 16th, Greg Butler facilitated a WLEOG work session devoted to creating and refining a set of mitigation actions for Florence's Natural Hazards Mitigation Plan.

Phase IV: Plan Implementation and Maintenance

The intergovernmental agreement and rules of procedure adopted by the West Lane Emergency Operations Group naturally serve to establish the implementation and maintenance of the plan. At the WLEOG's meeting on July 21, 2008, the Group discussed the rationale for using the Action Item Matrix as a needs analysis to form a 5-year plan for the group. The WLEOG also agreed to continue serving as the coordinating body of the Florence Natural Hazards Mitigation Plan; the chair of the WLEOG will serve as the plan's convener. Please see Section 4, Plan Implementation & Maintenance for a description of continuing roles and responsibilities.

Dunes City developed an Addendum to the Florence Natural Hazards Mitigation Plan in conjunction with Florence's planning process (See Volume III, Dunes City Addendum for a greater description of Dunes City's planning process). Dunes City is a member of the West Lane Emergency Operations Group, and will continue to serve on the WLEOG and participate in all plan update and/or maintenance tasks.

On the evening of August 4, 2008 Greg Butler presented a draft of the Florence Natural Hazards Mitigation Plan to the Florence City Council for review and comment. The Council meeting was broadcast via internet and local television. Finally, on August 18, 2008 Greg Butler presented the Florence Natural Hazards Mitigation Plan to the West Lane Emergency Operations Group, to be forward onto the Oregon Partnership for Disaster Resilience, Oregon Emergency Management, and the Federal Emergency Management Agency for approval.

How is the Plan Organized?

Each volume of the mitigation plan provides specific information and resources to assist readers in understanding the hazard-specific issues facing citizens, businesses, and the environment. Combined, the sections work in synergy to create a mitigation plan that furthers the community's mission to identify, productively plan for, mitigate the impact of, react to, and recover from natural or manmade disasters in Western Lane County. This plan structure enables stakeholders to use the section(s) of interest to them.

Volume I: Multi-jurisdictional Natural Hazards Mitigation Plan

Section 1: Introduction

The Introduction briefly describes the mitigation planning efforts and the methodology used to develop the plan. Dunes City's planning efforts are documented in Volume III: City/Special District Addendums.

Section 2: Community Overview

This section provides an overall description of Florence. The section includes a brief community profile, discussion of the government structure, listing of existing plans, policies, and programs, listing of community organizations, summary of existing mitigation actions, and an overview of the hazards addressed in the plan. This section allows readers to gain an understanding of the City's sensitivities – those community assets and characteristics that may be impacted by natural hazards, as well as the City's resilience – the ability to manage risk and adapt to hazard event impacts. A Community Overview for Dunes City is located in Volume III: City/Special District Addendums.

Section 3: Mission, Goals and Action Items

This section documents the plan's vision, mission, goals, and actions and also describes the components that guide implementation of the identified mitigation strategies. Actions are based on community sensitivity and resilience factors and the hazard assessments in Section 2 and the Hazard Annexes. Dunes City's action items are located in Volume III: City/Special District Addendums.

Section 4: Plan Implementation and Maintenance

This section provides information on the implementation and maintenance of the plan. It describes the process for prioritizing projects, and includes a suggested list of tasks for updating the plan to be completed at the semi-annual and 5-year review meetings. Dunes City will utilize this implementation and maintenance process as well.

Volume II: Hazard-Specific Annexes

The hazard annexes describe the risk assessment process and summarize the best available local hazard data. A hazard summary is provided for each of the hazards addressed in the plan. The summary includes hazard history, location, extent, vulnerability, impacts, and probability.

The hazard specific annexes included with this plan are the following:

- Coastal Erosion;
- Drought;

- Earthquake;
- Flood;
- Landslide;
- Tsunami;
- Volcanic Eruption;
- Wildfire;
- Wind & Winter Storms

Volume III: City Addenda

Volume III includes the Dunes City Addendum to the Florence Natural Hazards Mitigation Plan.

Volume IV: Resource Appendices

The resource appendices are designed to provide the users of the Florence Natural Hazards Mitigation Plan with additional information to assist them in understanding the contents of the mitigation plan, and provide them with potential resources to assist with plan implementation.

Appendix A: Action Item Forms

This appendix contains the detailed action item forms for each of the mitigation strategies identified in this plan.

Appendix B: Planning and Public Process

This appendix includes documentation of all the public processes utilized to develop the plan. It includes invitation lists, agendas, sign-in sheets, and summaries of West Lane Emergency Operations Group meetings as well as any other public involvement methods.

Appendix C: Economic Analysis of Natural Hazards Mitigation Projects

This appendix describes the Federal Emergency Management Agency's (FEMA) requirements for benefit cost analysis in natural hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities. This appendix was developed by *The Partnership*. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Appendix D: Regional Household Preparedness Survey

This appendix includes the survey instrument and results from the regional household preparedness survey implemented by *The Partnership*. The survey aims to gauge household knowledge of mitigation tools and techniques to assist in reducing the risk and loss from natural hazards, as well as assessing household disaster preparedness.

ⁱ USGS – The Partnership for Disaster Resilience Research Collaborative, 2006

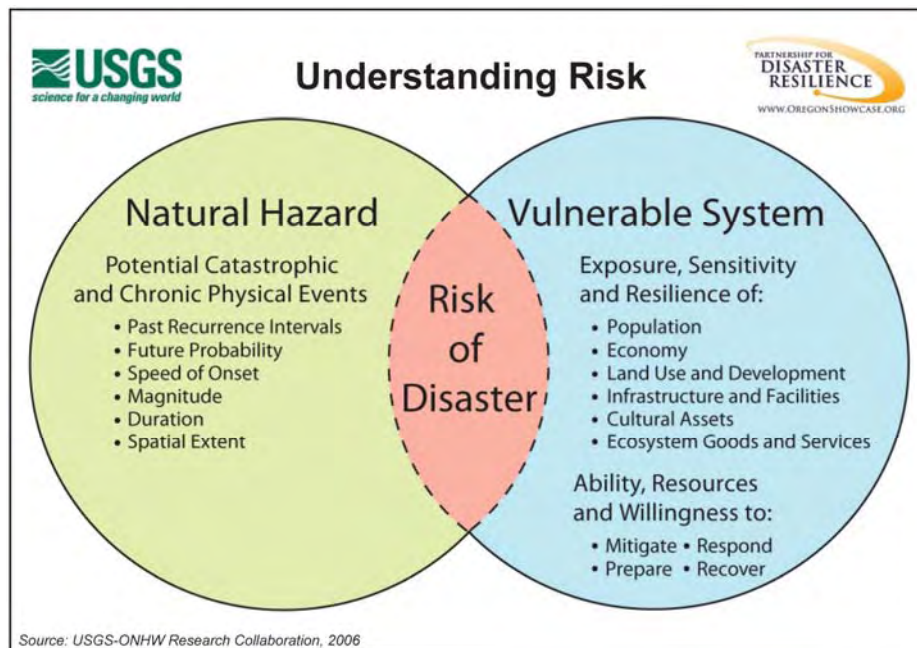
ⁱⁱ National Institute of Building Science's Multi-hazard Mitigation Council. "Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities" 2005.

Section 2

Community Overview

The Community Overview Section describes Florence from a number of perspectives to help define and understand Florence’s sensitivity and resilience to natural hazards. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community’s ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the City when the plan was developed. The information documented below, along with the hazard assessments located in the Hazard Annex, should be used as the local level rationale for the risk reduction actions identified in Section 3 – Mission, Goals, and Action Items. The identification of actions that reduce Florence’s sensitivity and increase its resilience assist in reducing overall risk, or the area of overlap in Figure 2.1 below.

Figure 2.1 Understanding Riskⁱ



Community Profile

Geography and Climate

The City of Florence is located on the Central Oregon Coast on a bend of the Siuslaw River, near the river’s mouth on the Pacific Ocean. The land on which the City is sited began forming 12 million years ago, when the sea floor of sedimentary rock was pushed up to form the Coast Mountain Range to the east. Strong winds and rain eroded the uplifted sandstone, and rivers carried the sediment back to the

ocean where off-shore sand depths currently reach 150 feet. The work of the waves and high tides carried sand back to shore where it was dried by the sun and carried inland by the wind. A chain of coastal lakes were formed as sand dammed mountain rivers and cut off ocean inlets. Some lakes were also formed when depressions in the sand were filled by rising groundwater.

Estimates indicate that the present day shoreline stabilized 6,000 years ago. The continuous sand transfer by tides, waves, and wind created an area of dune development 56 miles long that is built on a terrace of solid marine sandstone known as the Coos Bay Dune Sheet. Sand dunes ranging from 5 feet to over 500 feet above sea level were formed along this area, forming the largest expanse of coastal sand dunes in North America. The unique nature of this area was federally recognized in 1972, when 32,186 acres of dunes, forest, streams, and lakes from the south side of the Siuslaw River in Florence to the north side of Coos Bay were set aside as the Oregon Dunes National Recreation Area. In the early 1900's, this landscape was forever changed by the intentional introduction of beach grass along the lower Siuslaw. The beach grass was introduced to stabilize encroaching sand, and in doing so, it created ocean front fore-dunes that stopped new sand from building up the active dunes behind them. Without new sand to replenish the area behind the fore-dunes, the wind exposed a wet deflation plain capable of supporting greater vegetative growth. The plant succession changed accordingly, with willows dominating the shrub stage and shore pines accounting for the majority of the forested stage.

The climate in Florence is temperate with average monthly fluctuations of less than 20 degrees F. Precipitation is concentrated between the months of October and May; localized storm events are common in winter months as well. Winds generally blow from the North and West in the summer and come from the South and West in the winter. Coastal influences can cause rapid changes in the weather on a daily basis.

Figure 2.2 Florence, Oregon Climateⁱⁱ

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ave. Max. Temp. (F)	50.8	53.7	56	59	63.2	66.3	69.3	69.7	69.8	63.1	54.4	50.2	60.4
Ave. Min. Temp. (F)	37.8	39.0	39.2	40.7	44.1	47.8	50.2	51.1	49.1	45.4	41.5	37.9	43.7
Ave. Total Precip. (in)	10.4	8.48	8.60	5.41	3.61	2.37	0.86	1.10	1.97	5.17	10.9	12.0	70.84
Ave. Total Snow Fall (in)	0.1	0.5	0	0	0	0	0	0	0	0	0	0.3	0.9
Ave. Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Until as late as 1917, travel by boat down the Siuslaw River was the only clear way to reach Florence from inland. Today, the river is used only by a small fishing fleet and recreational boaters. The jetties at the mouth of the river, completed in 1917 and later rehabilitated in 1957, 1962, and 1987, exist to flush sand out of the bar and maintain the channel to the ocean. Presently, inadequate federal appropriations for dredging are threatening the river's future as a navigable river. Florence is more commonly reached by way of one of two highways: Route 101, also known as the Oregon Coastal Highway, which runs parallel to the Pacific Ocean from California north through Washington, and Route 126 runs west to the Cascades and is the main connector to Eugene. Several bridges on these highways enable access to the City. The Siuslaw River Bridge, built in 1936, connects Florence to the

South via Highway 101 and a bridge on Route 126 crosses the North Fork of the Siuslaw River just east of the City. Additional bridges built in the 1930's cross streams and canyons to the north, making travel possible to other regional cities.

Population and Demographics

Approximately 8200 people live within city limits, with an additional 1500 people estimated to be living outside the city's urban growth boundary. Florence's growth rate is higher than in Lane County as a whole, with the average rate of growth increasing from 1.5% between 1980 and 1990 to 4.2% between 1990 and 2000.

Figure 2.3 Florence, Oregon Populationⁱⁱⁱ

Year	Lane County	Florence	Percentage of Lane County
1970	215,401	2,246	1.0%
1980	275,226	4,411	1.6%
1990	282,912	5,190	1.8%
2000	322,959	7,263	2.2%
2005	336,085	8,185	2.4%
2006	339,740	8,270	2.4%
2025	410,790	15,600	3.8%

Much of the population growth has been in the 65 and older age group, who make up 38.2% of the population. Over 95 % of the population considers themselves white according to the most recent census data.

Florence is the largest city in western Lane County, an area that is geographically separated from the eastern part of the County by the Coast Mountain Range. The Eugene/Springfield metropolitan area is the closest large population area, with over 200,000 residents. Other nearby cities include Newport (50 miles north and a population of 9,532) and Reedsport (23 miles south with a population of 4,378). It is estimated that Florence serves as a regional market center for a rural population of approximately 20,000.

Employment & Economics

Only 39% of Florence's population is in the labor force, mostly as a result of the large retiree population. Florence's economy was historically based on the Siuslaw River and the Port facilities that enabled industry development in fishing and timber related trades. A decline in these industries has significantly changed the character of work available in the City with tourism/recreation and health care/social services taking the lead. Currently, of those in the workforce, 20.5% are employed in education and health and social service positions; 15% work in retail trade; 14% work in accommodations, food service and entertainment; and 10% work in construction.^{iv}

Top employers in the area include Peace Harbor Hospital (375), Fred Meyer (200), the Siuslaw School District (175) and R& R King Logging Inc. (100); the Three Rivers Casino run by the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians, located just east of city limits, recently expanded their operation to include a full service hotel. With the expansion complete, the casino now employs approximately 500 people, making them the area's largest employer. Peace Harbor Hospital is a full-service, 21-bed acute care facility and Level IV Trauma Center. Peace Harbor provides a range of services including emergency and inpatient medical and surgical services, intensive and cardiac care services, labor and delivery, and state-of-the art diagnostic and therapeutic services. Younger Florence residents are served by Siuslaw 97J School District. The district has approximately 1675 children enrolled in Rhododendron Primary/Elementary, Siuslaw Middle and Siuslaw High School. Lane Community College's Florence campus offers advanced job training and educational opportunities.

Housing in Florence

Housing type and age are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk.

The growth of Florence is reflected in the 2000 housing statistics, which found that of the 4,242 housing units reported, 35.4% were built between 1990 and 2000. As shown in Figure 2.4 below, 29% of all residences are mobile homes and 20% are multiple family units. Approximately 44% of the City's housing stock was built prior to 1980, before stronger seismic building codes were put into place.^v

Figure 2.4 Florence, Oregon Demographic Information^{vi}

Demographic Data	City of Florence
Total housing units	4,242
Occupied housing Units	3,628
Vacant housing units	614
Vacancy percentage	14.5%
Owner-occupied housing units	58%
Renter-occupied housing units	27.5%

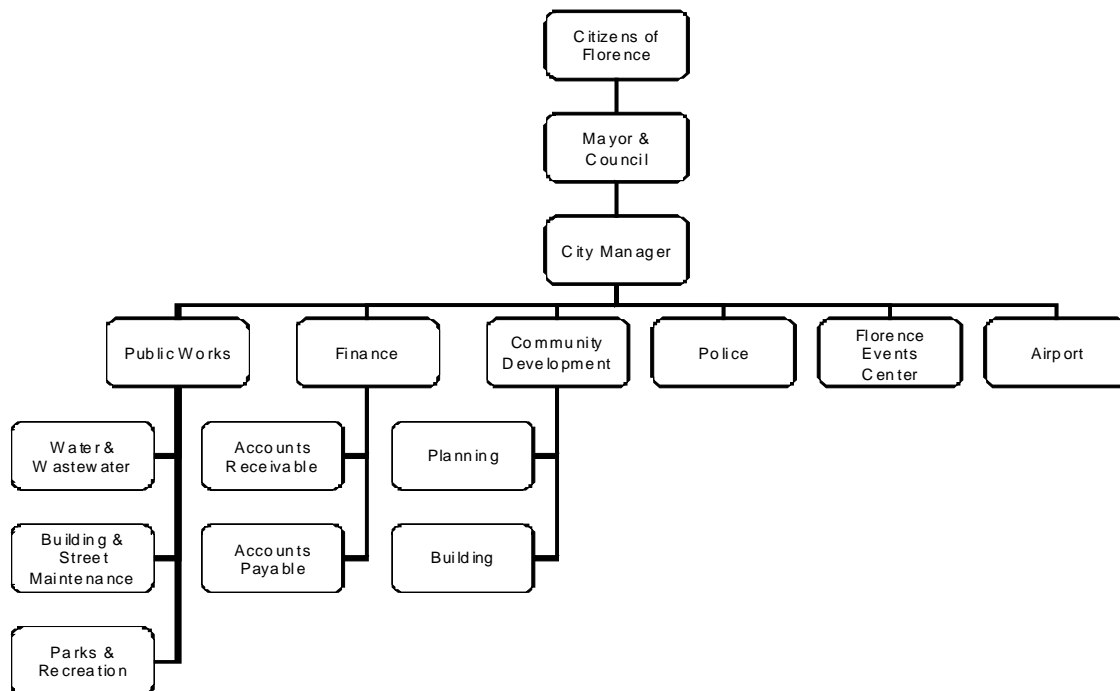
Land & Development

The City of Florence presently encompasses approximately five and a half square miles. The planned usage of these lands and the land identified as being within the City's Urban Growth Boundary is reflected in the Florence Comprehensive Plan. The Florence Residential Buildable Land Inventory found that a total of 5,237 additional residential units can be accommodated by existing buildable lands, buildable lots and redevelopment within the urban growth boundary. Although concerns linger about the market availability of these developable lands, it is projected that Florence will have sufficient lands to meet population demands for housing through 2025.

The City of Florence draws its water from a sole source dunal aquifer via twelve operable wells. The City recently completed a Drinking Water Protection Plan to encourage future sensitivity to this unique sole water source. Florence's new Water Treatment Facility has a capacity to provide approximately 3 million gallons of water per day, which is 500,000 gallons in excess of peak summer demand. The City has also recently completed an upgrade on the Wastewater Treatment Plant, increasing capacity to serve double the current population.

Government Structure

The following is an organizational chart of the City of Florence:



The City of Florence uses a Council-Manager form of government, in which the citizens of Florence elect four councilors to serve four year terms and a mayor to serve a two year term, thus forming the City Council. The City Council appoints a manager to administer the functions of the City and to implement the policies established by the City Council.^{vii}

The City Manager oversees the following six departments of the City of Florence:

- **Public Works:** The Public Works Department is responsible for maintaining the City's infrastructure and is divided into three main divisions – Water & Wastewater, Building & Street Maintenance, and Parks & Recreation. The department also houses the City's GIS division.
- **Finance Department:** The Finance Department is responsible for the management of accounts payable and accounts receivable, including utility billing and administering court functions. The department is integral in establishing a

balanced budget for the entire City each year, and ensuring that the budget is met during the course of the fiscal year.

- **Community Development:** The Community Development Department is divided into two divisions – Planning and Building. Planning is responsible for establishing long range comprehensive and zoning plans for the City, and implementing those plans as development occurs. Planning also administers Title 10, Chapter 7 of the Florence City Code – *Special Development Standards* which governs areas that are prone to natural hazards. The department is responsible for maintaining maps related to planning including, but not limited to, those depicting zoning, natural hazards, soil conditions, flood probability, etc. The Building division is responsible for ensuring that the International Code Council and Florence City Codes are followed in all new construction within the City limits.
- **Police:** The police department is responsible for protecting the safety and welfare of the citizens of Florence by enforcing the laws and ordinances of the State of Oregon and the City of Florence. The department also houses the Code Enforcement division and operates a jail facility. The police department, in conjunction with the Siuslaw Rural Fire Protection District and the Western Lane Ambulance District, are the first responders in the event that a hazard occurs.
- **Florence Events Center (FEC):** The FEC is a non-profit community and events center funded by the City of Florence and operated by a mostly volunteer workforce. The FEC is slated to serve as a staging area in the aftermath of a severe hazard.
- **Airport:** The City of Florence owns and operates a municipal airport within the City limits and is considered a critical facility. In the event of a natural hazard Florence is at risk of being isolated due to its location between the Pacific Ocean and the Coast Range. There are only two main thoroughfares through town, and both have been impeded for significant amounts of time during previous natural hazard events, including wind storms, landslides, mudslides, and floods.

Existing Plan & Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.^{viii}

The Florence Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the City’s vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the City’s existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the action items identified in the Plan. Implementing the natural hazards mitigation plan’s action items through existing

plans and policies increases their likelihood of being supported and getting updated, and maximizes the City’s resources.

The following table documents the plans and policies already in place in Florence.

Plan	Author	Adopted or Updated
Florence Comprehensive Plan	City of Florence	2008
Florence City Codes	City of Florence	2008
Lane County Community Wildfire Protection Plan	Lane County	2004
Florence Storm Water Management Plan	City of Florence, Brown & Caldwell	2000
Florence Wastewater Facilities Plan	City of Florence, Brown & Caldwell	1997
Florence Drinking Water Protection Plan	City of Florence	
Florence to Eugene Corridor Strategy: HWY 126 West - US101 to I-5	ODOT, LCOG	1997
City of Florence Public Facilities System Plan	City of Florence	1988
Lane County Natural Hazards Mitigation Plan	Oregon Partnership for Disaster Resilience	2005

Community Organizations and Programs

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g. elderly, children, low income). The City can use existing social systems as resources for implementing such communication-related activities because these service providers already work directly with the public on a number of issues, one of which could be natural hazard preparedness and mitigation.

The following table highlights organizations that are active within the community and may be potential partners for implementing mitigation actions. The table includes information on how the organization or program could be involved in natural hazard mitigation. The three involvement methods are defined below.

- (A) Education and outreach – organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.

- (B) Information dissemination - organization could partner with the community to provide hazard-related information to target audiences.
- (C) Plan/project implementation - organization may have plans and/or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

Community Organizations	West Lane Emergency Operations Group Member Category	Involvement Method(s)
City of Florence	WLEOG Member	A, B, C
Siuslaw Rural Fire Protection District	WLEOG Member	A, B, C
Port of Siuslaw	WLEOG Member	C
Western Lane Ambulance District	WLEOG Member	C
Dunes City	WLEOG Member	A, B, C
Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians Police Department	WLEOG Member	A, B, C
West Lane ARES/RACES	WLEOG Associate Member	C
Siuslaw School District (SJ9)	WLEOG Associate Member	A, B
Florence Area Chamber of Commerce and Visitor Center	WLEOG Associate Member	A, B
Greentrees Homeowners Association	WLEOG Associate Member	A, B
Peace Harbor Hospital	WLEOG Associate Member	A
Florence Area Humane Society	WLEOG Associate Member	A
Senior & Disabled Services	WLEOG Associate Member	A, B
Mapleton Fire District	WLEOG Associate Member	A, B, C
American Red Cross	WLEOG Associate Member	A
Citizen Corps/Community Emergency Response Team (CERT)	Volunteer Group	A, B

Existing Mitigation Activities

Existing mitigation activities include current mitigation programs and activities that are being implemented by the community in an effort to reduce the community's overall risk to natural hazards. Documenting these efforts can assist participating jurisdictions in understanding their risk and can assist in documenting successes.

- Florence City Code Title 10, Chapter 7 *Special Development Standards*: development on dunes is restricted.
- Florence Comprehensive Plan, Chapter 5
- Florence Comprehensive Plan, Chapter 7
- Florence Comprehensive Plan, Chapter 16

- Florence Storm Water Management Plan
- Florence Drinking Water Protection Plan
- Lane County Coastal Resources Management Plan
- Lane County Community Wildfire Protection Plan
- Tsunami Inundation Zone & Evacuation Routes

Hazard Summary

The following is a brief overview of the hazards that can impact the City of Florence. Each of the hazards is described in more detail in Volume II: Hazard Annexes.

Coastal Erosion

Coastal Erosion poses a consistent and significant threat to Florence. Erosion is a chronic issue along the Siuslaw River and on properties adjacent to the Pacific Ocean. Typically, banks are eroded by wind and water currents. Erosion occurs gradually, providing ample time for response through riparian repairs or the relocation of buildings.

Drought

An extended drought is unlikely to occur in Florence. However, the Florence Dunal Aquifer is the only sole-source aquifer identified by the Environmental Protection Agency in Oregon. Due to Florence's isolation from neighboring communities, the effect of a situation in which water is not available from the aquifer for a significant amount of time becomes magnified.

Earthquake

Lane County has no occurrences of historic earthquakes centered within the County, and the probability of an earthquake centered near Florence within the next 100 years is deemed high by the State of Oregon's Natural Hazard Mitigation Plan. Due to soil conditions the City is considered highly vulnerable to such an event as liquefaction would almost certainly occur throughout the City limits. A strong Cascadia Subduction Zone (CSZ) earthquake will likely initiate a tsunami that would inundate a significant number of homes and businesses in Florence.

Flood

Florence has a long history of flood occurrences, most recently in the 1996 winter floods that caused entire neighborhoods to be inundated with water. Significant damage to buildings, homes, vehicles, and roads occurred within the City and surrounding areas. Floods are typically caused by strong winter storms that pound the coast line, causing flooding along the Siuslaw River or in low-lying areas throughout town. These areas are identified in the Florence Storm Water Management Plan.

Landslides

Landslides are typically the result of heavy, prolonged rainfall, and due to Florence's level topography pose very little threat to Florence itself. However, landslides are a common occurrence on both Highway 101 and Highway 126 creating situations in which Florence can

become isolated. For the purposes of this plan, active dunes (which are dunes that are not stabilized in position) within the City limits are considered to be potential landslide hazards.

Tsunami

Tsunamis result from earthquakes and undersea volcanic eruptions which cause a sudden rise or fall of part of the ocean floor, producing tsunami waves. In the open ocean tsunami waves may be only a few inches high and thus be virtually undetectable, except by special monitoring instruments. These waves travel across the ocean at speeds of several hundred miles per hour. When such waves reach shallow water near the coastline, they slow down and can gain great heights. Although there is a moderate probability a tsunami will occur, Florence's location on the Pacific Ocean makes it extremely vulnerable to such an event, specifically those areas along the Siuslaw River such as Old Town.

Volcanic Eruption

Volcanic Eruption is considered a low probability risk by the Western Lane Emergency Operations Group. All of Florence's volcano-related action items seek to protect the City's water supply from potential ash-fall. It was reported during the risk assessment that ash was observed as nearby as Mapleton, 16 miles east on Highway 126, in the aftermath of the 1980 Mount St. Helen's eruption. The closest volcanoes are located in the Cascade Mountain Range east of Eugene.

Wildfire

The 2005 Lane County Community Wildfire Protection Plan determined that Western Lane County has a very low risk to wildfire due to the cool and wet climate on the Pacific Coast. Under the right conditions, however, wildfires may affect Florence due to its proximity of the Siuslaw National Forest and the National Dunes Recreation Area.

Wind and Winter Storms

Almost all windstorms occur during the winter months in Florence and come from the Pacific Ocean. Several historic windstorms in 1962, 1971, 1990, and 1995 affected the entire state of Oregon. Windstorms in 1997 and 2002 caused significant damage in Western Lane County. The most recent storm occurred in December 2007 and caused significant damage to areas north of Florence, but did not cause significant damage to the city.

Winter storms typically bring high winds along the Pacific Coast, but due to the temperate climate adjacent to the Pacific Ocean, the ground temperature is rarely low enough for the accumulation of snow. Hail, freezing rain, and sleet are common during winter storms.

ⁱ USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

ⁱⁱ Oregon Climate Service

ⁱⁱⁱ US Census, 2000

^{iv} US Census, 2000

^v US Census, 2000

^{vi} US Census, 2000

^{vii} Florence City Council, Florence Charter Committee. Adopted May 17, 1988. *Charter of the City of Florence*.

^{viii} Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*.

Section 3: Mission, Goals, and Action Items

Section 3 describes the mission, goals, and action items for the Florence Multi-jurisdictional Natural Hazards Mitigation Plan. It provides information on the process used to develop the mission, goals and action items, and includes an explanation of how the City intends to incorporate the mitigation strategies outlined in the plan into existing planning mechanisms and programs. These programs include: the City's comprehensive land use planning process, capital improvement planning process, and building codes enforcement and implementation. Furthermore, the information in Section 2 and the Hazard Annexes provides the basis and justification for the mitigation actions identified in this section. Each action item also includes the components needed to guide implementation of the identified mitigation strategies, and is based on strategic planning principles.

The following are definitions for the Mission, Goals, and Action Items:

- **Mission**—The mission statement is a philosophical or value statement that answers the question “Why develop a plan?” In short, the mission states the purpose and defines the primary function of the City's multi-jurisdictional Natural Hazards Mitigation Plan. The mission is an action-oriented statement of the plan's reason to exist. It is broad enough that it need not change unless the community environment changes.
- **Goals**— Goals are designed to drive actions and they are intended to represent the general end toward which the City effort is directed. Goals identify how the City intends to work toward mitigating risk from natural hazards. The goals are guiding principles for the specific recommendations that are outlined in the action items.
- **Action Items**— The action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk.

Mitigation Plan Mission

The mission of the Florence Natural Hazards Mitigation Plan is two-fold. First the Plan aims to identify all assets within the city limits that are at risk to natural hazards, and to identify potential action items that will mitigate the risk of each. Secondly, the Plan will act as a needs analysis to establish a five year strategic plan for the West Lane Emergency Operations Group.

The mission statement was formed by the RARE Participant based on discussions with the West Lane Emergency Operations Group at the June 2008 meeting.

Mitigation Plan Goals

The plan goals help guide the direction of future activities aimed at reducing risk and preventing loss from natural hazards. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

In 2004 the City of Florence organized a steering committee of community stakeholders, known as the Florence Hazard Mitigation Planning Task Force (HMPTF), in an effort to create an addendum to the Lane County Natural Hazard Mitigation Plan. Although the planning process stalled with the departure of a key employee, the HMPTF did identify the goals for their plan at a meeting on August 24, 2004. After review, the West Lane Emergency Operations Group chose to adopt those same goals identified by the Florence Hazard Mitigation Plan Task Force at the WLEOG meeting on February 11, 2008. The Plan’s goals are as follows:

Goal 1: Protect Human Life, Commerce, Property, and Natural Systems;

Goal 2: Enhance Emergency Services;

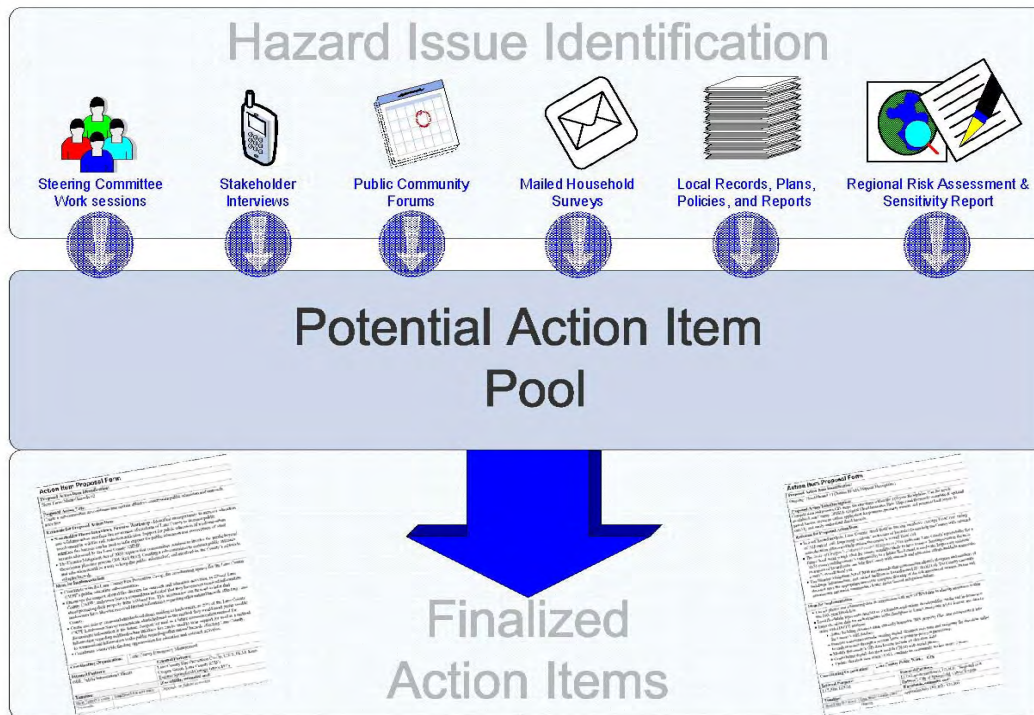
Goal 3: Improve Partnerships for Communication and Coordination to Ensure the Implementation of Mitigation Measures;

Goal 4: Increase Awareness among Citizens; Local and Regional Agencies; Non-Profit Organizations; and Businesses

Mitigation Plan Action Items

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. They address both multi-hazard (MH) and hazard-specific issues. Action items can be developed through a number of sources. The figure below illustrates some of these sources.

Figure 3.1 Action Item Sourcesⁱ



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The action items presented in this plan were developed by the RARE Participant and Steering Committee members, and are derived from a variety of different resources. The action items address the following natural hazards found in the City of Florence:

- Coastal Erosion
- Drought
- Earthquake
- Flood
- Landslide
- Tsunami
- Volcano
- Wildfire
- Wind and Winter Storm

In addition, the plan includes actions that address multiple hazards. Most of the actions were derived using information gathered from the risk assessment meeting on March 17, 2008, as well as from individual steering committee members. Additionally, the RARE Participant surveyed actions within existing natural hazard mitigation plans around the state of Oregon. On June 16, 2008, the RARE Participant facilitated a WLEOG work session devoted to creating and refining a set of mitigation actions for Florence's Natural Hazard Mitigation Plan. Local information, state, and federal resources were used to support each action item.

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The action item worksheets are located in Appendix A of this plan. The different components of the action item worksheet are described below:

Rationale or Key Issues Addressed

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section 2 and the Hazard Annexes.

Ideas for Implementation

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as collaboration with relevant organizations, grant

programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure.

Implementation through Existing Programs

The Florence Natural Hazards Mitigation Plan includes a range of action items that, when implemented, will reduce losses from hazard events in the City. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Florence currently addresses statewide planning goals and legislative requirements through its comprehensive land use plan, capital improvements plan, mandated standards, and building codes. To the extent possible, the West Lane Emergency Operations Group will work to incorporate the recommended mitigation action items into existing programs and procedures.

Many of the Florence Natural Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the City's existing plans and policies. Where possible, the West Lane Emergency Operations Group will implement the Florence Natural Hazard Mitigation Plan's recommended actions through existing plans and policies. Plans and policies already in existence have support from local residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.ⁱⁱ Implementing the Natural Hazards Mitigation Plan's action items through such plans and policies increases their likelihood of being supported and implemented.

Coordinating Organization

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

Internal and External Partners

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project Steering Committee but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the City or other participating jurisdictions that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

Plan Goals Addressed

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

Timeline

Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items* (ST) are activities that may be implemented with existing resources and authorities in one to two years. *Long-term action items* (LT) may require new or additional resources and/or authorities, and may take from one to five years to implement.

ⁱ Partnership for Disaster Resilience, 2006

ⁱⁱ Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*.

Section 4:

Plan Implementation and Maintenance

This section details the formal process that will ensure that the Florence multi-jurisdictional Natural Hazards Mitigation Plan remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the Plan annually, as well as producing an updated plan every five years. Finally, this section describes how the City and participating jurisdictions will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

After the Plan is locally reviewed and deemed complete by the West Lane Emergency Operations Group, the City of Florence submits it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management submits the plan to the Federal Emergency Management Agency (FEMA--Region X) for review. This review addresses the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the City will adopt the plan via resolution. At that point the City will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds. Following Florence's local adoption, Dunes City will adopt its addendum.

Convener and Coordinating Body

The West Lane Emergency Operations Group (WLEOG) Chair will serve as the convener for the City of Florence Natural Hazards Mitigation Plan. The roles and responsibilities of the convener include, but are not limited to, the following:

- Coordinate WLEOG meeting dates, times, locations, agendas, and member notification;
- Document outcome of WLEOG meetings that are devoted to plan maintenance and/or update; and
- Serve as a communication conduit between the WLEOG and key plan stakeholders.

The Rules of Procedure, Intergovernmental Agreement ratified by all WLEOG members, and the letter informing the Oregon Secretary of State of the Group's existence are on file with the City. These rules state that a chair, who will act as the convener of the Natural Hazards Mitigation Plan, will be elected by the Group on an annual basis. The WLEOG was formed to address all four components of the disaster cycle: mitigation, preparedness, response, and recovery.

Coordinating Body

The West Lane Emergency Operations Group will serve as the coordinating body for the life of the mitigation plan. The WLEOG will include, at the minimum, member and associate member

organizations. WLEOG meetings are open to the public, and non-member organizations may be invited as needed. The roles and responsibilities of the WLEOG as ‘coordinating body’ of the Florence Natural Hazards Mitigation Plan are as follows:

- Identify emergency management-related funding sources for natural hazard mitigation projects;
- Utilize the Risk Assessment as a tool for prioritizing proposed natural hazard risk reduction projects;
- Establish, maintain, and update the City’s natural hazard risk GIS data elements;
- Serve as the local evaluation committee for funding programs such as the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and the Flood Mitigation Assistance program;
- Document successes and lessons learned;
- Evaluate and update the Natural Hazards Mitigation Plan following a disaster;
- Evaluate and update the Natural Hazards Mitigation Plan in accordance with the prescribed maintenance schedule; and
- Develop and coordinate ad hoc and/or standing subcommittees as needed.

Members

The following organizations were represented and served on the West Lane Emergency Operations Group during the development of the Florence Natural Hazards Mitigation Plan:

West Lane Emergency Operations Group Members	Membership Type
City of Florence	Member
Siuslaw Rural Fire Protection District	Member
Port of Siuslaw	Member
Western Lane Ambulance District	Member
Dunes City	Member
Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians Police Department	Member
West Lane ARES/RACES	Associate Member
Siuslaw School District (SJ9)	Associate Member
Florence Area Chamber of Commerce and Visitor Center	Associate Member
Greentrees Homeowners Association	Associate Member
Peace Harbor Hospital	Associate Member
Florence Area Humane Society	Associate Member
Senior & Disabled Services	Associate Member
Mapleton Fire District	Associate Member
American Red Cross	Associate Member
Citizen Corps/Community Emergency Response Team (CERT)	Not Associated

To make the coordination and review of the Florence Natural Hazards Mitigation Plan as broad and useful as possible, the West Lane Emergency Operations Group will engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items. Specific organizations have been identified as either internal or external partners on the individual action item forms found in Appendix A.

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan. Proper maintenance of the plan ensures that this plan will maximize the West Lane Emergency Operations Group's efforts to reduce the risks posed by natural hazards. This section was developed by the University of Oregon's Partnership for Disaster Resilience and includes a process to ensure that a regular review and update of the plan occurs. The West Lane Emergency Operations Group and local staff are responsible for implementing this process, in addition to maintaining and updating the plan through a series of meetings outlined in the maintenance schedule below.

Semi-Annual Meetings

The West Lane Emergency Operations Group shall meet on the third Monday of each month at 10:00am as required by the West Lane Emergency Group Rules of Procedure. On a semi-annual basis the Group shall complete the following tasks related to Florence's Natural Hazard Mitigation Plan. During the first meeting the Group will:

- Review existing action items to determine appropriateness for funding;
- Educate and train new members on the plan and mitigation in general;
- Identify issues that may not have been identified when the plan was developed; and
- Prioritize potential mitigation projects using the methodology described below.

During the second meeting of the year the Group will:

- Review existing and new risk assessment data;
- Discuss methods for continued public involvement; and
- Document successes and lessons learned during the year.

The convener of the West Lane Emergency Operations Group will be responsible for documenting the outcome of the semi-annual meetings in Appendix B. The process the Group will use to prioritize mitigation projects is detailed in the section below. The plan's format allows the City and participating jurisdictions to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a natural hazards mitigation plan that remains current and relevant to the participating jurisdictions.

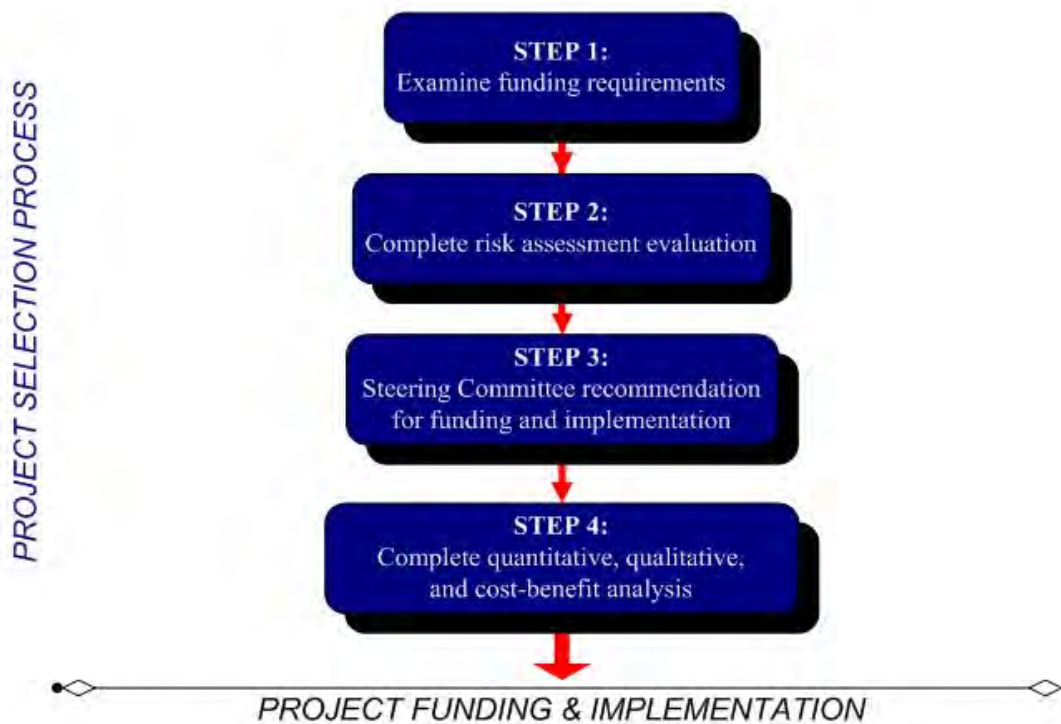
Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that jurisdictions identify a process for prioritizing potential actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by group members, local government staff, other planning documents, or the risk assessment.

Depending on the potential project’s intent and implementation methods, several funding sources may be appropriate. Examples of mitigation funding sources include, but are not limited to: FEMA’s Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance program (FMA), National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds, and private foundations. Figure 4.1 illustrates the project development and prioritization process.

Figure 4.1: Project Prioritization Processⁱ

Action Item and Project Review Process



Step 1: Examine funding requirements

The West Lane Emergency Operations Group will identify how best to implement individual actions within the appropriate existing plans, policies, or programs. The group will examine the selected funding stream’s requirements to ensure that the mitigation activity would be eligible through the funding source. The WLEOG may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organizations about the project’s eligibility.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan’s action items is to examine which hazards they are associated with and where these hazards rank in terms of community risk. The WLEOG will determine whether or not the plan’s risk assessment supports the implementation of the mitigation activity. This determination will be based on the location of the potential activity

and the proximity to known hazard areas, historic hazard occurrence, vulnerable community assets at risk, and the probability of future occurrence documented in the plan.

Step 3: Group recommendations

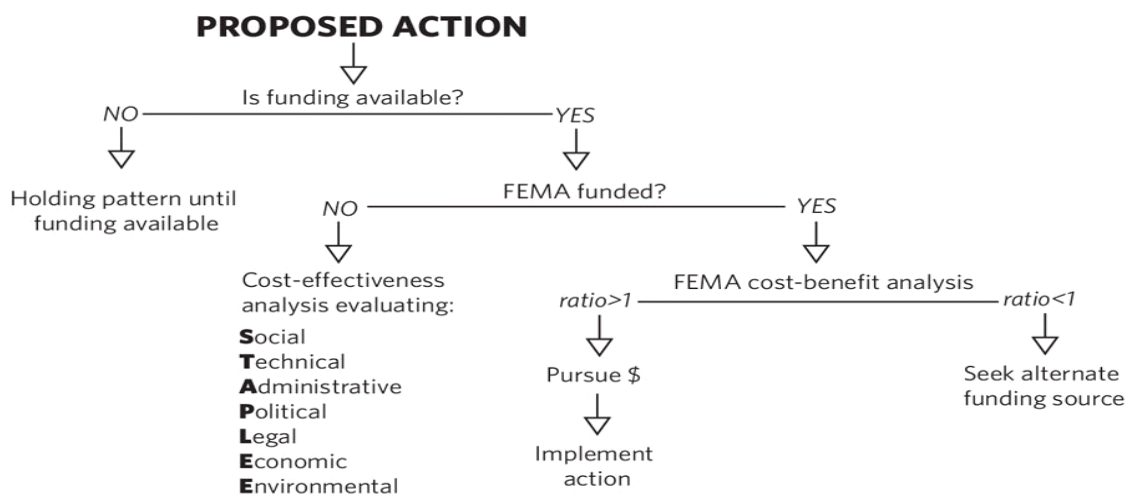
Based on the steps above, the WLEOG will recommend whether or not the mitigation activity should be moved forward. If the Group decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action documenting success upon project completion. The WLEOG will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

The West Lane Emergency Operations Group and the community’s leadership have the option to implement any of the action items at any time, (regardless of the prioritized order). This allows the WLEOG to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of the highest priority. This methodology is used by the WLEOG to prioritize the plan’s action items during the annual review and update process.

Step 4: Complete quantitative and qualitative assessments, and economic analysis

The fourth step is to identify the costs and benefits associated with natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 4.2 shows decision criteria for selecting the method of analysis.

Figure 4.2: Benefit Cost Decision Criteriaⁱⁱ



If the activity requires federal funding for a structural project, the Group will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project's cost effectiveness. The group will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness. The STAPLE/E technique has been tailored for use in natural hazard action item prioritization by the Partnership for Disaster Resilience at the University of Oregon's Community Service Center. See Appendix C for a description of the STAPLE/E evaluation methodology.

After all of the steps above have been completed, and the Group selects a project for inclusion in the plan, the Group will create a letter of support, to be signed by all members of the West Lane Emergency Operations Group. This letter can be utilized in grant applications to show community support for the mitigation action.

Continued Public Involvement & Participation

The City of Florence is dedicated to involving the public directly in the continual reshaping and updating of the Florence Natural Hazards Mitigation Plan. Although members of the West Lane Emergency Operations Group represent the public to some extent, the greater public will also have the opportunity to continue to provide feedback about the Plan.

During plan development, public participation was incorporated into every stage of the plan and development process. To ensure that these opportunities will continue, the City and participating jurisdictions will:

- Publicize all meetings of the West Lane Emergency Operations Group in accordance with Oregon State Law;
- Publish mitigation plan project information and hazard preparedness materials on the West Lane Emergency Operations Group webpage available on the City's website;
- Distribute educational materials at City gatherings such as festivals, open houses, and the proposed annual Emergency Preparedness Expo; and
- Engage the media to produce stories regarding new and ongoing hazard mitigation efforts in Florence. Local media, including the Siuslaw News, is provided with an agenda prior to all meetings.

In addition to the involvement activities listed above, the Florence Natural Hazards Mitigation Plan has been archived and posted on the Partnership website via the University of Oregon Libraries' Scholar's Bank Digital Archive.

Five-Year Review of Plan

This plan will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During this plan update, the following questions will be

asked to determine what actions are necessary to update the plan. The WLEOG will be responsible for addressing the questions outlined below:

- Are the plan's goals still applicable?
- Do the plan's priorities align with State priorities?
- Are there new partners that should be brought to the table?
- Are there new local, regional, state or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Do existing actions need to be reprioritized for implementation?
- Are the actions still appropriate, given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

The questions above will help the WLEOG determine what components of the mitigation plan need updating. The WLEOG will be responsible for updating any deficiencies found in the plan based on the questions above.

ⁱ Partnership for Disaster Resilience, 2006

ⁱⁱ Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2006.

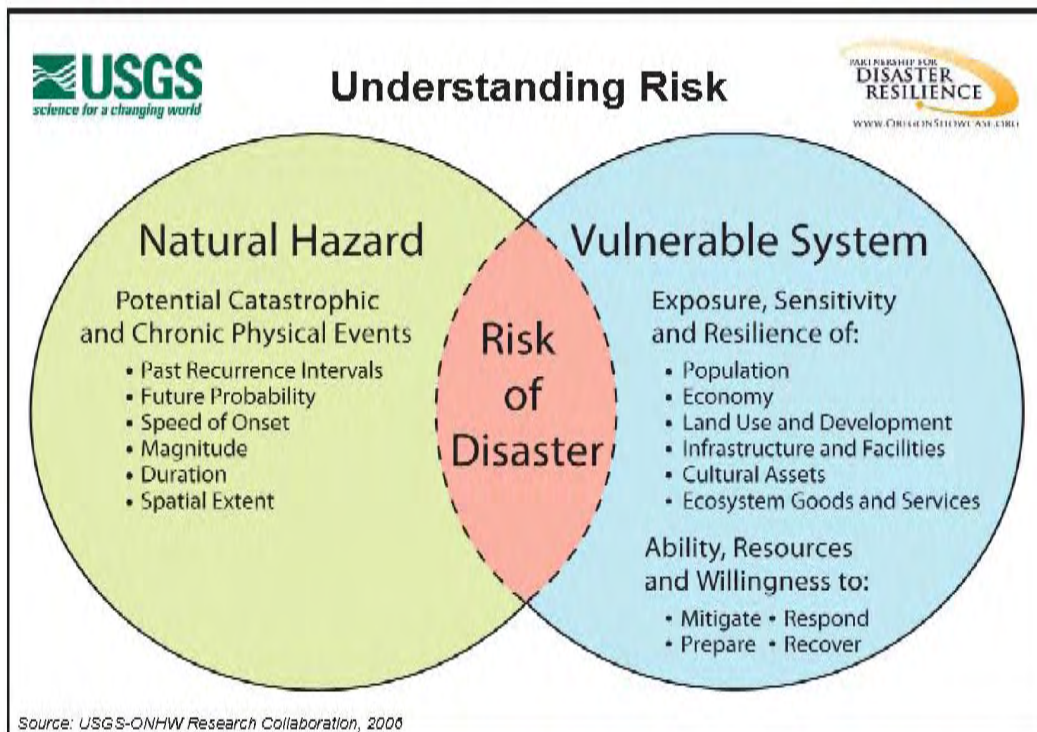
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Introduction

The foundation of the Florence multi-jurisdictional Natural Hazards Mitigation Plan is the risk assessment. Risk assessments provide information about the areas where the hazards may occur, the value of existing land and property in those areas, and an analysis of the potential risk to life, property, and the environment that may result from natural hazard events.

This section identifies and profiles the location, extent, previous occurrences, and future probability of natural hazards that can impact the participating jurisdictions, as highlighted in Figure 1 below. The information in this section was paired with the information in Section 2 – Community Overview during the planning process in order to identify issues and develop actions aimed at reducing overall risk, or the area of overlap in the figure below.

Figure 1. Understanding Risk



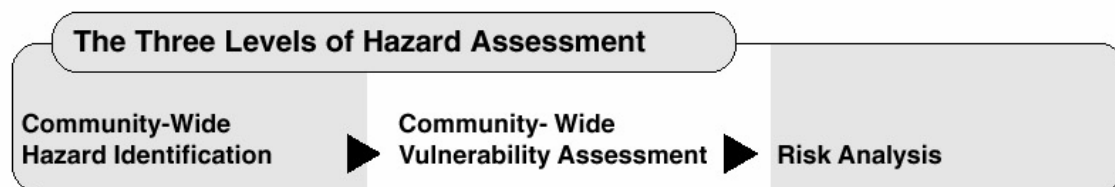
Source: USGS – The Partnership for Disaster Resilience Research Collaborative, 2006

This section drills down to local level information and results in an understanding of the risks the communities face. In addition to local data, the information here relies upon the Regional Risk Assessment in the State Natural Hazards Mitigation Plan.

What is a Risk Assessment?

A risk assessment consists of three phases: hazard identification, vulnerability assessment, and risk analysis, as illustrated in the following graphic.

Figure 2. The Three Phases of a Risk Assessment



Source: Planning for Natural Hazards: Oregon Technical Resource Guide, 1998

The first phase, hazard identification, involves the identification of the geographic extent of a hazard, its intensity, and its probability of occurrence. This level of assessment typically involves producing a map. The outputs from this phase can also be used for land use planning, management, and regulation; public awareness; defining areas for further study; and identifying properties or structures appropriate for acquisition or relocation.ⁱ

The second phase, vulnerability assessment, combines the information from the hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard, and attempts to predict how different types of property and population groups will be affected by the hazard. This step can also assist in justifying changes to building codes or development regulations, property acquisition programs, policies concerning critical and public facilities, taxation strategies for mitigating risk, and informational programs for members of the public who are at risk.ⁱⁱ

The third phase, risk analysis, involves estimating the damage, injuries, and costs likely to be incurred in a geographic area over a period of time. Risk has two measurable components: (1) the magnitude of the harm that may result, defined through the vulnerability assessment, and (2) the likelihood or probability of the harm occurring. An example of a product that can assist communities in completing the risk analysis phase is HAZUS, a risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH current scientific and engineering knowledge is coupled with the latest geographic information systems (GIS) technology to produce estimates of hazard-related damage before, or after a disaster occurs.

This three-phase approach to developing a risk assessment should be conducted sequentially because each phase builds upon data from prior phases. However, gathering data for a risk assessment need not occur sequentially.

ⁱ Burby, R. 1998. Cooperating with Nature. Washington, DC: Joseph Henry Press.
Pg. 126.

ⁱⁱ Burby, R. 1998. Cooperating with Nature. Washington DC: Joseph Henry Press.
Pg. 133.

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Coastal Erosion

Causes and Characteristics of the Hazard

Coastal erosion is a natural process that continually affects the entire coast. Erosion becomes a hazard when human development, life and safety are threatened. Beaches, sand spits, dunes and bluffs are constantly affected by waves, currents, tides and storms resulting in chronic erosion, landslides and flooding. Changes may be gradual over a season or many years. Changes may also be drastic, occurring during the course of a single storm event.

Erosion may be caused by large waves, storm surges, rip cell embayments, high winds, rain, runoff, flooding, or increased water levels and ocean conditions caused by periodic El Niños. Coastal dunes and bluffs comprised of uplifted marine terrace deposits are especially vulnerable to chronic and catastrophic hazards.

Natural hazards that cause erosion and other impacts on coastal areas can be divided into two general classes, chronic and catastrophic.

Chronic hazards are those that we can often see clear evidence of along the ocean shore and include the following:

- Periodic high rates of beach, dune and bluff erosion;
- Mass wasting of sea cliffs in the form of landslides and slumps due to wave attack and geologic instability;
- Storm surges, high ocean waves and the flooding of low-lying lands during major storms;
- Sand inundation;
- Erosion due to the occurrence of El Niños and from rip embayments; and
- Recession of coastal bluffs due to long-term changes in mean sea level and the magnitude and frequency of storm systems.

Chronic hazards are usually local in nature, and the threats to human life and property that arise from them are generally less severe than those associated with catastrophic hazards. However, wide distribution and frequent occurrence of chronic hazards makes them more of an immediate concern.

The damage caused by chronic hazards is usually gradual and cumulative. However, storms that produce large winter waves, heavy rainfall and/or high winds may result in very rapid erosion or other damage that can affect properties and infrastructure over a matter of hours. The regional, oceanic and climatic environments that result in

intense winter storms determine the severity of chronic hazards along the Oregon coast.

Catastrophic hazards are regional in scale and scope. Though very infrequent, Cascadia Subduction Zone earthquakes and the ground shaking, subsidence, land sliding, liquefaction and tsunamis that accompany them are very destructive in their effect causing extensive property losses and high numbers of deaths and injuries, both on the coast and inland.

History of the Hazard in Your Community

Coastal erosion is a chronic issue on the coastline and along the banks of the Siuslaw River, and is the combined result of wave attack, mass wasting, and human activities. Wave attack is the combined force of wind and waves that result in water overtopping and undercutting the dune bluffs. Mass wasting refers to the process where gravity and weathering deteriorates sediment along the banks. Human activities include the effects of construction of the jetties at the river mouth, maintenance dredging and the development that has occurred along the river. Florence's location on the Northern edge of an extensive coastal dunal sheet, with soils composed of loam, fine sand, and loamy fine sand, makes the area particularly susceptible to the forces of erosion.

The jetties were originally completed in 1917 and dredging of the channel was finished in 1929. These projects were necessary to contain the Siuslaw River in its present location. The construction of the jetties has succeeded in keeping the force of the river in the established channel but in doing so, it directs some of the powerful wave energy against the opposite bank. Erosion at the mouth of the river has occurred for at least 60 years. In 1977, erosion at river mile two adjacent to Rhododendron Dr. necessitated an emergency bank protection project to protect the utility lines that run between road and river. In 1990 the Army Corps of Engineers performed a study of the erosion along the Siuslaw. They determined that at the most significant point of erosion, by the Shelter Cove subdivision, the erosion rate between 1957 and 1988 averaged 4.7 ft. per year. The Corps predicted that erosion would remain constant at 5ft bank recession per year. The rate of this erosion is threatening several homes.

Riparian improvements have been made repeatedly along the river banks in order to stabilize homes along the river, specifically in the subdivisions known as Greentrees, Marine Manor, Shelter Cove and Wild Winds. Rhododendron Drive, a main north-south route within the city, has also required stabilization.

Risk Assessment

How are Hazard Areas Identified?

Areas along the Pacific Ocean and Siuslaw are most likely to be damaged during a coastal erosion event. Additional areas at risk include the east side of Rhododendron Drive; homes in Greentrees, Marine Manor, Shelter Cove and Wild Winds; businesses along the riverfront in Florence's Old Town. The City is currently evaluating its development standards along the Siuslaw River, and hopes to propose amendments to the City Council in 2009. Development on dunes is restricted by Florence City Codes - Title 10, Section 7 *Special Development Standards*.

An 800 linear foot section of Rhododendron Drive is exposed to damage from a coastal erosion event. The base of the Siuslaw Bridge is at risk as well, although a bridge retrofit is planned by ODOT in 2009.

The degree of damage to structures, as well as injury and death to people caused by coastal erosion and related hazards (e.g., ocean, urban and riverine flooding, landslides and slumping, storm surges and high ocean wave action, sand inundation, wind storms, tsunamis and earthquakes, etc.) will depend upon: 1) whether the hazard events are catastrophic or chronic in nature and, 2) the proximity of people and property to the event and its magnitude and duration.

Probability of Future Occurrence

Coastal erosion is a chronic hazard along the Florence coastline and along the banks of the Siuslaw River, especially on cut banks and the dune-backed beaches. The damage caused by chronic hazards is usually gradual and cumulative. The regional, oceanic, and climatic environments that result in intense winter storms determine the severity of chronic hazards along the coast. Based on the chronic nature of coastal erosion, the West Lane Emergency Operations Group estimates a 'high' probability that coastal erosion will occur. A 'high' rating indicates that one incident is likely within a 10-35 year period.

Vulnerability Assessment

Locations vulnerable to coastal erosion hazards are listed above under "How are Hazard Areas Identified?" Additionally, coastal highways are vulnerable due to their general proximity to the coast and riverbanks. Although the main thoroughfares in Florence (Highways 101 and 126) are not adjacent to erosive areas, both highways are susceptible to damage along other parts of the coast. Highway damages could potentially isolate Florence. Areas along coastal highways that are prone to erosion have been mapped as part of DOGAMI's environmental geology series. Bedrock conditions can and do change abruptly within very short distances. This results in an inconsistent highway foundation; some sections are more susceptible to erosion than others and require continuous maintenance. Highway 126, which traverses the Siuslaw River delta for 16 miles east of Florence, is an example of such a highway.

The West Lane Emergency Operations Group estimates that the vulnerability of Florence to Coastal Erosion is 'moderate,' meaning 1-10% of the population or regional assets would be affected by an event.

Risk Analysis

Approximately 75 residential lots are at risk to coastal erosion in the UGB, including the 140 unit Driftwood Shores Condominium. At this time, data does not allow for estimates of coastal erosion damages.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Coastal erosion processes create special challenges for people living near the ocean, requiring sound planning in order to minimize the potential dangers to life and

property. Attempts to stabilize the shoreline or beach are often futile because the forces that shape the coast are persistent and powerful. Inadequate understanding of the complex interaction of coastal land forms and waters and the various types of coastal erosion can result in serious threats to people, communities and infrastructure.

The effects from more frequent chronic hazards will in most instances be much less severe than catastrophic events and cover a much smaller area. However, a significant chronic hazard can still result in dangerous slides, flooding, high winds and dangerous wave effects causing major damage to roads, bridges, homes, schools, businesses and infrastructure. Such impacts can be particularly hard on smaller-sized communities, isolated rural homes and farm, and large residential, resort, tourist and commercial developments located in or near areas of known hazards due to erosion, slides and slumping, high wave action and storm surges and ocean or river flooding.

Human activities also influence, and in some cases, intensify the effects of erosion and other coastal hazards. Major actions such as jetty construction and maintenance dredging can have long-term effect on large sections of the coast. This is particularly true along dune-backed and inlet-affected shorelines such as the Columbia River littoral cell. The planting of European bunchgrass since the early 1900s has locked up sand in the form of high dunes. This in turn has contributed to the net loss of beach sand and increased beach erosion. Residential and commercial development can affect shoreline stability over shorter periods of time and in smaller geographic areas. Activities such as grading and excavation, surface and subsurface drainage alterations, vegetation removal, and vegetative as well as structural shoreline stabilization can all reduce shoreline stability. Finally heavy recreational use in the form of pedestrian and vehicular traffic can affect shoreline stability over shorter time frames and smaller spaces. Because these activities may result in the loss of fragile vegetative cover they are a particular concern along dune-backed shorelines. Graffiti carving along bluff-backed shorelines is another byproduct of recreational use that can damage fragile shoreline stability.

Obviously, as compared to the lesser impacts from a chronic hazard, a rare catastrophic event striking the coast will likely result in much more extensive property damage and higher numbers of dead and injured people. A catastrophic incident potentially can seriously damage, disrupt and destroy large numbers of homes, buildings, schools, utilities, infrastructure, boats and port facilities, roads and bridges, and communication and other lifeline systems. Such damage also can seriously impede or prevent the movement of people and goods and may disrupt the response of police, fire and emergency services. Such consequences in turn can produce serious impacts on community and regional economic activity by disconnecting people from home, jobs, school, food and needed commercial, medical and social services. On the coast, the interruption of the tourist industry for any prolonged time could have very dire economic effects.

Existing Hazard Mitigation Activities

The Florence City Codes stipulate a fifty foot setback requirement from the bank for buildings along the Siuslaw River.¹ The inner jetty historically provided some protection to the bank, but it too has eroded over the years, leaving the banks exposed to the constant action of the waves. A common form of short term mitigation of erosion

along the Siuslaw River is the installation of rip-rap that offers some modest protection to the banks. Variances have also been granted for reduced setbacks in areas with riprap stabilization, which have put homes at risk as the stabilization has failed.²

The Storm Water Management Plan addresses the factor that drainage plays in the erosion problem and what steps can be taken to mitigate this impact by controlling storm water runoff (see flooding chapter).

In 2008 the City received an initial review and recommendations for waterfront hazard management from the Oregon Coastal Management Program.

Riparian improvements have been made repeatedly along the river banks in order to stabilize homes along the river, specifically in the subdivisions known as Greentrees, Marine Manor, Shelter Cove and Wild Winds. Rhododendron Drive, a main north-south route within the city, has also required stabilization.

Hazard Mitigation Action Items – Coastal Erosion

- CE 1: Enter into a contract with DOGAMI or private geologist consultant to map oceanfront and riverfront land and produce a report recommending development standards.
- CE 2: Establish geologic report content standards and certification requirements for hazards and proposals for shoreline protective structures.
- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 3: Digitize existing maps and data concerning hazardous areas within Western Lane County.
- MH 5: Review FCC 10-7 Special Development Standards and develop new regulations for developments within areas identified as at risk to hazards (tsunami inundation, steep slope, flood, erosion, etc...).
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

¹ "Special Development Standards." *Florence City Codes* (1988): Title 7, Chapter 10.

² Williams, Steve, Oregon Coastal Management Program. "Recommendations for Waterfront Hazard Management at Florence, Oregon." 2008.

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Drought

Causes and Characteristics of the Hazard

Drought can be defined in several ways. The American Heritage Dictionary defines drought as "a long period with no rain, especially during a planting season." Another definition of drought is a deficiency in surface and sub-surface water supplies. In socioeconomic terms, drought occurs when a physical water shortage begins to affect people, individually and collectively and the area's economy.

Drought is typically measured in terms of water availability in a defined geographical area. It is common to express drought with a numerical index that ranks severity. The Oregon Drought Severity Index is the most commonly used drought measurement in the state because it incorporates both local conditions and mountain snow pack. The Oregon Drought Severity Index categorizes droughts as mild, moderate, severe, and extreme.

History of the Hazard in Your Community

Droughts are not uncommon in the State of Oregon, nor are they just an "east of the mountains" phenomenon. They occur in all parts of the state, in both summer and winter. They appear to be cyclic, and can have a profound effect on the State's economy, particularly the hydropower and agricultural sectors. The environmental consequences also are far-reaching, including insect infestations in Oregon forests and a reduction in the stream flows that support endangered fish species.

There are several records of drought affecting Lane County since 1850, but none specific to Florence or areas west of the Coast Range were found. Drought is averted as a result of the City's high rainfall from moist air masses moving onto land from the Pacific Ocean, especially during winter months. Table 1 describes drought that affected the entire state of Oregon, but no recorded damages in the Florence vicinity could be found.

TABLE 1: Historic Droughts in Oregon

DATE	DESCRIPTION
1904-1905	A drought period of about 18 months throughout Oregon
1917-1931	A very dry period, punctuated by brief wet spells in 1920-21 and 1927 throughout Oregon
1939-1941	A three-year intense drought in Oregon
1976-1981	Intense drought in western Oregon; 1976-77 single driest year of century
1985-1997	Generally a dry period, capped by statewide droughts in 1992 and 1994
2000-2001	General statewide drought

Source: Taylor, George H., and Ray Hatton, 1999, *The Oregon Weather Book*.

Risk Assessment

How are Hazard Areas Identified?

In recent years, the State has addressed drought emergencies through the Oregon Drought Council. This interagency (state/federal) council meets to discuss climate outlooks, water and soil conditions, and advise the Governor as the need arises. At the time the plan was developed, no data existed to assist in identifying the location or extent of the drought hazard in the City of Florence. In general, drought hazards tend to affect an entire community; therefore, the location and extent for the hazard can be considered to be the whole of the region.

Probability of Future Occurrence

The West Lane Emergency Operations Group determined the probability of a drought incident in Florence is *low*, meaning no more than one incident is likely within a 75 to 100 year period.

Vulnerability Assessment

Although a prolonged drought is unlikely, it should be noted that Florence is the only community in Oregon that relies on a sole-source aquifer as its water source. In the event of an extended drought in Florence, the area's water table could conceivably desiccate, creating a situation in which potable water would be required to be imported from Reedsport or Eugene.

Extended drought enhances the risk factors commonly associated with wildfire, as well as reducing the ability of the local fire department to combat such a fire.

The West Lane Emergency Operations Group estimates that Florence's vulnerability to a drought incident is *high*, and that a significant portion (more than 10% of the population) would be at risk with the extended loss of potable water.

Risk Analysis

A risk analysis for Drought has not been performed. Estimated damages and losses for a given drought event are not available at this time.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Drought is frequently an "incremental" hazard; the onset and end are often difficult to determine. Also, its effects may accumulate slowly over a considerable period of time and may linger for years after the termination of the event.

Droughts are not just a summer-time phenomenon; winter droughts can have a profound impact on agriculture, particularly east of the Cascade Mountains. Also, below average snowfall in higher elevations has far-reaching effects, especially in terms of hydro-electric power, irrigation, recreational opportunities and a variety of industrial uses.

Drought can affect all segments of a jurisdiction's population, particularly those employed in water-dependent activities (e.g., agriculture, hydroelectric generation, recreation, etc.). Also, domestic water-users may be subject to stringent conservation measures (e.g., rationing) and could be faced with significant increases in electricity rates. In addition, water-borne transportation systems (e.g., ferries, barges, etc.) could be impacted by periods of low water.

There also are environmental consequences. A prolonged drought in forests promotes an increase of insect pests, which in turn damage trees already weakened by a lack of water. A moisture-deficient forest constitutes a significant fire hazard (see the Wildfire Hazard Annex). In addition, drought and water scarcity add another dimension of stress to species listed pursuant to the Endangered Species Act (ESA) of 1973.

For more information on the drought hazard, please visit the state plan's Drought chapter.

Existing Hazard Mitigation Activities

The Florence Drinking Water Protection Plan is dedicated to protection the Florence Dunal Aquifer.

Hazard Mitigation Action Items - Drought

- D 1: Enter into a contract or intergovernmental agreement with water purveyors to provide potable water in the event that the Florence Dunal Aquifer becomes tainted.
- D2: Establish water conservation measures and drought management practices.
- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.)

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Earthquake

Causes and Characteristics of the Hazard

Seismic events were once thought to pose little or no threat to Oregon communities. However, recent earthquakes and scientific evidence indicate that the risk to people and property is much greater than previously thought. Oregon and the Pacific Northwest in general are susceptible to earthquakes from three sources: 1) the offshore Cascadia Subduction Zone; 2) deep intra-plate events within the subducting Juan de Fuca Plate; and 3) shallow crustal events within the North American Plate.

While all three types of quakes possess the potential to cause major damage, Subduction zone earthquakes pose the greatest danger. The source for such events lies off the Oregon coast and is known as the Cascadia Subduction Zone (CSZ - see Figure 3.1. to the right). A major CSZ event could generate an earthquake with a magnitude of 9.0 or greater resulting in devastating damage and loss of life.

The specific hazards associated with an earthquake include the following:

Ground Shaking

Ground shaking is defined as the motion or seismic waves felt on the Earth's surface caused by an earthquake. Ground shaking is the primary cause of earthquake damage.

Ground Shaking Amplification

Ground shaking amplification refers to the soils and soft sedimentary rocks near the surface that can modify ground shaking from an earthquake. Such factors can increase or decrease the amplification (i.e., strength) as well as the frequency of the shaking.

Surface Faulting

Surface faulting are planes or surfaces in Earth materials along which failure occurs. Such faults can be found deep within the earth or on the surface. Earthquakes occurring from deep lying faults usually create only ground shaking.

Earthquake-Induced Landslides

These landslides are secondary hazards that occur from ground shaking.



Figure 3.1. Map of the Cascadia Subduction Zone (adapted from the 2007 U.S. Geological Survey)

Liquefaction

Liquefaction takes place when ground shaking causes granular soils to turn from a solid into a liquid state. This in turn causes soils to lose their strength and their ability to support weight.

Tsunamis

Tsunamis are another secondary earthquake hazard created by events occurring under the ocean. A tsunami, often incorrectly referred to as a “tidal wave,” is a series of gravity-induced waves that can travel great distances from the earthquake’s origin and can cause serious flooding and damage to coastal communities. There are two sources of tsunamis that can affect Western Lane County: earthquakes in or near the County (CSZ) or earthquakes from distant areas (e.g., Japan).

The severity of an earthquake is dependent upon a number of factors including: 1) the distance from the quake’s source (or epicenter); 2) the ability of the soil and rock to conduct the quake’s seismic energy; 3) the degree (i.e., angle) of slope materials; 4) the composition of slope materials; 5) the magnitude of the earthquake; and 6) the type of earthquake.

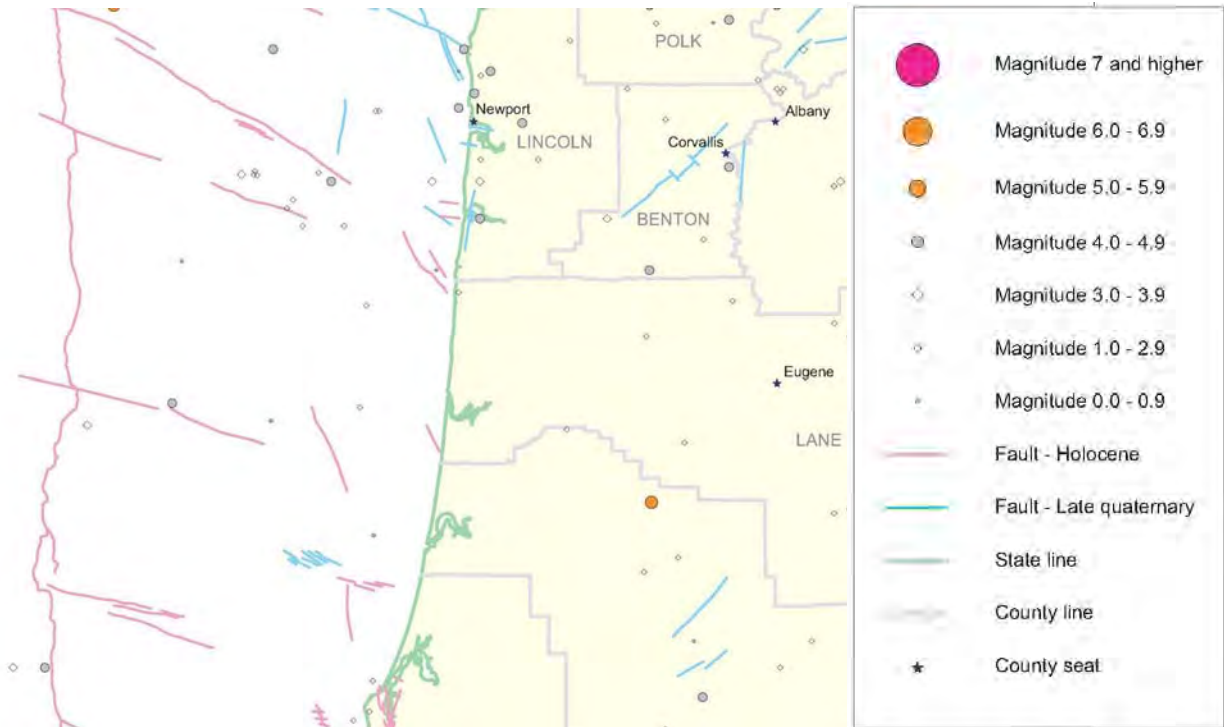
History of the Hazard in Your Community

Although Florence and surrounding areas have not been the center point of any recorded earthquakes, the proximity of the Cascadia Subduction Zone and a history of earthquakes along the Oregon coast mean that such an event is probable, if not inevitable. On April 13, 1949, a major earthquake (magnitude 7.0) caused eight deaths and an estimated \$25 million damage in Olympia, Washington, and a broad area around the capital city. The depth was greater than normal, which, in part, accounted for the large felt area - 388,000 square kilometers in the United States. In Oregon, widespread damage was observed.ⁱ Between 1841 and 2002 only two earthquakes were centered in Western Lane County and two in the Pacific Ocean off the coast of Lane County. None of the four earthquakes were of a high magnitude, nor were they in proximity to the City of Florence.

Oregon has experienced seven Cascadia Subduction Zone (CSZ) events in the last 3,500 years - some of which were probably as large as magnitude 9.0. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1000 years. The last CSZ event occurred approximately 300 years ago. Scientists estimate that there is a 10-20% probability that a subduction zone earthquake will occur within the next 50 years.ⁱⁱ

Figure 3.2ⁱⁱⁱ below shows a map of selected Oregon earthquakes from 1841 through 2002.

Figure 3.2 Map of Selected Earthquakes for Oregon, 1841 through 2002



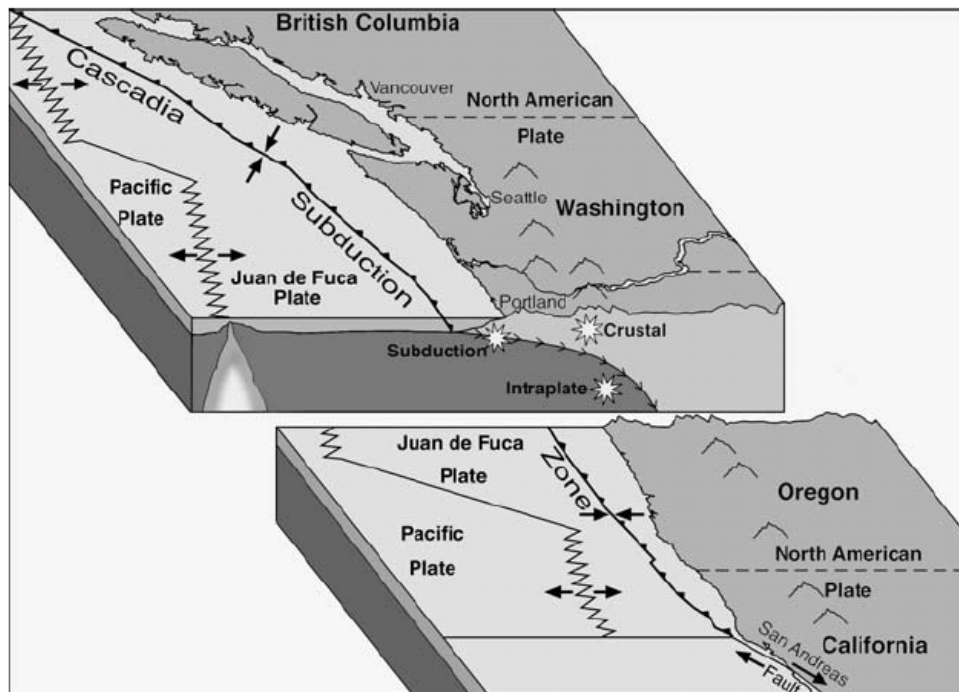
Source: DOGAMI, 2003. <<http://www.oregongeology.com/sub/earthquakes/images/EpicenterMap.pdf>>

Risk Assessment

How are Hazard Areas Identified?

Until recently, earthquakes were thought to pose little risk to Oregon and its residents. Through geologic investigation and more recent earthquake events, this perception has changed drastically. The Cascadia Subduction Zone (illustrated in Figure 3.3 below) presents the potential for an earthquake of magnitude 9.0 or higher. An event of such magnitude would result in buildings and infrastructure suffering varying amounts of damage. Large portions of Highway 101 and roads across the Coast Range would be impassable. This would for the most part sever travel from the coast to the inland valley.

Figure 3.3 Cascadia Subduction Zone



Source: Shoreland Solutions. Chronic Coastal Natural Hazards Model Overlay Zone. Salem, OR: Oregon Department of Land Conservation and Development (1998) Technical Guide-3.

In recent years the Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has commenced a program to identify seismic hazards and risks. Many of these studies have recently been published. DOGAMI has created maps that identify areas in selected Oregon communities that will suffer more damage, relative to other areas, during a damaging earthquake. Those maps are shown below on pages 7-10.

Probability of Future Occurrence

It is difficult to estimate recurrence intervals from available data. Paleoseismic studies along the Oregon coast indicate that the state has experienced seven Cascadia Subduction Zone (CSZ) events possibly as large as M9 in the last 3,500 years. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1000 years. Scientists estimate the chance in the next 50 years of a great subduction zone earthquake is between 10 and 20 percent, assuming that the recurrence is on the order of 400 ± 200 years.^{iv} The last CSZ event occurred approximately 300 years ago.

Vulnerability Assessment

Oregon is rated third highest in the nation for potential losses due to earthquakes. This is due in part to the fact that until recently Oregon was not considered to be an area of high seismicity, and consequently the majority of buildings and infrastructure were not

designed to withstand the magnitude of ground shaking that would occur in conjunction with a major seismic event. Experts predict that in the event of a magnitude 8.5 Cascadia Subduction Zone earthquake, losses in the Cascadia Region (Northern California, Oregon, Washington and British Columbia) could exceed \$12 billion; 30,000 buildings could be destroyed, and 8,000 lives lost.

The degree of damage to structures and injury and death to people will depend upon the type of earthquake, proximity to the epicenter and the magnitude and duration of the event. Buildings, ports, dams, levees and lifelines including water, sewer, storm water and gas lines, transportation systems, and utility and communication networks are particularly at risk. Also, damage to roads and water systems will make it difficult to respond to post-earthquake fires.

Florence is especially vulnerable to earthquake hazards. This is because of the development near the Cascadia Subduction Zone (CSZ), regional seismicity, topography, bedrock geology and local soil profiles. For example, a large number of buildings are constructed on soils that are subject to liquefaction during severe ground shaking. Also, the principal roads and highways that provide ingress and egress to Florence are susceptible to earthquake induced landslides. The Siuslaw Bridge, immediately south of Florence, and the tunnels on Highway 101 north of Florence and on Highway 126 east of Florence needs to be retrofitted to withstand ground shaking. The City of Florence estimates a 'high' vulnerability to earthquakes, meaning more than 10% of the population and regional assets will be affected by a major earthquake event.

DOGAMI released a series of maps identifying the magnitude of risk for amplification, liquefaction, and earthquake induced landslides in Florence and Dunes City, as well as a map combining all three factors into a risk assessment for earthquakes in general. Maps illustrating these hazards are shown below in Figures 3.4-3.7. With very few exceptions, all of the structures located within the city are built on soils that are subject to liquefaction. Although the municipal area of Florence is not prone to earthquake induced landslides, the south side of the Siuslaw River is at high risk as well as areas along Highways 101 and 126. In the event that a strong earthquake occurs in the Florence area, it is very likely that transportation routes to the City will be blocked for an extended period of time.

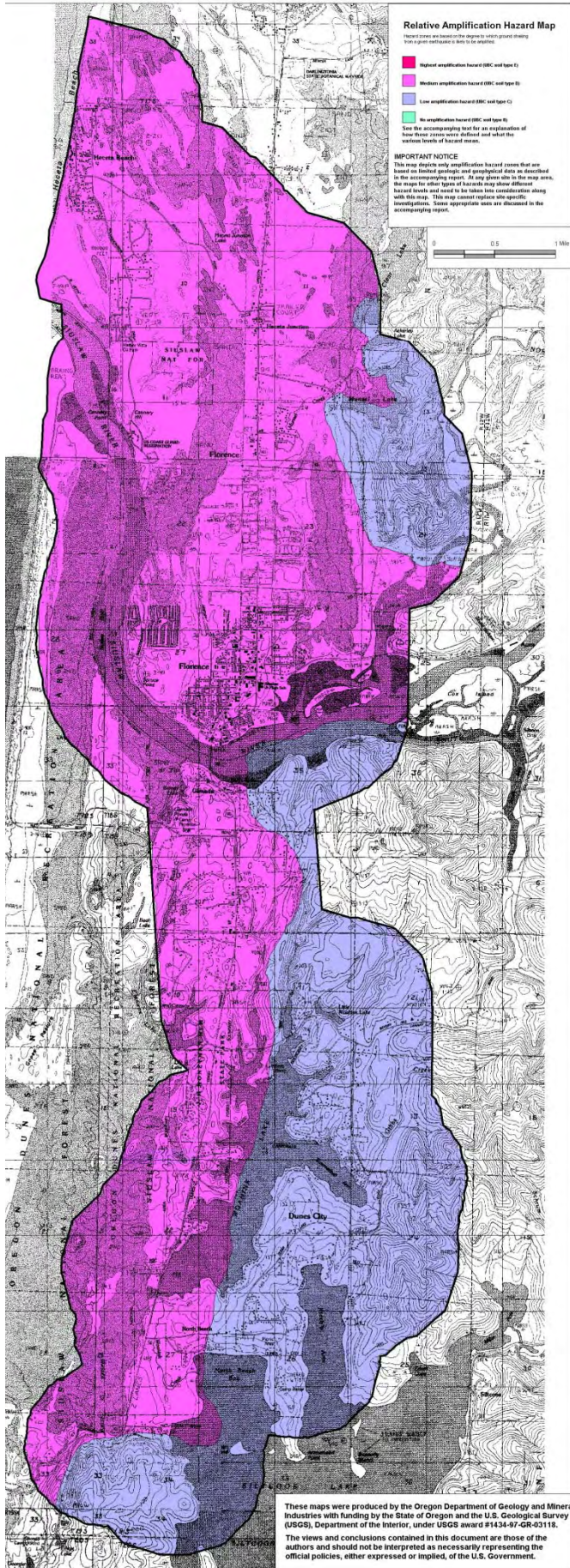
Due to its soil type, Florence is identified as a medium risk area for amplification of ground shaking during a high magnitude earthquake. Several public structures within the City, including the elementary, middle, and high schools and some fire stations are not constructed to withstand a major earthquake.

Other useful resources for planning for earthquakes include the following:

- Maps of earthquake hazard areas: DOGAMI has mapped urban areas and relative Environmental Quality hazard maps for all of the Region 1
- Map of coastal critical facilities vulnerable to hazards: DOGAMI has developed these maps for all Region 1 counties.

- Environmental Geology of Land Use Geology maps: DOGAMI has developed these maps for all Region 1 counties.
- Nuclear energy/hazardous waste sites inventories: No Region 1 counties have nuclear facilities.

Figure 3.4 Relative Amplification Hazard Map



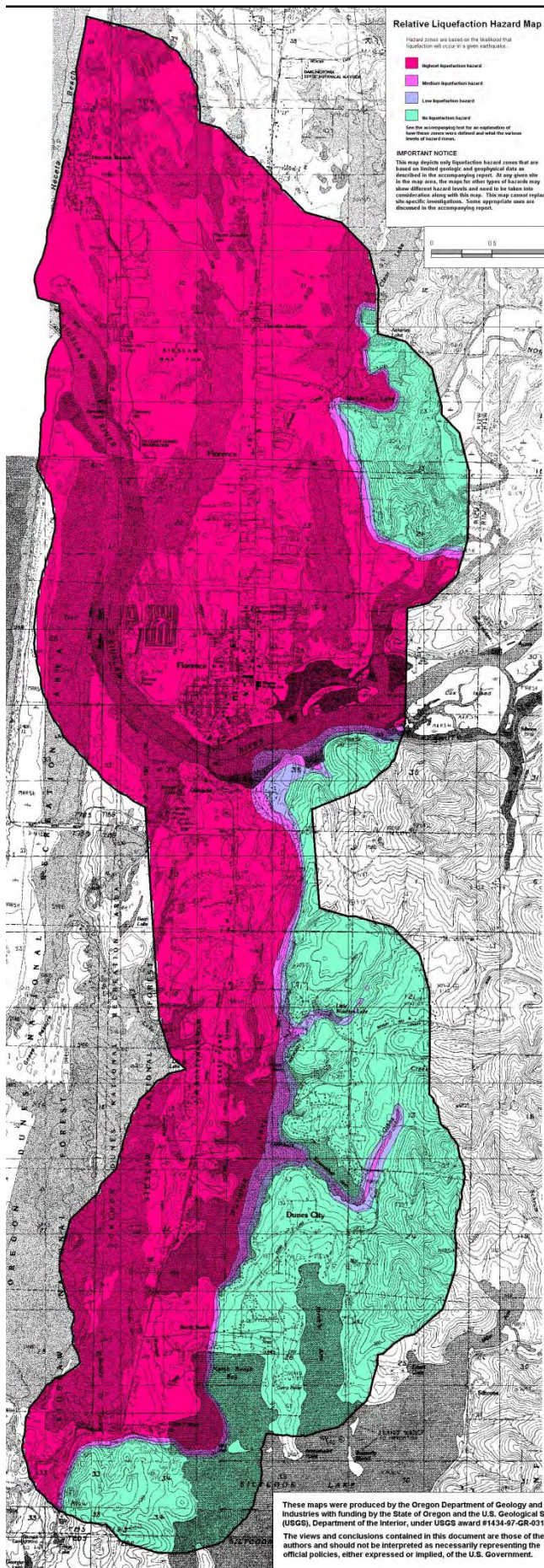
Relative Amplification Hazard Map

Hazard zones are based on the degree to which ground shaking from a given earthquake is likely to be amplified.

-  **Highest amplification hazard (UBC soil type E)**
-  **Medium amplification hazard (UBC soil type D)**
-  **Low amplification hazard (UBC soil type C)**
-  **No amplification hazard (UBC soil type B)**

See the accompanying text for an explanation of how these zones were defined and what the various levels of hazard mean.

Figure 3.5 Relative Liquefaction Hazard Map



Relative Liquefaction Hazard Map

Hazard zones are based on the likelihood that liquefaction will occur in a given earthquake.

-  **Highest liquefaction hazard**
-  **Medium liquefaction hazard**
-  **Low liquefaction hazard**
-  **No liquefaction hazard**

See the accompanying text for an explanation of how these zones were defined and what the various levels of hazard mean.

Figure 3.6 Earthquake Induced Landslides

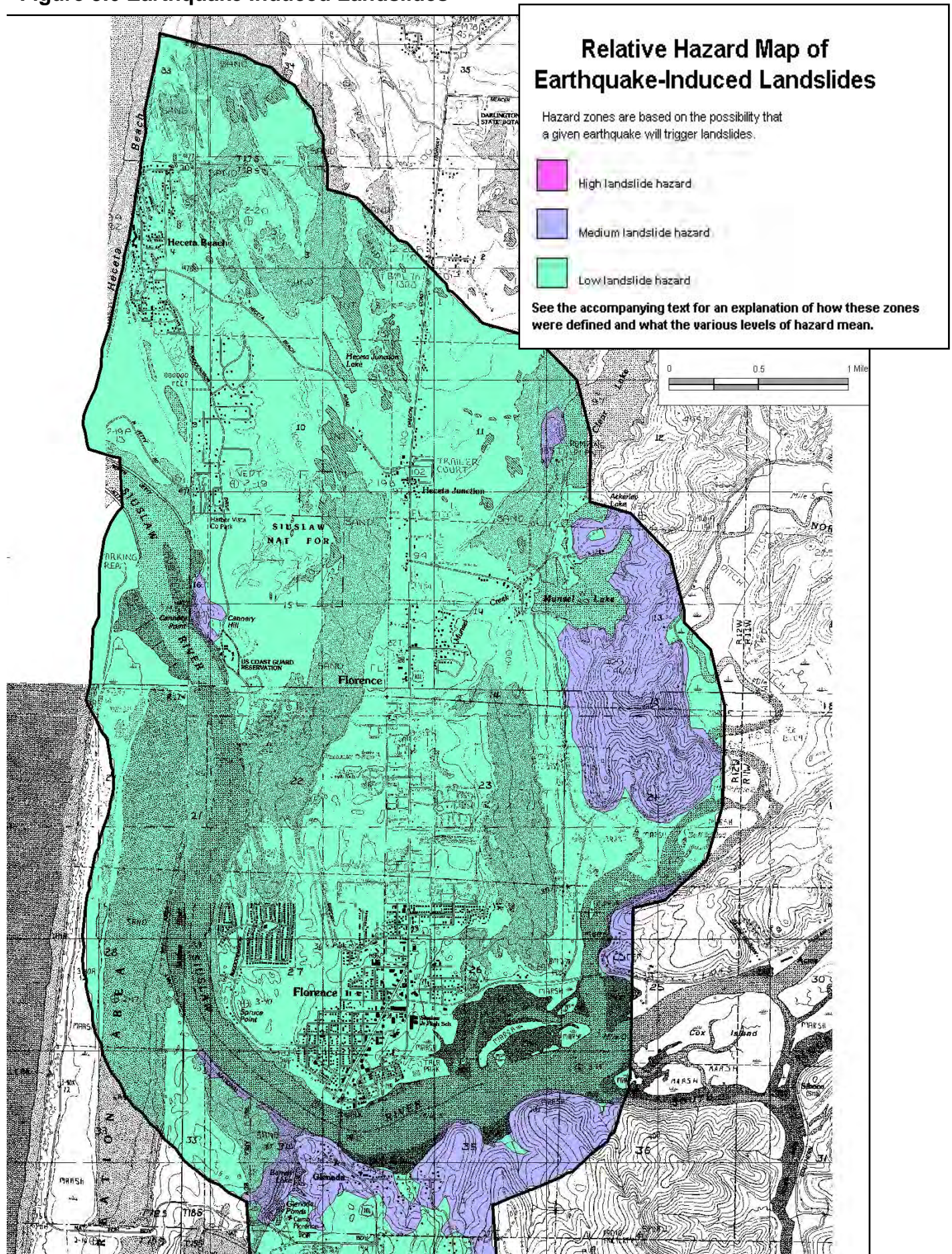
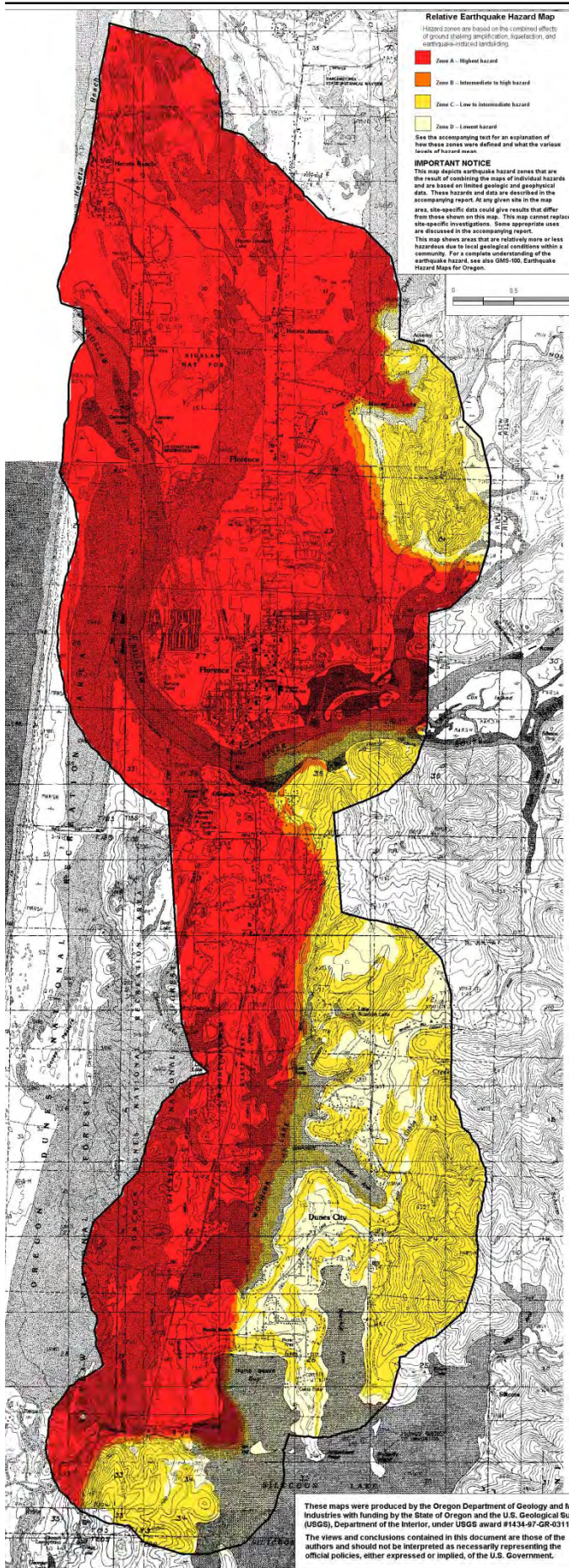


Figure 3.7 Relative Earthquake Hazard Map



Relative Earthquake Hazard Map

Hazard zones are based on the combined effects of ground shaking amplification, liquefaction, and earthquake-induced landsliding.

Zone A - Highest hazard

Zone B - Intermediate to high hazard

Zone C - Low to intermediate hazard

Zone D - Lowest hazard

See the accompanying text for an explanation of how these zones were defined and what the various levels of hazard mean.

Risk Analysis

DOGAMI has developed two earthquake loss models for Oregon based on the two most likely sources of seismic events: (1) the Cascadia Subduction Zone (CSZ), and (2) combined crustal events (500-year Model). Both models are based on HAZUS, a computerized program, currently used by the Federal Emergency Management Agency (FEMA) as a means of determining potential losses from earthquakes. The CSZ event is based on a potential 8.5 earthquake generated off the Oregon coast. The model does not take into account a tsunami, which probably would develop from the event. The 500-Year crustal model does not look at a single earthquake (as in the CSZ model); it encompasses many faults, each with a 10% chance of producing an earthquake in the next 50 years. The model assumes that each fault will produce a single “average” earthquake during this time. Neither model takes unreinforced masonry buildings into consideration. DOGAMI has calculated financial, human and operational risks associated with an M8.5 earthquake. Tables 1-4 project the dollar losses, economic losses, human effects and the facilities that would be operational after an M 8.5 event

DOGAMI investigators caution that the models contain a high degree of uncertainty and should be used only for general planning purposes. Despite their limitations, the models do provide some approximate estimates of damage.

Table 1. Projected dollar losses based on a M8.5 Subduction Event and a 500-year Model

County	Economic Base in Thousands (1999)	Greatest Absolute Loss in Thousands from a M8.5 CSZ Event ¹	Greatest Absolute Loss in Thousands from a 500-Year Model
Lane	\$15,418,000	\$1,614,000	\$3,044,000

Source: DOGAMI. 1999. Special Paper 29. Earthquake Damage in Oregon

Table 2. Estimated losses associated with a M8.5 Subduction Event in Lane County

	Injuries	Deaths	Displaced Households
Number	1,036	19	2,345
Percent of Residents / Households Effected	3%	0%	12%

Source: DOGAMI. 1999. Special Paper 29. Earthquake Damage in Oregon

Table 3. Operational facilities in Lane County the day after a M8.5 Subduction Event

Fire Stations	Police Stations	Schools	Bridges
49%	42%	46%	76%

Source: DOGAMI. 1999. Special Paper 29. Earthquake Damage in Oregon

Table 4. Economic Losses to Lane County after a M8.5 Subduction Event

Highways	Airports	Communications
\$39 mil	\$11 mil	\$11 mil

Source: DOGAMI. 1999. Special Paper 29. Earthquake Damage in Oregon

In 2007, DOGAMI completed a rapid visual screening of public facilities in Oregon. Several public structures within the City scored a high collapse potential, meaning that there is a greater than 10% chance of collapse following a large earthquake. These structures include Peace Harbor Hospital, Siuslaw High School, and the Siuslaw Valley Fire & Rescue Station located on Laurel Street in Old Town Florence.^v

Community Hazard Issues

What is susceptible to damage during a hazard event?

Earthquake damage occurs because we have built structures that cannot withstand severe shaking. Buildings, ports, and lifelines (highways, telephone lines, gas, water, etc.) suffer damage in earthquakes. Damage and loss of life can be very severe if structures are not designed to withstand shaking, are on ground that amplifies shaking, or ground which liquefies due to shaking. Unreinforced masonry buildings are known to be the most susceptible to damage. While it is not impossible to design structures to withstand earthquakes, it can be prohibitively expensive to design for significant events. Most buildings are designed with life-safety integrity for the occupants to safely survive the event and evacuate, but not necessarily to protect the building from damage. The advantage of improved seismic design requirements is that they can protect lives, and maintain the functionality of the structure in lesser magnitude events. Buildings that were not built to an adequate seismic standard often can be retrofitted and strengthened to help withstand earthquakes and provide life safety.

Earthquake damage to roads and bridges can be particularly serious by hampering or cutting off the movement of people and goods and disrupting the provision of emergency response services. Such effects in turn can produce serious impacts on the local and regional economy by disconnecting people from work, home, food, school and needed commercial, medical and social services. A major earthquake can separate businesses and other employers from their employees, customers, and suppliers thereby further hurting the economy. Finally, following an earthquake event, the cleanup of debris can be a huge challenge for the community.

Florence is also vulnerable because of the age of the homes. Figure 3.8 shows the age of homes in Florence. Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1960s in the Northwest use earthquake resistant designs and construction techniques. Those built before 1960 are not likely to be earthquake resistant.

Figure 3.8 Housing Year Built

Pre 1959	1960 – 1979	1980 - 2000
9.6%	34.5%	55.8%

Source: 2000 US Census

Existing Hazard Mitigation Activities

The City of Florence adheres to the International Code Council Building Codes and Oregon State Codes for building within the identified seismic risk areas.

Hazard Mitigation Action Items

- EQ 1: Develop a comprehensive outreach program to educate businesses and residents about Florence's vulnerability to earthquakes and non-structural and structural retrofits they can implement to reduce the impact of a future earthquake event.
- EQ 2: Develop an inventory of public (city buildings, LCC, etc.) and large commercial buildings/employers that may be particularly vulnerable to earthquake damage.
- EQ 3: Retrofit public buildings and critical facilities to meet or exceed current standards for earthquake resistance.
- EQ 4: Seismically retrofit the historic Siuslaw River Bridge. EQ 6: Earthquake Resilient Siuslaw Bridge.
- EQ 5: Improve local capabilities to perform earthquake building safety evaluations.
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH4: Develop a data repository for all existing GIS hazard data, and a GIS clearinghouse for sharing risk assessment data layers and risk models.
- MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 10: Develop a hazard awareness plan specifically targeted at tourists and visitors.
- MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.
- MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.
- MH 13: Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.

MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

ⁱ USGS, 2007. Earthquake History: Oregon, <http://earthquake.usgs.gov/regional/states/oregon/history.php>

ⁱⁱ Geologic Hazards on the Oregon Coast. Oregon Department of Geology and Mineral Industries. <http://www.oregongeology.com/sub/earthquakes/Coastal/OrGeoEqNTsu.htm>

ⁱⁱⁱ DOGAMI, 2003. < <http://www.oregongeology.com/sub/earthquakes/images/EpicenterMap.pdf>

^{iv} DOGAMI. Spring 2002. Geologic Hazards on the Oregon Coast: Earthquakes and tsunamis documented at southern Oregon coast. <http://www.oregongeology.com/sub/earthquakes/Coastal/OrGeoEqNTsu.htm>

^v Statewide Seismic Needs Assessment Using Rapid Visual Screening. DOGAMI, 2007. <http://www.oregongeology.com/sub/projects/rvs/county/county-lane.htm>

Volume II: Hazard Annex

Flood

Causes and Characteristics of the Hazard

Oregon has a detailed history of flooding with flood records dating back to the 1860s. The principal types of flood that can occur in Florence include: (1) riverine flooding along the Siuslaw River and Munsel Creek; (2) surface water flooding due to an inundated water table and (3) ocean flooding from high tides and wind-driven waves or a tsunami event. Flooding is most likely to occur during the winter or spring time. The most serious flooding occurs during December, January, and February.

Riverine Floods

Riverine floods occur when water levels in rivers and streams overflow their banks. Florence, as with most communities located along such water bodies, has the potential to experience this type of flooding after spring rains, heavy thunderstorms or rapid runoff from snow melt. Riverine floods can be slow or fast-rising, but typically develop over a period of days.

The danger of riverine flooding occurs mainly during the winter months, with the onset of persistent, heavy rainfall, and during the spring, with melting of snow in the Coast Range.

Surface Water Floods

The soil content in Florence is almost entirely sand, meaning the infiltration capacity of the soil is elastic and extensive. In most areas of the city, infiltration is utilized as the primary technique for managing storm water, and with the notable exception of Old Town, drain and pipe collection is not used. During periods of high rainfall the area's ground table rises, allowing the aquifer to recharge. It can also result in standing water in certain areas of the city, historically along 9th Street west of Highway 101 and along Munsel Creek.

The depths and velocities of flooding from poor drainage are not life threatening, but there are risks with driving, electrocution, pollution, and exposure to disease.

Ocean Flooding / Wave Action

Flooding from wind-driven waves is a common event on the Oregon coast. This is particularly true during the winter storm season, during El Niño events, and when spring and perigean tides occur. The Federal Emergency Management Agency has identified and mapped coastal areas subject to direct wave action (V zones) and sand dune overtopping (AH and AO zones). Direct wave action was especially severe during the winter storm events of 1972 (Siletz Spit), 1978 (Nestucca Spit), and the El Niño events of 1982-83 and 1997-98. Beach and cliff erosion were significant during these periods and a number of homes were destroyed. The following lessons were learned (and oftentimes forgotten between damaging events):

- Oregon coastal processes are complex and dynamic, sometimes eroding, sometimes aggrading;
- Some sections of the Oregon coast are rising in relation to ocean levels, others remain fairly constant or are becoming lower;ⁱ
- Primary frontal dunes provide protection from ocean storms;
- Sand spits are not permanent features;
- Erosion rates vary and are dependent on several factors including storm duration and intensity, composition of sea cliff, time of year, and impact of human activities (e.g., altering the base of sea cliffs, interfering with the natural movement of beach sand).

History of the Hazard in Your Community

During the February 1996 flood communities throughout the northwest were cut off from assistance and many citizens had to be evacuated from their homes by boat and helicopter. The entire town of Mapleton, 16 miles east of Florence, had to be evacuated by boat during the worst of the flooding. In Florence, entire housing developments were inundated by floodwaters for several weeks. At the same time Oregon's rivers and streams were overflowing their banks, and landslides created by the torrential rainfall washed out major roads and highways. Highway 126 had multiple areas of washouts and mudslides which blocked the road, as did Highway 101 south. In recent years, landslides have closed Highway 101 North for several months, which creates havoc for travelers and businesses using Highway 101.

The following table describes significant floods that have occurred in the region.

TABLE 1. SIGNIFICANT FLOODS

DATE	LOCATION	DESCRIPTION	TYPE OF FLOOD
1813	NW Oregon	Said to exceed "Great Flood" of 1861 (Source: Native Americans)	unknown
12/1861	Coastal rivers	The "Great Flood"; largest flood of known magnitude on the Rogue	Rain on snow
02/1890	Coastal rivers	Widespread flooding; Siuslaw River dammed by a large debris flow	Rain on snow
01/1923	Lower Columbia	Mild temperatures; large amount of rain. Flooded roads / railroads	Rain on snow
03/1931	Western Oregon	Extremely wet and mild; saturated ground	Rain on snow
12/1933	Northern Oregon	Intense warm rains; Clatskanie River set record	Rain on snow
12/1937	Western Oregon	Heavy coastal rain; large number of debris flows	Rain on snow
10/1950	SW Oregon coast	Heavy October rain	Rain on snow
12/1953	Western Oregon	Heavy rain accompanied major windstorm; serious log hazards on Columbia	Rain on snow
12/1955	Columbia & coastal streams	Series of storms; heavy, wet snow; many homes and roads damaged	Rain on snow
12/1962	SW Oregon	Severe flooding, especially the Rogue River	Rain on snow
03/1964	Coast & Columbia River estuary	Ocean flooding	Tsunami
12/1964	Entire state	Two storms; intense rain on frozen ground	Rain on snow
01/1972	Northern coast	Severe flooding and mudslides; 104 evacuated from Tillamook	Rain on snow
01/1974	Western Oregon	Series of storms with mild temperatures; large snowmelt; rapid runoff	Rain on snow
12/1978	Coastal streams	Intense warm rain; two fatalities on Yaquina River; widespread flooding	Rain on snow
02/1986	Entire state	Warm rain and melting snow; numerous homes evacuated	Rain on snow
02/1987	Western Oregon	Heavy rain; mudslides; flooded highways; damaged homes	Rain on snow
12/1989	Clatsop, Tillamook & Lincoln	Warm Pacific storm system. High winds. Fatalities. Mudslides	Rain on snow
01/1990	W. Oregon	Significant damage in Tillamook Co. Many streams had all-time records	Rain on snow
04/1991	Tillamook County	48-hour rainstorm. Wilson River 5 ft. above flood stage. Businesses closed	Rain on snow
02/1996	NW Oregon	Deep snow pack. Warm temperatures. Record-breaking rains.	Rain on snow
11/1996	W. Oregon	Record-breaking precipitation. Flooding. Landslides. (FEMA-1149-DR-OR)	Rain on snow
12/2005	Coos, Curry, and Douglas Counties	\$2,840,000.00 in property damage *figure also includes Jackson and Josephine Counties	

Source: Taylor and Hannon, 1999, *The Oregon Weather Book*, pp.96-103.

Risk Assessment

How are Hazard Areas Identified?

FEMA Flood Insurance Rate Maps (FIRMs) are the most comprehensive resource for identifying flood hazards in Florence. FIRMs depict flood locations and extent; however, many old maps are inaccurate. Florence's most recent FIRM was developed on June 16, 1999, and can be referenced at City Hall on 250 Hwy 101 N. V (wave velocity) zones, depicted on FEMA's Flood Insurance Rate Maps, are areas subject to 100-year events (i.e., 1% chance in any given year). The Flood Insurance Rate Maps show areas vulnerable to wave action (V zones), pounding and sheet-flow from waves over-topping dunes (AO and AH zones).

After the 1996 floods, the City of Florence completed a comprehensive Storm Water Management Plan in 2000 evaluating drainage concerns throughout the City's urban growth boundary. The plan identifies likely flooding locations and established a capital improvement plan to alleviate flooding concerns. Principle riverine flood sources in Florence include the Siuslaw River and Munsel Creek.ⁱⁱ

Florence is a participant in the National Flood Insurance Program (NFIP). The City has 158 policies in effect; 24 of those policies are located in the A Zone. Zero properties are located in the V Zone. There have been 4 claims since 1978, with \$99 in total payments. There have been no repetitive loss claims in the City of Florence.

Probability of Future Occurrence

The City of Florence estimates a 'high' probability that flooding will occur in the future. A 'high' ranking indicates that one incident is likely within a 10 to 35 year period. Ocean storms can be expected every year. El Niño effects, which tend to raise ocean levels, occur about every three to five years (Taylor and Hannan, 1999).

FEMA Flood Insurance Rate Maps (FIRMs) depict areas in Florence likely to experience high water during a 100-year (1%) flood or a 500-year (0.2%) flood event, and more detailed information is available in the Florence Storm Water Management Plan, adopted in 2000.

Vulnerability Assessment

The City of Florence estimates a 'high' vulnerability to flood events, meaning more than 10% of the population or regional assets are likely to be affected by a major flooding event.

Low-lying coastal areas are particularly vulnerable to flood hazards that can be exacerbated by high tides, specifically in the northwest quadrant of Florence. The portions of the City that are most susceptible to riverine floods include the south banks of the Siuslaw River, the east side of Florence along Munsel Creek, Old Town and the Green Trees retirement community.

In general, economic activities at-risk from a 1% flood include:

- Motel / hotel operations
- Old Town historic district, a major tourist draw
- Food outlets (e.g., grocery stores)

Other special considerations to include:

- Special populations (e.g., elderly, handicapped, non-English speaking)
- Institutions / incarceration facilities
- Schools / Day-Care
- Hazardous materials sites

The majority of the corporate limits of Florence are within Zone X, according to the most recent FIRM. Exceptions are Zones Aⁱⁱⁱ and AE^{iv} along the Pacific Ocean, Siuslaw River, and Munsel Creek. The City's comprehensive storm water management plan, adopted in 2000, generally provides a much more detailed outlook on potential flooding areas within the City as well a capital improvements plan to address areas of concern.

Although the Old Town district is the economic facet most at risk to flooding, floods typically occur in the off-season, thus reducing the risk of immediate economic impact of property damage.

Risk Analysis

A detailed risk analysis, which clearly identifies areas of concern within the City and the urban growth boundary, can be found in the Florence Storm Water Management Plan. Monetary damage estimates do not exist at this time.

Community Hazard Issues

What is susceptible to damage during a hazard event?

The extent of the damage and risk to people caused by flood events is primarily dependent on the depth and velocity of floodwaters. Fast moving floodwaters can wash buildings off their foundations and sweep vehicles downstream. Roads, bridges, other infrastructure and lifelines (pipelines, utility, water, sewer, communications systems, etc.) can be seriously damaged when high water combines with flood debris, mud and ice. Extensive flood damage to residences and other structures also results from basement flooding and landslide damage related to soil saturation. Surface water entering into crawlspaces, basements and daylight basements is common during flood events not only in or near flooded areas but also on hillsides and other areas far removed from floodplains. Most damage is caused by water saturating materials susceptible to loss (e.g., wood, insulation, wallboard, fabric, furnishings, floor coverings and appliances.)

Homes in frequently flooded areas can also experience blocked sewer lines and damage to septic systems and drain fields. This is particularly the case of residences in rural flood prone areas who commonly utilize private individual sewage treatment systems. Inundation of these systems can result in the leakage of wastewater into surrounding areas creating the risk of serious water pollution and public health threats. This kind damage can render homes unlivable.

As was seen in Oregon's 1996 floods, many housing units that were damaged or lost were mobile homes and trailers. Many older manufactured home parks are located in floodplain areas. Manufactured homes have a lower level of structural stability than "stick-built" (standard wood frame construction) homes. Manufactured homes in

floodplain zones must be anchored to provide additional structural stability during flood events. Lack of community enforcement of manufactured home construction and anchoring standards in floodplains can contribute to severe damages from flood events.

Flood events impact businesses by damaging property and interrupting commerce. Flood events can cut off customer access and close businesses for repairs. A quick response to the needs of businesses affected by flood events can help a community maintain economic viability in the face of flood damage.

Bridges are a major concern during flood events as they provide critical links in road networks by crossing water courses and other significant natural features. However bridges and their supporting structures can also be obstructions in flood-swollen watercourses and can inhibit the rapid flow of water during flood events. Although the Siuslaw Bridge elevation is high enough that it would likely not be disrupted except in the worst case scenario, three bridges to the north on Highway 101, Big Creek, Ten Mile, and Cape Creek are all susceptible to flooding, thus limiting ingress and egress to the City.

Existing Hazard Mitigation Activities

The Florence Storm Water Management Plan identifies several key projects to alleviate flooding in the City. Thus far, conveyance improvements have been made to Maple Street from 9th to 6th, along 35th Street, and from the intersection of Spruce Street and Munsel Lake Road to Hwy 101 and south along Hwy 101 to 42nd Street.

The next scheduled project will continue from Hwy 101 and 42nd street to a drainage way behind Pacific Pines RV Park south to 40th street, then into a storm water pipe from 40th street to 38th Street and finally to a new outfall into Munsel Creek.

Hazard Mitigation Action Items

- FL 1: Reevaluate the projects outlined in the Florence Storm Water Management Plan and reprioritize and add projects as necessary.
- FL 2: Continue compliance with the NFIP and explore the potential for participation in the NFIP's Community Rating System.
- FL 3: Promote mitigation efforts to homes identified in the Florence Storm Water Management Plan as prone to flooding.
- FL 4: Implement the Spruce Street LID storm water improvement system, phase 3, which consists of storm water conveyance upgrades from Hwy 101 and 42nd street to a drainage way behind Pacific Pines RV Park south to 40th street, then into a storm water pipe from 40th street to 38th Street and finally to a new outfall into Munsel Creek.
- FL 5: Continue compliance with the National Flood Insurance Program (NFIP).
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH 3: Digitize existing maps and data concerning hazardous areas within Western Lane County.

MH4: Develop a data repository for all existing GIS hazard data, and a GIS clearinghouse for sharing risk assessment data layers and risk models.

MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.

MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.

MH 9: Establish an annual Natural hazard Preparedness Expo.

MH 10: Develop a hazard awareness plan specifically targeted at tourists and visitors.

MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.

MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.

MH 13: Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.

MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

ⁱ Beach Processes and Sedimentation. Komar, P.D. 1992, 40-41

ⁱⁱ Lane County Flood Insurance Study, June 2, 1999. Federal Emergency Management Agency.

ⁱⁱⁱ Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

^{iv} Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed hydraulic analyses, establishing Base Flood Elevations or depths that are shown within this zone. Mandatory flood insurance purchase requirements apply.

Volume II: Hazard Annex

Landslide

Causes and Characteristics of the Hazard

Landslides are a major geologic threat in almost every state in the United States. In Oregon, a significant number of locations are at risk from dangerous landslides and debris flows. While not all landslides result in property damage, many landslides do pose serious risk to people and property. Increasing population in Oregon and the resultant growth in home ownership has caused the siting of more development in or near landslide areas. Often these areas are highly desirable owing to their location along the coast, rivers and on hillsides.

Landslides are fairly common, naturally occurring events in various parts of Oregon. In simplest terms, a landslide is any detached mass of soil, rock, or debris that falls, slides or flows down a slope or a stream channel. Landslides are classified according to the type and rate of movement and the type of materials that are transported.

In understanding a landslide, two forces are at work: 1) the driving forces that cause the material to move down slope, and 2) the friction forces and strength of materials that act to retard the movement and stabilize the slope. When the driving forces exceed the resisting forces, a landslide occurs.

Landslides can be grouped as “on-site” and “off-site” hazards. An “on-site” slide is one that occurs on or near a development site and is slow moving. It is slow moving slides that cause the most property damage in urban areas. On-site landslide hazards include features called slumps, earthflows and block slides. “Off-site” slides typically are rapid moving and begin on steep slopes at a distance from homes and development. A 1996 “off-site” slide in southern Oregon began a long distance away from homes and road, traveled at high velocity and killed five people and injured a number of others.

Landslides are classified based on causal factors and conditions and exist in three basic categories.

Falls

This type of landslide involves the movement of rock and soil which detaches from a steep slope or cliff and falls through the air and/or bounces or rolls down slope. This type of slide is termed a rock fall and is very common along highways where they have been cut through bedrock in steep canyons and along the coast.

Slides

This kind of landslide exists where the slide material moves in contact with the underlying surface. Here the slide moves along a plane and either slumps by moving along a curved surface (called a rotational slide) or along a flat surface (called a translational slide). While slow-moving slides can occur on relatively gentle slopes

and are less likely to cause serious injuries or fatalities, they can result in very significant property damage.

Flows

In this case the landslide is characterized as plastic or liquid in nature in which the slide material breaks up and flows during movement. This type of landslide occurs when a landslide moves down slope as a semi-fluid mass scouring or partially scouring rock and soils from the slope along its path. A flow landslide is typically rapid moving and tends to increase in volume as it moves down slope and scours out its channel.

Rapidly moving flow landslides are often referred to as a debris flow. Other terms given to debris flows are mudslides, mudflows, or debris avalanches. Debris flows frequently take place during or following an intense rainfall on previously saturated soil. Debris flows usually start on steep hillsides as slumps or slides that liquefy, accelerate to speeds as high as 35 miles per hour or more, and travel down slopes and channels onto gentle sloping or flat ground. Most slopes steeper than 70 percent are at risk from debris flows.

The consistency of a debris flow ranges from watery mud to thick, rocky, mud-like, wet cement which is dense enough to carry boulders, trees and cars. Separate debris flows from different starting points sometimes combine in canyons and channels where their destructive energy is greatly increased. Debris flows are difficult for people to outrun or escape from and present the greatest risk to human life. Debris flows have caused most of their damage in rural areas and were responsible for most of landslide-related deaths and injuries during the 1996 storm in Oregon.

Conditions Affecting Landslides

Natural conditions and human activities can both play a role in causing landslides. Certain geologic formations are more susceptible to landslides than others. Locations with steep slopes are at the greatest risk of slides. However, the incidence of landslides and their impact on people and property can be accelerated by development. Developers who are uninformed about geologic conditions and processes may create conditions that can increase the risk of or even trigger landslides.

There are four principal factors that affect or increase the likelihood of landslides:

- Natural conditions and processes including the geology of the site, rainfall, wave and water action, seismic tremors and earthquakes and volcanic activity.
- Excavation and grading on sloping ground for homes, roads and other structures.
- Drainage and groundwater alterations that are natural or human-caused can trigger landslides. Human activities that may cause slides include broken or leaking water or sewer lines, water retention facilities, irrigation and stream alterations, ineffective storm water management and excess runoff due to increased impervious surfaces.

- Change or removal of vegetation on very steep slopes due to timber harvesting, land clearing and wildfire.

History of the Hazard in Your Community

Landslides typically accompany every major storm system that impacts western Oregon. In recent events, particularly noteworthy landslides accompanied storms in 1964, 1982, 1996, 1999, and 2000. Two major landslide-producing winter storms occurred in Oregon during November 1996. Intense rainfall on recently and past logged land as well as previously un-logged areas triggered over 9,500 landslides and debris flows that resulted directly or indirectly in eight fatalities throughout the state. Highways were closed and a number of homes were lost. The fatalities and losses resulting from the 1996 landslide events brought about the passage of Oregon Senate Bill 12, which set site development standards, authorized the mapping of areas subject to rapidly moving landslides and the development of model landslide (steep slope) ordinances. In February 1999, two timber workers were killed in a mud and rockslide south of Florence. Additionally, a January 2000 landslide north of Florence closed Highway 101 for three months, resulting in major social and economic disruption to nearby communities.¹

Risk Assessment

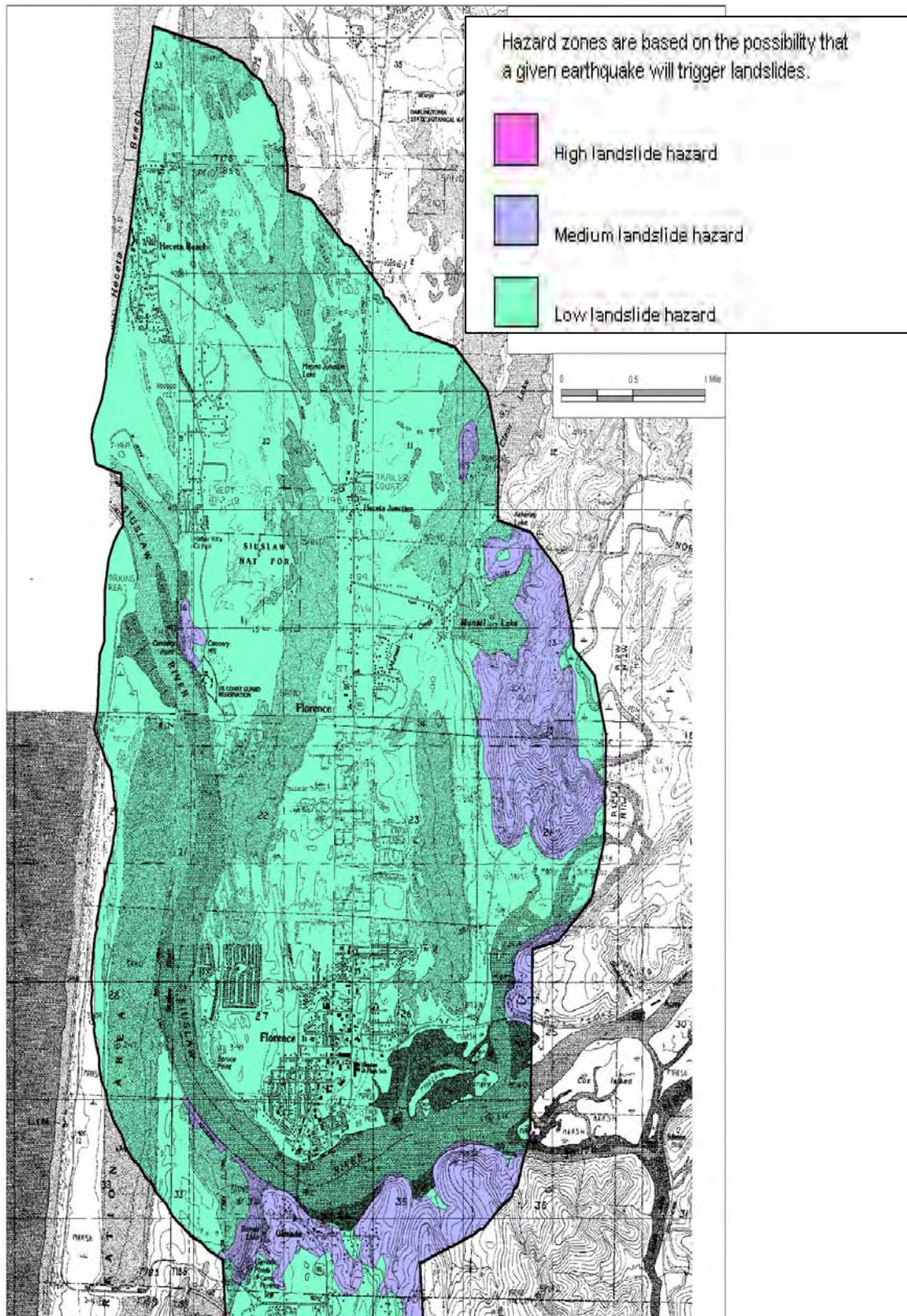
How are Hazard Areas Identified?

DOGAMI has identified the following areas (Figure 5.1 below) as prone to landslides in the aftermath of an earthquake. It can be assumed that these same areas may be prone to landslides due to other causes such as rain storms. Due to the relatively flat topography within the city limits, Florence is not prone to landslides.

As noted in the City of Florence's Comprehensive Plan, "only one area in the City's Urban Growth boundary is subject to non-coastal landslides. This is an area of about 80 acres located east of Munsel Lake Road primarily in Bohannon-Preacher-Slickrock soils. Slopes in some areas approach 70% and minor landslides have occurred in the past. Forty acres of the site are developed as a residential PUD. Sections of the internal street system have grades in excess of 10%, making emergency and service vehicle access difficult. Engineering studies have been required for each phase of the development, and engineering foundations have been required for many of the dwellings.

A Site Investigation Report may be required if the Hazards Maps or Natural Resources Conservation Services Soils maps show potential for landslide or coastal erosion/sloughing. The Hazards Map from the 1988 Comprehensive Plan is the indicator of need for a Site Investigation Report."²

Figure 5.1 Relative Hazard Map of Earthquake-Induced Landslides³



Probability of Future Occurrence

The probability of rapidly moving landslides occurring depends on a number of factors; these include steepness of slope, slope materials, local geology, vegetative cover, human activity, and water. There is a strong correlation between intensive winter rainstorms and the occurrence of rapidly moving landslides (debris flows). Given the correlation between precipitation/snow melt and rapidly moving landslides, it would be feasible to construct a probability curve. The installation of slope indicators or the use of more advanced measuring techniques could provide information on slower moving slides.

Due to the relative lack of steep slopes within Florence's city limits, the West Lane Emergency Operations Group determined that there is a low probability of a landslide event, meaning one incident is unlikely to occur more once in a 75-100 year period. It should be noted that there is a high probability of landslide events occurring in surrounding areas along the major thoroughfares connecting Florence to nearby communities.

Vulnerability Assessment

Because there are relatively few areas susceptible to landslides within City limits, the West Lane Emergency Operations Group estimates that Florence has a *low* vulnerability to landslides. A low ranking indicates that less than 1% of the population or City assets are likely to be affected by a landslide.

Florence has greater vulnerabilities, however, to landslides that can occur beyond City limits. Rain-induced landslides and debris flows can potentially occur during any winter in Western Lane County. The potential exists for landslides to occur along thoroughfares beyond the City. As such, Florence is vulnerable to isolation for an extended period of time. The slope of the land increases dramatically on the south side of the Siuslaw River, and is identified by DOGAMI as being prone to landslides (see Figure 5.1 above).

Additionally, major tunnels control access to Florence from the north and east. Tunnels are drilled through basaltic rock, as are many areas along Highways 126 and 101; areas carved from rock cliffs are particularly susceptible to landslides from seismic activity and/or excessive rainfall.⁴ The Heceta Head tunnel 13 miles north of Florence was constructed during the 1930's at the same time as the coastal bridges. The Highway 126 tunnel 20 miles east of Florence was constructed in the early 1960's. Both tunnels could be susceptible to damage and/or blockage caused by landslides.

The implications of extended isolation would be great. Florence relies on ground transportation for almost all resources and goods. With transportation routes blocked, the City would have to rely on air and sea transport. Landslides in western Lane County typically occur during the winter months when bad weather is common. Often times during these months it is difficult for boats to cross the bar at the mouth of the Siuslaw River or for pilots to land at the airport.

Risk Analysis

At this time, data does not allow for estimates of potential landslide damages.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Depending upon the type, location, severity and area affected, severe property damage, injuries and loss of life can be caused by landslide hazards. Landslides can damage or temporarily disrupt utility services, roads and other transportation systems and critical lifeline services such as police, fire, medical, utility and communication systems, and emergency response. In addition to the immediate damage and loss of services, serious disruption of roads, infrastructure and critical facilities and services may also have longer term impacts on the economy of the community and surrounding area.

Increasing the risk to people and property from the effects of landslides are the following three factors:

- Improper excavation practices, sometimes aggravated by drainage issues, can reduce the stability of otherwise stable slopes.
- Allowing development on or adjacent to existing landslides or known landslide-prone areas raises the risk of future slides regardless of excavation and drainage practices. Homeowners and developers should understand that in many potential landslide settings that there are no development practices that can completely assure slope stability from future slide events
- Building on fairly gentle slopes can still be subject to landslides that begin a long distance away from the development. Sites at greatest risk are those situated against the base of very steep slopes, in confined stream channels (small canyons), and on fans (rises) at the mouth of these confined channels. Home siting practices do not cause these landslides, but rather put residents and property at risk of landslide impacts. In these cases, the simplest way to avoid such potential effects is to locate development out of the impact area, or construct debris flow diversions for the structures that are at risk.

For more information on the landslide hazard, please visit the state plan's Landslide chapter or the Oregon Technical Resource Guide.

Existing Hazard Mitigation Activities

- FCC Title 10; Chapter 7, Section 3 - *Special Development Standards*. The following subsections govern development in areas prone to landslides within Florence.
 - G. Slopes Greater than Twelve (12) Percent: For development on steep slopes, a foundation design and grading with provision for retaining walls or excavated banks shall be carried out according to plans by a registered engineer and approved by the City.

Hazard Mitigation Action Items - Landslides

- LS 1: Enter into an agreement with DOGAMI's Oregon LIDAR Consortium to map the geomorphology (the study of landforms and the processes that shape them) of Western Lane County.
- LS 2: Commission a study to determine the slope of "Jake Mann's Hill" and if any properties or city infrastructure (i.e. elevated storage tank) is at risk to landslide.
- LS 3: Enter into a contract with DOGAMI or private geologist consultant to map and review active dunes within Florence and to produce a report recommending development standards.
- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH 3: Digitize existing maps and data concerning hazardous areas within Western Lane County.
- MH 5: Review FCC 10-7 Special Development Standards and develop new regulations for developments within areas identified as at risk to hazards (tsunami inundation, steep slope, flood, erosion, etc...).
- MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.
- MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.
- MH 13: Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.
- MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

¹ Taylor and Hatton, 1999. *The Oregon Weather Book*; and FEMA After-Action Report; 1996 events; and interviews, Oregon Department of Transportation representatives.

² Realization 2020 Comprehensive Plan for the City of Florence, Oregon. January, 2008.

³ Department of Geology and Mineral Industries, Relative earthquake hazard maps for selected urban areas in western Oregon, by I. P. Madin and Z. Wang, 1999, 4 p., 1:24,000.

⁴ "Emergency Plan." City of Florence and the Siuslaw Vally Fire & Rescue Department. 2006.

Volume II: Hazard Annex

Tsunami

Causes and Characteristics of the Hazard

Tsunamis are induced hazards created by events occurring under the ocean. A tsunami, often incorrectly referred to a “tidal wave,” is a series of waves that can travel great distances from the earthquake’s origin and can cause serious flooding and damage to coastal communities. A tsunami usually begins as a single ocean wave but quickly becomes a series of waves, initiated by earthquakes, underwater volcanic eruptions, or landslides (including landslides that begin below the water surface or enter a deep body of water from above the water surface). It is also possible that a tsunami can be generated by a meteoroid, asteroid, or comet impacts that can be catastrophic to an entire ocean basin.

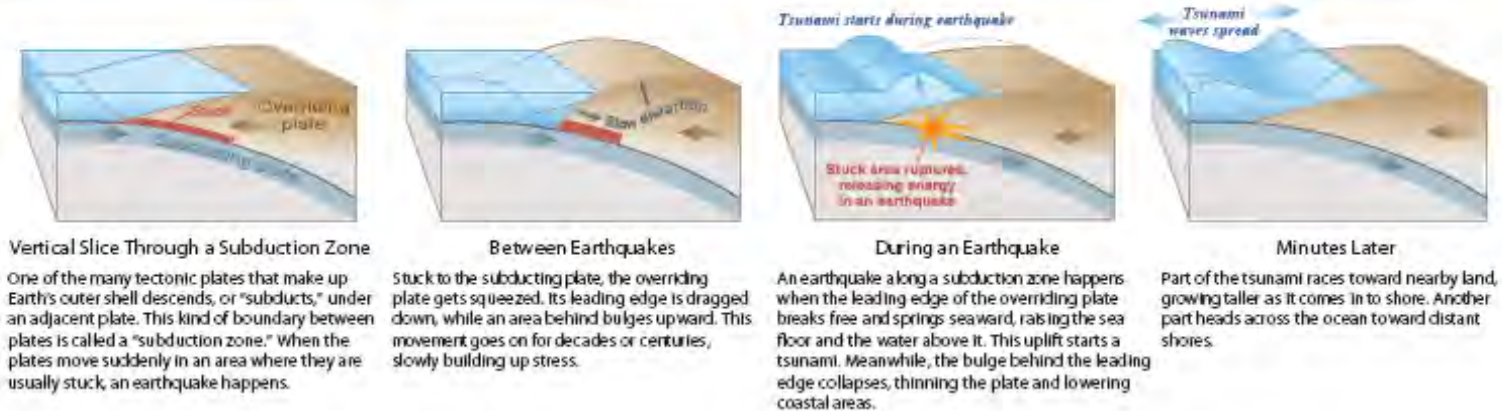
The wavelength of a tsunami may be 100 miles or more in the ocean, with a surface wave height of only a few feet or more. These waves have the potential to travel up to 500 mph. As tsunamis approach shallow water, the speed of the tsunami will slow, but wave heights may increase to as much as 100 feet.

Tsunamis can be divided geographically into two categories: those of distant origin and those locally caused. The distant tsunami is generated by a subduction zone earthquake far out in the Pacific and takes up to 24 hours to reach the coast of Oregon. A local tsunami is generated by a subduction earthquake near the Oregon coastline and would take mere minutes to reach land. In the past, Oregon has experienced both types.ⁱ While all types of quakes possess the potential to cause tsunamis, subduction zone earthquakes pose the greatest danger.ⁱⁱ

The Pacific Northwest is located at a convergent plate boundary, where the Juan de Fuca and North American tectonic plates meet. The two plates are converging at a rate of about 1-2 inches per year. This boundary is called the Cascadia Subduction Zone. It extends from British Columbia to northern California. Subduction zone earthquakes are caused by the abrupt release of slowly accumulated stress. Subduction zones similar to the Cascadia Subduction Zone have produced earthquakes with magnitudes of 8 or larger. Historic subduction zone earthquakes include the 1960 Chile (magnitude 9.5) and 1964 southern Alaska (magnitude 9.2) earthquakes. These types of earthquakes have been known to produce tsunamis. See Figure 6.1 below for a greater understanding of tsunami produced by a subduction zone earthquake

Figure 6.1. Tsunami Generationⁱⁱⁱ

TSUNAMI GENERATION



The interplate earthquakes on the Cascadia Subduction Zone are the only "local" earthquakes that would result in tsunamis on the Oregon Coast. Deep intraplate earthquakes are highly unlikely to cause a tsunami and shallow crustal earthquakes within the North American plate cannot cause tsunamis.

History of the Hazard in Your Community

The Pacific Northwest experienced a subduction zone earthquake estimated at magnitude 9 on January 26, 1700. The earthquake generated a tsunami that caused damage as far away as Japan. Subduction zone earthquakes and associated tsunamis have occurred on average every 500 years over the last 3500 years in the Pacific Northwest. The time between events has been as short as 100 to 200 years and as long as 1000 years. Since 1812, Oregon has experienced about a dozen tsunamis with wave heights greater than 3 feet; some of these were destructive. Ten of these were generated by distant earthquakes near Alaska, Chile or Japan.

In March 1964, a tsunami struck southeastern Alaska following an earthquake beneath the Prince William Sound. The tsunami arrived along the Alaska coastline between 20 and 30 minutes after the quake, devastating villages. Damages were estimated to be over \$100 million. Approximately 120 people drowned. The tsunami spread across the Pacific Ocean and caused damage and fatalities in other coastal areas as well. Four children drowned at Beverly Beach and significant property damaged was incurred, including \$5,000 in Depoe Bay. Along the entire Oregon Coast damage was estimated to be between \$750,000 and \$1 million. Tsunamis of lesser magnitude occurred along the Oregon Coast in 1946, 1960, and 1968.^{iv}

Risk Assessment

How are Hazard Areas Identified?

The Oregon Department of Geology and Mineral Industries (DOGAMI) has collaborated with the Oregon Graduate Institute and NOAA to create tsunami inundation maps for several areas along the Oregon Coast using regional tsunami simulations and professional judgment. The maps depict the expected inundation for

tsunamis produced by a magnitude 8.8 to 8.9 undersea earthquake. The tsunami hazard maps were produced to help implement Senate Bill 379 (SB 379), which was passed by the 1995 regular session of the Oregon Legislature. SB 379, implemented as Oregon Revised Statutes (ORS) 455.446 and 455.447, and Oregon Administrative Rules (OAR) 632-005, limits construction of new essential facilities and special occupancy structures in tsunami flooding zones. Florence's tsunami inundation zone is depicted in Figure 6.2 below. Additionally, Florence's tsunami evacuation zone map is shown in Figure 6.3 below.

The entire immediate coastal area of Florence is subject to tsunamis. The inundation area extends upstream along the Siuslaw River as far inland as Mapleton and several miles inland along the North Fork of the Siuslaw River as well (see Figure 6.2 below). A Community Emergency Notification System (CENS) has been established in the coastal communities to transmit warnings of potential tsunamis to affected residents.

DOGAMI is currently working on using LIDAR, computer technology and computer modeling to map the tsunami inundation zones in Oregon. The tsunami inundation zones can't be 'mapped' by LIDAR, per se - but better mapping of coastal lands (i.e., surface, shape, height, etc.) can produce more accurate inundation maps. Cannon Beach is serving as the pilot project for this effort. This mapping method is scenario-based and attempts to express what could be expected from a tsunami in the event of a Cascadia subduction zone earthquake or another distant earthquake.^v



NOTICE





This map cannot serve as a substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from those shown on the maps. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. government.

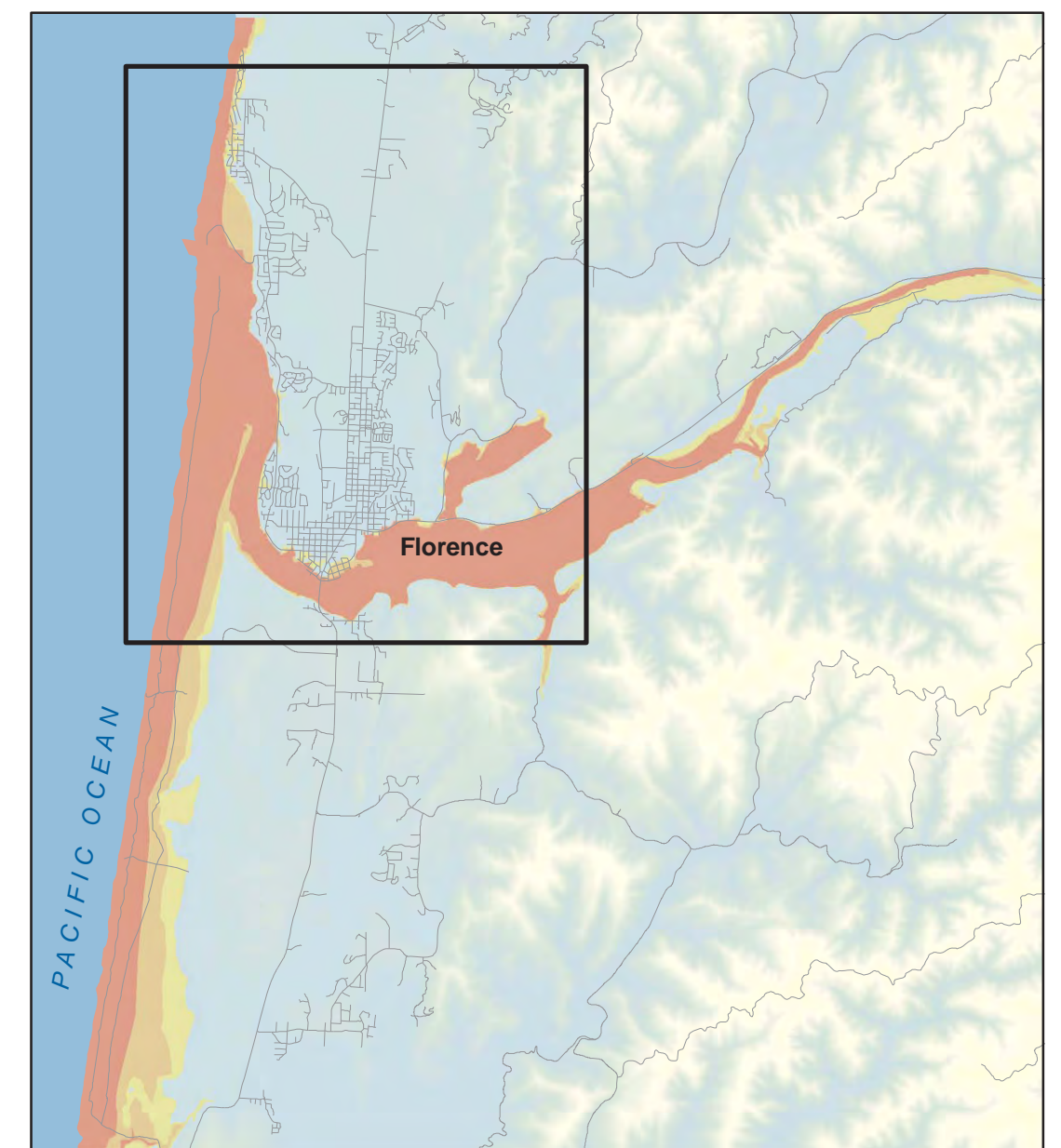
DISCUSSION

When planning evacuation routes and destinations, check with local officials for guidance. In general, one should go to the least hazardous site on the map (a noncolored area or the coolest color) by the shortest route after making sure that the route is not compromised by other earthquake hazards such as liquefaction or earthquake-induced landslides. Bridges may fail in the event of an earthquake.

See accompanying text report for explanation of hazard zones, mapping methods, and results.

HAZARD ZONES

-  Low to negligible risk zone for tsunami flooding (300-600 year events)
-  Moderate risk zone for tsunami flooding (300-600 year events)
-  High risk zone for tsunami flooding (300-600 year events)
-  Extreme risk zone for tsunami flooding (300-600 year events)



Regional extent of tsunami inundation to eastern limit of the numerical simulation. Boxed area is the mapped area.

Software used: ESRI ArcMap 9.2 and MapInfo Professional 8

Source File: \\Rocks\ArcGIS\Project\MXD\IMS25.mxd

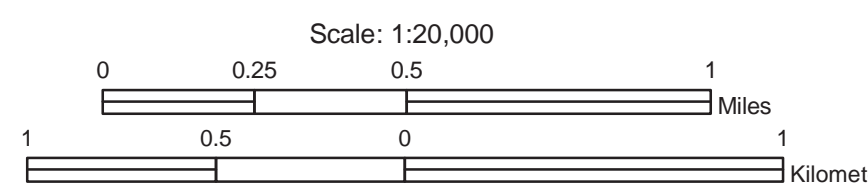
Map sheet reviewed by Ian P. Madien, Oregon Department of Geology and Mineral Industries.

Cartography by Rudie Watzig.

Acknowledgments: Vasily Titov, Hal Mofjeld, and Frank Gonzalez of the NOAA Tsunami Inundation Mapping Effort (TIME) reviewed the map for technical sufficiency. The map was field checked for accurate representation of topographic control of inundation by George Priest, DOGAMI; Ron Miller, Public Works Director, City of Florence; John Buchannon, Fire Chief, Siuslaw Valley Fire and Rescue; and Tom Kartrude, Port Manager, Port of Siuslaw.



Base Photo: 2005 National Agriculture Imagery Program (NAIP) 1 meter resolution
Projection: Oregon Lambert International Feet, NAD 83



Prepared by George R. Priest, Oregon Department of Geology and Mineral Industries, from numerical simulations of Arun Chawla, Oregon Graduate Institute of Science and Technology, Oregon Health Sciences University, with assistance from Jonathan C. Allan, Oregon Department of Geology and Mineral Industries.



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TSUNAMI EVACUATION MAP



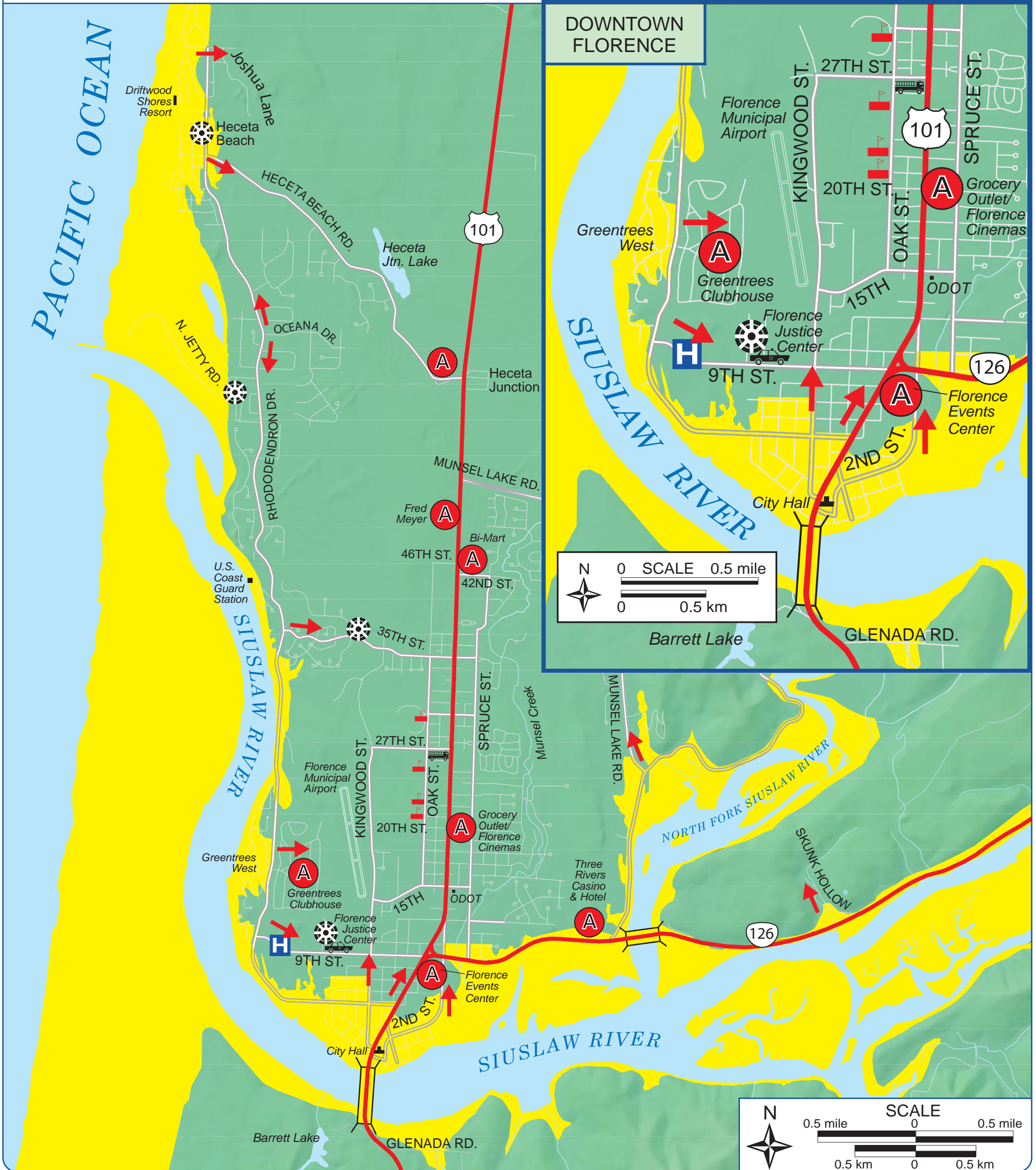
City of Florence, Oregon

If you feel the ground shake:

- Move immediately inland to higher ground
- Follow evacuation route signs
- Do not wait for an official warning

MAP SYMBOLS

- | | | |
|-------------------------|-----------|-----------------------|
| EVACUATE FROM THIS AREA | SCHOOL | TSUNAMI WARNING SIREN |
| OUTSIDE HAZARD AREA | HOSPITAL | FIRE DEPT. |
| EVACUATION ROUTE | CITY HALL | POLICE |
| ASSEMBLY AREA | BRIDGE | |



NOTICE

The evacuation zone on this map was developed by the Oregon Department of Geology and Mineral Industries (DOGAMI) in consultation with local emergency officials. It is intended to represent a worst-case scenario for a local tsunami from an earthquake near the Oregon coast. The evacuation routes were developed by local emergency officials and reviewed by the Oregon Department of Emergency Management.

DOGAMI is publishing this brochure because the information furthers the mission of the Department. The map is intended for emergency response and should not be used for site-specific planning.



Probability of Future Occurrence

The City of Florence has a “moderate” probability of experiencing a tsunami event. Given the past pattern of tsunami occurrence on the Oregon Coast, geologists predict a 10-14 percent chance that a Cascadia Subduction Zone earthquake will occur within the next 50 years, causing a tsunami that will affect the Oregon coast. This forecast comes from evidence for large but infrequent earthquakes and tsunamis that have occurred at the Oregon coast, on average, every 500 years.^{vi}

Vulnerability Assessment

The City of Florence is “highly” vulnerable to a tsunami event. This score indicates that a minimum of 10% of the population or City assets are likely to be affected by a tsunami emergency or disaster. It is anticipated that Florence will become isolated in the aftermath of an earthquake-tsunami event, and that the entire Oregon coastline will require assistance. As such, Florence cannot assume that outside resources will be immediately available.

As shown figures 6.3 and 6.4 below a relatively small portion of Florence’s population is located within the tsunami inundation zone. However, the inundation zone includes the areas of Florence, Old Town and the Port of Siuslaw, which hold more cultural and economic value than any other part of the City. Furthermore, during a tsunami event these areas are the most likely to be populated with tourists, who tend to be unaware of evacuation maps and plans. As such, many casualties are expected from a local tsunami event.

Figure 6.4 shows the relatively low amount of land that is within the Tsunami Inundation Zone in Florence and Western Lane County.^{vii}

Figure 6.4 Developed Land in the Tsunami Inundation Zone.

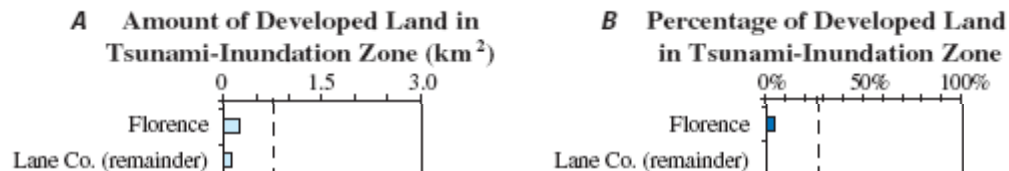
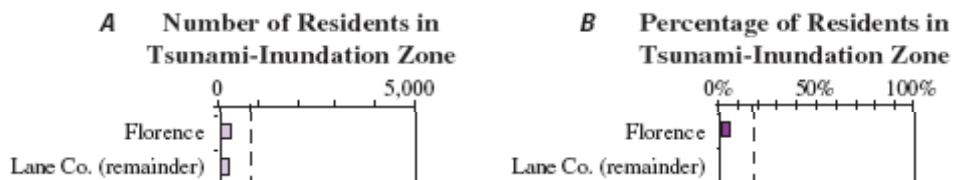


Figure 6.5 shows the relatively low number of permanent residents living within the Tsunami Inundation Zone in Florence and Western Lane County.

Figure 6.5. Number of Residents in Tsunami Inundation Zone



In 2007 the United States Geological Survey released estimates of the potential socio-economic impact of tsunamis on each Oregon coastal community, including Florence. It can be inferred from the data in the report that Florence would have difficulty recovering from a tsunami event due to its mostly service based economy.^{viii}

Risk Analysis

Damage estimates [for specific tsunami event scenarios] are not available at this time.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Tsunamis generated by a CSZ event just off the Oregon coast can strike the coast within five to thirty minutes, possibly disrupting power lines and communications and leaving little time for an official warning. The actual ground shaking of the earthquake may be the only warning received. Tsunamis generated by earthquakes occurring thousands of miles away will take several hours to reach the coast. There would be time for an official warning, although no earthquake would be felt, and the only warning may be a sudden unexpected change in sea level.

A significant tsunami event can be expected to cause disruption of power, contamination of water supplies, loss of essential communication systems, a large amount of debris, and traffic congestion. Dealing with evacuees would be a major challenge in the first days after the event. The tourist industry would be non-existent for a considerable period of time and damaged public facilities would have to be restored or replaced at considerable cost.

Boats and ships in harbor are also at great risk from the sudden changes in sea level. The water level can change so fast that lines holding ships to the pier have the potential to break. Navigating in these conditions would be treacherous as well as unpredictable; dangerous currents can continue for hours while the water in the harbor shifts back and forth.

The rapidly increasing sea level caused by the tsunami picks up debris, rocks, logs and other materials that act as projectiles causing additional damage and dangers.

Existing Hazard Mitigation Activities

The City of Florence has established Tsunami Evacuation Routes, and posted signage within the inundation zone identified by DOGAMI. An ordinance is currently being enacted by the Florence City Council to require hotels to post tsunami evacuation information in all rooms.

A tsunami warning system was installed in the aftermath of the 2004 Indian Ocean tsunami, and is tested on the last Friday of every month.

Hazard Mitigation Action Items

- T1: Review signage and warnings for Tsunami Evacuation Routes, new siren tone meanings, etc.
- T2: Examine costs and benefits of installing a tsunami siren in Old Town Florence.
- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH 3: Digitize existing maps and data concerning hazardous areas within Western Lane County.
- MH 5: Review FCC 10-7 Special Development Standards and develop new regulations for developments within areas identified as at risk to hazards (tsunami inundation, steep slope, flood, erosion, etc...).
- MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 10: Develop a hazard awareness plan specifically targeted at tourists and visitors.
- MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.
- MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.
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i Partnership for Disaster Resilience, State of Oregon Natural Hazard Mitigation Plan (2002), http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_tsunami_chapter.pdf.

ii Oregon Department of Geology and Mineral Industries. Geologic Hazards on the Oregon Coast: Prehistoric and historic tsunamis, <http://www.oregongeology.com/sub/earthquakes/Coastal/HistoricTsunamis.htm>

iii U.S. Geological Survey Circular 1187.

iv NOAA, 1993. Tsunamis affecting the West Coast of the United States: 1806-1992.

v Oregon Department of Geology and Mineral Industries, <http://www.oregon.gov/DOGAMI/index.shtml> Is this meant to reference a particular document on their webpage?

vi Oregon Department of Geology and Mineral Industries. Oregon Geology Fact Sheet: Tsunami Hazards in Oregon. http://www.oregongeology.com/sub/publications/tsunami-factsheet_onscreen.pdf.

vii Wood, Nathan. Variations in City Exposure and Sensitivity to Tsunami Hazards in Oregon. U.S. Department of the Interior, U.S. Geological Survey. Scientific Investigations Report 2007-5283.

viii Wood, Nathan. Variations in City Exposure and Sensitivity to Tsunami Hazards in Oregon. U.S. Department of the Interior, U.S. Geological Survey. Scientific Investigations Report 2007-5283.

Volume II: Hazard Annex

Volcanic Eruption

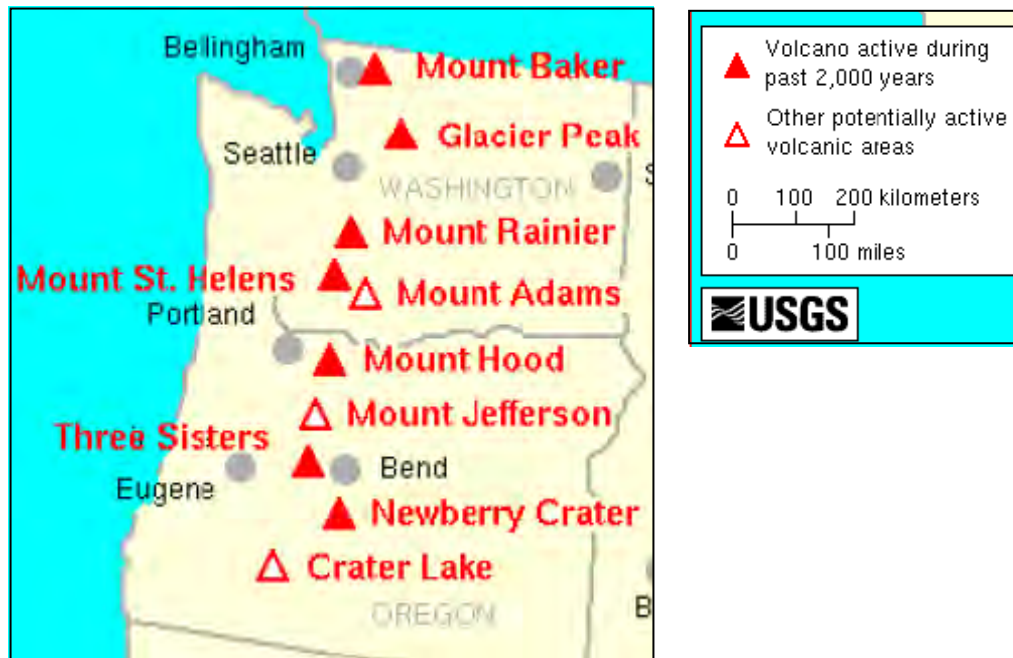
Causes and Characteristics of the Hazard

The Cascade Range of the Pacific Northwest has more than a dozen active volcanoes. These familiar snow-clad peaks are part of a 1,000 mile-long chain of mountains which extend from southern British Columbia to northern California. Cascades volcanoes tend to erupt explosively, and have occurred at an average rate of 1-2 per century during the last 4,000 years. Future eruptions are certain. Seven Cascades volcanoes have erupted since the first U.S. Independence Day slightly more than 200 years ago. Four of those eruptions would have caused considerable property damage and loss of life had they occurred today without warning. The most recent events were Mt. St. Helens in Washington (1980-86) and Lassen Peak in California (1914-1917). The existence, position and recurrent activity of Cascades volcanoes are generally thought to be related to the convergence of shifting crustal plates. As population increases in the Pacific Northwest, areas near volcanoes are being developed and recreational usage is expanding. As a result more and more people and property are at risk from volcanic activity.

The effects of a major volcanic event can be widespread and devastating. The Cascade Range in Washington, Oregon and northern California is one of the most volcanically active regions in the United States. Volcanoes produce a wide variety of hazards that can destroy property and kill people. Large explosive eruptions can endanger people and property hundreds of miles away and even affect the global climate. Some volcano hazards such as landslides can occur even when a volcano is not erupting.

Although there are no active volcanoes in Western Lane County, it is important to note the potential impacts of nearby volcanoes. Two types of volcanoes exist in the Three Sisters region, approximately 125 miles east of Florence, and both pose distinct hazards to people and property. South Sister, Middle Sister, and Broken Top, major composite volcanoes clustered near the center of the region, have erupted repeatedly over tens of thousands of years and may erupt explosively in the future. In contrast, mafic volcanoes, which range from small cinder cones to large shield volcanoes like North Sister and Belknap Crater, are typically short-lived (weeks to centuries) and erupt less explosively than composite volcanoes. Hundreds of mafic volcanoes scattered through the Three Sisters region are part of a much longer zone along the High Cascades of Oregon in which birth of new mafic volcanoes is possible.¹ While immediate danger area around a volcano is approximately 20 miles; ash fall problems may occur as much as 100 miles or more from a volcano's location. Figure 7.1 below illustrates the location of volcanoes in the Pacific Northwest.

Figure 7.1 Potentially Active Volcanoes of the Western United Statesⁱⁱ



Eruption Columns and Clouds

An explosive eruption blasts solid and molten rock fragments called tephra and volcanic gases into the air with tremendous force. The largest rock fragments called bombs usually fall back to the ground within two miles of the event. Small fragments (less than 0.1 inch across) of volcanic glass, mineral and rock (ash) rise high into the air forming a huge, billowing eruption column. Eruption columns creating an eruption cloud can grow rapidly and reach more than 12 miles above a volcano in less than 30 minutes. Volcanic ash clouds can pose serious hazards to aviation. Several commercial jets have nearly crashed because of engine failure from inadvertently flying into ash clouds.

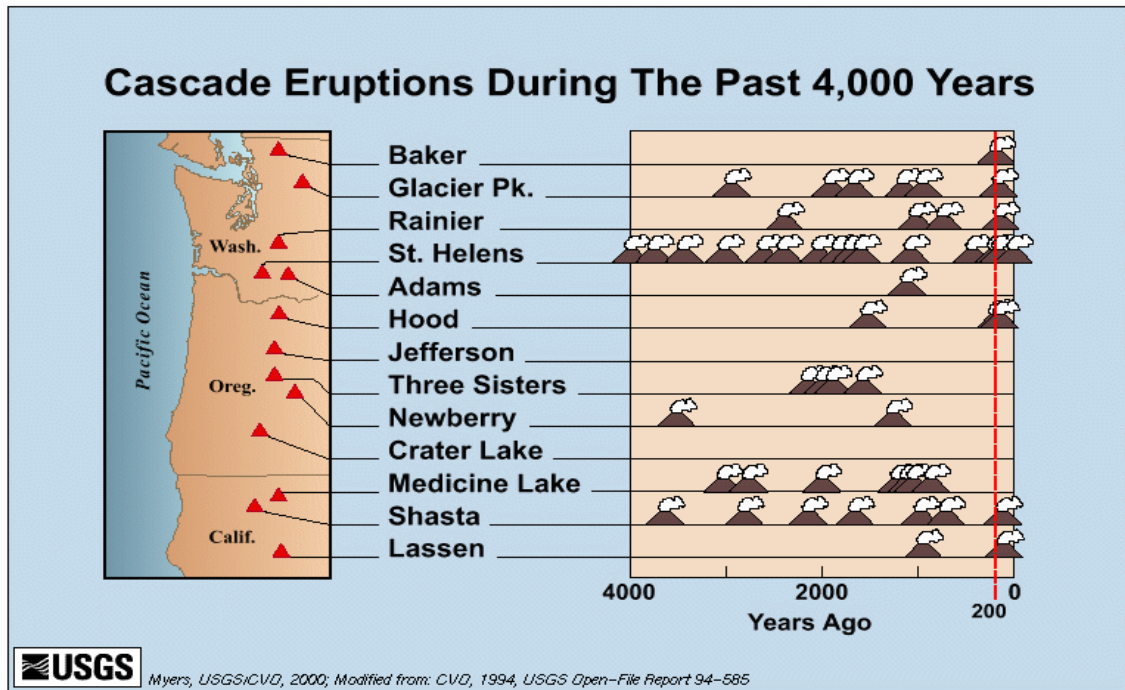
Large eruption clouds can extend hundreds of miles downwind resulting in ash fall over enormous areas. Ash from the May 18, 1980 Mt. St. Helens eruption fell over an area of 22,000 square miles in the western U.S. Heavy ash fall, particularly when mixed with rain, can collapse buildings and even a minor ash fall can damage crops, electronics and machinery.

For more information on the volcanic hazard, please visit the State Plan's Volcano Chapter.

History of the Hazard in Your Community

According to the Oregon Department of Geology and Mineral Industries (DOGAMI), the closest volcanoes to Florence are in the Three Sisters area approximately 125 miles to the east. Given the right wind conditions, ash fall in Western Lane County could be a concern. Figure 7.2 illustrates the eruptive history of volcanoes in the Cascade Range.

Figure 7.2 History of Cascade Eruptionsⁱⁱⁱ



Mt. St. Helens, a volcano in Washington State, is the most active volcano in the Cascade Range. Its last major eruption occurred on May 18th, 1980 when a large landslide and powerful explosive eruption created a large crater, and ended 6 years later after more than a dozen extrusions of lava built a dome in the crater.^{iv} Larger, longer lasting eruptions have occurred in the volcano's past and are likely to occur in the future. Some reports indicate that ashfall reached Mapleton after the 1980 eruption, but no supporting documentation has been found.

Risk Assessment

How are Hazard Areas Identified?

To identify the areas that are likely to be affected by future events, pre-historic rock deposits are mapped and studied to learn about the types and frequency of past eruptions at each volcano. This information helps scientists to better anticipate future activity at a volcano, and provides a basis for preparing for the effects of future eruptions through emergency planning.

Scientists also use wind direction to predict areas that might be affected by volcanic ash; during an eruption that emits ash, the ashfall deposition is controlled by the prevailing wind direction. The predominant wind pattern over the Cascades originates from the west, and previous eruptions seen in the geologic record have resulted in most ashfall drifting to the east of the volcanoes. Figure 7.3 shows the annual probability of 10 centimeters or more of ash accumulation from Pacific Northwest volcanoes. Figure 7.4 depicts the potential and geographical extent of volcanic ashfall in excess of 10 centimeters from a large eruption of Mt. St. Helens.

Figure 7.3 Average Annual Probability of Ashfall^v

Map showing annual probability of 10 cm (~4 inches) or more tephra accumulation in Oregon and Washington from eruptions throughout the Cascade Range (Florence is circled in red).

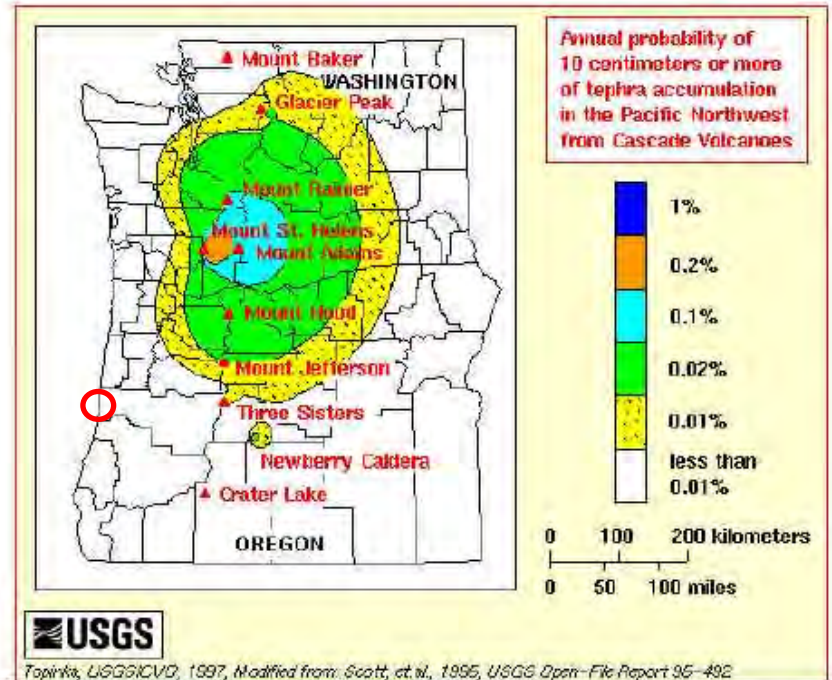
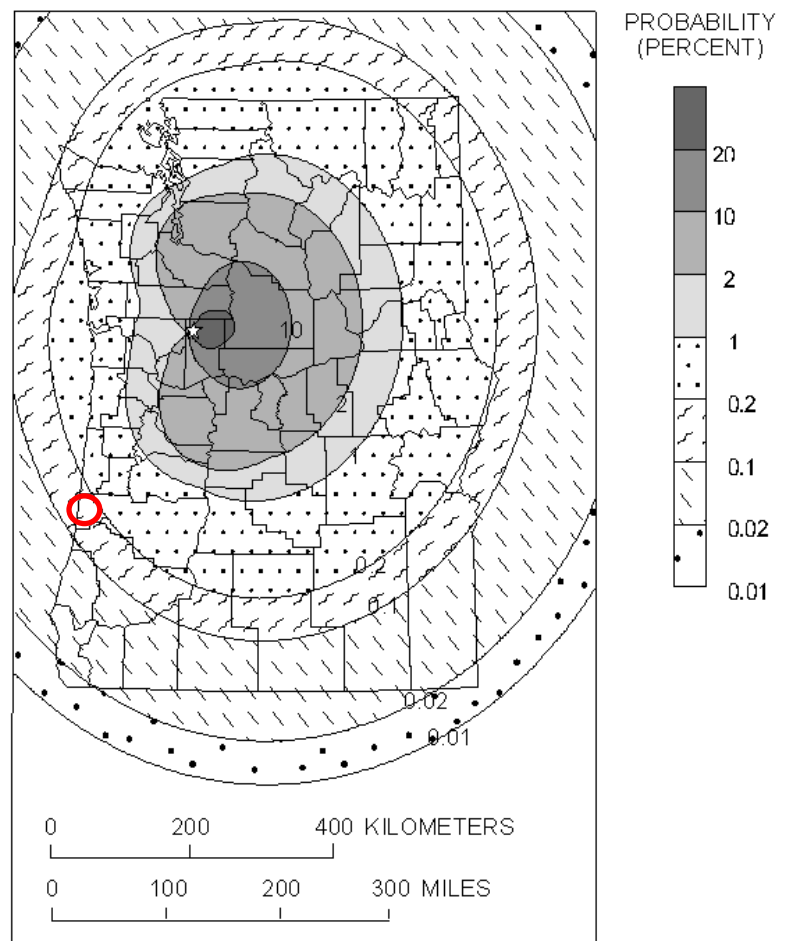


Figure 7.4 Potential Ashfall from a Mt. St. Helens Eruption (in excess of 10cm)^{vi}

Map of Washington and Oregon showing the percentage probability of accumulation of ten or more centimeters (four or more inches) of tephra from a large eruption of Mount St. Helens.



Probability of Future Occurrence

The West Lane Emergency Operations Group (WLEOG) determined the probability of a volcanic event creating a catastrophic effect on Florence to be *low*, meaning no more than one even is likely to occur within the next 75 to 100 years.

Vulnerability Assessment

The WLEOG determined that the City of Florence's vulnerability to a volcanic event is *low*, meaning less than one percent of the community is at risk to volcanic hazards. As noted above, due to Florence's location on the coast there is little risk of ashfall affecting the city. Typical wind patterns push eastward, and all volcanoes are located to the east of Florence in the Cascade Range. The community's greatest vulnerability is its water supply. Due to Florence's reliance on a sole source aquifer, any impact on the water system from ashfall would be detrimental.

Risk Analysis

Because of the distance between the volcanic areas of the Cascade Range and Western Lane County, WLEOG does not believe there is significant volcanic risk to the City of Florence. Furthermore, volcanoes in the Three Sisters Region have been inactive for over 1,000 years. Quantifiable damage and loss estimates are not available at this time due to the low probability of a volcanic eruption affecting the community.

Community Hazard Issues

What is susceptible to damage during a hazard event?

Structural damages can result from the weight of ash, especially if it is wet. Four inches of wet ash may cause buildings to collapse. A half-inch of ash can impede the movement of most vehicles and disrupt transportation, communication, and utility systems, and cause problems for human and animal respiratory systems. It is extremely dangerous for aircraft, particularly jet planes, as the volcanic ash accelerates wear to critical engine components, can coat exposed electrical components, and erodes exposed structures. Ashfall may severely decrease visibility and even cause darkness, which can further disrupt transportation and other systems.

Ashfall can severely degrade air quality, triggering health problems. In areas with considerable ashfall, people with breathing problems might need additional services from doctors or emergency rooms. In severe events, an air quality warning, similar to those given on summer problem air quality days, could be issued. This would, for example, warn people with breathing problems not to go outside. On roads and streets, ashfall can create serious traffic problems as well as road damage. Vehicles moving over even a thin coating of ash can cause great clouds of ash to swell. This results in grave visibility problems for other drivers, calling for speed restrictions, and often forcing road closures. It also adds to the potential for health problems for residents of the area.

Extremely wet ash creates very slippery and hazardous road conditions. Ash filling roadside ditches and culverts can prevent proper drainage and cause shoulder erosion and road damage. Blocked drainages can also trigger debris flows or lahars if they

cause water to pool on or above susceptible slopes. Conventional snow removal methods do not work on dry ash, as they only stir it up and cause it to resettle on the roadway. When ash is pushed to the side of travel lanes, wind and vehicle movement continue to cause it to billow.

Existing Hazard Mitigation Activities

The extremely low vulnerability and probability of a volcanic event in Florence, combined with the low cost-benefit ratio has precluded any mitigation actions.

Hazard Mitigation Action Items

- VE1: Evaluate capability of the Florence wastewater treatment plant to deal with ash fall and upgrade facility as necessary.
- VE2: Update emergency response planning for ash fall events.
- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH 3: Digitize existing maps and data concerning hazardous areas within Western Lane County.
- MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.
- MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.
- MH 13: Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.
- MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

i W.E. Scott, R.M. Iverson, S.P. Schilling, and B.J. Fischer, 2001, Volcano Hazards in the Three Sisters Region, Oregon: U.S. Geological Survey Open-File Report 99-437, 14p.

ii USGS Cascades Volcano Observatory, 1999. Potentially Active Volcanoes of the Western United States. http://vulcan.wr.usgs.gov/Volcanoes/WesternUSA/Maps/map_potentially_active.html

iii Myers, USGS-CVO, 2000, Modified from CVO, 1994, USGS Open-File Report 94-585.

iv USGS Mt. St. Helens Volcano. <http://vulcan.wr.usgs.gov/Volcanoes/MSH/framework.html#Figures1>

v USGS Cascades Volcano Observatory, 1997. Modified from W.E. Scott et al., 1997, Open File Report 95-492

vi USGS Cascades Volcano Observatory, 1999. <http://vulcan.wr.usgs.gov/Images/Gif/MSH/OFR95-497/figure2.gif>

Volume II: Hazard Annex

Wildfire

Causes and Characteristics of the Hazard

Fire is an essential part of Oregon's ecosystem, but it is also a serious threat to life and property particularly in the state's growing rural communities. Wildfires occur in locations that have large areas of flammable vegetation. Due to the dry, hot climate, Central, Southwest and Northeast Oregon have the highest risk; the Oregon Coast has the least risk due to its cooler, wet climate. The Oregon Department of Forestry has estimated that there are about 200,000 homes in Oregon at serious risk to wildfire.

The impact on communities from wildfire can be great. In 1990, Bend's Awbrey Hall Fire destroyed 21 homes, causing \$9 million in damage and costing over \$2 million to suppress. The 1996 Skeleton fire in Bend burned over 17,000 acres and damaged or destroyed 30 homes and structures. Statewide that same year, 218,000 acres were burned, 600 homes were threatened and 44 homes were lost. The 2002 Biscuit fire in southern Oregon affected over 500,000 acres and cost \$150 million to suppress.

Interface Fires

Essentially an interface fire occurs where wildland and developed areas come together with both vegetation and structural development combining to provide fuel. The wildland/urban interface (sometimes called rural interface in small communities or outlying areas) can be divided into three categories.

- The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas.
- The mixed wildland/urban interface is more typical of the problems in areas of exurban or rural development: isolated homes, subdivisions, resorts and small communities situated predominantly in wildland settings.
- The occluded wildland/urban interface where islands of wildland vegetation exist within a largely urbanized area.

Wildland Fires

A wildland fire's main fuel source is natural vegetation. Often referred to as forest or rangeland fires, these fires occur in national forests and parks, private timberland, and on public and private rangeland. A wildland fire can become an interface fire if it encroaches on developed areas.

Firestorms

Firestorms are events of such extreme intensity that effective suppression is virtually impossible. Firestorms often occur during dry, windy weather and generally burn until conditions change or the available fuel is consumed. The disastrous 1991 East

Bay Fire in Oakland, California is an example of an interface fire that developed into a firestorm.

Conditions Contributing to Wildfires

Ignition of a wildfire may occur naturally from lightning or from human causes such as debris burns, arson, careless smoking, and recreational activities or from an industrial accident. Once started, four main conditions affect the fire's behavior: fuel, topography, weather and development.

Fuel is the material that feeds a fire. Fuel is classified by volume and type. As a western state, Oregon is prone to wildfires due to its prevalent conifer, brush and rangeland fuel types.

Topography influences the movement of air and directs a fire's course. Slope and hillsides are key factors in fire behavior. Unfortunately, hillsides with steep topographic characteristics are also desirable areas for residential development.

Weather is the most variable factor affecting wildfire behavior. High risk areas in Oregon share a hot, dry season in late summer and early fall with high temperatures and low humidity.

The increase in residential development in interface areas has resulted in greater wildfire risk. Fire has historically been a natural wildland element and can sweep through vegetation that is adjacent to a combustible home. New residents in remote locations are often surprised to learn that in moving away from built-up urban areas, they have also left behind readily available fire services providing structural protection.

History of the Hazard in Your Community

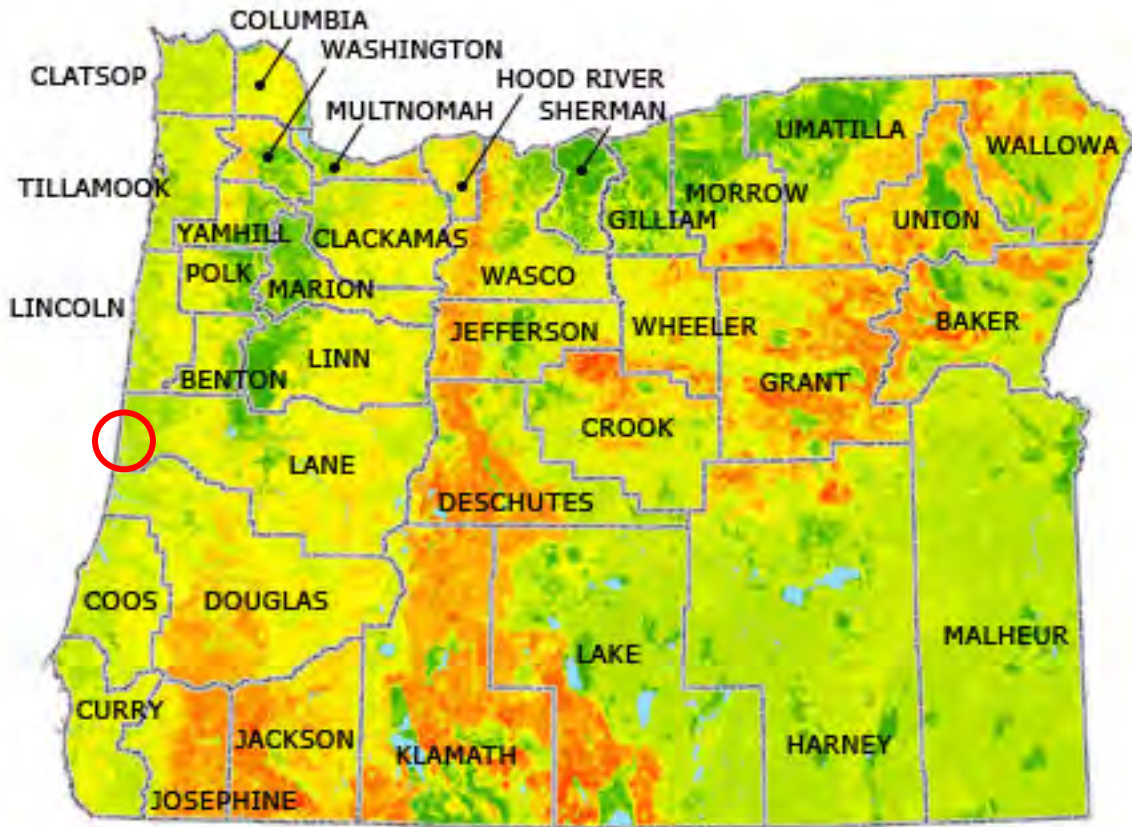
Florence has not had any significant wildfires in the past, but the possibility does exist due to the immense Siuslaw National Forest immediately to the north and east, and the Oregon Dunes National Recreation Area to the south. The lack of wildfire in the past is mostly due to coastal Oregon's wet climate.

Risk Assessment

How are Hazard Areas Identified?

In December of 2004, the Lane County Board of Commissioners directed County staff to work collaboratively with fire protection districts and federal and state agencies to develop a Community Wildfire Protection Plan. The plan determined that less than one percent of the Florence community is at high risk to wildfire, and that over 75 percent of the population is considered low risk. Risk Assessments throughout the state of Oregon are shown in Figure 8.1; Western Lane County has a moderate to low risk rating. Figure 8.2 shows the wildfire risk for Lane County.

Figure 8.1 Wildfire Rating for Oregon

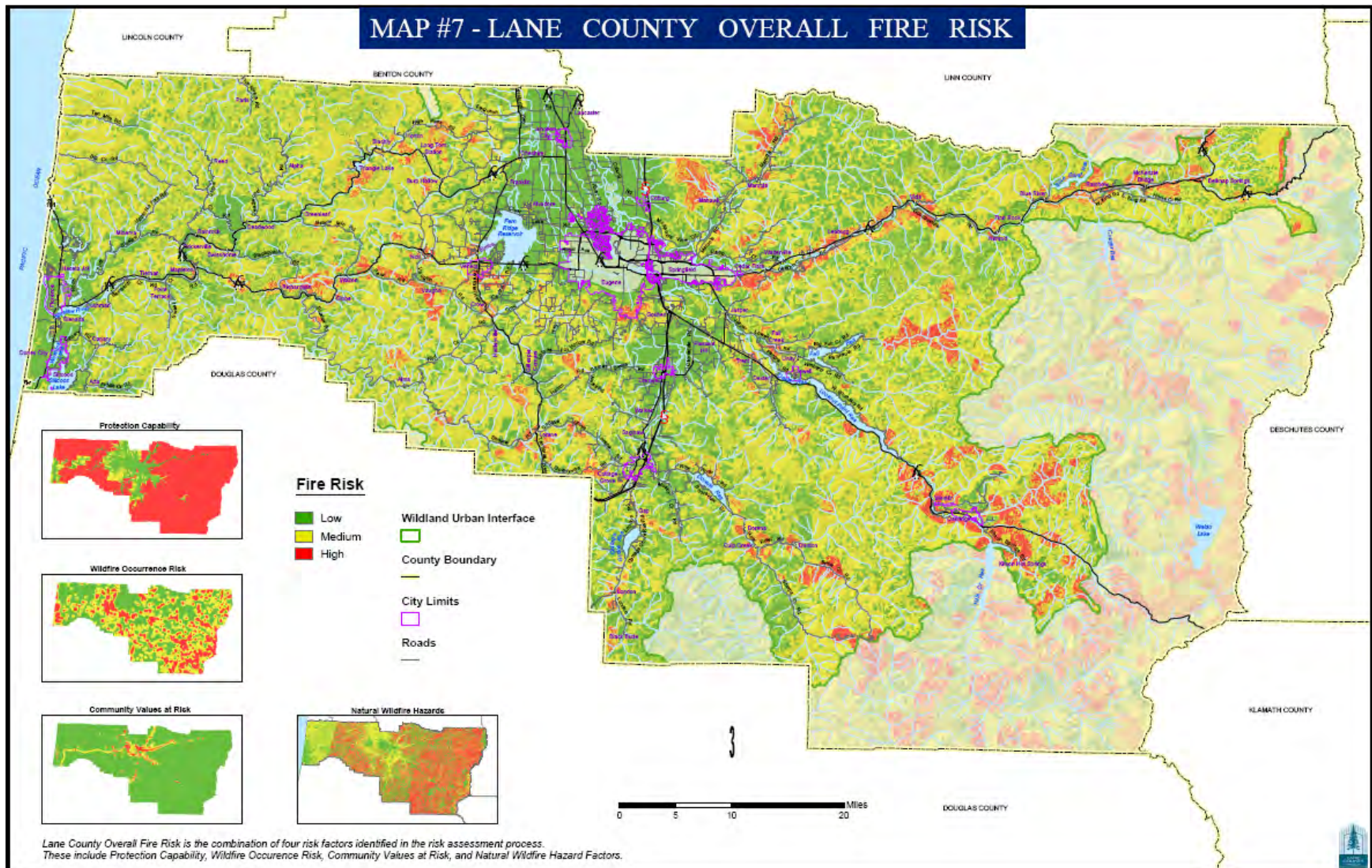


(Green-Low Rating; Yellow-Moderate Rating; Red-High Rating; Blue-Water)

Source: Oregon Department of Forestry.

http://egov.oregon.gov/ODF/FIRE/FirePlans.shtml#Community_Wildfire_Protection_Plans__CWPP_

Figure 8.2 Lane County Wildfire Risk Map



Source: Lane County CWPP

The Oregon Department of Forestry determines Fire Weather Hazard Values which are related to the number of days per season that forest fuels are capable of producing a significant fire. Hazard Values range from 1 to 12 with 1 being the lowest capacity to sustain a forest fire and 12 being the highest. Lane County is divided into Area 1, which contains Florence, and Area 2; both these areas have very low hazard rankings which indicate they are not in a wildfire hazard zone.ⁱ Hazard Value 1 or HV1 produces flame lengths up to five feet with little spotting, torching or crowning. HV2 has flame lengths from 5-8 feet with sporadic spotting, torching or crowning.

Probability of Future Occurrence

The Western Lane Emergency Operations Group estimates a *low* probability of a wildfire event due to the cool and damp climate. This score indicates that one incident is likely within a 35 to 75 year period. Wildfire results from natural causes (e.g., lightning strikes), a mechanical failure (Oxbow Fire), or human-causes (unattended campfire, debris burning, or arson). Most wildfires can be linked to human carelessness. A wildfire in the Siuslaw National Forest, located to the north and east of Florence, given the right fuel conditions and left unimpeded, could feasibly pose a risk to Florence. The typical prevailing wind along the coast during the summer months, when forest fires are most common, is from the north.

Vulnerability Assessment

The City of Florence estimates a *low* vulnerability to wildfire events, meaning less than one percent of the population or region assets are likely to be affected by a major wildfire emergency or disaster. The low vulnerability ranking is due mainly to the cool and damp climate. There are no areas within the City limits that are seen as at risk to wildfire according to WLEOG. It can be assumed that in order for a major wildfire to affect the coast the area would be in the midst of a drought, which would affect the area's water supply. The implications of a drought on Florence are thoroughly described in the drought annex, but one aspect is that there would be a reduced capacity for firefighting within the City. Even with these considerations, WLEOG and the Siuslaw Valley Fire & Rescue Department contend that a fire would have to be left unabated in order to directly impact Florence. According to the Lane County Community Wildfire Protection Plan, the number of days per season that forest fuels are capable of producing a major fire event is significantly lower on the coast than in other parts of Lane County.ⁱⁱ

Risk Analysis

The Lane County Community Wildfire Protection Plan evaluated fire risk by analyzing four factors: (1) historical occurrences; (2) vegetative fuels, weather, and topographic features that typically contribute to fires; (3) potential social, economic, and infrastructure values at risk in the community; and (4) each community's ability to respond to fire. Based on these factors, the assessment determines the risk (high, medium, or low) that wildfire poses throughout Lane County. WLEOG based their probability and vulnerability scores on the Lane County Community Wildfire Protection Plan findings.

Community Hazard Issues

What is susceptible to damage during a hazard event?

The effects of fire on ecosystem resources can include damages, benefits, or some combination of both. Ultimately, a fire's effects depend largely on the characteristics of the fire site, the severity of the fire, its duration and the value of the resources affected by the fire.

The ecosystems of most forests and wildlands depend upon fire to maintain various functions. These benefits can include, depending upon location and other circumstances, reduced fuel load, disposal of slash and thinned tree stands, increased forage plant production, and improved wildlife habitats, hydrological processes and aesthetic environments. Despite these potential benefits, fire has historically been suppressed for years because of its effects on timber harvest, loss of scenic and recreational values and the obvious threat to property and human life.

At the same time, the effects of a wildfire on the built environment, particularly in the face of a major wildfire event, can be devastating to people, homes, businesses and communities. As noted above, fuel, topography, weather and the extent of development are the key determinants for wildfires. A number of other factors also have been identified which affect the degree of risk to people and property in identified wildfire interface areas. These include:

- Combustible roofing material (for example cedar shakes)
- Wood construction
- Homes and other structures with no defensible space
- Roads and streets with substandard width, grades, weight-load and connectivity standards making evacuation and fire response more difficult
- Subdivisions and homes surrounded by heavy natural fuel types
- Structures on steep slopes covered with flammable vegetation
- Limited on-site or community water supply
- Locations with normal prevailing winds over 30 miles per hour

For more information on the wildfire hazard, please visit the State Plan's Wildfire Chapter, Lane County's Community Wildfire Protection Plan, or the Oregon Technical Resource Guide.

Existing Hazard Mitigation Activities

The Siuslaw Valley Fire & Rescue Department, a member of the West Lane Emergency Operations Group, participated in the planning process for Lane County's Community Wildfire Protection Plan (CWPP). The CWPP includes Western Lane County in its risk assessment.

Hazard Mitigation Action Items

- WF1: Identify evacuation routes and procedures for high risk areas and educate the public.
- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH 3: Digitize existing maps and data concerning hazardous areas within Western Lane County.
- MH 5: Review FCC 10-7 Special Development Standards and develop new regulations for developments within areas identified as at risk to hazards (tsunami inundation, steep slope, flood, erosion, etc...).
- MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.
- MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.
- MH 13: Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.
- MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

i Oregon Department of Forestry. 1996. Criteria for Determination of Wildfire Hazard Zones Administration Rules. http://egov.oregon.gov/OSP/SFM/docs/Comm_Ed/WUI/WHZ.doc

ii Oregon Natural Hazards Workgroup. 2004. Lane County Community Wildfire Protection Plan. <http://www.oregonshowcase.org/index.cfm?mode=projects&page=wildfire>

Volume II: Hazard Annex

Windstorms & Winter Storms

Causes and Characteristics of the Hazard

Destructive wind and winter storms that produce ice, rain, freezing rain, and high winds have a long history in Florence. Severe storms affecting Oregon with snow and ice typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from October through March.

Ice storms are comprised of cold temperatures and moisture, but subtle changes can result in varying types of ice formation which may include freezing rain, sleet and hail. Of these, freezing rain can be the most damaging of ice formations.

Due to Florence's location at sea level and adjacent to the Pacific Ocean, significant snow accumulation is much less than on the east side of the Cascades, although accumulation in excess of 10 inches has been documented in the past.

High winds can be expected throughout Western Lane County. Destructive wind storms are less frequent, and their pattern is fairly well known. They form over the North Pacific during the cool months (October through March), move along the coast and swing inland in a northeasterly direction. Wind speeds vary with the storms. Gusts exceeding 100 miles per hour have been recorded at several coastal locations, but lessen as the storm moves inland. These storms can be very destructive as documented in the now infamous Columbus Day Storm of October, 1962. Less destructive storms usually topple trees, power lines, and cause building damage. Flooding can be an additional problem. A large percentage of Oregon's annual precipitation comes from these events.ⁱ

A windstorm is generally a short duration event involving straight-line winds and/or gusts in excess of 50 mph. Although windstorms can affect all of Western Lane County, they are especially dangerous along the coastline in areas with significant tree stands, and in areas with exposed property, major infrastructure, and above ground utility lines. Windstorms can knock down trees and power lines, damage homes, businesses, public facilities, and create tons of disaster related debris.

Though tornadoes are not common in Oregon, these events do occasionally occur and sometime produce significant property damage and even injury. Tornadoes are the most concentrated and violent storms produced by earth's atmosphere, and can produce winds in excess of 300 mph. They have been reported in most of the counties throughout the state since 1887, but are relatively rare phenomena in Florence.

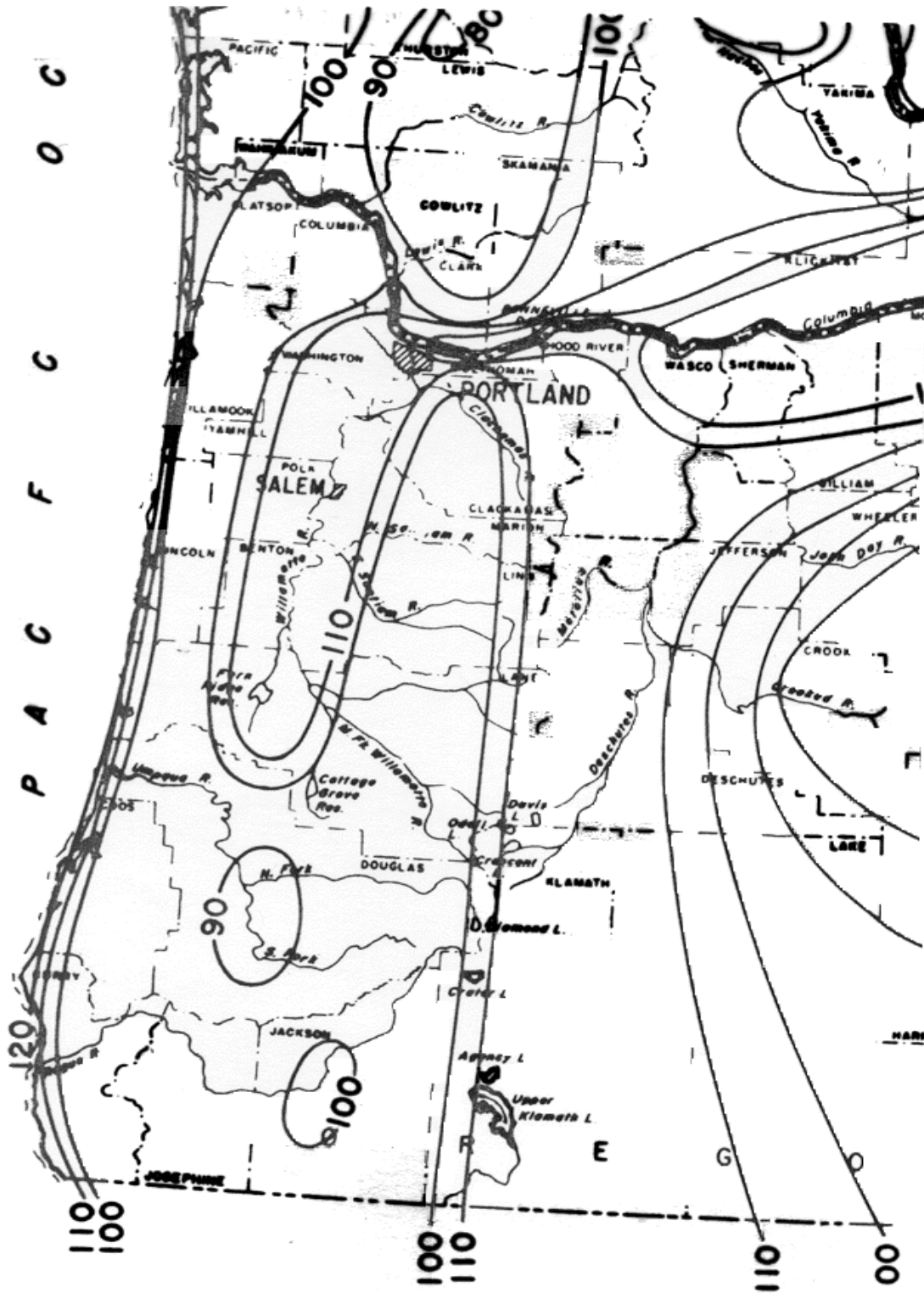
History of the Hazard in Your Community

Winter storms represent a particularly critical problem in the western portions of Lane County, including the area surrounding Florence. The Pacific coastal margin, the area

within a few miles of the Pacific coastline, bears the initial brunt of the massive winter storms that strike Oregon at irregular intervals. Documentation of these impacts is difficult due to the very limited number of observing stations in coastal locations. Figure 9.1 shows the track of a major wind storm that came ashore close to Florence. Reports from other coastal observing stations indicated winds of well over 100 miles per hour and, as noted in the official Oregon climate summary, *(Coastal) wind speeds can exceed hurricane force*. In one case, the observing station at Newport, Oregon (some 50 miles north of Florence on the coast) reported a gust of nearly 130 miles per hour before the recording instrument was destroyed.

Periods of high wind speeds along the Oregon coast are not uncommon; coastal highland areas are commonly forecast to have gusts reaching 60 to 70 miles per hour during the winter months. As noted above, much higher wind speeds and gust velocities are observed at less frequent intervals. The extremely steep gradient in wind speeds all along the coast, with by far the strongest winds occurring near the coast and diminishing rapidly as one moves inland, is of critical interest to Florence since some portions of the City and its Urban Growth Boundary are on the coast itself. Much of the City's critical infrastructure is not far inland.

Figure 9.1 Wind Speed Contours for 50-year Recurrence Interval (km/hr)



During the Columbus Day Storm of 1962, when the tail of Typhoon Frieda struck the Oregon Coast, gusts estimated at 100-140 mph hit the Florence area. Damage in the City included: the leveling of a new solarium wing under construction at the hospital, several flipped planes at the Florence Municipal Airport with one completely totaled, the destruction of the Drive-In Theater screen, the collapse of the Siuslaw 97J Bus garage with resulting damage to vehicles, and many lost and damaged signs, roofs, and windows in commercial and residential buildings alike. A storm on December 12, 1995 brought hurricane force winds of 80-90 mph through Florence. One Florence man was killed when a tree fell on his pickup truck. The greater Florence area lost power for almost twelve hours.

Although less frequent, Florence has also occasionally been hit by substantial snow falls. In 1968, 27 inches of snow was recorded and in 1972, 16 inches was recorded.

Aside from direct wind damage itself, Western Lane County regularly suffers from the flooding and landslide conditions that accompany major coastal storms.

Western Lane County has had the following winter storms and windstorms during its history. Heavy precipitation aspects associated with storms, which sometimes lead to flooding, are covered in the flood annex.

Figure 9.2: Recorded Wind and Winter Storms in Western Lane Countyⁱⁱ

Date	Location	Type	Comments
February 2002	South and Central Coast, Southern Willamette Valley	Windstorm	Major disaster declaration FEMA-1405-DR-OR
December 1995	Northwest Oregon	Wind / Rain	Strongest windstorm since Nov. 1981
January 1993	North Coast Range	Windstorm	Inauguration Day Storm; resulted in a major disaster declaration in Washington State
November 1981	Oregon Coast and N. Willamette Valley	Windstorm	Back-to-back storms on the 13 th and 15 th of November
January 25, 1974		Wind / Rain	
January 21, 1972		Wind / Rain	
February 13, 1971		Wind / Rain	
December 24, 1964		Wind / Rain	
October 1962	Western Oregon, locations east of Cascades	Windstorm	Oregon's most famous and most destructive windstorm, the Columbus Day Storm, produced a barometric pressure low of 960 mb (*)
November 1958	Northwest and Northern Oregon	Windstorm	Also produced damaging gusts across Idaho, Montana, Wyoming
March 1, 1957		Wind / Rain	
December 29, 1955		Wind / Rain	
December 1951	Statewide		Barometric pressure low of 968.5 mb near Astoria (*)
January 1921	Oregon coast /Lower Columbia	Windstorm	Winds 113 mph at mouth of Columbia. Gusts at Astoria, 130mph. Widespread damage
January 1880	Western Oregon	Windstorm	Very high winds. 65-80 mph near Portland Flying debris; fallen trees

(*) For the sake of comparison, surface barometric pressures associated with Atlantic hurricanes are often in the range of 910 to 960 mb. The all-time record low sea level barometric pressure recorded was associated with Typhoon Tip in the Northwest Pacific Ocean on October 12, 1979 at 870 mb.

Risk Assessment

How are Hazard Areas Identified?

All of Western Lane County and Florence are at risk for wind and winter storms. Due to the multitude of variables, such as wind speed and direction, temperature, and rain fall the effects of each storm is different and capable of causing significant damage anywhere. Although undocumented, long term Florence Public Works employees contend that the area south of 12th Street and west of Kingwood experiences the most consistent wind damage during winter months. Damages, however, have been documented throughout the City.

Probability of Future Occurrence

Snowstorms need two ingredients: cold air and moisture. Rarely do the two ingredients occur at the same time over western Oregon, except in the higher elevations of the Coast Range and especially in the Cascades.ⁱⁱⁱ

High windstorms occur yearly. More destructive storms occur once or twice per decade, most recently in December 2007. Although most damage was documented north of Florence, extensive damage from wind, flooding, and landslides were noted throughout the North Coast. High wind events on the order of the 1962 Columbus Day storm are thought to have a 100-year recurrence interval. Western Lane County is rated “high” for windstorm probability, which indicates that at least one major emergency or disaster because of a windstorm is likely within a 10 to 35 year period.^{iv} The West Lane Emergency Operations Group agrees with the Lane County assessment.

Vulnerability Assessment

The West Lane Emergency Operations Group estimates a ‘high’ vulnerability to windstorms. A high ranking indicates that more than 10% of the population or regional assets are likely to be affected by a major windstorm emergency or disaster.

Buildings, utilities, and transportation systems in Florence are all vulnerable to wind damage. This is especially true in open areas, such as along the Pacific Ocean. It also is true in forested areas, along tree-lined roads and electrical transmission lines, and on residential parcels where trees have been planted or left for aesthetic purposes.

Structures most vulnerable to high winds in Florence include insufficiently-anchored manufactured homes and older buildings in need of roof repair. Manufactured and other non-permanent homes make up 31.2% of the housing stock according to the 2000 US Census and require anchoring. Additionally, a majority of Florence’s permanent housing structures were built before 1980 (see Figure 9.3 below^v) and would need to replace their original roofs if not already completed.

Figure 9.3: Florence Housing By Year Built

Pre 1959	1960 – 1979	1980 - 2000
9.6%	34.5%	55.8%

Source: 2000 US Census

Division 530 of the Oregon Building Code identifies high wind areas in Western Lane County and sets anchoring standards for manufactured homes located in those areas.^{vi} It is essential that coastal counties ensure that the standards are enforced. The Oregon Department of Administrative Service's inventory of state-owned and operated buildings includes an assessment of roof conditions as well as the overall condition of the structure. Oregon Emergency Management has arranged this information by county.

Fallen trees are especially troublesome. They can block roads and rails for long periods, which can affect emergency operations. In addition, uprooted or shattered trees can down power and/or utility lines, effectively bringing local economic activity and other essential activities to a standstill. Much of the problem may be attributed to a shallow or weakened root system in saturated ground. Many roofs have been destroyed by uprooted ancient trees growing next to a house. In some situations, strategic pruning may be the answer. Prudent counties will work with utility companies in identifying problem areas and establishing a tree maintenance / removal program.

Tree-lined coastal roads and highways present a special problem in Western Lane County, especially along Highways 126 and 101. This is because much of the traveling public enjoys the beauty of forested corridors and most certainly would be concerned with any sort of tree removal program. In short, any "safety" program involving tree removal must be convincing, minimal, and involve a variety of stakeholders.

Wind-driven waves are common along the Oregon coast and are responsible for road and highway wash-outs and the erosion of beaches and headlands. These problems are addressed under Flood Hazards (i.e., Ocean flooding and wave action) and Coastal Erosion.

Risk Analysis

At this time, data does not allow for estimates of potential wind and winter storm damages.

What is susceptible to damage during a hazard event?

The damaging effects of windstorms may extend for distances of 100 to 300 miles from the center of storm activity. Isolated wind phenomena in the mountainous regions have more localized effects. Near-surface winds and associated pressure effects exert loads on walls, doors, windows, and roofs, sometimes causing structural components to fail.

Positive wind pressure is a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Negative pressure also affects the sides and roof: passing currents create lift and suction forces that act to pull building components and surfaces outward. The effects of winds are magnified in the upper levels of multi-story structures. As positive and negative forces impact and remove the building protective envelope (doors, windows, and walls), internal pressures rise and result in roof or leeward building component failures and considerable structural damage. Debris carried along by extreme winds can directly contribute to loss of life and indirectly to the failure of protective building envelope components. Upon impact, wind-driven

debris can rupture a building, allowing more significant positive and internal pressures. When severe windstorms strike a community, downed trees, power lines, and damaged property are major hindrances to response and recovery.

Severe winter weather can be a deceptive killer. Winter storms which bring snow, ice and high winds can cause significant impacts on life and property. Many severe winter storm deaths occur as a result of traffic accidents on icy roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to the cold. The temporary loss of home heating can be particularly hard on the elderly, young children and other vulnerable individuals.

Property is at risk due to flooding and landslides that may result if there is a heavy snowmelt. Additionally, ice, wind and snow can affect the stability of trees, power and telephone lines and TV and radio antennas. Down trees and limbs can become major hazards for houses, cars, utilities and other property. Such damage in turn can become major obstacles to providing critical emergency response, police, fire and other disaster recovery services.

Severe winter weather also can cause the temporary closure of key roads and highways, air and train operations, businesses, schools, government offices and other important community services. Below freezing temperatures can also lead to breaks in uninsulated water lines serving schools, businesses, and industry and individual homes. All of these effects if lasting more than several days can create significant economic impacts for the communities affected.

Both winter storms and wind storms are particularly damaging to mobile homes and other non-permanent housing structures. According to the 2000 Census, non-permanent housing accounts for 31.2% of the housing stock in Florence. Special attention should be given to securing these types of structures.^{vii}

Existing Hazard Mitigation Activities

The City of Florence adheres to the International Code Council Building Codes and Oregon State Codes for building within the coastal wind zone.

Hazard Mitigation Action Items

- WW1: Educate property owners on how to properly maintain trees to prevent power loss on power lines off the right of way.
- WW2: Perform a city wide tree survey to determine potentially dangerous trees.
- WW3: Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.
- WW4: Support/encourage contractors and homeowners to use windstorm resistant construction methods (i.e. hurricane clips) where possible to reduce damage.
- WW5: Review strategies for debris management and/or removal after windstorm events.

- MH 1: Develop education programs aimed at mitigating risk posed by hazards.
- MH 2: Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...
- MH 5: Review FCC 10-7 Special Development Standards and develop new regulations for developments within areas identified as at risk to hazards (tsunami inundation, steep slope, flood, erosion, etc...).
- MH 6: Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.
- MH 8: Provide mitigation awareness training to the city planning, public works, and GIS staff.
- MH 9: Establish an annual Natural hazard Preparedness Expo.
- MH 11: Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.
- MH 12: Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.
- MH 13: Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.
- MH 14: Seek funding for generators for critical facilities.
- MH 15: Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).

ⁱ Taylor and Hatton, 1999, *The Oregon Weather Book*, p. 139; and FEMA-1405-DR-OR, *Reducing Windstorm Damage to Property and Electrical Utilities*.

ⁱⁱ FEMA http://www.fema.gov/news/disasters_state.fema?id=41, Taylor and Hatton, 1999, *The Oregon Weather Book*, pp. 130-137

ⁱⁱⁱ State Natural Hazard Mitigation Plan, *Winter Storms Chapter*.
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_winterstorm_chapter.pdf

^{iv} Lane County Natural Hazards Mitigation Plan, October 2005.
<http://www.lanecounty.org/EmerMgmt/documents/LaneCountyNHMP.pdf>

^v US Census, 2000

^{vi} Oregon Secretary of State, Department of Consumer and Business Services, Building Codes Division.
Division 530: Park Trailer and Cabana Installation Standards,
http://www.sos.state.or.us/archives/rules/OARS_900/OAR_918/918_530.html

^{vii} US Census Bureau. *2000 Census Summary File 3*, census.gov

Appendix A – Action Item Forms

Multi-Hazard # 1

Proposed Action Item:		Alignment with Plan Goals:	
Develop education programs aimed at mitigating risk posed by hazards		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems; 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>The City of Florence is vulnerable to coastal erosion hazards, drought, earthquakes, flood, landslides, tsunamis, volcanic eruptions, wildfires, and wind and winter storms. Hazards of particular concern include earthquakes, tsunamis, and windstorms.</p> <p>Education programs play a pivotal role in reducing risk from coastal hazards. Techniques used for hazard preparedness by an individual are primarily a function of their level of awareness. Realistic perceptions can minimize potential risk by influencing siting and design decisions. An educated community has a greater likelihood of making decisions that will reduce risk in coastal hazard situations. Source: Oregon Technical Resource Guide. July 2000. Community Planning Workshop. Eugene, OR: University of Oregon. p. 6-26.</p> <p>"The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public informed of, and involved in, the City's actions to mitigate hazards." Source: Oregon Natural Hazards Workgroup. Lane County Natural Hazard Mitigation Plan (Draft). October 2005. Community Service Center, University of Oregon, Eugene, OR. p. 45.</p> <p>"To increase natural hazard mitigation and emergency preparedness in a community, "residents must be aware of the risk and know what they should do before and after the disaster occurs. Outreach and awareness campaigns need to be carefully organized and developed to ensure that residents receive critical information." Source: Oregon Natural Hazards Workgroup. Lane County Natural Hazard Mitigation Plan (Draft). October 2005. Community Service Center, University of Oregon, Eugene, OR. p. 46.</p>			
Ideas for Implementation:			
Partner with Citizen Corps to implement a variety of education and outreach programs along the coast.			
Partner with DOGAMI's Tsunami Advisory Committee to support grassroots education and outreach programs within the community.			
Conduct door-to-door outreach within the tsunami inundation zone.			
Conduct tsunami evacuation drills with effective media coverage.			
Lead Agency:		West Lane Emergency Operations Group	
Internal Partners:		External Partners:	
		Citizen Corps	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)			
<u>Long Term</u> (2-4 or more years)			
Ongoing			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Multi-Hazard # 2

Proposed Action Item:		Alignment with Plan Goals:	
Encourage the public to have supplies, emergency kits and plans in place. Information on developing family emergency plans and kits should be disseminated through several different channels - television, radio, mail, web, etc...		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 	
Rationale for Proposed Action Item:			
<p>"The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public informed of, and involved in, the County's actions to mitigate hazards." Source: Oregon Natural Hazards Workgroup. Lane County Natural Hazard Mitigation Plan (Draft). October 2005. Community Service Center, University of Oregon, Eugene, OR. p. 45.</p> <p>"To increase natural hazard mitigation and emergency preparedness in a community, "residents must be aware of the risk and know what they should do before and after the disaster occurs. Outreach and awareness campaigns need to be carefully organized and developed to ensure that residents receive critical information." Source: Oregon Natural Hazards Workgroup. Lane County Natural Hazard Mitigation Plan (Draft). October 2005. Community Service Center, University of Oregon, Eugene, OR. p. 46.</p>			
Ideas for Implementation:			
Encourage residents to visit ready.gov for preparedness recommendations. Emergency kits should include water, food, a battery-powered or hand crank radio or NOAA Weather Radio, flashlight and extra batteries, a first aid kit, a whistle, dust masks, moist towelettes, garbage bags, and plastic ties, a wrench or pliers, a can opener, and local maps. Additional recommended items are listed on ready.gov as well.			
Encourage Citizen Corps to conduct presentations at local elementary schools; teach kids how to develop emergency kits and plans, and provide kids with information to take home.			
Provide educational material and examples of how to assemble 72 hour kits to residents of the City and employees			
Partner with Chambers of Commerce to teach local businesses how to develop survival kits for use in a natural disaster.			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
Citizen Corps, Siuslaw School District (SJ9), Chamber of Commerce		FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	LT (ongoing)		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 3

Proposed Action Item:		Alignment with Plan Goals:	
Digitize existing maps and data concerning hazardous areas within Western Lane County.		2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination.	
Rationale for Proposed Action Item:			
Improved data for risk assessments can help the City to better identify ways to reduce its risk to natural hazards.			
The City of Florence indicates within its Natural Hazards Mitigation Plan that its probability for, and vulnerability to, most hazards addressed by the NHMP as being moderate or high. Improved data for risk assessments can help the County to better identify ways to reduce its risk to natural hazards.			
The Disaster Mitigation Act of 2000 recommends that communities identify the types and numbers of buildings, infrastructure, and critical facilities in hazard areas [201.6(c)(2)(i)]. The City currently does not have the appropriate dataset to complete this step of the risk assessment process. Better risk assessments can assist communities better direct limited mitigation dollars.			
Ideas for Implementation:			
Partner with DOGAMI and DLCD to digitize the FEMA flood insurance rate map.			
Partner with Lane County; the County has a similar goal within its Natural Hazards Mitigation Plan, and efforts within western Lane County can be coordinated with the County as a whole.			
Lead Agency:		City of Florence - GIS	
Internal Partners:		External Partners:	
Lane Council of Governments		Department of Geology and Mineral Industries, Department of Land Conservation and Development	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3-5 years		
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Multi-Hazard # 4

Proposed Action Item:		Alignment with Plan Goals:	
Develop a data repository for all existing GIS hazard data, and a GIS clearinghouse for sharing risk assessment data layers and risk models.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 	
Rationale for Proposed Action Item:			
<p>The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that are being considered by the community to reduce the effect that natural hazards will have on the community [201.6(c)(3)(ii)]. A GIS data repository and clearinghouse would allow agencies responsible for hazard mitigation to access the most current information, improving their ability to mitigate for hazards. This will assist the City in reducing its overall risk to hazards.</p>			
Ideas for Implementation:			
<p>Explore ways to acquire existing GIS data.</p> <p>Develop method for storing GIS hazard data.</p> <p>Develop methods for informing agencies that would need GIS hazard data that the repository exists.</p>			
Lead Agency:	City of Florence - GIS		
Internal Partners:		External Partners:	
Lane Council of Governments, City of Florence Planning Dept.		Department of Geology and Mineral Industries	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-2 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 5

Proposed Action Item:		Alignment with Plan Goals:	
Review FCC 10-7 <i>Special Development Standards</i> and develop new regulations for developments within areas identified as at risk to hazards (tsunami inundation, steep slope, flood, erosion, etc...)		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on both new and existing buildings [201.6(c)(3)(ii)]. Establishing development standards and new regulations for developments within hazardous areas may reduce the effects of hazards on new and existing buildings.</p> <p>Goal 7 of Oregon's Statewide Land Use Planning Goals requires that local governments "adopt or amend, as necessary, based on the evaluation of risk, plan policies and implementing measures...[that prohibit] the siting of essential facilities, major structures, hazardous facilities and special occupancy structures, as defined in the state building code(ORS 455.447(1) (a)(b)(c) and (e)), in identified hazard areas..." Incorporating Goal 7's requirements in FCC 10-7 will fulfill the state's goal of mitigating essential facilities from natural hazard events.</p>			
Ideas for Implementation:			
Review similar ordinances for sample regulatory language.			
Use GIS data to establish boundaries of potential hazards.			
Conduct at least 1 public meeting (preferably 6) to obtain comments from public.			
Lead Agency:	City of Florence – Planning Department		
Internal Partners:		External Partners:	
GIS		DOGAMI	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3-5 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 6

Proposed Action Item:		Alignment with Plan Goals:	
Expand existing special needs population data to include detailed inventory of all at risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication. Determine effective means of alert, warning and evacuation.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 	
Rationale for Proposed Action Item:			
<p>Creating an inventory of special needs populations that are without access to transportation and communication will assist emergency personnel in responding to such populations in the event of a natural disaster.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify their vulnerability to the hazards that affect the community, and how the community will be impacted by them [201.6(c)(2)(ii)(A)]. Creating an inventory of special needs populations will help the city identify the ways in which these populations will be impacted in the event of a natural hazard, assisting the identification of the city's overall vulnerability to natural hazards.</p>			
Ideas for Implementation:			
<p>The County's Natural Hazards Mitigation Plan proposes the same action within its Natural Hazards Mitigation Plan. Partner with Lane County Public Health in their effort to accomplish the same task; or, contact Lane County Public Health for information regarding how this action has been (or is planned to be) accomplished.</p> <p>Establish "know your neighbor" programs within the City. Neighborhoods can inventory their population's resources (i.e., emergency supplies, equipment), as well as their population's vulnerabilities (i.e., who will need help in a tsunami evacuation?) Contact coastal cities' CERT and Citizen Corps teams for a greater understanding of how this can happen.</p>			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
		Lane County Public Health, Citizen Corps, Meals on Wheels, Home Health Hospice, etc.	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3-4 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 7

Proposed Action Item:		Alignment with Plan Goals:	
Amend West Lane Emergency Operations Group IGA to include Hazard Mitigation as a Purpose.		3. Improve Partnerships for Communication and Coordination.	
Rationale for Proposed Action Item:			
<p>The West Lane Emergency Operations Group IGA is an agreement entered into by and between some or all of the following: the Cities of Florence and Dunes City, the Port of Siuslaw, Siuslaw Rural Fire Protection District, and the Western Lane Ambulance District, all of which are political subdivisions of the State of Oregon, and the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians Police Department. The group agrees to carry out a set list of activities and functions, including emergency planning, preparedness, response, and recovery activities. Mitigation is not mentioned.</p> <p>“Sustainability means that a locality can tolerate – and overcome – damage, diminished productivity, and reduced quality of life from an extreme event without significant outside assistance.” – <i>Disasters by Design, Mileti, D. 1999.</i> Emergency planning, preparedness, response, and recovery activities will not reduce the effect of natural hazards on the built environment, social and cultural constructs, and people within the community. The sole group responsible for emergency planning activities within Western Lane County should take a more holistic, mature approach toward advancing sustainable principles within the community – especially since the coast is particularly vulnerable to earthquakes, tsunamis, windstorms, flooding, and landslides.</p>			
Ideas for Implementation:			
Draft a new set of ‘general purpose’ statements to propose within a future WLEOG meeting.			
Amend the IGA to include language regarding mitigation activities.			
Train WLEOG members about the benefits of mitigation, and encourage WLEOG members to think about incorporating mitigation into their everyday decisions, activities, and conversations.			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-2 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 8

Proposed Action Item:		Alignment with Plan Goals:	
Provide mitigation awareness training to the city planning, public works, and GIS staff.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Providing mitigation training for city planning, public works, and GIS staff increases their awareness and understanding of natural hazard mitigation planning. More informed staff can incorporate natural hazard mitigation into their daily work activities, make better decisions regarding natural hazard planning, and can assist the WLEOG in implementing the Plan's identified action items. This can help the county reduce its overall risk to the natural hazards addressed by the NHMP.</p>			
Ideas for Implementation:			
<p>Identify desired areas of natural hazard mitigation training for city planning, public works, and GIS staff.</p> <p>Research existing regional, state, and federal natural hazard mitigation training programs, and contact agencies for information on possible training opportunities.</p> <p>Allow staff members to attend natural hazard mitigation trainings, or provide incentives for their attendance. Ensure that this is a continued, city-supported effort.</p> <p>Train WLEOG members about the benefits of mitigation, and encourage WLEOG members to think about incorporating mitigation into their everyday decisions, activities, and conversations.</p>			
Lead Agency:	City of Florence		
Internal Partners:		External Partners:	
City Planning, Public Works, GIS		Oregon Emergency Management, FEMA, OPDR, DOGAMI, Insurance Companies	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 9

Proposed Action Item:		Alignment with Plan Goals:	
Establish an annual Natural Hazard Preparedness Expo		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>The Oregon Coast is highly susceptible to earthquakes originating along the Cascadia Subduction Zone (CSZ) and the tsunami that will result from the CSZ event. The entire immediate coastal area of Florence is subject to tsunamis. The inundation area extends upstream along the Siuslaw River as far inland as Mapleton and several miles inland along the North Fork of the Siuslaw River as well.</p> <p>The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(iii)]. Developing a public education and outreach strategies to raise awareness of the risk natural hazard pose will help to keep the public informed of, and involved in, awareness of natural hazards and potential mitigation activities the public can implement.</p> <p>Mitigation is a shared responsibility between local, state, and federal government; citizens; businesses; non-profit organizations; and others. Informing the public of their role in a community's preparedness / mitigation efforts not only increases the public's awareness of a community's hazard risks, but also helps a community reduce its risk to the hazards addressed by the Natural Hazard Mitigation Plan.</p>			
Ideas for Implementation:			
<p>Prepare materials and brochures for a Natural Hazard Preparedness Expo. Model after expos that may have occurred elsewhere in the country and/or along the pacific coast.</p> <p>Develop a website that advertises and describes the event. List information about natural hazards, and post educational information (and/or links to that information) about preparedness and mitigation.</p> <p>Partner with state agencies and organizations involved in emergency preparedness and mitigation along the Oregon Coast.</p> <p>Work with local news media to advertise, and then publicize/report on the event.</p> <p>Coordinate with neighboring communities along the coast to develop the preparedness expo. Work with the Tsunami Advisory Committee Outreach (TACO) group to develop this expo.</p>			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
		Florence Events Center, Senior Boosters, Citizen Corps, Peace Harbor, DOGAMI, Tsunami Advisory Committee, USGS, Oregon Emergency Management, OPDR	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 10

Proposed Action Item:		Alignment with Plan Goals:	
Develop a hazard awareness plan specifically targeted at tourists and visitors.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>A relatively small portion of Florence’s population is located within the tsunami inundation zone. However, the inundation zone includes the areas of Florence, Old Town and the Port of Siuslaw, which hold more cultural and economic value than any other part of the City. Furthermore, during a tsunami event these areas are the most likely to be populated with tourists, who tend to be unaware of evacuation maps and plans. As such, many casualties are expected from a local tsunami event.</p> <p>The City of Florence has established Tsunami Evacuation Routes, and posted signage within the inundation zone identified by DOGAMI. An ordinance is currently being enacted by the Florence City Council to require hotels to post tsunami evacuation information in all rooms. Additional outreach to day-visitors is needed.</p> <p>"To increase natural hazard mitigation and emergency preparedness in a community, "residents [and visitors] must be aware of the risk and know what they should do before and after the disaster occurs. Outreach and awareness campaigns need to be carefully organized and developed to ensure that residents [and visitors] receive critical information." Source: Oregon Natural Hazards Workgroup. Lane County Natural Hazard Mitigation Plan (Draft). October 2005. Community Service Center, University of Oregon, Eugene, OR. p. 46.</p>			
Ideas for Implementation:			
<p>Work with chambers of commerce and the Oregon Coast Visitor’s Association to disseminate natural hazards preparedness information to tourists.</p> <p>Make tsunami evacuation information available at visitor centers and highly populated tourist centers.</p> <p>Encourage restaurants to post tsunami-evacuation maps.</p>			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
		Chamber of Commerce, Oregon Coast Visitor’s Association	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-2 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 11

Proposed Action Item:		Alignment with Plan Goals:	
Map alternative routes that could provide access across the Coast Range in the event that a natural hazard causes isolation.		2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>Although Florence and surrounding areas have not been the center point of any recorded earthquakes, the proximity of the Cascadia Subduction Zone and a history of earthquakes along the Oregon coast mean that such an event is probable, if not inevitable. The Cascadia Subduction Zone presents the potential for an earthquake of magnitude 9.0 or higher. An event of such magnitude would result in buildings and infrastructure suffering varying amounts of damage. Large portions of Highway 101 and roads across the Coast Range would be impassable. This would for the most part sever travel from the coast to the inland valley.</p> <p>Earthquake damage to roads and bridges can be particularly serious by hampering or cutting off the movement of people and goods and disrupting the provision of emergency response services. Such effects in turn can produce serious impacts on the local and regional economy by disconnecting people from work, home, food, school and needed commercial, medical and social services. A major earthquake can separate businesses and other employers from their employees, customers, and suppliers thereby further hurting the economy.</p>			
Ideas for Implementation:			
<p>Identify and evaluate emergency transportation routes and determine which roads and bridges are critical to the transportation network. Map, and/or propose alternative routes.</p> <p>Identify locations at which alternative bridge crossings are required.</p> <p>Identify regional partners to complete this action for the entire Oregon Coast. Partnerships should additionally benefit efforts to identify and/or create alternative systems to connect communities.</p> <p>Map assets and necessary routes of travel. Prioritize routes of highest dependence, and establish partnerships to create redundancy for these routes. Involve the public throughout the mapping (and prioritization) exercise.</p>			
Lead Agency:	Siuslaw Valley Fire & Rescue		
Internal Partners:		External Partners:	
City of Florence – Public Works, Planning		Oregon Department of Transportation	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Ongoing			

Multi-Hazard # 12

Proposed Action Item:		Alignment with Plan Goals:	
Acquire funding to upgrade the Florence Municipal Airport facilities to allow for larger aircraft to land with supplies.		2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>The City of Florence owns and operates a municipal airport within the City limits and is considered a critical facility. In the event of a natural hazard Florence is at risk of being isolated due to its location between the Pacific Ocean and the Coast Range. There are only two main thoroughfares through town, and both have been impeded for significant amounts of time during previous natural hazard events, including wind storms, landslides, mudslides, and floods.</p> <p>The Florence Municipal Airport is the only alternative access to Florence should ground transportation be interrupted. Air transport also is the fastest way to deliver emergency supplies, medical personnel and law enforcement.</p>			
Ideas for Implementation:			
<p>Evaluate potential funding sources (PDM and HMGP will likely not fund this project); contact regional airports for input / advice.</p> <p>Develop a scope of work and budget for the potential upgrade. Identify a person and/or group to develop a grant application.</p>			
Lead Agency:	Florence Municipal Airport		
Internal Partners:		External Partners:	
Florence Planning Department		Federal Aviation Administration, Department of Homeland Security	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3-5 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 13

Proposed Action Item:		Alignment with Plan Goals:	
Develop a food distribution plan in the wake of an extended isolation period due to natural hazard.		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>If a hazard event requires prolonged recovery, feeding Florence City residents & coastal communities that rely upon Florence's services could become difficult. This is especially true if major roadways and bridges are harmed.</p> <p>In the event of a natural hazard Florence is at risk of being isolated due to its location between the Pacific Ocean and the Coast Range. There are only two main thoroughfares through town, and both have been impeded for significant amounts of time during previous natural hazard events, including wind storms, landslides, mudslides, and floods.</p>			
Ideas for Implementation:			
<p>Take steps toward increasing the population's food security by boosting self-reliance. Increasing the numbers of community gardens, victory gardens, CSA's, and urban agriculture enterprises are potential options.</p> <p>Create a food distribution contingency plan to distribute perishable food. The plan should focus on: 1) maintaining transportation lines from food production and distribution facilities; 2) support of urban agriculture. The plan should be developed in collaboration with the U.S. Department of Agriculture – Natural Resource Conservation Service.</p>			
Lead Agency:		West Lane Emergency Operations Group	
Internal Partners:		External Partners:	
		Local grocery stores, Food Share, U.S. Department of Agriculture Natural Resource Conservation Service, OSU Extension	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Multi-Hazard # 14

Proposed Action Item:		Alignment with Plan Goals:	
Seek funding for generators for critical facilities.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 	
Rationale for Proposed Action Item:			
<p>Although generators are typically not funded by the Pre-Disaster Mitigation (PDM) Grant Program or the Hazard Mitigation Grant Program (HMGP), the City of Florence has identified a need for acquiring this equipment. Critical facilities include the Airport, Police Department, Siuslaw Valley Fire & Rescue, the water & wastewater treatment plants, pump stations, lift stations, and the Florence Events Center (FEC). The FEC is a non-profit community and events center funded by the City of Florence and operated by a mostly volunteer workforce. The FEC is slated to serve as a staging area in the aftermath of a severe hazard.</p> <p>It is important that critical facilities function during and after disasters. Ensuring continuous service will assist residents in recovering from a natural disaster as well as make the process easier.</p>			
Ideas for Implementation:			
<p>Prioritize the need for generators within each facility.</p> <p>Establish a maintenance program for emergency power generators i.e., once a month, make sure there is a sufficient fuel supply for the generators, and make sure the generators are able to pick up the load required for its purpose.</p> <p>Potential FEMA funding sources include the Emergency Management Performance Grant (EMPG), Emergency Operations Center (EOC) Grant Program, the Homeland Security Grant Program (HSGP), the Interoperable Emergency Communications Grant Program (IECGP), and the Regional Catastrophic Preparedness Grant Program (RCPGP). Review all potential grant programs and determine an appropriate program to pursue.</p>			
Lead Agency:	City of Florence		
Internal Partners:		External Partners:	
		WLEOG, FEMA, Oregon Emergency Management	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Multi-Hazard # 15

Proposed Action Item:		Alignment with Plan Goals:	
Establish mutual aid agreements between governmental agencies and commercial businesses in the event of an emergency (e.g. fuel, heavy equipment, food, etc.).		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>Mutual Aid Agreements are commonly used in the emergency management field to pre-arrange assistance with other agencies or jurisdictions in case of an event. This concept, under the term “Memorandum of Understanding” could be applied to pre-disaster mitigation to confirm collaboration on natural hazard mitigation activities.</p> <p>Developing formal agreements with internal and external partners could assist the partners in collaborating and sharing the responsibility of natural hazard mitigation. Such actions to form collaborative partnerships and commitments to mitigation can assist the City in reducing its risk to the natural hazards addressed by the NHMP.</p> <p>If a hazard event requires prolonged recovery, feeding Florence City residents & coastal communities that rely upon Florence’s services could become difficult. This is especially true if major roadways and bridges are harmed.</p> <p>Earthquake damage to roads and bridges can be particularly serious by hampering or cutting off the movement of people and goods and disrupting the provision of emergency response services. Such effects in turn can produce serious impacts on the local and regional economy by disconnecting people from work, home, food, school and needed commercial, medical and social services. A major earthquake can separate businesses and other employers from their employees, customers, and suppliers thereby further hurting the economy. Established Mutual Aid Agreements can anticipate and prepare for meeting the needs and vulnerabilities of coastal communities.</p>			
Ideas for Implementation:			
Develop formal agreements (such as Memorandums of Understanding, MOUs) with internal (departments) and external partners (e.g. non-profit organizations, cities, and state agencies) to work together on risk reduction efforts in the City and communities along the Oregon Coast.			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
		Chamber of Commerce, coastal communities, Siuslaw Valley Fire & Rescue, Dunes City, Oregon Emergency Management	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Coastal Erosion # 1

Proposed Action Item:		Alignment with Plan Goals:	
Enter into a contract with DOGAMI or private geologist consultant to map oceanfront and riverfront land and produce a report recommending development standards.		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>The City is currently evaluating its development standards along the Siuslaw River, and hopes to propose amendments to the City Council in 2009.</p> <p>Coastal erosion processes create special challenges for people living near the ocean, requiring sound planning in order to minimize the potential dangers to life and property. Attempts to stabilize the shoreline or beach are often futile because the forces that shape the coast are persistent and powerful. Inadequate understanding of the complex interaction of coastal land forms and waters and the various types of coastal erosion can result in serious threats to people, communities and infrastructure.</p> <p>Currently, Title 10 of Chapter 7 in Florence’s Code limits development within fifty feet (50’) of a river cutbank unless the bank has been stabilized. “Human intervention has been responsible for altering beach processes and changing patterns of deposition and erosion. Considerable money and effort have been expended to halt coastal erosion, which in places carries away as much as two feet per year. Much of the problem can be attributed to a poor understanding of coastal processes. Sea walls and riprap, as well as housing on sand spits and headlands, quite often result in effects opposite those desired.” – <i>DOGAMI</i> Increased understanding of coastal processes may benefit the development of future code.</p>			
Ideas for Implementation:			
<p>Review coastal communities’ coastal development standards. Implement additional restrictions to Title 10 of Chapter 7.</p> <p>Consider the implementation of a <i>Beaches and Dunes Overlay</i>, which could prohibit the removal of soil and sand from the overlay area.</p> <p>The Clatsop County Dredged Material Disposal plan identifies specific areas that are appropriate for disposal of materials for beneficial use; such as coastal erosion. Consider developing a similar plan.</p> <p>Determine whether properties within the 50-foot setback should be moved and/or stabilized. Since coastal processes are ongoing, the setback line should expectedly move over time.</p>			
Lead Agency:	City of Florence - Planning		
Internal Partners:		External Partners:	
		Department of Geology and Mineral Industries	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	5+ years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Coastal Erosion # 2

Proposed Action Item:		Alignment with Plan Goals:	
Establish geologic report content standards and certification requirements for shoreline protective structures.		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>Areas along the Pacific Ocean and Siuslaw are most likely to be damaged during a coastal erosion event. Additional areas at risk include the east side of Rhododendron Drive; homes in Greentrees, Marine Manor, Shelter Cove and Wild Winds; businesses along the riverfront in Florence’s Old Town. The City is currently evaluating its development standards along the Siuslaw River, and hopes to propose amendments to the City Council in 2009.</p> <p>“There are many different types of shoreline protective structures. The most common form in Oregon is the riprap revetment, which consists of large boulders placed on the bluff or dune slope over smaller rock fill and/or filter fabric. Other less common types of shoreline protective structures includes seawalls constructed of formed concrete, concrete blocks, or in a few cases treated wood. Shoreline protective structures are very expensive to install, and can have several effects on a public beach such as beach narrowing, scenic degradation, and requirement for continued maintenance with heavy equipment. In addition, placement of a hardened structure in front of one property may cause adjacent properties to experience increased erosion.”</p>			
Ideas for Implementation:			
<p>According to Statewide Land Use Planning Goal 18, shoreline protective structures may be considered only where development existed on January 1, 1977. The Oregon Coastal Management Program is conducting a project to inventory the 1977 development status of all oceanfront properties. The results of this study are being made available county by county as the analysis is completed.</p> <p>When results are received, develop standards and certification requirements for shoreline protective structures, where allowed.</p>			
Lead Agency:	City of Florence - Planning		
Internal Partners:		External Partners:	
		Oregon Coastal Management Program, DLCD	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
0-1 year			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Drought # 1

Proposed Action Item:		Alignment with Plan Goals:	
Enter into a contract or intergovernmental agreement with water purveyors to provide potable water in the event that the Florence Dunal Aquifer becomes tainted.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 	
Rationale for Proposed Action Item:			
<p>The Florence Drought risk assessment notes that Florence has a low probability of a drought occurring during the next 75 to 100 years. However, Florence has a high vulnerability to drought because it is the only community with a sole-source aquifer in the state of Oregon. Should an extended drought occur in Florence, water resources in the aquifer may desiccate and water would have to be brought in from Reedsport or Eugene. In addition, if the Dunal Aquifer becomes tainted, Florence’s primary source of water will also be compromised. Entering into a contract or intergovernmental agreement with water purveyors will prepare Florence in the event the city’s water resources are compromised.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions and projects that reduce the effects of a hazard on the community [201.6(c)(3)(ii)]. While entering into a contract or intergovernmental agreement to obtain potable water does not necessarily protect water resources, it will reduce the impact of a drought or of water contamination on the community of Florence by improving preparedness.</p>			
Ideas for Implementation:			
<p>Coordinate with local communities to identify potential water purveyors and available water resources.</p> <p>Develop strategies for reducing water usage in the event of a drought or contamination of the Dunal Aquifer.</p>			
Lead Agency:	City of Florence – Public Works		
Internal Partners:		External Partners:	
		Heceta Head Water District, Dunes City, Reedsport, Eugene, Lane County, OEM, FEMA,	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Drought # 2

Proposed Action Item:		Alignment with Plan Goals:	
Establish water conservation measures and drought management practices.		1. Protect Life, Commerce, Property, and Natural Systems. 4. Increase Awareness Through Education.	
Rationale for Proposed Action Item:			
<p>The drought risk assessment rates Florence a low probability of a drought occurring during the next 75 to 100 years. However, Florence has a high vulnerability to drought because it is the only community with a sole-source aquifer in the state of Oregon. Should an extended drought occur in Florence, water resources in the aquifer may desiccate and water would have to be brought in from Reedsport or Eugene. Establishing water conservation measures and drought management practices will help reduce water usage in the event of an extended drought, and reduce reliance on outside sources of water.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions and projects that reduce the effects of a hazard on the community [201.6(c)(3)(ii)], which includes protecting natural resources. Water conservation measures and drought management practices will help in protecting Florence’s water resources should an extended drought occur.</p>			
Ideas for Implementation:			
Develop a water conservation ordinance to restrict water usage during drought conditions.			
Develop strategies for reducing water usage.			
Prepare outreach materials and strategies for informing the public about restricting water usage should a drought occur.			
Consider implementing water conservation measures during non-drought periods to reduce water usage and prevent low water levels from occurring.			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
		Siuslaw Fire & Rescue, Heceta Head Water District, Lane County, OEM, FEMA, Oregon Parks and Recreation.	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Earthquake # 1

Proposed Action Item:		Alignment with Plan Goals:	
Develop a comprehensive outreach program to educate businesses and residents about Florence’s vulnerability to earthquakes and non-structural and structural retrofits they can implement to reduce the impact of a future earthquake event.		1. Protect Life, Commerce, Property, and Natural Systems. 4. Increase Awareness Through Education.	
Rationale for Proposed Action Item:			
<p>Florence is especially vulnerable to earthquake hazards due to its proximity to the Cascadia Subduction Zone (CSZ). With very few exceptions, all of the structures located within the city are built on soils that are subject to liquefaction. Although the municipal area of Florence is not prone to earthquake induced landslides, the south side of the Siuslaw River is at high risk as well as areas along Highways 101 and 126. Educating businesses and homeowners about the structural and non-structural retrofitting of vulnerable homes will help reduce their vulnerability to a future earthquake event. In addition, future injuries can be prevented through non-structural retrofit of a business.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions that protect new and existing buildings [201.6(c)(3)(ii)]. Educating homeowners about the structural and non-structural retrofitting of vulnerable homes will encourage them to improve their homes and reduce the impact of a future earthquake event.</p>			
Ideas for Implementation:			
<p>Potential outreach materials include: informational brochures about community seismic risks and mitigation techniques, public forums, newspaper articles, training classes, and television advertisements.</p> <p>Seek funding for education and outreach programs.</p> <p>To encourage residents and businesses to implement structural and non-structural retrofits, develop a pilot project that provides financial incentives for structural and non-structural seismic mitigation measures.</p>			
Lead Agency:	City of Florence		
Internal Partners:		External Partners:	
		Lane County, Building Department, Public Works Department, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
0-1 year			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Earthquake # 2

Proposed Action Item:		Alignment with Plan Goals:	
Develop an inventory of public (city buildings, LCC, etc.) and large commercial buildings/employers that may be particularly vulnerable to earthquake damage.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 	
Rationale for Proposed Action Item:			
<p>Florence is especially vulnerable to earthquakes due to its proximity to the Cascadia Subduction Zone (CSZ). With very few exceptions, all of the structures located within the city are built on soils that are subject to liquefaction. Although the municipal area of Florence is not prone to earthquake induced landslides, the south side of the Siuslaw River is at high risk as well as areas along Highways 101 and 126. Developing an inventory of public and large commercial buildings vulnerable to earthquakes can help the city and private individuals focus efforts on appropriate mitigation priorities and measures.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify the community's vulnerability to natural hazards, and recommends identifying the types and numbers of buildings and infrastructure that could be affected by hazards [201.6(c)(2)(ii)(A)]. Completing an inventory of public and commercial buildings that are vulnerable to earthquakes helps the city assess its overall vulnerability to earthquakes. A more accurate assessment of its earthquake vulnerability can assist the city in identifying and selecting appropriate methods for earthquake risk mitigation.</p>			
Ideas for Implementation:			
<p>Use DOGAMI's Statewide seismic needs assessment as an initial inventory list of public buildings to determine vulnerability to earthquake damage.</p> <p>Assess large commercial buildings for vulnerability to earthquakes.</p> <p>Tools to determine a building's vulnerability to earthquake include Rapid Visual Screening techniques, engineering studies, DOGAMI's HAZUS reports for Lane County, and evaluation of local and regional seismic maps.</p> <p>Determine the importance of a building to the local economy and to recovery efforts during an emergency to prioritize importance for mitigation.</p>			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
Florence Building Department, Public Works Department		Chamber of Commerce, DOGAMI, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Earthquake # 3

Proposed Action Item:		Alignment with Plan Goals:	
Retrofit public buildings and critical facilities to meet or exceed current standards for earthquake resistance.		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>There are several public buildings in Florence with a moderate to high collapse potential should a major earthquake occur. The Statewide Seismic Needs Assessment completed by DOGAMI in 2007 identified two buildings in the Siuslaw 29J school district with a moderate collapse potential, and one building with a high collapse potential in the event of a large earthquake. One Lane County Community College building has been identified as having a high collapse potential.</p> <p>The Statewide Seismic Needs Assessment also identified three critical facilities as having a moderate to high collapse potential. These include the Peace Harbor Hospital and the Siuslaw Valley Fire and Rescue Station No. 8. While not a conclusive assessment about a building's resilience to earthquakes, the Statewide Seismic Needs Assessment does identify buildings that should be considered for seismic retrofit.</p> <p>Florence is especially vulnerable to earthquakes due to its proximity to the Cascadia Subduction Zone (CSZ). With very few exceptions, all of the structures located within the city are built on soils that are subject to liquefaction. Although the municipal area of Florence is not prone to earthquake induced landslides, the south side of the Siuslaw River is at high risk as well as areas along Highways 101 and 126. Retrofitting public buildings and critical facilities will help reduce the impact of a seismic event on the city should an earthquake occur.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions that protect new and existing buildings [201.6(c)(3)(ii)]. Retrofitting public buildings and critical facilities to meet or exceed current standards for earthquake resistance can significantly reduce Florence's vulnerability to future earthquakes.</p>			
Ideas for Implementation:			
Identify and prioritize public buildings and critical facilities in need of a seismic retrofit.			
Work with structural engineers and architects to develop techniques for proper seismic retrofit.			
Coordinate with DOGAMI and OEM to seek funding for retrofitting buildings.			
Lead Agency:		City of Florence	
Internal Partners:		External Partners:	
		Peace Health Hospital, Fire Department, Police Department, Lane County, Building dept, Siuslaw School District (SJ9), DOGAMI, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	5-7 years		
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Earthquake # 4

Proposed Action Item:		Alignment with Plan Goals:	
Seismically retrofit the historic Siuslaw River Bridge.		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>The Siuslaw River Bridge connects highway 101 over the Siuslaw River, linking smaller rural areas south of Florence to the city. The bridge, built in 1936, was constructed before Oregon’s earthquake risk was fully understood, and is not considered seismically stable. The bridge is also listed on the National Register of Historic Places. To ensure a reliable connection along highway 101 in the event of an earthquake, the bridge should be seismically retrofitted, but done in a sensitive manner to preserve the structure’s historic and architectural integrity.</p> <p>Florence is especially vulnerable to earthquakes due to its proximity to the Cascadia Subduction Zone (CSZ). With very few exceptions, all of the structures located within the city are built on soils that are subject to liquefaction. Although the municipal area of Florence is not prone to earthquake induced landslides, the south side of the Siuslaw River is at high risk as well as areas along Highways 101 and 126. Seismically retrofitting the historic Siuslaw River Bridge will reduce the impact of an earthquake on the city and maintain an important link over the Siuslaw River.</p> <p>Historic properties and cultural resources are also valuable economic assets that increase property values and attract businesses and tourists. Far from being at odds with economic development, preservation of these assets is often an important catalyst for economic development (e.g., historic downtown revitalization programs leading to growth in heritage tourism). (FEMA How-to Guide: Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning, May 2005). Seismically retrofitting the historic Siuslaw River Bridge will protect one of Florence’s historic landmarks and maintain its tourist-based economy.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions that protect new and existing buildings [201.6(c)(3)(ii)]. The Siuslaw is a critical piece of infrastructure that connects both sides of the Siuslaw River, and will significantly reduce Florence’s vulnerability to future earthquakes.</p>			
Ideas for Implementation:			
<p>Coordinate with ODOT and the Oregon State Historic Preservation Office to develop proper seismic retrofit techniques for the Siuslaw River Bridge.</p> <p>Seek funding from ODOT for retrofit of the bridge.</p>			
Lead Agency:		City of Florence	
Internal Partners:		External Partners:	
Public Works Department		Lane County, Oregon Department of Transportation, State Historic Preservation Office (SHPO)	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)			
<u>Long Term</u> (2-4 or more years)			
5-7 years			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Earthquake # 5

Proposed Action Item:		Alignment with Plan Goals:	
Improve local capabilities to perform earthquake building safety evaluations.		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>Building safety evaluations are important in determining the seismic strength of a structure. Improving local capacity to perform evaluations will provide a more comprehensive assessment of overall building safety. Improving local capabilities will also help in implementing Earthquake Action # 2 in developing an inventory of buildings in need of a seismic retrofit.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify the community's vulnerability to natural hazards, and recommends identifying the types and numbers of buildings and infrastructure that could be affected by hazards [201.6(c)(2)(ii)(A)]. Improving local capabilities to perform earthquake building safety evaluations will help in identifying the types and numbers of buildings and infrastructure that could be impacted by an earthquake event.</p>			
Ideas for Implementation:			
<p>Coordinate with the Oregon Building Codes Division to conduct training on performing earthquake building safety evaluations.</p> <p>Work with FEMA and DOGAMI to develop trainings for improving building safety.</p>			
Lead Agency:	Florence Building Department		
Internal Partners:		External Partners:	
Planning Department		FEMA, DOGAMI, Oregon Building Codes Division	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	1-3 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Flood # 1

Proposed Action Item:		Alignment with Plan Goals:	
Reevaluate the projects outlined in the Florence Storm Water Management Plan and reprioritize and add projects as necessary.		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>After the 1996 floods, the City of Florence completed a comprehensive Storm Water Management Plan in 2000 evaluating drainage concerns throughout the City’s urban growth boundary. The plan identifies likely flooding locations and established a capital improvement plan to alleviate flooding concerns. Thus far, conveyance improvements have been made to Maple Street from 9th to 6th, along 35th Street, and from the intersection of Spruce Street and Munsel Lake Road to Hwy 101 and south along Hwy 101 to 42nd Street. As Florence’s plan for storm water and flood management, projects outlined in the eight-year old plan need to be reprioritized and new projects should be added where necessary.</p> <p>The Disaster Mitigation Act of 2000 requires that mitigation plans include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate [201.6(c)(4)(ii)]. The Florence Storm Water Management Plan is a local mechanism for reducing the impact of flooding events through storm water management. The plan provides a process for Florence to prioritize and implement flood mitigation projects and incorporates many of the requirements found in the Florence Natural Hazards Mitigation Plan.</p>			
Ideas for Implementation:			
<p>Identify unaddressed flooding issues and storm water projects to include in the Florence Storm Water Management Plan.</p> <p>Review the Florence Storm Water Management Plan for outdated information and update the plan as needed.</p> <p>Coordinate a review of the Storm Water Management Plan with the public to gather feedback on flooding and storm water issues in the community.</p>			
Lead Agency:	City of Florence – Public Works		
Internal Partners:		External Partners:	
Planning Department		WLEOG, ODOT	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3-5 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Flood # 2

Proposed Action Item:		Alignment with Plan Goals:	
Explore the potential for participation in the NFIP's Community Rating System.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Increase Awareness through education. 	
Rationale for Proposed Action Item:			
<p>The flood hazard risk assessment for the City of Florence indicates that the city has a high probability and vulnerability to future flooding events. The most recent flood occurred in 1996 where entire housing developments in Florence were inundated. Currently, the city is a participant in the National Flood Insurance Protection Program which covers a total of 158 properties. The community rating system (CRS) provides financial incentives for cities and property owners to improve their flood mitigation efforts above minimum flood management techniques. Joining the CRS will not only improve flood mitigation in Florence, but will also reduce the NFIP premiums for the 158 properties in the NFIP program.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions that protect new and existing buildings [201.6(c)(3)(ii)]. Participating in NFIP's Community Rating System will improve flood mitigation efforts in Florence that will protect existing buildings in the NFIP program, but the additional flood mitigation efforts will also reduce the impact of floods on new construction.</p>			
Ideas for Implementation:			
<p>Visit the CRS website to find out how Florence can become a member of the CRS. CRS website: http://training.fema.gov/EMIWeb/CRS/</p> <p>Work towards obtaining higher CRS class ratings (1 being the highest rating obtainable; 10 being a non-participating community). Activities that reduce flood insurance premiums fall under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.</p>			
Lead Agency:	City of Florence - Planning		
Internal Partners:		External Partners:	
Florence Public Works		WLEOG, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	2 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Flood # 3

Proposed Action Item:		Alignment with Plan Goals:	
Promote mitigation efforts to homes identified in the Florence Storm Water Management Plan as prone to flooding.		1. Protect Life, Commerce, Property, and Natural Systems. 4. Increase Awareness Through Education.	
Rationale for Proposed Action Item:			
<p>After the 1996 floods, the City of Florence completed a comprehensive Storm Water Management Plan in 2000 evaluating drainage concerns throughout the City's urban growth boundary. The plan identifies likely flooding locations and established a capital improvement plan to alleviate flooding concerns. The Plan also identifies homes prone to flooding, and mitigation efforts should be focused on these properties to reduce the impact of future flooding events.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions that protect new and existing buildings [201.6(c)(3)(ii)]. The Storm Water Management Plan has identified buildings in Florence that are prone to flooding events, and mitigation efforts should be focused on these buildings to reduce future flood losses.</p>			
Ideas for Implementation:			
<p>Inform property owners of their risk to flooding events and mitigation actions they can implement to reduce the impact of future floods.</p> <p>Education and outreach materials such as informational brochures, newspaper articles, and presentations are cost-effective methods for promoting mitigation efforts in homes prone to flooding.</p>			
Lead Agency:	City of Florence		
Internal Partners:		External Partners:	
Planning Department, Public Works Department		Neighborhood Associations, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Flood # 4

Proposed Action Item:		Alignment with Plan Goals:	
Implement the Spruce Street LID storm water improvement system, phase 3, which consists of storm water conveyance upgrades from Hwy 101 and 42nd street to a drainage way behind Pacific Pines RV Park south to 40th street, then into a storm water pipe from 40th street to 38th Street and finally to a new outfall into Munsel Creek.		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>Over the past several years, the city of Florence has worked to provide municipal services to the northernmost extent of the city in the vicinity of Highway 101 and Munsel Lake Road. A high demand for serviced residential land has spurred the development of the Spruce Street Local Improvement District (LID). While developing a storm water system for the LID, it was determined that limited drainage capacity was available for the subject region. Munsel Creek serves as the primary drainage way for northeast Florence. This waterway was determined to have limited capacity for storm water runoff. Therefore, in developing the storm water system for the LID, a drainage strategy for the entire sub-basin was developed to fairly allocate available drainage capacity. The total project has been divided into three phases. Work for phases 1 and 2 have been completed, and the third phase must be completed to finish the project. Completion of this work will reduce future flooding events due to inadequate storm water runoff.</p> <p>The Disaster Mitigation Act of 2000 requires communities to identify comprehensive actions that protect new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Implementing phase 3 of the Spruce Street LID will improve drainage and help in protecting existing and future structures from flooding events.</p>			
Ideas for Implementation:			
<p>Coordinate efforts with the Public Works Department to implement the Spruce Street LID storm water improvement system.</p> <p>Conduct a competitive bidding process to identify contractors to completed the work for improving the storm water system.</p>			
Lead Agency:		City of Florence – Public Works	
Internal Partners:		External Partners:	
Planning Department		FEMA, ODOT, Oregon DEQ	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-3 years			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Flood # 5

Proposed Action Item:		Alignment with Plan Goals:	
Continue compliance with the National Flood Insurance Program (NFIP).		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>The National Flood Insurance Program (NFIP) provides communities with federally backed flood insurance, provided that communities develop and enforce adequate floodplain management measures. According to the NFIP, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify actions and projects that reduce the impact of a natural hazard on the community, particularly to new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continued participation in the NFIP will diminish flood damage to new and existing buildings in communities while providing homeowners, renters, and business owners additional flood insurance protection.</p>			
Ideas for Implementation:			
<p>Actively participate with DLCD and FEMA during Community Assistance Visits. The Community Assisted Visit (CAV) is a scheduled visit to a community participating in the NFIP for the purpose of: 1) conducting a comprehensive assessment of the community's floodplain management program; 2) assisting the community and its staff in understanding the NFIP and its requirements; and 3) assisting the community in implementing effective flood loss reduction measures when program deficiencies or violations are discovered.</p> <p>Conduct an assessment of Florence's floodplain ordinances to ensure they reflect current flood hazards.</p>			
Lead Agency:	Florence Planning Department		
Internal Partners:		External Partners:	
Public Works Department		FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Ongoing			

Landslide # 1

Proposed Action Item:		Alignment with Plan Goals:	
Enter into an agreement with DOGAMI's Oregon LIDAR Consortium to map the geomorphology (the study of landforms and the processes that shape them) of western Lane County.		1. Protect Life, Commerce, Property, and Natural Systems.	
Rationale for Proposed Action Item:			
<p>LIDAR (light detection and ranging) is a mapping tool that can provide very precise, accurate, and high-resolution images of the surface of the earth, vegetation, and the built environment. It can be used to study landforms and identify areas, especially landslide areas that may be susceptible to future occurrences. The Oregon Department of Geology and Mineral Industries (DOGAMI) has been working with communities to develop large-scale LIDAR maps of entire regions. In 2006-2007, various local, state, and federal agencies formed the Portland Consortium to gather 2200 square miles of LIDAR data in the Portland Metropolitan region. DOGAMI has formed the Oregon LIDAR Consortium (OLC) to gather data in other Oregon regions, including Western Lane County. Entering into an agreement with the OLC will assist in mapping areas of Western Lane County and landforms around Florence, especially those susceptible to landslide events.</p> <p>While the landslide hazard risk assessment for Florence has a low probability and vulnerability, there are areas in Florence that are susceptible to landslide events. These include 80 acres located east of Munsel Lake Road where the road grade can extend more than 10%. In addition, there are areas outside of Florence along Highways 101 and 126 that are vulnerable to landslide events, and if these highways were to be closed down, Florence would be isolated from the rest of the state. Landslides usually occur when rains are heavy, and the implications can be significant since Florence relies on overland transport for daily supplies. Mapping Western Lane County through LIDAR can help in identifying potential hazard areas.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify actions and projects that reduce the impact of a natural hazard on the community, particularly to new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Entering into an agreement with DOGAMI's OLC will help in understanding areas and landforms susceptible to landslide events to protect new and existing buildings, and infrastructure.</p>			
Ideas for Implementation:			
<ul style="list-style-type: none"> - DOGAMI's LIDAR website provides information about the OLC and LIDAR and is a starting point for entering into an agreement with DOGAMI. http://www.oregongeology.com/sub/projects/olc/default.htm - Collaborate with other Lane County communities to develop a partnership to map the geomorphology of western Lane County. - Seek funding opportunities through FEMA, OEM, and DOGAMI. 			
Lead Agency:	City of Florence		
Internal Partners:		External Partners:	
Planning Department		WLEOG, DOGAMI, FEMA, OEM, Lane County, Lane County communities	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Landslide # 2

Proposed Action Item:		Alignment with Plan Goals:
Commission a study to determine the slope of "Jake Mann's Hill" and if any properties or city infrastructure (i.e. elevated storage tank) is at risk to landslide.		1. Protect Life, Commerce, Property, and Natural Systems.
Rationale for Proposed Action Item:		
<p>Better data provide for better decisions to minimize loss. Incorporating indirect economic loss better depicts the cost from natural hazard events.</p> <p>With continued urban and near-urban development, areas with significant hazard risk will face development pressures. Land use development should provide for mitigating potential losses from landslide hazards.</p>		
Ideas for Implementation:		
Seek funding to further study Jake Mann's Hill. Participate in DOGAMI's 2007 – 2009 LIDAR Acquisition project to map the south coast. Utilize improved topographic data from the LIDAR study.		
Lead Agency:	City of Florence – Planning Department	
Internal Partners:		External Partners:
		WLEOG, DOGAMI
Timeline:		If available, estimated cost:
Short Term (0-2 years)	Long Term (2-4 or more years)	
	2-4 Years	
Form Submitted by:	West Lane Emergency Operations Group	
Action Item Status: Pending		

Landslide # 3

Proposed Action Item:		Alignment with Plan Goals:
Enter into a contract with DOGAMI or private geologist consultant to map and review active dunes within Florence and to produce a report recommending development standards.		1. Protect Life, Commerce, Property, and Natural Systems.
Rationale for Proposed Action Item:		
<p>The continuous sand transfer by tides, waves, and wind created an area of dune development 56 miles long that is built on a terrace of solid marine sandstone known as the Coos Bay Dune Sheet. Sand dunes ranging from 5 feet to over 500 feet above sea level were formed along this area, forming the largest expanse of coastal sand dunes in North America. The unique nature of this area was federally recognized in 1972, when 32,186 acres of dunes, forest, streams, and lakes from the south side of the Siuslaw River in Florence to the north side of Coos Bay were set aside as the Oregon Dunes National Recreation Area. In the early 1900's, this landscape was forever changed by the intentional introduction of beach grass along the lower Siuslaw. The beach grass was introduced to stabilize encroaching sand, and in doing so, it created ocean front fore-dunes that stopped new sand from building up the active dunes behind them. Without new sand to replenish the area behind the fore-dunes, the wind exposed a wet deflation plain capable of supporting greater vegetative growth. The plant succession changed accordingly, with willows dominating the shrub stage and shore pines accounting for the majority of the forested stage.</p> <p>Better data provide for better decisions to minimize loss. Incorporating indirect economic loss better depicts the cost from natural hazard events.</p> <p>With continued urban and near-urban development, areas with significant hazard risk will face development pressures. Land use development should provide for mitigating potential losses from landslide hazards.</p>		
Ideas for Implementation:		
Consult with DOGAMI or private geologist to determine the need for and/or potential outcomes of an active dune study. Determine potential development standard outcomes.		
Lead Agency:	City of Florence - Planning	
Internal Partners:		External Partners:
Building, Parks & Recreation		WLEOG, DOGAMI
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
	2-4 Years	
Form Submitted by:	West Lane Emergency Operations Group	
Action Item Status: Pending		

Tsunami # 1

Proposed Action Item:		Alignment with Plan Goals:
Review signage and warnings for Tsunami Evacuation Routes, new siren tone meanings, etc.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.
Rationale for Proposed Action Item:		
<p>The Tsunami risk assessment for Florence indicates that Florence has a moderate probability of a tsunami recurring, but has a high vulnerability should a tsunami occur because many areas of the city lie in the Tsunami inundation zone. Florence has four tsunami sirens located in the city to alert residents about an oncoming tsunami. In addition, DOGAMI has printed tsunami evacuation maps and brochures to inform residents and tourists where they need to evacuate. To ensure that the tsunami warning systems and evacuation plans are current, they should be reviewed and tested to see if they will function properly.</p> <p>Reviewing signage and warnings for Tsunami Evacuation Routes will significantly enhance the safety of Florence residents and tourists who may not understand the tsunami risk in Florence.</p>		
Ideas for Implementation:		
<p>Conduct an education and outreach campaign to teach residents of Florence’s vulnerability to a tsunami and actions they can take to enhance their safety.</p> <p>Regularly test tsunami warning systems to ensure that equipment is working properly, and review outreach materials to make sure information is current.</p> <p>Conduct a tabletop exercise and/or full-scale exercise to determine whether response and evacuation techniques are effective.</p>		
Lead Agency:	West Lane Emergency Operations Group	
Internal Partners:		External Partners:
		Lane County Emergency Management, Lane County, DOGAMI, OEM, FEMA
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
	Ongoing	
Form Submitted by:	West Lane Emergency Operations Group	
Action Item Status: Pending		

Tsunami # 2

Proposed Action Item:		Alignment with Plan Goals:	
Examine costs and benefits of installing a Tsunami Siren in Old Town Florence		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>The Pacific Northwest is located at a convergent plate boundary, where the Juan de Fuca and North American tectonic plates meet. The two plates are converging at a rate of about 1-2 inches per year. This boundary is called the Cascadia Subduction Zone. It extends from British Columbia to northern California. Subduction zone earthquakes are caused by the abrupt release of slowly accumulated stress. Subduction zones similar to the Cascadia Subduction Zone have produced earthquakes with magnitudes of 8 or larger. Historic subduction zone earthquakes include the 1960 Chile (magnitude 9.5) and 1964 southern Alaska (magnitude 9.2) earthquakes. These types of earthquakes have been known to produce tsunamis.</p> <p>The entire immediate coastal area of Florence is subject to tsunamis. The inundation area extends upstream along the Siuslaw River as far inland as Mapleton and several miles inland along the North Fork of the Siuslaw River as well (see Figure 6.2 below). A Community Emergency Notification System (CENS) has been established in the coastal communities to transmit warnings of potential tsunamis to affected residents.</p> <p>The community has voiced concerns regarding the audibility of tsunami sirens; there is interest in installing a tsunami siren in Old Town. Sirens can immediately inform residents and tourists of an impending disaster. Tsunami sirens trigger response systems whereby residents are encouraged to evacuate to higher ground.</p>			
Ideas for Implementation:			
Determine costs and benefits of installing a tsunami siren in Florence's Old Town. Seek funding options to install a new tsunami.			
Lead Agency:		West Lane Emergency Operations Group	
Internal Partners:		External Partners:	
City of Florence		DOGAMI, OEM, Department of Homeland Security	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-2 Years			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Volcanic Eruption # 1

Proposed Action Item:		Alignment with Plan Goals:
Evaluate capability of the Florence Waste Water Treatment Plant to deal with ash fall and upgrade the facility as necessary.		1. Protect Life, Commerce, Property, and Natural Systems.
Rationale for Proposed Action Item:		
<p>The Florence Waste Water Treatment Plan serves a population of 8,600 and provides an essential service for the city. Should an ash fall disrupt operation of the waste water treatment plant, contamination of water systems could result. As a precaution against failure, the ability of the Florence waste water treatment plant to withstand an ash fall should be evaluated. If it is determined that repairs are necessary, the facility should be upgraded to avoid future problems.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify actions and projects that reduce the impact of a natural hazard on the community, particularly to new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Evaluating the capability of the Florence waste water treatment plan will help understand the limitations of the plant in regards to ash fall and help reduce the impact of a potential future volcanic event.</p>		
Ideas for Implementation:		
<p>Hire structural engineers to conduct an assessment of the Florence waste water treatment plant to determine if it can withstand an ash fall.</p> <p>Seek funding for potential mitigation projects on the waste water treatment plant.</p>		
Lead Agency:	City of Florence – Public Works	
Internal Partners:		External Partners:
Planning Department		FEMA, OEM
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
	3-5 years	
Form Submitted by:	West Lane Emergency Operations Group	
Action Item Status: Pending		

Volcanic Eruption # 2

Proposed Action Item:		Alignment with Plan Goals:	
Update emergency response planning for ash fall events.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>While Florence may have a low probability of a future volcanic event occurring, there is still a chance that a volcanic event will occur, which can significantly disrupt transportation services, among others. Volcanic ash has a high silicon content and can disrupt braking and ventilation systems in cars. Updating emergency response planning for an ash fall will prepare Florence to respond effectively and reduce future impacts.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify actions and projects that reduce the impact of a natural hazard on the community, particularly to new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Updating emergency response planning for ash fall events will allow Florence to respond effectively and prepare the city from a potentially damaging natural hazard.</p>			
Ideas for Implementation:			
<p>Coordinate with Lane County Emergency Management to improve response planning efforts to an ash fall.</p> <p>Provide informational brochures to inform the public on the dangers of an ash fall and what they can do to reduce the impact.</p> <p>Incorporate emergency response plans for ash fall events in city and county emergency operations plans.</p>			
Lead Agency:	West Lane Emergency Operations Group		
Internal Partners:		External Partners:	
City of Florence		Lane County Emergency Management, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Wildfire # 1

Proposed Action Item:		Alignment with Plan Goals:	
Identify evacuation routes and procedures for high risk areas and educate the public about the risk to wildfire events.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>Most of the City of Florence has a low probability and vulnerability to wildfires, however, the city of Florence is potentially vulnerable to wildfires should one occur in the Siuslaw State Forest to the north and the east, or in the Oregon Dunes National Recreational Area to the south. Areas immediately adjacent to these wildland areas are particularly vulnerable. Educating the public about the potential risk to wildfire and identifying evacuation routes and procedures for these high risk areas will improve the safety of residents in Florence and reduce the impact of wildfires on the community.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify actions and projects that reduce the impact of a natural hazard on the community, particularly to new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Identifying evacuation routes and procedures for high risk areas will reduce the impact of a wildfire event on members of the public.</p>			
Ideas for Implementation:			
<p>Coordinate with the US Forest Service and Lane County Emergency Management to identify evacuation routes and procedures for high risk areas.</p> <p>Use the mechanisms outlined in the Lane County CWPP to identify evacuation routes and procedures and education and outreach to the public about the wildfire risk.</p>			
Lead Agency:	Siuslaw Valley Fire & Rescue		
Internal Partners:		External Partners:	
Public Works		Lane County Emergency Management, FEMA, OEM, US Forest Service	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1-2 Years			
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Wind and Winter Storm # 1

Proposed Action Item:		Alignment with Plan Goals:	
Educate property owners on how to properly maintain trees to prevent power loss on power lines off the right of way.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 4. Increase Awareness Through Education. 	
Rationale for Proposed Action Item:			
<p>Educating property owners about how to prevent power outages on their private property can help reduce impacts of windstorm events on these homeowners.</p> <p>Overhead electrical lines are subject to high winds and winter storm damage. The risk is higher on the lines going to a mountaintop or peak.</p> <p>All of Lane County and Florence is at risk for winter storms. Due to the multitude of variables, such as wind speed, direction, and temperature, each storm is capable of causing extensive damage in any part of the city.</p> <p>High winds can topple trees and break limbs which in turn can result in power outages and disrupt telephone, computer, and TV and radio service.</p> <p>Wind storms affect Florence on nearly a yearly basis due to winter and wind storms.</p> <p>During a wind storm access to lines off the right by the utility is difficult. This difficulty delays the time for restoration of power to Florence residents.</p> <p>The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards [201.6(c)(3)(ii)]. Educating property owners on how to properly maintain trees to prevent power loss on power lines off the right of way will reduce the impact of severe weather on Florence.</p>			
Ideas for Implementation:			
<p>Coordinate with the City of Florence Public Works Department and the Central Lincoln People’s Utility District to gather information about the maintenance and removal of hazardous trees.</p> <p>Work with the community and City of Florence Public Works Department to identify areas that are prone to damage from nearby trees and perform the necessary maintenance or removal of those trees.</p> <p>Use the hazardous tree inventory created in Wind and Winter Storm Action # 2.</p>			
Lead Agency:		Florence Public Works Department	
Internal Partners:		External Partners:	
City of Florence Planning Department		Central Lincoln People’s Utility District, FEMA, Lane County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Wind and Winter Storm # 2

Proposed Action Item:		Alignment with Plan Goals:
Perform a city wide tree survey to determine potentially dangerous trees.		1. Protect Life, Commerce, Property, and Natural Systems.
Rationale for Proposed Action Item:		
<p>Trees can be a major source of power outages in Florence, which has a high probability of wind and winter storms recurring. Power outages from falling trees also increase the city’s vulnerability to wind and winter storms because emergency services will be delayed or unavailable. Developing an inventory of dangerous trees that may be more vulnerable to damage from winter and wind storms can help a community in better identifying and prioritizing projects that can assist a community in mitigating its overall risk to storms.</p> <p>The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards [201.6(c)(3)(ii)]. Performing a city-wide tree survey to determine potentially dangerous trees will reduce the future damage to power lines from wind and winter storms that frequently occur in Florence.</p>		
Ideas for Implementation:		
<p>Coordinate with the Central Lincoln People’s Utility District to conduct a city-wide survey of potentially dangerous trees.</p> <p>Identify areas in the city that exhibit frequent problems and develop appropriate mitigation actions.</p> <p>Map potentially dangerous trees using Geographic Information Systems (GIS) maps.</p>		
Lead Agency:	City of Florence – Public Works	
Internal Partners:		External Partners:
City of Florence GIS Dept.		Central Lincoln People’s Utility District, FEMA
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
1-3 years		
Form Submitted by:	West Lane Emergency Operations Group	
Action Item Status: Pending		

Wind and Winter Storm # 3

Proposed Action Item:		Alignment with Plan Goals:	
Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.		1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services.	
Rationale for Proposed Action Item:			
<p>One of the major impacts of wind and winter storms are downed power lines from high winds and downed trees. The wind and winter storm hazard risk assessment rates Florence as having a high vulnerability to wind and winter storm and a high probability of a future storm recurring. Supporting and encouraging the Central Lincoln People’s Utility District to use underground construction methods to reduce power outages from storms will reduce the impact of future wind and winter storms.</p> <p>The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards.[201.6(c)(3)(ii)]. Supporting and encouraging the Central Lincoln People’s Utility District to use underground construction methods to reduce power outages from storms will reduce the impact of future wind and winter storms.</p>			
Ideas for Implementation:			
<p>Work with the community and Florence Public Works Department to identify high wind areas from previous outages and apply for grants to underground utilities in those areas.</p> <p>Use the tree inventory created from Wind and Winter Storm Action # 2 to identify potential areas for undergrounding power lines.</p>			
Lead Agency:	Florence Public Works Department		
Internal Partners:		External Partners:	
City of Florence GIS Dept.		Lane County, Central Lincoln People’s Utility District, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	2-3 years		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Wind and Winter Storm # 4

Proposed Action Item:		Alignment with Plan Goals:	
Support/encourage contractors and homeowner to use windstorm resistant construction methods (i.e. hurricane clips) where possible to reduce damage.		1. Protect Life, Commerce, Property, and Natural Systems. 4. Increase Awareness Through Education.	
Rationale for Proposed Action Item:			
<p>Wind and winter storms have the potential to down trees and cause significant damage to buildings and infrastructure. Florence is especially vulnerable due to the prevalence of near hurricane-force winds that can occasionally hit the coast. Florence has a high probability rating of a wind and winter storm recurring, and also has a high vulnerability to wind and winter storms due to the high number of unanchored manufactured homes and homes built before 1980. Supporting contractors and homeowners to use windstorm resistant construction methods, such as hurricane clips, can significantly decrease the potential for wind and winter storms to cause damage to buildings.</p> <p>The Disaster Mitigation Act of 2000 requires that communities identify actions and projects that reduce the impact of a natural hazard on the community, particularly to new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Encouraging contractors and homeowners to use windstorm resistant construction methods can significantly reduce damage from windstorm and winter storm events and protect new and existing buildings and infrastructure.</p>			
Ideas for Implementation:			
<p>Develop outreach materials to educate homeowners and contractors about Florence’s vulnerability to wind and winter storm events and measures they can take, such as installing hurricane clips, to reduce the impact of wind and winter storm events.</p> <p>Consider strengthening local building codes by requiring additional anchoring of buildings.</p> <p>FEMA’s website, www.fema.gov provides several strategies homeowners and contractors can implement to reduce the impact to wind and winter storm events.</p>			
Lead Agency:	City of Florence-Building Department		
Internal Partners:		External Partners:	
Public Works Department, Planning Department		Lane County, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Ongoing		
Form Submitted by:	West Lane Emergency Operations Group		
Action Item Status: Pending			

Wind and Winter Storm # 5

Proposed Action Item:		Alignment with Plan Goals:	
Review strategies for debris management and/or removal after windstorm events.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 	
Rationale for Proposed Action Item:			
<p>“Debris clearance is often traffic clearance as well, to the extent that roadways are blocked by felled trees or flood muck and thus impede other recovery functions.” In addition, “Ensuring the smooth function of this service also speeds the clearance of debris-ridden sites so that properties may be repaired and rebuilt, and enhances the prospects for economic recovery by eliminating potential eyesores.” Source: American Planning Association. 1998. Planning for Post-Disaster Recovery and Reconstruction. Planning Advisory Service Report Number 483/484.</p> <p>"Debris management needs to be determined prior to a hazard to ensure a coordinated response. Often times, debris management is one of the largest local expenditures following a disaster. Having a plan ahead of time may assist the community in curbing excess spending postdisaster." Source: ONHW. Cannon Beach Case Study Report. July 2006. University of Oregon. p. 4-14.</p> <p>Expedient removal of debris is critical to implementing a smooth recovery following a natural disaster in the City of Florence.</p>			
Ideas for Implementation:			
Coordinate with Florence Public Works to develop strategies and a plan for debris management after windstorm events.			
Develop partnerships with private companies with debris removal equipment to create debris removal strategies.			
Incorporate debris removal in city and county emergency operations plans and continuity of operations plans.			
Lead Agency:		West Lane Emergency Operations Group	
Internal Partners:		External Partners:	
City of Florence-Public Works Dept., Planning Dept.		Lane County, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
0-1 year			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Wind and Winter Storm # 5

Proposed Action Item:		Alignment with Plan Goals:	
Review strategies for debris management and/or removal after windstorm events.		<ol style="list-style-type: none"> 1. Protect Life, Commerce, Property, and Natural Systems. 2. Enhance Emergency Services. 3. Improve Partnerships for Communication and Coordination. 	
Rationale for Proposed Action Item:			
<p>“Debris clearance is often traffic clearance as well, to the extent that roadways are blocked by felled trees or flood muck and thus impede other recovery functions.” In addition, “Ensuring the smooth function of this service also speeds the clearance of debris-ridden sites so that properties may be repaired and rebuilt, and enhances the prospects for economic recovery by eliminating potential eyesores.” Source: American Planning Association. 1998. Planning for Post-Disaster Recovery and Reconstruction. Planning Advisory Service Report Number 483/484.</p> <p>"Debris management needs to be determined prior to a hazard to ensure a coordinated response. Often times, debris management is one of the largest local expenditures following a disaster. Having a plan ahead of time may assist the community in curbing excess spending postdisaster." Source: ONHW. Cannon Beach Case Study Report. July 2006. University of Oregon. p. 4-14.</p> <p>Expedient removal of debris is critical to implementing a smooth recovery following a natural disaster in the City of Florence.</p>			
Ideas for Implementation:			
<p>Coordinate with Florence Public Works to develop strategies and a plan for debris management after windstorm events.</p> <p>Develop partnerships with private companies with debris removal equipment to create debris removal strategies.</p> <p>Incorporate debris removal in city and county emergency operations plans and continuity of operations plans.</p>			
Lead Agency:		West Lane Emergency Operations Group	
Internal Partners:		External Partners:	
City of Florence-Public Works Dept., Planning Dept.		Lane County, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
0-1 year			
Form Submitted by:		West Lane Emergency Operations Group	
Action Item Status: Pending			

Appendix B – Planning and Public Process

August 25, 2004 – City Council Chambers; Natural Hazard Mitigation Plan Meeting

On Wednesday, August 25th, 2004, the Hazard Mitigation Planning Task Force held their final meeting to discuss plan implementation and maintenance requirements. The 2004 planning process did not result in a FEMA-approved, locally-adopted natural hazards mitigation plan. This is the only remaining agenda from the 2004 planning process.

September 27, 2007 – WLEOG Agenda and Minutes

Meeting focused on Lane County's hazard analysis and forming a mission statement for the West Lane Emergency Operations Group.

October 29, 2007 – WLEOG Agenda and Minutes

RARE Participant was introduced to the West Lane Emergency Operations Group; WLEOG discussed a group mission statement and goals (related to emergency preparedness, public outreach, funding acquisition, etc.) Sub-committees were developed in an effort to achieve newly-developed goals.

December 11, 2007 - Siuslaw News: “Dunes City outlines hazard mitigation plan”

February 11, 2008 – WLEOG Agenda and Minutes

The RARE Participant attended the February 11th WLEOG meeting to describe: 1) the major components of a natural hazard mitigation planning process; 2) the roles, responsibilities and expectations of the groups involved; 3) the overall mission of the project as well as the plan's goals; and 4) a project timeline.

March 17, 2008 – WLEOG Agenda

The RARE Participant led the WLEOG through a risk assessment exercise. In addition to discussing the effects of previous hazard events, the committee identified community assets and potential vulnerabilities within the City. The West Lane Emergency Operations Group identified nine hazards as a potential threat to the City of Florence, and analyzed each one to determine how Florence has been, or could be, impacted. Butler.

March 21, 2008 – Siuslaw News: “City officials assess potential effects of coast natural hazards”

April 28, 2008 – WLEOG Agenda and Minutes

The RARE Participant presented the West Lane Emergency Operations Group with the nine hazard annexes for review.

May 19, 2008 – WLEOG Agenda and Minutes

Megan Findley, PDM Program Manager of the Oregon Partnership for Disaster Resilience, provided the West Lane Emergency Operations Group with an overview of the mitigation action item development process. Megan provided the WLEOG with action item worksheets, and gave an overview of the types of mitigation actions that communities could implement to reduce their risks to natural hazards. WLEOG members were asked to think of actions before their next meeting on June 16, 2008.

June 16, 2008 – WLEOG Agenda and Minutes

Greg Butler facilitated the creation of a mission statement, goals, and action items for the natural hazard mitigation plan.

July 21, 2008 – WLEOG Agenda and Minutes

Greg Butler presented a draft of the Natural Hazard Mitigation Plan to the West Lane Emergency Operations Group.

August 4, 2008 Florence City Council Agenda

Greg Butler presented a draft of the Natural Hazard Mitigation Plan to the Florence City Council for review and comment. The meeting was also televised live on the local public information channel.

August 18, 2008 – WLEOG Agenda

Greg Butler presented a final draft of the plan to the West Lane Emergency Operations Group and provided an overview of the Group's responsibilities in maintaining the plan.



Event: *City of Florence – Natural Hazard Mitigation Plan Meeting*
Date: *Wednesday August 25th, 2004*
Time: *1:30PM to 4:00PM*
Location: *City Council Chambers*

AGENDA

- (1) WELCOME & MEETING OVERVIEW (10 MINUTES)**
 - (a) Introductions
 - (b) Overview
 - (2) DISCUSSION OF FEMA/OEM REQUIREMENTS AND FORMAT (10 MINUTES)**
 - (a) Draft Outline Distributed
 - (3) DRAFT INTRODUCTION (10 MINUTES)**
 - (a) Why undertaking the plan?
 - (b) What is the process?
 - (c) Who's involved?
 - (d) How is plan organized?
 - (e) History of the process...room for where the plan goes from here
 - (4) DRAFT PLAN VISION, MISSION, GOALS, AND ACTION ITEMS (55 MINUTES)**
 - (a) Discussion of vision-mission-goals-action items
 - (b) Discussion of Draft Goals
 - (c) Action Item Development
 - (i) Action Item/Capability Matrices
 - (d) Setting Prioritization
 - (i) Draft Goal and Method Exercise
 - (ii) Prioritization of Hazards based on County Plan
 1. Results can be utilized for:
 - a. Refining implementation strategy
 - b. Prioritizing plan's action items
 - c. Articulating preferred strategies of the group
- (5) PLAN MAINTENANCE (5 MINUTES)**
- (6) NEXT STEPS (60 MINUTES)**
 - (a) Documentation of this meeting and process (ONHW)
 - (b) Charted path for wrap up plan and implementation
 - (c) Continued communication and tracking on the County's plan
 - (d) Other/Next Steps

-Break-

West Lane Emergency Operations Group

Siuslaw Valley Fire and Rescue
2625 Hwy 101
Florence, OR 97439
541-997-3437

September 17, 2007

STUDY SESSION AGENDA

8:00 am.

Siuslaw Rural Fire Protection District City of Florence

Dunes City

Western Lane Ambulance District

Confederated Tribal Police Department

Port of Siuslaw

With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair
accessible.

CALL TO ORDER - ROLL CALL

1. INTRODUCTIONS OF GUESTS
2. APPROVAL OF MINUTES
Consider approval of the minutes form the August 20, 2007 meeting.
3. MISSION STATEMENT
4. RADIO COMMUNICATIONS GRANT NARRATIVE AND IDENTIFICATION OF EQUIPMENTS NEEDS.
5. EMERGENCY PLANS FOR THE AREA SOUTH OF THE BRIDGE
6. PRIORITITES FOR 2008
7. LANE COUNTY HAZARD ANALYSIS
8. STATUS ON CHECKING ACCOUNT
9. LIABILITY INSURANCE
10. SATELLITE PHONES
11. GREENTREES TABLETOP EXERCISE
12. NEXT MEETING

ADJOURN

WEST LANE EMERGENCY OPERATIONS GROUP
September 17, 2007
MINUTES OF STUDY SESSION

Meeting Held at Siuslaw Valley Fire and Rescue

MEMBERS PRESENT:

Public Works Director Mike Miller
Port Manager Mark Freeman
Dunes City Recorder Joanne Hickey
Dunes City Manager Bret Fiengold
Western Lane Ambulance District Director Henry Hanf
Police Chief Maury Sanders
Fire Chief John Buchanan
City of Florence Jacquie Morgan
City of Florence Bob Willoughby
Confederated Tribal Police Chief Brad Kneaper

ASSOCIATE MEMBERS PRESENT

Ken Stone- Greentrees
Dick Childs – Florence Area Humane Society
Shelly Smith – Peace Harbor Hospital

GUESTS PRESENT:

George Wintershield- Siuslaw School District
Dick Markee – Airport Advisory Committee
Stan Torgison- Western Lane Ambulance
Marvin Tipler – Siuslaw Valley Fire and Rescue
Rennie Kirk- Florence Airport Manager

CALL TO ORDER:

The meeting was called to order at 8:17 a.m.

APPROVAL OF THE AGENDA:

The agenda was approved- Item #4 *Radio Communications Grant Narrative and Identification of Equipment Needs* was moved up on the agenda.

RADIO COMMUNICATIONS GRANT NARRATIVE AND IDENTIFICATION OF EQUIPMENT NEEDS

Chief Sanders discussed a handout that he had prepared on a radio communications grant narrative proposal. It includes an operability and interoperability project narrative, pricing, and budget. It still needs some work but it is good place to start. Marvin gave a summary on the new repeater project. Chief Sanders said that he needs an accurate price list from Marvin to add to his grant narrative proposal.

Henry suggested that we have a price list of equipment available for the next meeting in October and then apply for funding through the Ford Foundation.

APPROVAL OF THE MINUTES:

Jacquie Morgan made the motion to approve the Minutes of the August 20, 2007 meeting, motion seconded by Henry Hanf by voice all ayes, motion to approve the minutes was approved unanimously

MISSION STATEMENT

There was nothing new to report on the mission statement. Jacquie will bring the purpose statement from the IGA to the meeting in October so the members will have a starting point.

EMERGENCY PLANS FOR THE AREA SOUTH OF THE BRIDGE

Bret Feingold has been appointed by the Dunes City Council to be the Emergency Manager for Dunes City. Bret said that there is a definite need for communications and also inquired into

becoming involved with the CENS system. Chief Buchanan agreed that Dunes City needs radio capability and that should be our first objective south of bridge.

PRIORITIES FOR 2008

City Manager Bob Willoughby facilitated a goal setting session. A separate document listing the goals and the sub-committees will be attached to the minutes and entered into the record.

LANE COUNTY HAZARD ANALYSIS

Jacque Morgan handed out a copy of a Hazard Analysis that was prepared by Lane County Emergency Manager Linda Cook. The State required her to separate the coast from the valley and she asked that the Group review her assessment and offer input on the coastal hazard analysis. The Group did review the document and felt comfortable with what was in the report. Jacque Morgan made the motion to approve the coastal hazard analysis prepared by Lane County, seconded by Joanne Hickey by voice all ayes, motion to approve the hazard analysis was approved unanimously

STATUS ON CHECKING ACCOUNT

Two signatures are required on the checking account and the following people are authorized to sign; John Buchanan, Henry Hanf, Jacque Morgan and Brad Kneaper.

Chief Buchanan handed invoices to the members for their annual membership dues. Janet Huston will take care of the deposits for us.

LIABILITY INSURANCE

Jacque Morgan received the application from the Special Districts Association for insurance on the Group. Mark Freeman will fill out the papers and file them with the appropriate agency.

SATELLITE PHONES:

Bruce Bjerke was excused from the meeting and Henry asked that we move this to the October agenda so we can talk with Bruce again about which one to purchase.

GREENTREES TSUNAMI DRILL

Ken Stone gave an overview of the events planned for the tsunami disaster drill planned for October 26th. The Group decided not to open an EOC at Siuslaw Valley Fire and Rescue, but instead go to the clubhouse on the east side of Greentrees to observe the evacuation drill. The test begins at 11 am and coincides with the regularly scheduled test of the tsunami sirens. Ken said that lunch will also be served for those that would like to stay.

NEXT MEETING

The next meeting was scheduled for Monday October 15th at 9:30 at Florence City Hall.

ADJOURN:

The meeting was adjourned at 10:50am

Henry Hanf, Chair

DATE

EMERGENCY OPERATIONS GROUP

West Lane Emergency Operations Group

City Hall
250 Hwy 101
Florence, OR 97439
541-997-3437

October 29, 2007

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District City of Florence

Dunes City

Western Lane Ambulance District

Confederated Tribal Police Department

Port of Siuslaw

With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair
accessible.

CALL TO ORDER - ROLL CALL

1. **INTRODUCTIONS OF GUESTS**
2. **INTRODUCTION OF RARE STUDENT GREG BUTLER**
3. **APPROVAL OF MINUTES**
Consider approval of the minutes form the September 17, 2007 meeting.
4. **DUNES CITY – APPOINT NEW VOTING MEMBER**
4. **SATELLITE PHONES**
5. **APPROVAL OF ASSOCIATE MEMBERS**
Bruce Bjerke – West Lane County ARES/RACES
Karen Smith – American Red Cross
6. **2008 GOALS**
Consider approval of the 2008 Goals
7. **DEVELOPMENT OF MISSION STATEMENT**
8. **UPDATE EQUIPMENT PRICE LIST FOR GRANT**
9. **SIREN TONES**
10. **NEXT MEETING – NOVEMBER 19, 2007**

ADJOURN

WEST LANE EMERGENCY OPERATIONS GROUP
October 29, 2007 Meeting Minutes

MEMBERS PRESENT:

Public Works Director Mike Miller
Port Manager Mark Freeman
Dunes City Manager Bret Fiengold
Western Lane Ambulance District Director Henry Hanf
Police Chief Maury Sanders
Fire Chief John Buchanan
City of Florence Jacque Morgan
City of Florence Bob Willoughby
Confederated Tribal Police Chief Brad Kneaper

ASSOCIATE MEMBERS PRESENT

Ken Stone- Greentrees
Bruce Bjerke- West Lane ARES/RACES
Shelly Smith – Peace Harbor Hospital
Melinda Dietz – Senior and Disabled Services

GUESTS PRESENT:

George Wintershield- Siuslaw School District
Karin Marchini- Siuslaw School District
Walt Zandy- West Lane ARES/RACES
Phyllis Mauldin – CERT
Greg Butler – RARE Participant/City of Florence

CALL TO ORDER:

The meeting was called to order at 10:05 a.m.

INTRODUCTION OF GUESTS:

Bruce Bjerke introduced Walt Zandy , the recently appointed Assistant Emergency Coordinator for West Lane ARES/RACES.

Phyllis Mauldin, who will be working on the location of the emergency operations center was introduced.

INTRODUCTION OF RARE STUDENT GREG BUTLER

Jacque Morgan introduced Greg Butler, who will be working on the completion of the Florence Natural Hazards Mitigation Plan over the course of the next year.

Chief Sanders discussed a handout that he had prepared on a radio communications grant narrative proposal. It includes an operability and interoperability project narrative, pricing, and budget. It still needs some work but it is good place to start. Marvin gave a summary on the new repeater project. Chief Sanders said that he needs an accurate price list from Marvin to add to his grant narrative proposal.

Henry suggested that we have a price list of equipment available for the next meeting in October and then apply for funding through the Ford Foundation.

APPROVAL OF THE MINUTES:

John Buchanan made the motion to approve the Minutes of the August 20, 2007 meeting, motion seconded by Brad Kneaper by voice all ayes, motion to approve the minutes was approved unanimously

DUNES CITY – APPOINT NEW VOTING MEMBER

Bret Feingold was appointed as the new voting member for Dunes City.

SATELLITE PHONES

Henry Hanf stated that at a previous meeting he requested that Bruce Bjerke provide a brief explanation of satellite phones, as well as a recommendation. Bruce stated that the Iridium network is clearly the best provider on the market, and recommended that the Group enter into a contract directly with an Iridium dealer.

Bruce stated that he believed the cost of the phone and equipment would be between \$1200 and \$1400. John asked where the phone would be placed, and Bruce replied that he believed it would go in the fire center's communications center.

Maury asked if it would be a one year contract. Bruce affirmed that it would be a one year contract, and that it would be set up as a dormant account costing approximately \$20/month until the phone was utilized, at which point the rate would increase. Maury asked if one phone would be satisfactory at first, and John agreed that it would be.

John Buchanan made a motion to contract with a vendor in order to purchase one satellite phone as recommended by Bruce Bjerke. The motion was seconded by Henry Hanf; the motion carried unanimously.

APPROVAL OF ASSOCIATE MEMBERS

Bruce Bjerke – West Lane County ARES/RACES

Karen Smith – American Red Cross

John Buchanan motioned to approve the associate members. Brad Kneaper seconded the motion; the motion carried unanimously.

2008 GOALS

Jacque passed out a handout detailing the goals, and the group members assigned to each.

Henry asked if there were any volunteers to replace Joanne Hickey on the Grant Funding Committee. Greg Butler volunteered to participate. Maury asked George if there was anyone involved with the school district that specialized in grant funding. George requested that he be added to the grant funding committee as well.

Shelly requested that a member from Peace Harbor Hospital be added to the Mutual Aid Agreement sub-committee.

Each sub-committee designated the following chair:

Communications/EOC Plan Inventory – John Buchanan

Education – Dave Davis

Grant Funding – Maury Saunders

Emergency Supply Cache – Phyllis Mauldin

Mutual Aid Agreements – Mike Miller

John stated that the group needed to create a contact list.

Maury asked if a mutual aid agreement can be set up between a public and private entity. Bob replied that he did not know for sure, but that it would be a good idea to have these agreements in place either way. John added that he felt the group needed to expand beyond the City of Florence limits to include PUD and the Heceta Water District.

Chief Buchanan motioned to amend these goals to be the 2008-2009 Fiscal Year Goals. Brad Kneaper seconded the motion; the motion carried unanimously.

The group tentatively decided to reconvene in March 2008 to discuss the status of the 2008-2009 Fiscal Year Goals.

Brad Kneaper motioned to adopt the 2008-2009 Fiscal Year Goals. John Buchanan seconded the motion; the motion carried unanimously.

DEVELOPMENT OF MISSION STATEMENT

Jacque Morgan handed out a draft of the mission statement, and a discussion ensued. Henry suggested that everyone review the statement, and bring back suggestions for condensing the statement at the next meeting.

UPDATE EQUIPMENT PRICE LIST FOR GRANT

Maury Saunders distributed a detailed price list including manufactures and model numbers. Maury stated that this list completed the project details for applying for a grant for an operability center.

John mentioned that the group received a grant from the County for the four combiners and the salary for Dave Davis.

Bob Willoughby asked what the total amount needed for the operability center was. Maury responded that the total was 1.2 million, but that it could be broken out into separate phases.

SIREN TONES

John Buchanan informed the group that he is on the state's committee dealing with siren tones. John stated that the state's preference is that the tone is the same for all coastal communities. Bob said that the current tone sounds like a typical emergency response vehicle, and that he had no idea it was a specific tsunami alert. Henry said the tones originally recommended by the audiologist were not implemented, and asked if anyone still had the CD with the recommended tones. Dave Davis said that he had the CD and that he would bring it to the next meeting. John said that he would call the State to ascertain if a standard tsunami tone has been set.

NEXT MEETING

The next meeting was scheduled for Monday November 19th at 9:30 at Florence City Hall.

GENTREES TSUNAMI DRILL

Henry Hanf asked Ken Stone to give an overview of the tsunami disaster drill that occurred on October 26th. Ken described the event as a success, and that they learned a lot from the exercise. Some determinations included the need for a key to the rear gate, and the realization that the community center would not be an adequate site in the event of an emergency. A debriefing is set for Friday, November 2nd.

John Buchanan discussed his experiences with working with reverse 9-1-1 during the recent Siltcoos Lake water incident. Maury suggested that we set up the reverse 9-1-1 number bank for the entire city, instead of waiting for an incident to occur. John agreed, and said that his experience went smoothly. Dave Davis said that Homeland Security training for emergency management would be occurring on December 3 and 4th at the fire station. Bruce said the training is designed for the entire community, not just public service officials. Jacque Morgan suggested a table top exercise involving an incident involving the school district, such as a campus incident, to be scheduled for January 28.

ADJOURN:

The meeting was adjourned at 11:15am.

Henry Hanf, Chair

DATE

EMERGENCY OPERATIONS GROUP

Dunes City outlines hazard mitigation plan

Posted: Tuesday, Dec 11th, 2007

BY: Denise Ruttan

Agencies and planners held workshop to coordinate disaster plans.

Three University of Oregon disaster planners met with Dunes City on Dec. 6 to start the process of developing a comprehensive natural hazard mitigation plan for the community.

At Thursday's workshop, participants identified steps to developing a plan for reducing the risk of future natural hazards based on lessons learned in the past about what resources are available. Plans are also being developed for Florence and several communities in Coos and Curry counties using the resources of the university. Thursday's workshop focused on resources in Dunes City specifically.

Dunes City's emergency manager Bret Feingold, Siuslaw Valley Fire and Rescue chief John Buchanan and city councilor Susie Navetta were the only community members at the afternoon workshop, the first of a project that could divert Federal Emergency Management Agency (FEMA) funds to Dunes City disaster mitigation activities.

The city is working with the Partnership for Disaster Resilience, a disaster planning coordination project developed through the Community Service Center at the University of Oregon. Project team members have helped develop a statewide disaster plan as well as county-specific plans, and are now working with cities and communities across Oregon to develop strategies for the use of local resources in preparation and mitigation plans.

"We'll never be able to stop a disaster from happening, but we can protect community assets," said Krista Dillon, associate director at the Oregon Partnership for Disaster Resilience. "This plan is looking at what natural hazards are going to impact your community and how they are going to affect infrastructure."

Workshop participants identified Siltcoos Dam, the Siuslaw River bridge, city hall and Honeyman State Park as key local assets in terms of infrastructure.

Workshop participants cited windstorms as a serious risk for Dunes City specifically, more so than tsunamis or earthquakes. They also talked about ice storms, volcano-related activity, landslides and wildfires.

"Everyone wants to talk tsunamis, but I think windstorms are our target area," said Buchanan. "We have really dodged a bullet these past five to six years."

Navetta also pointed to Dunes City's location in the Cascadia Subduction Zone, and an earthquake fault that runs through Woahink Lake.

Workshop participants also talked about the risk of a Highway 101 closure, especially around the Siuslaw River Bridge.

"We're isolated because if it isn't a tunnel, it's a bridge," said Navetta.

Workshop participants ranked economic assets that would be affected by a natural disaster. They cited tourism and recreation-related industry as the most critical assets that would be affected.

Though the park is not inside city limits and Dunes City only has jurisdiction over eight percent of the Siltcoos shoreline, over one million visitors come to Honeyman State Park each year, said

Navetta, and businesses in town depend on recreation in Siltcoos and Woahink Lakes.

She said there are 11 mostly tourism-based businesses inside city limits and that fishing in Woahink and Siltcoos is popular. If there were no fish, said Navetta, tourism would be affected.

Participants cited these environmental assets as Dunes City's most critical resource. Workshop participants also discussed relying on the infrastructure resources that already connect the area, such as the West Lane Emergency Operations Group, an intergovernment agreement between entities such as Florence, Dunes City, the Port of Siuslaw and others.

"We realize that we are one community from Florence to Dunes City to Mapleton to Swisshome," said Buchanan. "The big buzz statewide is interoperability. Our concern is operability. Before you can become operable, you have to have one voice."

Buchanan suggested that FEMA dollars could be used to earthquake-proof the Canary Road fire station and enlarge the building enough to make room for a community meeting place during disaster warnings.

University of Oregon graduate teaching fellow Nick Kraemer, who will be working with Dunes City on developing a mitigation plan, will be interviewing community members to get more information about community assets, resources and infrastructure. More workshops are tentatively planned for the future.

West Lane Emergency Operations Group

City Hall
250 Hwy 101
Florence, OR 97439
541-997-3437

February 11, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce and Visitor Center

**With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair accessible.**

CALL TO ORDER - ROLL CALL

1. **INTRODUCTION OF GUESTS**
2. **APPROVAL OF MINUTES**
Consider approval of the minutes from the January 14, 2008 meeting.
Discuss future preparations of minutes.
3. **COMMUNICATIONS TOWER AGREEMENT**
Chief John Buchanan and Chief Maury Sanders
4. **CITIZENS CORE**
Dave Davis
5. **UPDATE ON HAZARD MITIGATION PLAN**
RARE Student Greg Butler
6. **NIMS TRAINING**
Chief Buchanan
7. **FINANCIAL STATEMENTS**
Chief Buchanan
8. **DISCUSS TABLETOP EXERCISE FOR FEBRUARY 25, 2008**
Chief Buchanan
9. **NEXT MEETING**
March 17, 2008

ADJOURN

**West Lane Emergency Operations Group Meeting.
Minutes
February 12, 2007 meeting.**

Western Lane Ambulance District Manager Henry Hanf called the meeting to order at 9:30 am. Assistant to the City Manager Jacque Morgan called the roll. Members present were: SVF&R Fire Chief John Buchanan, Florence Police Chief Maurice Sanders, City Manager Bob Willoughby, Confederated Tribal Police Chief Brad Kneaper, Port of Siuslaw Manager Tom Kartrude and his assistant Teresa Weaver.

Guests present were LCSO Captain Tom Turner, WLA District and SVF&R representative Marvin Tipler, Florence CCO Kim Greenwood, West Lane ARES/RACES representative Rob Worley, CERT Coordinator Dave Davis, Florence police officer John Brejska, and Humane Society representative Dick Childs.

Old Business

A status on the proposed ORS 190 Intergovernmental Agreement was given. The following timeline is projected for adoption by the governing bodies:

Dunes City	February 8, 2007
City of Florence	February 20, 2007
Siuslaw Valley Fire & Rescue	February 21, 2007
Port of Siuslaw	February 21, 2007
Western Lane Ambulance District	February 15, 2007
Confederated Tribal Police Department	(not available to ask)

Henry reminded the group that they need to get ready to allocate their budgeted funds over to Fire Chief John Buchanan after he gets a fund set up for the Group.

New Business

Discussion centered primarily on the need to improve interoperability AND operability between agencies in Lane County. Police Chief Sanders stated that current legislation would require public safety entities to be P25 compliant by approximately year 2013, and narrow banded by approximately 2011. There is no funding however to back-up the mandate.

Marvin Tipler gave a status on the Herman Peak repeater project. PSAP recently approved the replacement of the tower and he is pursuing permits that will take approximately 3 months to acquire. Financing for the foundation still needs to be secured, however they are hopeful that it will be built by this summer. The tower will be 180 ft high and the bottom 50 ft will be dedicated to the west Lane ARES/RACES group.

Rob Worley, disseminated a draft copy of a communications annex for the Siuslaw Valley Fire & Rescue Disaster Plan, to let members know how they can benefit west Lane County in the event of a communications failure. Chief Buchanan stated that we are very fortunate to have the expertise and dedication from the ARES/RACES volunteers and need to make sure we are

utilizing their assets to the fullest potential. He asked Jacque Morgan to include Bruce Bjerke on all future notifications for the West Lane Emergency Operations Group meetings, as we will eventually be asking them to be an associate member of the organization.

Roundtable

Chief Buchanan will be hosting the Coastal Fire Chief's Association meeting this weekend, and Jay Wilson from Oregon Emergency Management will be attending. Chief is currently on a committee with Jay that is researching the potential benefits of implementing a systematic tsunami siren program for coastal communities. Jacque Morgan suggested to Cpt. Tom Turner that if it was Lane County's intent to gift over the siren that they purchased for the Harbor Vista area, that they put that in writing so that they are not liable for any maintenance on the siren.

Jacque Morgan said that she has been in contact with a representative from Senior and Disabled Services in Florence and that they will be coming to the next meeting to talk about emergency preparedness, particularly as it relates to tsunamis. Henry asked Jacque to see if someone from LCOG would also be able to attend.

Henry Hanf suggested that Marvin Tipler and John Brejska research what it would cost for our emergency agencies to have the same radios/technology so that we have a better idea what to budget for in the future.

Chief Buchanan passed around a copy of a letter that was drafted by Bruce Bjerke outlining the need to have access to everyone's frequency so that they can improve interoperability. A copy of the letter will also be sent to our legislators explaining the long-standing problem within the emergency response community; communications, interoperability, or the lack of it. However the message is clear that we will continue to make strides. Henry made a motion to have Chief Buchanan print the letters on his letterhead so that Jacque Morgan and Bob Willoughby could take them with them to the State Capital on the next day. Included in that motion, Henry also asked that Tom Kartrude research logo designs for the West Lane Emergency Operations Group. Chief Buchanan seconded and the motion carried unanimously.

The next meeting was set for Monday March 5th and with no further business the Henry adjourned the meeting at 10:30 am.

Henry Hanf, Chair

West Lane Emergency Operations Group

City Hall
250 Hwy 101
Florence, OR 97439
541-997-3437

March 17, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce and Visitor Center

Mapleton Fire District

**With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair accessible.**

CALL TO ORDER - ROLL CALL

1. INTRODUCTION OF GUESTS

2. APPROVAL OF MINUTES

Consider approval of the minutes from the February 11, 2008 meeting.

3. SIREN MAINTENANCE AGREEMENT AND REPAIRS TO SIRENS

Henry Hanf and Jacque Morgan

4. MAP YOUR NEIGHBORHOOD/NEW TSUNAMI INUNDATION MAP

Chief Buchanan and Jacque Morgan

5. FINANCIAL STATEMENTS

Chief Buchanan

6. NEXT MEETING

April ? (April 21st not ok at City Hall)

ADJOURN INTO WORKSESSION ON THE FLORENCE NATURAL HAZARDS MITIGATION PLAN RISK ASSESSMENT.

This work session is for the six members of West Lane Emergency Operations Group. Please allow one hour for this work session.

City officials assess potential effects of coast natural hazards

Posted: Friday, Mar 21st, 2008

By Denise Ruttan

University of Oregon is coordinating disaster mitigation planning for coastal communities.

Which is a more likely disaster to affect Florence: wildfires, tsunamis, floods or wind storms?

Florence city officials worked together in a workshop on Monday, March 17, to identify potential impacts of such natural hazards using local knowledge.

The risk assessment exercise is part of a series of community-specific hazard mitigation plans currently being developed for Florence, Dunes City and other cities statewide as part of the Partnership for Disaster Resistance and Resilience, a disaster planning coordination project developed through the Community Service Center at the University of Oregon.

The partnership works with Oregon Emergency Management (OEM) and City County Insurance Services to develop a Pre-Disaster Mitigation Grant proposal for coastal cities in Lane, Douglas, Coos and Curry counties. The grant supports either the update of existing city-level plans or the development of new plans for coastal communities. By participating in the project, communities become eligible for federal money for specific mitigation activities.

“You can highlight mitigation activities that you want to take, but you’re not bound by that,” said Megan Findley, program manager at Partners for Disaster Resilience. “Projects are eligible to compete for national money. It doesn’t matter if you’re a small community or San Diego.”

University of Oregon disaster planners met with Dunes City leaders in early December to work on the first stage of a plan specific to Dunes City.

On Monday, Florence city officials, including City Manager Bob Willoughby, Port of Siuslaw Manager Mark Freeman and Chief of Police Maurice Sanders, worked to identify the risk factors of nine hazards that could affect the city, as well as populations at risk and community assets. City officials identified on a map where disasters are likely to happen in Florence, based on history.

City officials discussed such known disasters as a major flood in 1996 and the 1962 Columbus Day wind storm.

In terms of flooding, Siuslaw Valley Fire and Rescue Chief John Buchanan cited the Cushman area as “probably the most prone to flooding.” Old Town, Heceta Beach Road and the Munsel Creek area were also called potential flood zones.

“Clearly wind damage is most likely. We have high winds every winter,” said Willoughby.

Wash-outs on Highway 101 near Gardiner, for example, or trees and rocks that block the Highway 126 route, have restricted access to Florence in the past.

“The effect would be the loss of commerce,” said Assistant to the City Manager Jacque Morgan.

Wildfires were another issue mentioned at the workshop.

“All along the coast, you could have a beach grass fire that could be pretty extreme,” said Buchanan.

But Buchanan said that on a scale of one to 10, 10 being the worst kind of disaster, wildfires have a potential disaster factor of two.

“We have a moisture content that is not conducive to wildfires,” said Buchanan.

The potential effects of tsunamis, earthquakes, landslides and coastal erosion, volcano-related hazards, droughts and general winter storms were also ranked and discussed.

City officials discussed community assets and key facilities as well. They ranked Old Town, Peace Harbor Hospital, educational facilities along Oak Street and a variety of care facilities.

City officials expressed concern regarding the potential of power outages.

“A big issue we have is power. How many people are power-reliant health-wise?” asked Buchanan.

City officials discussed the need for back-up generators at such facilities as the Florence Events Center, which is an American Red Cross gathering place in the event of disasters, said Morgan.

City officials especially focused on the need for such generators at sewer pump and lift stations.

“We’re really vulnerable if the power goes out,” said Willoughby.

Public Works Director Mike Miller said the city has 37 pump lift stations, soon to be 40.

“Right now, without electricity, we’re out of the sewer business,” said Miller.

The city does have enough power to keep those stations functional at least an hour and 40 minutes into a citywide power outage, said Miller.

“We could use more portable generators,” said Willoughby.

Generators are also specific mitigation activities that could qualify for grant funds, Findley told city officials.

Buchanan said the central Siuslaw Valley Fire and Rescue station should be earthquake-proof, another possible candidate for federal money.

City officials will continue to supply information on the effects of past disasters and critical community facilities to the Partners for Disaster Resilience as mitigation plans are developed.

West Lane Emergency Operations Group

Siuslaw Valley Fire and Rescue
2625 Hwy 101
Florence, OR 97439

April 28, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce and Visitor Center

Mapleton Fire District

**With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair accessible.**

CALL TO ORDER - ROLL CALL

1. **INTRODUCTION OF GUESTS**
 2. **OPERABILITY UPDATE**
West Lane ARES/RACES Bruce Bjerke
 3. **2009 STATEWIDE EQ AND TSUNAMI EXERCISE MEETING DATES**
Lane County Emergency Manager Linda Cook
 4. **UPDATE ON TSUNAMI SIREN MAINTENANCE**
Henry Hanf and Jacque Morgan
 5. **CITIZEN CORP COUNCIL**
Dave Davis and John Buchanan
 6. **SUB-COMMITTEE REPORT ON AIRPORT CACHE**
Phyllis Mauldin
 7. **FINANCIAL STATEMENTS AND BUDGET DISCUSSIONS**
John Buchanan
 8. **FUTURE MEETING LOCATIONS AND LOGISTICS**
Henry Hanf
 9. **NEXT MEETING –May 19th**
-

**CITY OF FLORENCE
WEST LANE EMERGENCY OPERATIONS GROUP
APRIL 28, 2008
MINUTES**

MEMBERS PRESENT:

Public Works Director Mike Miller
Port Manager Mark Freeman
Dunes City Emergency Manager Bret Fiengold
Western Lane Ambulance Director Henry Hanf
Police Chief Maury Sanders
Fire Chief John Buchanan
Confederated Tribal Police Department

GUESTS PRESENT:

Bruce Bjerke-West Lane ARES/RACES
Walt Zandi – West Lane ARES/RACES
Ken Stone- Greentrees
George Winterscheid - Siuslaw School District
Karen Marchini- Siuslaw School District
Dick Childs -Florence Area Humane Society
Carol Foster- American Red Cross
Phyllis Mauldin- Airport Advisory Committee
David Haberman – Mapleton Fire District
Greg Butler- RARE Student

CALL TO ORDER:

The meeting was called to order at 10:00am.

APPROVAL OF THE AGENDA:

The agenda was approved

INTEROPERABILITY UPDATE:

Group member Bruce stated that as you may recall during mid-year last year, we under took an interoperability survey that went out with Chief Buchanan's signature, to all the various response agencies or potential response agencies in the area. The goal was to comply with the state executive interoperability council with recommendations. It was evident since we do not have an AC1000, which is an interoperability switch that cost about \$35,000, we would have to use other means to provide interoperability communications.

Further more, although we didn't anticipate it, it has been confirmed that a great deal of the radio equipment is owned by most of the agencies in the Florence area and it is not user programmable. Thus the federally mandated UHF and VHF interoperability frequencies are not available to us. So with those problems we undertook surveying agencies to find out the different frequencies they have available and hoped to find enough commonality so that we could put together our operability matrix. Fortunately our service types have the state fire net program in virtually all of our vehicles and base units as 154.280 and among the different frequencies that law enforcement uses which vary all over the place.

The frequency 155.805 is present in all law enforcement vehicles and base station with the exception of the 911 call center. Therefore we can achieve a degree of interoperability on the law enforcement side by understanding and agreeing in advance and hopefully practicing to come up on state SAR 155. 805.

Even the Lane County Sheriff, who operates primarily on UHF has State SAR programmed into their radio. Fire Service is way ahead with many interoperability channels but fortunately they all have state fire net, which is 154. 280. In a larger event how would we have everyone intercommunicate (first responders)? Using our hand radio equipment here in town we can set up what are known as cross band repeaters and we can create an in-bed repeater that can translate stations talking on 154.280. For fire response we can translate those frequencies so that they can talk to people on State SAR (law enforcement). That gives us a measure of interoperability that we can put into use if needed in a wide spread event, so that all agencies can talk to each other. The system would be implemented by giving the incident commander, operations and the logistics chief hand held radio's that would transmit out to both of these frequencies and would be able to hear the traffic that is taking place. We would have a measure of mandatory control communication that way.

On the lower two- thirds of the chart you can see a lot of other agencies that are not typically first responders but who probably would have a role to play in a wide spread emergency. We have individual frequencies identified so we can program our radios such that if someone on the incident management team said I need to talk to the Coast Guard we can dial that frequency directly from that same hand held transmitter. Bruce continued by saying that he would like the group to take the matrixes home and check the frequencies that we have listed for each of the agencies. He said that he thinks the frequencies are accurate but please test them out. Bruce said that he had received no response to the service from Lane County, ODOT and the Mapleton School District so if any of you have contacts there please let them know that they need to respond to the survey. Cell phones are not a reliable way to communicate during a crisis or wide spread emergency.

There is an inexpensive radio system available where the frequency spectrum is perfect for this type of use and it does not require a license. The price is \$250 to \$400. We could get two of these radios and they would include back up battery packs. Bruce concluded by saying that was his summary from an interoperability point of view. Thanks to public works they now have a broadband antenna up on the water tanks on 35th Street and are again using hand radio equipment, which enables them to replace a failing repeater system.

Bruce commented that the Group should conduct an exercise which would actually be proof of the concept.

UPCOMING TSUNAMI EXERCISE

Jacque Morgan stated that the reason that Linda Cook was going to attend this meeting was to talk about the Oregon State- Wide tsunami exercise that is going to happen in 2009. No action is needed at this time, but she will keep the Group updated as needed.

TSUNAMI SIREN MAINTENANCE

Jacque Morgan stated that the group had received a bill in the amount of \$1,210 for repairs done to the sirens on Third and 35th Street. The repairs are not covered under the maintenance agreement because they were done before the agreement was activated. At the 35th street siren there are drivers out that are going to have to be replaced. Maintenance on that particular item could be put off temporarily but not for very long. It's going to require Day Wireless to come down and we will also need a ladder struck.

CITIZEN CORP COUNCIL

John Buchanan commented that the Group asked to have the Citizen Corp program on the agenda for further discussion, before voting on whether or not to umbrella their organization. He said that we don't want to take direct supervision away from any departments as it would keep the specific departments under their operational control. The governess of it should be put back into this group.

Group member Dave Davis said that the Citizens Corp Council would accept responsibility for

coordinating the activities of all the Emergency Operation Groups. John commented that he had no problem with it and relayed that ultimately it was only himself and Maury that would be affected.

The Group discussed joining the Citizen Corp Council.

Group member Maury motioned to bring the Central Coast Citizens Corp Council under the umbrella of the West Lane Emergency Operation's Group for emergency planning, coordinating, training, and funding opportunities with the intent to create one organization responsible for implementing an action plan to mobilize our trained citizen volunteers. John seconded the motion and the motion passed unanimously.

Group member John commented that the Fire Chief Association's Coastal Commission voted in a resolution that sets in motion and states what is going to be the tsunami signal coast- wide. He handed out a document of the presentation that he made to the Commission on Wednesday. He gave a summary of the tsunami information that was given at the Association Coastal Commission.

Group member Maury asked what it would take to change the siren on the Siuslaw Bridge. Jacque responded by saying that she attended a meeting with ODOT last Thursday for a bridge tour and they are actually going to be removing that siren in 2009 when they do all the electrical improvements, but they are putting another siren back up. She said that now would be the time to request a new siren sound. They would also like to see another tsunami siren placed up on the hill near the Florence Events Center.

The Group discussed grant opportunities and planning for the purchase of a new siren. They also discussed writing a letter to ODOT requesting to have the siren tones changed.

REPORT ON THE EDUCATIONAL SUB-COMMITTEE OF THE WEST LANE EMERGENCY OPERATIONS GROUP GOALS AND SUBCOMMITTEES OF 2008.

This is an educational sub- committee that was given the responsibility of membership training, public awareness of the West Lane Emergency Operations Group, community education and community outreach. Dave Davis gave an overview on the trainings and details of each objective.

The Group also watched a national response plan video. Dave said that this is a new program created by the federal government that covers how an organization will respond to an emergency. The group discussed the video, the trainings and the sub- committee report.

The sub-committee will be putting together a press release to promote the West Lane Emergency Operations Group and they will submit the release to the local media.

The Are You Ready Program has been taught to over 800 people. As part of the presentation they handed out books on how to prepare for an emergency. Oregon Emergency Management approved of the program and Dave explained the Neighborhood Program and the Are You Ready Manual to the Group.

REPORT ON THE AIRPORT CACHE SUB-COMMITTEE

Sub- committee member Phyllis Mauldin stated that when she was on the Neighborhood Watch Committee they talked about conducting a similar Are You Ready Neighborhood Program. She said that what she has for the group is some ideas on where to put an emergency cache building on airport property. There is an area that is south of the airport hangers by the gate (where the old hangers used to be). She continued saying that she took the idea to Mike Miller, Jacque Morgan and Bob Willoughby for approval.

Their response was for her to give some direction on where to put the new building as well as the next

steps that need to be taken in order to proceed with building the Cache on Airport property. The area that was discussed by the sub- committee seemed like a very good place to have the building. Phyllis explained the report documents and the process that has to happen and opened it up for questions. The FAA does need to approve the location before the Group can proceed any further with the concept. This concept also needs to go to the grant sub- committee for further discussion.

FINANCIAL STATEMENTS AND BUDGET DISCUSSION

There were three checks issued this month. Currently the checking account balance is \$16,111.47.

The Group discussed the 08-09 budget process and the formation of a budget committee for this specific Group. Budget requests need to be submitted to Jacque a week before the next meeting.

FUTURE MEETING LOCATIONS AND LOGISTICS

Jacque commented that the West Lane Emergency Operations Group is growing and it would be more ideal and comfortable to hold the meeting at the Siuslaw Valley Fire and Rescue building at 2625 Hwy 101.

The Group agreed with the new location. The logistics of the meeting will be that the full members sit at the front table and all others sit in the audience.

NEXT MEETING

The next meeting is scheduled for May 19, 2008.

Group member Maury commented that The PSAP grant was submitted as a convoluted series of documents that really diminished everybody's project. This is the structure of the grant document itself. It has gone to OEM and they have requested an electronic copy of the grant application. The Group discussed the PSAP grant application as well as the radio equipment and tower.

ADJOURNED

The meeting was adjourned at 11:40am.

Henry Hanf
Chair

DATE

West Lane Emergency Operations Group
Siuslaw Valley Fire and Rescue
2625 Hwy 101
Florence, OR 97439

May 19, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce

Mapleton Fire District

**With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair accessible.**

CALL TO ORDER - ROLL CALL

1. INTRODUCTION OF GUESTS

2. FLORENCE HAZARD MITIGATION PLAN

Megan Findley, Oregon Partnership for Disaster Resilience, will be presenting a brief summary of the process for identifying and prioritizing action items; an exercise which will be conducted at the June meeting.

3. BUDGET FOR 2008-09 FISCAL YEAR

Discuss and appropriate money for the upcoming year

4. UPDATE ON POSSIBLE SIREN LOCATION FOR OLD TOWN AREA.

Henry Hanf

5. NEXT MEETING –June 16, 2008

ADJOURN

**CITY OF FLORENCE
WEST LANE EMERGENCY OPERATIONS GROUP
MAY 19, 2008
MINUTES**

MEMBERS PRESENT:

City of Florence Jacque Morgan
Public Works Director Mike Miller
Port Manager Mark Freeman
Dunes City Emergency Manager Bret Feingold
Western Lane Ambulance Director Henry Hanf
Police Chief Maury Sanders
Fire Chief John Buchanan
Confederated Tribal Police Department Brad Kneaper

GUESTS PRESENT:

Bruce Bjerke-West Lane ARES/RACES
Ken Stone- Greentrees
George Winterscheid- Siuslaw School District
Dick Childs Florence Area Human Society

CALL TO ORDER:

The meeting was called to order at 10:00am.

APPROVAL OF THE AGENDA:

The agenda was approved

APPROVAL OF THE MINUTES:

There were no minutes to approve at this time.

INTRODUCTION OF GUESTS:

Megan Findley, Oregon Partnership for Disaster Resilience

FLORENCE HAZARD MITIGATION PLAN

Megan Findley is here on behalf of Greg Butler who has been working on the Natural Hazards Mitigation Plan. Greg has done a thorough profile of the Community and Megan presented the Natural Hazards Mitigation Plan.

The Group discussed the Natural Hazards Mitigation Plan. Megan asked the Group to review the document then update Greg on what they would like to see changed in the Plan.

Jacque stated that the action items will be done at the June meeting and it is a good idea to start thinking about what the Group plans to include in the action plans in the event of a natural disaster, or some of the ways they would like to see a hazard mitigated. She said that the changes that the Group has already given him he has not applied yet. He is out of the country and will be gone until June.

BUDGET FOR 2008-09 FISCAL YEAR

The Group reviewed the West Lane Operations Group Reconciliation Detail (WLEO Checking Account, Period ending 4/30/2008).

Group member Jacque stated that some of the line items the Group did not even use. She commented that the document that was passed out will be the draft that everyone can mark up and then go over again in June. John stated that Fire Corp. was budgeted into the fire department budget.

Fire Chief John commented that the "Are You Ready" program is going to be replaced with the "Map Your Neighborhood" program. So he would like that line item changed to the "Map Your Neighborhood" program.

The Group discussed the budgets line items that may need to be changed.

Group member Jacque concluded by letting the Group know that she will work on the adjustments and the changes that the Group has made and then the budget will go before the Group in June for final adoption.

UPDATE ON POSSIBLE SIREN LOCATION FOR OLD TOWN AREA

Fire Chief John commented that the best place to locate the new Siren is at the Fire Station next to City Hall 250 Hwy 101. With the way sound travels that location is the best location for a siren. ODOT is willing to change the siren tone on the bridge. They have two frequencies and they said if we let them know what our frequency is they can check to see if they can use the other siren tone.

Fire Chief John commented that there are some city's in Oregon that are losing the funding for emergency managers. He also said that he would like to be present in the state wide tsunami drill.

The Group discussed radios and communications as well as emergency managers.

Group member Jacque commented that now would be a good time for the subcommittees to start meeting because it is the slow season for most of the Group members as far as work goes.

The Group discussed subcommittees. Jacque will send a reminder out and attach the goals sheet.

NEXT MEETING

The next meeting is scheduled for June 16, 2008.

ADJOURNED

The meeting was adjourned at 10:50am.

Henry Hanf, Chair

DATE

West Lane Emergency Operations Group

Siuslaw Valley Fire and Rescue
2625 Hwy 101
Florence, OR 97439

June 16, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce

Mapleton Fire District

With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired.
Meeting is wheelchair accessible.

CALL TO ORDER - ROLL CALL

- 1. INTRODUCTION OF GUESTS**
- 2. APPROVAL OF MINUTES**
Consider approval of the minutes from the April 28th and May 19th meetings.
- 3. 2008-09 BUDGET**
Review and consider adoption of the 2008-09 budget.
- 4. UPDATE ON AIRPORT CACHE**
Police Chief Sanders will be giving a report on behalf of Phyllis Mauldin
- 5. PSAP INTEROPERABILITY GRANT UPDATE**
Police Chief Sanders and Fire Chief Buchanan
- 6. NEW BUSINESS AND FUTURE AGENDA ITEMS**

ADJOURN INTO WORKSESSION TO PREPARE ACTION ITEMS FOR THE HAZARD MITIGATION PLAN. RARE student Greg Butler will be leading this portion of the meeting. Associate Members are welcome to stay if they so desire.

- 7. NEXT MEETING** –July 21, 2008

ADJOURN

**CITY OF FLORENCE
WEST LANE EMERGENCY OPERATIONS GROUP
JUNE 16, 2008
MINUTES**

MEMBERS PRESENT:

City of Florence Jacque Morgan
Public Works Director Mike Miller
Port Manager Mark Freeman
Western Lane Ambulance District Director Henry Hanf
Police Chief Maury Sanders
Fire Chief John Buchanan
Siuslaw Rural Fire Protection District Marvin Tipler
Confederated Tribal Police Department Brad Kneaper

GUESTS PRESENT:

West Lane ARES/RACES Bruce Bjerke and Walt Zandi
Greentrees Ken Stone
Peace Harbor Hospital Shelly Smith

CALL TO ORDER:

The meeting was called to order at 10:00 am.

APPROVAL OF THE AGENDA:

The agenda was approved

APPROVAL OF THE MINUTES:

John Moved to approve the minute of April 28th and May 19, 2008. Henry seconded the motion, motion passed by unanimous vote.

INTRODUCTION OF GUESTS:

Megan Findley, Oregon Partnership for Disaster Resilience. Greg Butler- RARE Participant for the City of Florence, Dave Davis-Community Emergency Response Teams (CERT) Representative

2008-2009 BUDGET

Jacque gave an overview of the 2008-2009 final draft budget and noted that CENS will be budgeted separately. Jacque also noted that the extra passwords that were paid for this year was not included in the budget for next year. These are the new code keys for the new CENS program. The Community Notification System is switching over so that Siuslaw Valley has access to activate their overhead team instead of activation coming from Central Lane Fire District and in order to do that the Group has to pay to have an access code to the computer software. The Group would like to take that particular payment out of contingency.

John passed a document around and stated that he did a short telephone meeting with Linda Cook. He said that he has looked at the Homeland Security budget and in that budget there are three different funds. One of the three different funds is CERT. Linda Cook assured John that there would be funding for a continuance on Dave Davis's position in CERT.

John said that he also put in the budget some amenities for the Herman Peak project. This was in the amount of \$20,000.

Maury moved to approve the 2008-2009 budget. John seconded the motion, motion passed by unanimous vote.

UPDATE ON AIRPORT CACHE

Maury stated that he met with Phyllis and Wilbur about the Airport Cache and they discussed how to really get down to the nuts and the bolts of what this sub-committee is doing.

John commented that he had a meeting last week with the Governor's representative for Homeland Security. The governor is really interested in the concept of establishing four armories along the coast. Homeland Security is run under the Army. The Governor thought that Florence would be a great location to establish an armory.

John said he took them to see the airport and he also showed them what the Group's plan was for the airport cache. Homeland Security would like to possibly be partners with the City in using the airport property to store some of their emergency equipment and storing the City's as well.

PUBLIC SAFETY INTEROPERABILITY COMMUNICATIONS (PSIC) GRANT UPDATE

The PSIC grant was approved. Now the city will need to work on the press release and the development. The project includes three base station radios at the Police Department, as well as the Herman Peak amenities.

Maury explained the grant budget sheets.

This grant will be managed through Marvin Tipler.

John commented that there is an Agreement of Understanding that would be signed by all participants. The participants include the Ambulance District the Fire District the Confederated Tribes and the City of Florence.

Marvin commented that he sees a lot of potential for customers. This could cause some interference in communications. He said that he would like to keep it a clean site to ensure good communication if ever an emergency should arise. The customers need to be run through combiners and to make sure that all customers are in compliance with current standards As well as not demonstrate any interference for any of the five participants of the agreement that were previously mentioned. Marvin has gone through the total permit process and permit fees have been paid for the antenna and the tower.

John commented that he would be going in front of the Board on Wednesday for permission to make the expenditures necessary to meet the criteria for the PSAP grant and for purchasing.

Jacque asked what the City of Oakridge applied for.

Maury responded by saying that their grant application was for their tower site.

The interoperability grant agreement will be signed and sent out after the next PSAP meeting.

The Group discussed the building and tower project.

TSUNAMI SIREN

John commented that he thinks that this project is a good project. He said that he sent the guy around to look at tsunami siren sites.

The ideal location for a tsunami siren is in between City Hall and the Fire Station. Now all that is needed is to find a funding source.

The Group discussed possible funding sources.

NEW BUSINESS AND FUTURE AGENDA ITEMS:

- Sub Committee Goals Review
- Airport Cache
- The School Superintendent George Wintersched Will Give a Update About The Pandemic Flu From the School District's Perspective.
- Appointment of Board Members
- Tsunami Financing Options
- Hazard Mitigation Plan Update

FINANCES

There is no change in status the satellite phone service. It is paid through the next six months.

Dave commented that he will be moving ahead on the scheduled class and will be participating in creating a visual that will be aired in the future. Dave invited the group to attend the Creating a Vigilant, Prepared and resilient community training and said in addition there is training on July 11 at 7:00pm at the Hwy 101 fire station that includes three speakers.

The Group discussed the trainings.

NEXT MEETING

The next meeting is scheduled for July 21, 2008.

ADJOURNED

The meeting was adjourned at 10:35 am.

HENRY HANF, CHAIR **DATE**
EMERGENCY OPERATIONS GROUP

West Lane Emergency Operations Group

Siuslaw Valley Fire and Rescue
2625 Hwy 101
Florence, OR 97439

July 21, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce

Mapleton Fire District

CALL TO ORDER - ROLL CALL

1. **INTRODUCTION OF GUESTS**
2. **APPROVAL OF MINUTES**
Consider approval of the minutes from the June 16th meeting.
3. **APPOINTMENT OF BOARD MEMBERS FOR 2008-09**
According to the by-laws Officers shall be elected at the annual meeting in July of each year.
4. **COMMUNICATIONS DRILL**
Bruce Bjerke
5. **PANDEMIC FLU UPDATE**
Siuslaw School District Superintendent George Winterscheid
6. **AIRPORT CACHE UPDATE**
Phyllis Mauldin
7. **TSUNAMI SIREN FINANCING UPDATE**
Fire Chief John Buchanan
8. **OWNERSHIP OF COMMUNICATION SITE AND EQUIPMENT**
Initiate dialogue on whether or not the West Lane Group intends to become the owner and explore funding to buy out SVF&R.
9. **REPORT ON 2008-09 GOALS**
10. **ANY OTHER BUSINESS**
11. **NEXT MEETING** – August 18, 2008

ADJOURN

**CITY OF FLORENCE
WEST LANE EMERGENCY OPERATIONS GROUP
JULY 21, 2008
MINUTES**

MEMBERS PRESENT:

City of Florence Jacque Morgan
Port Manager Mark Freeman
Western Lane Ambulance District Director Henry Hanf
Siuslaw Rural Fire Protection District Fire Chief John Buchanan

ASSOCIATE MEMBERS:

West Lane ARES/RACES Bruce Bjerke and Walt Zandi
Mapleton Fire District Dave Hagerman
Florence Area Humane Society Dick Childs
Citizen Corps. Dave Davis
City of Florence R.A.R.E. Participant Greg Butler
Central Lincoln PUD Matt Boshaw
Airport, Cache Committee Phyllis Mauldin

CALL TO ORDER:

The meeting was called to order at 10:00 am.

APPROVAL OF THE AGENDA:

The agenda was approved as presented. Dick Childs suggested that they should be introduced as Associate Members and not guests. Dully noted

APPROVAL OF THE MINUTES:

John moved to approve the minutes of June 16, 2008 as corrected. Henry seconded the motion, motion passed by unanimous vote.

APPOINTMENT OF BOARD MEMBER FOR 2008-09

John moved to maintain the current officers through the year 2008-2009. Dave seconded the motion, Motion passed.

COMMUNICATIONS DRILL

Bruce stated that there was a meeting held two weeks ago of which Fire Chief John Buchanan, Police Chief Maury Sanders, and Western Lane Ambulance Director Henry Hanf were in attendance. This meeting was to propose an interoperability communications proof of concept. He said that for the last three or four weeks the group has been talking about this. There was an interoperability survey that the group did. The group created an interoperability matrix so that all have the same frequencies as first responders. He said that now all first responders, (law enforcement, fire, and ambulance) are all operating on the same net. The group has also demonstrated the ability to replace a failed public safety system repeater.

On August 20, 2008 between 10am-12pm there will be a three part operability/ interoperability exercise. The first part of the demonstration will require participation from all of the board members and associate board members. They will be coming up on the primary frequencies and demonstrating communications with someone from public works and from the airport in the event of an emergency. In the second part of the demonstration they will throw up the interoperability net and attempt to do a roll call of all law enforcement and fire department personnel. The third part of the demonstration is to

simulate the failure of the West Lane Ambulance District repeater at Herman Peak. It will be a band failure so it can be reinstated immediately if necessary. This will demonstrate the ability to bring back a secondary system should the primary system fail. He said that this will not require much assistance from anyone.

They will be passing the word along by asking targeted officials to do a radio check and be available on the radio on that frequency at that time. He would also like all group members to let the target department heads know so that they can ensure that they respond to the call. For example the Mapleton station is monitoring state fire net because that will be the interoperability frequency for the fire service and for law enforcement the frequency would be the State S.A.R. He said that these frequencies were chosen because of the fact that every law enforcement agency in town and every fire- med agency in town has access to one or two of those frequencies and we will join them for the purpose of the test.

There was weekend training for State Fire Marshall Communications. While attending the training, somebody cut the fiber optic cable on 42nd Street in Springfield. This caused the telephone and 9-1-1 service in the Mohawk Valley to be disrupted. In response Kristy Wildle who works at the Eugene 9-1-1 centers called up the Lane County ARES/RACES Group. They deployed some people from the fire station in the Mohawk Valley to the 911 center to establish communications for 9-1-1 dispatches.

This was a good demonstration of how to respond in that kind of emergency situation.

PANDEMIC FLU UPDATE

This item was tabled until the next meeting.

AIRPORT CACHE UPDATE

Phyllis stated that they had a meeting with the Federal Aviation Association (FAA) and that she is not giving up on the airport building or that spot. The FAA would like to see the use be for something based on or having to do with the airport. They are looking for income for the airport and the spot is 19 cents a square foot. This is \$915 a year. You cannot find many other places that are as inexpensive. This would not include the construction of the building.

John B. commented that the National Guard is now the home of Oregon Emergency Management. When he met with the National Guard they showed a plan for more armories along the Oregon Coast. An armory means a supply cache for emergency supplies and equipment. He said that he met with General Caldwell who was the Deputy Director of the National Guard. He told the General about the City's plan of purchasing a piece of land to construct an emergency supplies building. He said that the General had envisioned something similar which was having all of the emergency supply buildings on the same block. John B. said that the National Guard and the City could share that property. The American Red Cross offered depositories of equipment.

Jacque commented that the City was not involved with planning the meeting with the FAA. She said that the City will be meeting with the FAA at the end of August. Then the City will find out what the issues are and how they can be addressed.

The Group discussed the meeting with the FAA.

Phyllis commented that the Cache Sub Committee will not be meeting again. This Committee has obtained all of the goals that were assigned to them.

TSUNAMI SIREN FINANCING UPDATE

John commented that it would be around \$30,000 for another tsunami siren.

The Group reviewed the finance document that was previously handed out.

Jacque commented that she and the City Manager Bob Willoughby could hear the siren from as far as the Justice Center and questioned whether the City really needed a new siren.

The Group discussed the Tsunami siren. There is a tsunami test every last Friday of the month.

The Group discussed the future option of cell phone alert systems.

OWNERSHIP OF COMMUNICATION SITE AND EQUIPMENT

This item was tabled until a later date.

REPORT ON 2008-09 GOALS

Communications Goal

John stated that the Group met with the appropriate people and they have not signed any agreements with the Federal Government yet, but it is just a matter of gathering all the funding information and other proper agreements together. He said that the Group has gone out for its first bid which cannot be awarded until the agreement is signed. This is for the erection of the tower which will cost around \$40,000. Marvin has designed a system around the \$140,000 and this is through a particular Communication's company that would be doing the work. As soon as the agreement is signed the Inter Oregon Communications Company can start work.

Education Goal

Dave commented that they had a speaker come in to talk about creating a vigilant prepared community. Many people attended. He said that there was also a meeting with the electrical reserve corp that had good attendance as well. There is \$10,000 available if the City were to start a reserve medical corp. Currently there is a state medical reserve registry that any licensed doctor or nurse can sign up for. These doctors or nurses would register on the internet and then in the event of an emergency they would be called upon to be of service. He said that he met Brian Johnson with Health and Human Services who work on disaster preparedness for the County. Brian Johnson would like to come and attend one of the Group meetings.

Dave gave a summary of the Active Neighborhood Program. There will be no expo this year as it will be replaced by other public outreach mechanisms such as advertisements on the radio, newspaper and attending as many health fairs as possible.

The Group discussed the Citizen Corp concept.

John explained the funding process of the Homeland Security Grant.

Grant funding

The Group has obtained one grant thus far and Suzan Sowers is looking into another grant opportunity that will allow for training and communications.

John commented that there are two potential grants. One for the fire department for breathing apparatuses, The other for a communications grant request that would fund Mapleton, Swisshome, Deadwood and Florence for new radios.

Emergency Supply Cache

Phyllis gave an overview of what the sub committee is currently working on. She is waiting on a call back from Jan Nieberlein.

Mutual Aid Agreements

City of Florence
City Hall
250 Hwy 101
Florence, OR 97439
541-997-3437

Aug 4, 2008 - **AGENDA** - 7:00 PM

Councilors: Phil Brubaker - Mayor
Alan Burns - Councilor
Paul Holman - Council Vice-President
Suzanne Roberts - Councilor
Nola Xavier - Council President

With 48 hour prior notice, an interpreter and/or TDY: 541-997-3437, can be provided for the hearing impaired. Meeting is wheelchair accessible.

Call to Order - Roll Call - Pledge of Allegiance

Presentations

- Draft Hazard Mitigation Plan
- Ethics Policy

1) **Approval of Agenda**

2) **Public Comments**

This is an opportunity for members of the audience to bring to the Council's attention any item not otherwise listed on the Agenda. Comments will be limited to three (3) minutes per person, with a maximum time of 15 minutes for all items. Speakers may not yield their time to others.

Consent Agenda

The consent agenda is an area of the meeting agenda where items of a repeating or routine nature can be considered under a single action. Any person who desires to have an item on the consent agenda removed and considered separately could make it so by merely asking.

3) **Minutes**

Consider approval of the regular council meeting minutes of July 7th and 21st, 2008.

4) **Liquor License Approval**

Consider approval of the liquor license for Brisbane Enterprises, Inc. dba 1285 Resto Bar.

Action Items

The Mayor will provide opportunity for the public to offer comments on action items after staff has given their report and if there is an applicant, after they have had an opportunity to speak.

5) **Driftwood Shores Annexation and Zoning**

A. Consider approval of Ordinance No. 14, Series 2008, an ordinance annexing property known as Driftwood Shores and portions of road right-of-way to the City of Florence.

B. Consider approval of Ordinance No. 15, Series 2008, an ordinance establishing the zoning for Driftwood Shores and portions of Arch Street, 1st Avenue, and Meares Street as commercial and establishing the zoning for Beach Drive as open space.

- 6) [City of Florence Travel Policy](#)
Consider approval of Resolution No. 29, Series 2008, a resolution identifying reimbursable costs for travel, training, conferences, food and lodging by authorized personnel and establishing procedures for reimbursement.
- 7) [General Obligation Refunding Bond Series 2008 for the Justice Center](#)
Review and consider approval of the Preliminary Official Statement for the refinancing of the Justice Center bonds.
- 8) [League of Oregon Cities Policy Recommendations by City Staff](#)
Review recommendations of the policy committees and provide input to the League of Oregon Cities for their 2009 legislative agenda.

Reports

- 9) [Monthly Reports](#)
- 10) **City Manager Report**
- 11) **Mayor and Council Reports**

West Lane Emergency Operations Group
Siuslaw Valley Fire and Rescue
2625 Hwy 101
Florence, OR 97439

August 18, 2008

AGENDA

10:00 am.

Siuslaw Rural Fire Protection District

City of Florence

Western Lane Ambulance District

Dunes City

Confederated Tribal Police Department

Port of Siuslaw

Associate Members

Greentrees

West Lane ARES/RACES

Siuslaw School District

Florence Area Humane Society

Senior & Disabled Services

American Red Cross

Peace Harbor Hospital

Florence Area Chamber of Commerce

Mapleton Fire District

CALL TO ORDER - ROLL CALL

- 1. INTRODUCTION OF ASSOCIATE MEMBERS**
- 2. APPROVAL OF MINUTES**
Consider approval of the minutes from the July 21st meeting.
- 3. SAFETY FAIR**
Sean Barrett and Liz Iabichello
- 4. INCIDENT COMMAND FORMS**
Stan Torginson
- 5. DENISE LANGERVELD**
Business presentation and possible emergency supply storage in their aircraft hanger
- 6. TABLETOP EXERCISE**
City Manager Bob Willoughby will discuss the City's need to have an exercise due to new staff not familiar with disaster protocols.
- 7. MAP YOUR NEIGHBORHOOD**
Dave Davis
- 8. HAZARD MITIGATION PLAN**
RARE Student Greg Butler will solicit final input.
- 9. EARTHQUAKE MITIGATION MEETING**
Fire Chief John Buchanan and Asst. to the City Manager Jacque Morgan
- 10. PANDEMIC FLU UPDATE**
Siuslaw School District Superintendent George Winterscheid
- 11. NEW BUSINESS**
- 12. NEXT MEETING - September 15, 2008**

Appendix C:

Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police - Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigation*. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation

activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are some Economic Analysis Approaches for Evaluating Mitigation Strategies?

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the three methods is outlined below:

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in Public Sector Mitigation Activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in Private Sector Mitigation Activities

Private sector mitigation projects may occur on the basis of one or two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchases. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Considering detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of those methods is the STAPLE/E approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a synthetic fashion. This set of criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan - Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process."

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or county planning commission, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private?)
- How will this action affect the fiscal capability of the community?

- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

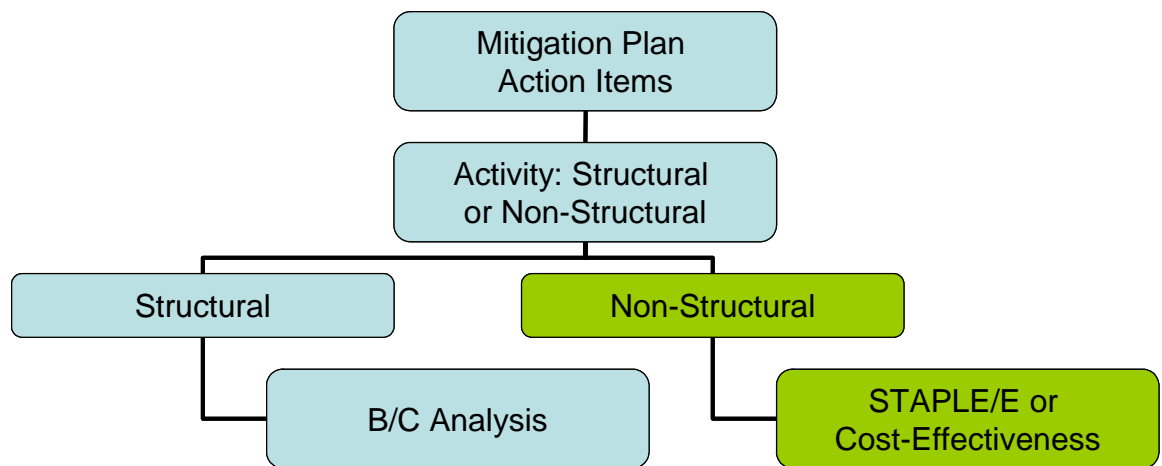
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed benefit/cost analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure A.1: Economic Analysis Flowchart



Source: Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center, 2005

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation projects can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- ***Determine the project cost.*** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ***Estimate the benefits.*** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- ***Consider costs and benefits to society and the environment.*** These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ***Determine the correct discount rate.*** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the

best activities given varying costs and benefits include net present value and internal rate of return.

- ***Net present value.*** Net present value is the value of the expected future returns of an investment minus the value of the expected future cost expressed in today's dollars. If the net present value is greater than the projected costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ***Internal rate of return.*** Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic

value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies for Evaluating the Socio-Economic Consequences of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eidinger, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates, Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997

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Federal Emergency Management Agency, *Report on the Costs and Benefits of Natural Hazard Mitigation*. Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in the City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects Volume V, Earthquakes*, Prepared for FEMA's Hazard Mitigation Branch, October 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olsen Associates, Prepared for Oregon State Police, Office of Emergency Management, July 1999.

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Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

Region 1: Oregon Coast Household Natural Hazards Preparedness Survey

Survey Report for:

Clatsop County, Oregon
Tillamook County, Oregon
Lincoln County, Oregon
Lane County, Oregon
Douglas County, Oregon
Coos County, Oregon
Curry County, Oregon

Prepared by:

**Oregon Partnership for Disaster
Resilience**

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January 2008

Special Thanks & Acknowledgements

Project Staff:

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Robert Parker, Managing Director, Community Service Center

Bethany Johnson, Associate Director, Community Planning Workshop

Jenny Pearce, Intern, Oregon Partnership for Disaster Resilience

Natural Hazard Household Preparedness Survey

The Oregon Partnership for Disaster Resilience (*Partnership, OPDR*) is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster resilient and sustainable state. The *Partnership* is recognized by the Institute for Business & Home Safety (IBHS) as a Showcase State for Disaster Resilience. Developed and coordinated by the Community Service Center (CSC) at the University of Oregon the *Partnership* employs a service learning model to increase community capacity and enhance disaster safety and resilience statewide.

The *Partnership's* current planning initiatives cover over two-thirds of the geographic area of Oregon. It is working with Central Oregon, Southeast Oregon, Northeast Oregon, and the Oregon Coast through Pre-Disaster Mitigation Planning Grants to support staff in developing local natural hazard mitigation plans. CSC staff serve as the lead project coordinator providing plan development support, technical resources, and a proven planning process / framework for each county.

As part of the PDM Program, OPDR is assisting the Coastal region of Oregon with the citizen involvement components of the natural hazard mitigation planning process. Citizen involvement is a key component in the natural hazard mitigation planning process. Citizens have the opportunity to voice their ideas, interests and concerns about the impact of natural disasters on their communities. To that end, the Disaster Mitigation Act of 2000¹ requires citizen involvement in the natural hazard mitigation planning process. It states:

“An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

1. An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.
2. An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and

¹ National Archives and Records Administration. 2002. Federal Emergency Management Agency 44 CFR Parts 201 and 206 Hazard Mitigation Planning and Hazard Mitigation Grant Program; Interim Final Rule in Federal Register.

agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.”

The benefits of citizen involvement, according to Bierle², include the following: (1) educate and inform public; (2) incorporate public values into decision making; (3) improve substantially the quality of decisions; (4) increase trust in institutions; (5) reduce conflict; and (6) ensure cost effectiveness. To gather public input into the planning process, OPDR administered a survey to randomly selected households.

This report summarizes the results of the Oregon Coast Household Natural Hazards Preparedness Survey. The survey helps the counties of the Coastal region - Clatsop, Tillamook, Lincoln, Lane (only coastal portion), Douglas (only coastal portion), Coos, and Curry Counties - realize Bierle’s five benefits of citizen involvement in the natural hazard mitigation planning process.

Methodology

To conduct the household survey, OPDR used a modified version of a survey administered statewide in 2002. The purpose of the 2002 survey was to better understand the perceptions of risk to natural hazards held by citizens, as well as the level of preparedness and types of risk reduction activities in which citizens have engaged. The primary goal of the 2002 survey was to gauge the overall perception of natural disasters and determine a baseline level of loss reduction activity for residents in the community. OPDR adapted the statewide survey to include questions about citizens’ support for different types of community planning actions. Planning actions mentioned included protecting critical facilities, disclosing natural hazard risks during real estate transactions, and the use of tax dollars to compensate land owners for not developing in hazardous areas.

This survey was sent to 1200 households in the Coastal region, which includes: Clatsop, Tillamook, Lincoln, Lane (only coastal portion), Douglas (only coastal portion), Coos, and Curry Counties. The households were randomly selected and population weighted based on registered voter lists provided to OPDR by each of the counties.

The mailing contained a cover letter, the survey instrument, and a postage-paid return envelope. Completed surveys were returned to OPDR at the University of Oregon. A second postcard was sent to remind households to send in the survey or to access an online version of the survey. OPDR received 206 valid responses from the mailed survey, for a 20% response

² Bierle, T. 1999. “Using social goals to evaluate public participation in environmental decisions.” *Policy Studies Review*. 16(3/4) ,75-103.

rate. (Only 1034 of the 1200 addresses were valid addresses.) Only two people completed the online version of the survey; therefore, these responses were not analyzed because of the very low sample size.

Limitations

The study identifies key issues about how members of Coastal Oregon communities perceive their risk to natural hazards, providing a snapshot of those perceptions at a single point in time. As such, survey responses may reflect external issues, such as heightened concern about terrorism or the current state of the economy. This study was not intended to be representative of the perceptions of all residents, and cannot be generalized to the public.

Organization of Report

The survey results are organized into the following sections:

Characteristics of Survey Respondents: This section reports information about respondent characteristics including: educational attainment, age, and length of time as an Oregon resident.

Perception of Risk: This section identifies the general level of concern over natural hazards risk.

Household Preparedness and Risk Reduction: This section describes the types of structural and nonstructural measures that are being implemented by survey respondents, and the types of resources or programs that might increase risk reduction activities.

Community Natural Hazard Preparedness: This section describes citizens' priorities for planning for natural hazards and the community-wide strategies respondents support.

Written Responses to Open-Ended Questions: This section includes summarizes the responses of the open-ended questions and comments.

Section II. Characteristics of Survey Respondents

Demographic survey questions provide a statistical overview of the characteristics of the respondents. This section of the survey asked respondents about their age and gender, their level of education, and how long they have lived in Oregon. The survey also included questions regarding respondents' present housing.

There were 206 individuals who responded to the survey, giving the survey a 20% response rate. Of the seven counties the survey was mailed to, the majority of surveys (31%) returned came from residents of Coos County (Table 1). This is not surprising as Coos County has the greatest number of residents in the region with 62,905 of the total region residents (PSU population estimate). It is difficult to know the exact number of

residents living in the region as only part of Lane and Douglas counties are included in the coastal region. If all of Lane and Douglas counties are included in the resident total, the region would contain 634,920 (2006 Region 1: Profile and Risk Assessment, OPDR).

Zip codes provide a more specific location of the survey respondents than the county level data. Of the 37 different zip codes indicated, the most respondents live in the 97103 zip code (Astoria) (Table 2).

Table 1. Per County Sample Distribution and Survey Response

County	Sample Distribution	Survey Responses
Coos	30%	31%
Lincoln	21%	19%
Clatsop	17%	17%
Tillamook	12%	12%
Lane	7%	9%
Curry	10%	9%
Douglas	3%	3%

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007).

Table 2. Percent of Surveys by Zipcode

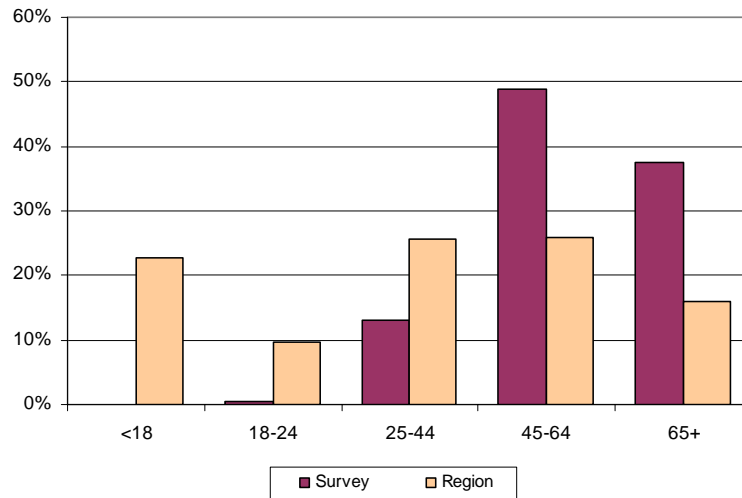
Zip Code	City	Percent
97103	Astoria	17.2
17420	Coos Bay	11.8
97439	Florence	8.3
97459	North Bend	6.9
97415	Brookings	6.4
97423	Coquille	5.4
97365	Newport	4.9
97141	Tillamook	4.4
Other		34.7

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007).

Age and Gender

Figure 1 compares the ages of survey respondents to the 2000 U.S. Census. This shows that younger people were underrepresented while older people were overrepresented in the sample. Women accounted for 58% of survey respondents.

Figure 1. Percentage of Coastal Oregon Population and Survey Respondents by Age Category (persons 18 and over)

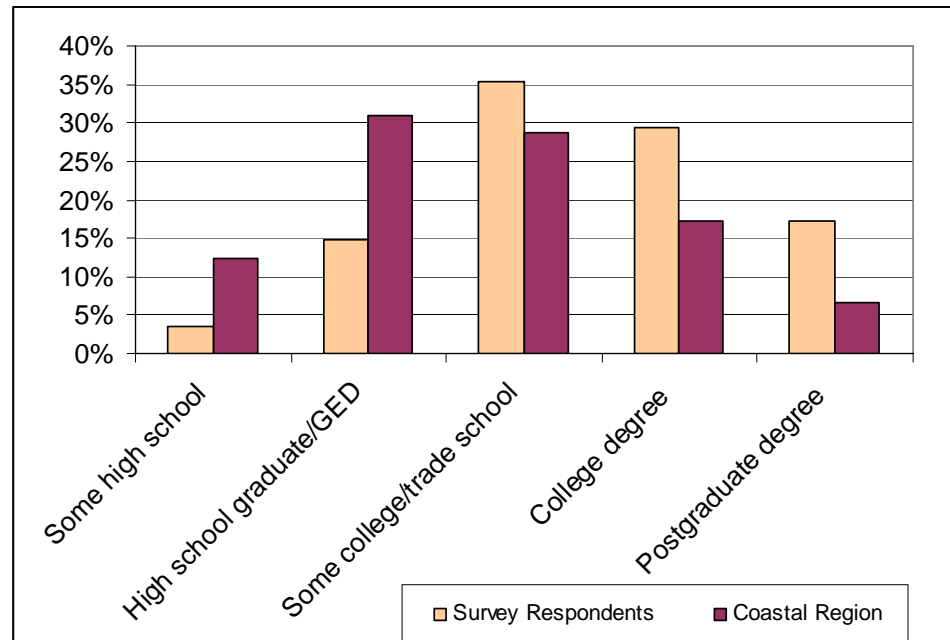


Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007).

Level of Education

In general, survey respondents were relatively well educated. Figure 2 compares the level of education of survey respondents with the 2000 U.S. Census for the region. About 80% of survey respondents have attended some college or gone to a trade school, obtained a college degree, or have a postgraduate degree. In contrast, figures from the Census show that approximately 50% of Coastal residents have achieved this level of educational attainment. Survey respondents were much more likely to have completed a higher educational level than the overall population of the Coastal region.

Figure 2. Level of Education of Coastal Oregon Population and Survey Respondents

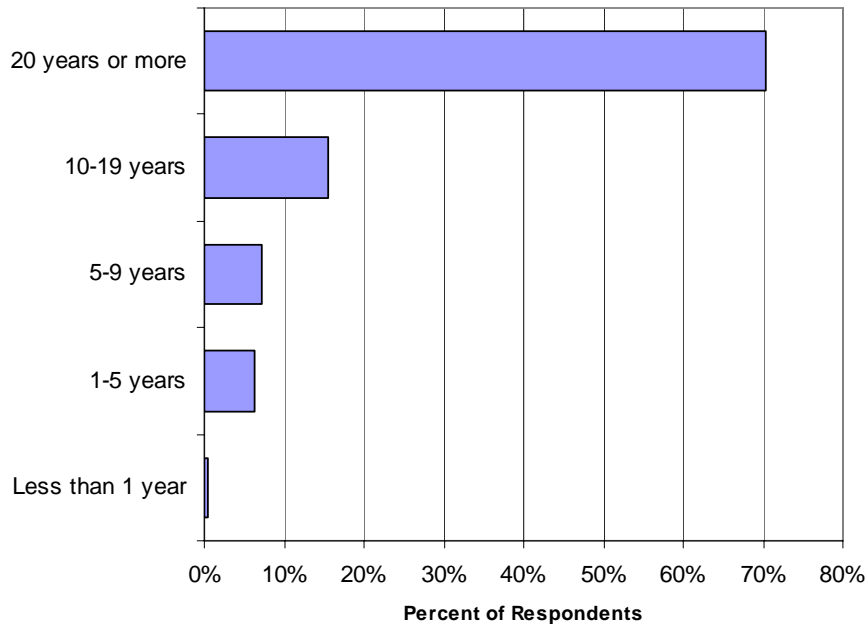


Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Preparedness, (Nov. 2007)

Oregon Residency

Approximately 70% percent of survey respondents have lived in Oregon for 20 years or more (see Figure 3). Respondents who have lived in Oregon for fewer than 20 years have most commonly moved from California (17%).

Figure 3. Length of Time Survey Respondents Have Lived in Oregon



Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

Housing Characteristics

Housing characteristics are important variables in creating effective education and outreach programs. Knowledge of the percentage of homeowners in a community can help target the programs. Homeowners might be more willing to invest time and money in making their homes more disaster resilient. The majority of survey respondents own their own home (88%). Almost 79% of survey respondents live in single-family homes, 11% live in manufactured homes, 3% in apartments of 5 or more units, 2% live in duplexes, and less than 0.5% live in condominiums/townhomes or apartments with 3-4 units. In addition, 79% said they have access to the internet.

Section III. Perception of Risk

It is helpful to understand community members' experiences and their perceptions of risk to natural hazards to make informed decisions about natural hazard risk reduction activities. The survey asked respondents about their level of concern for specific hazards in the Coastal region. The primary objective of this question was to create a "natural hazard profile" of respondents to better understand how Coastal residents perceive natural hazards.

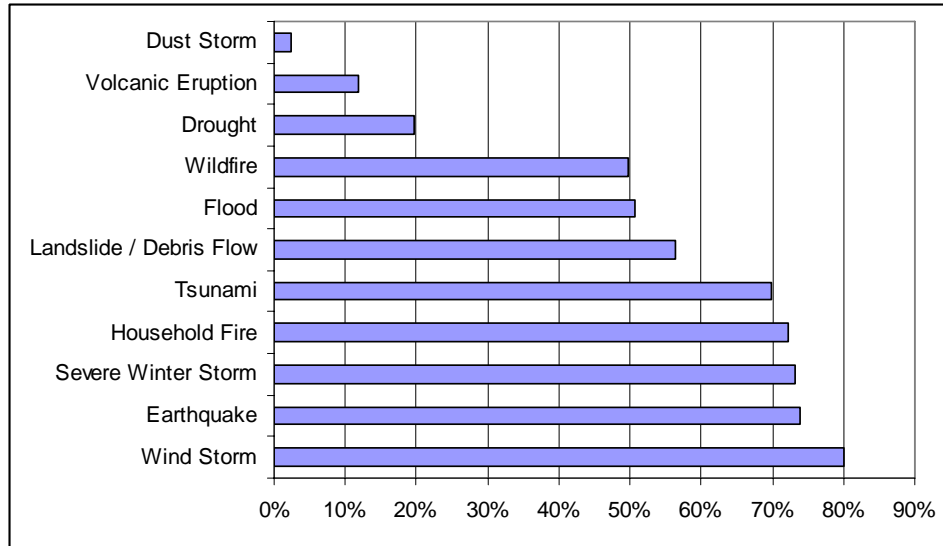
The survey asked respondents to rank their personal level of concern for specific natural disasters affecting their community (Table 3). The results show that respondents were most concerned about windstorm, earthquake, severe winter storm and household fire. The respondents are least concerned about volcanic eruptions and dust storm. Figure 5 shows the percent of respondents that identified their level of concern as either "Very Concerned" or "Somewhat Concerned".

Table 3. Survey Respondents' Level of Concern Regarding Natural Hazards in the Coastal Region

Natural Disaster	Very Concerned	Somewhat Concerned	Neither Concerned		
			nor Unconcerned	Not Very Concerned	Not Concerned
Drought	5.9%	13.7%	18.1%	22.5%	39.7%
Dust Storm	0.5%	2.0%	10.3%	17.2%	70.0%
Earthquake	19.7%	54.2%	9.9%	10.8%	5.4%
Flood	14.9%	35.8%	14.4%	16.4%	18.4%
Landslide / Debris Flow	20.8%	35.6%	10.9%	18.3%	14.4%
Wildfire	16.7%	33.0%	14.3%	20.2%	15.8%
Household Fire	21.9%	50.2%	11.4%	12.9%	3.5%
Volcanic Eruption	1.5%	10.4%	17.9%	16.9%	53.2%
Wind Storm	32.8%	47.3%	10.4%	5.5%	4.0%
Severe Winter Storm	24.3%	49.0%	11.4%	7.9%	7.4%
Tsunami	26.1%	43.8%	13.3%	6.4%	10.3%

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

Figure 4. Percentage of Survey Respondents' Who Are "Very Concerned" or "Somewhat Concerned" about Natural Hazards



Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

Section IV. Household Preparedness and Risk Reduction

There are many steps people can take to prepare their households for a natural disaster or emergency. Preparing for a disaster can improve the safety and comfort of the members of a household immediately following a natural disaster or emergency. The survey asked respondents about what steps their households have taken or plan to take to increase their disaster preparedness.

Property Protection

Exactly half (50%) of the respondents considered the possible occurrence of a natural hazard when they bought or moved into their current homes. The need to have adequate provisions for financial and property recovery when natural disasters do occur is a necessary component of natural hazard preparedness. Only ten percent of the respondents indicated they have flood insurance leaving 90% without insurance. However, 65% of those who don't have flood insurance indicated the reason is because their home is not located in the floodplain and 15% felt it was not necessary. Many more respondents (37%) indicated they have earthquake insurance. The top two reasons given by those who don't have earthquake insurance were "not familiar with it/don't know" (30%) or "it is not necessary" (20%).

Table 4. Survey Respondents' Reasons For Not Having Flood and/or Earthquake Insurance

Flood Insurance		Earthquake Insurance	
Not located in the floodplain	64%	Not familiar with it/don't know	30%
Not necessary	14%	Not necessary	20%
Not familiar with it/don't know	7%	Too Expensive	19%
Too Expensive	6%	Deductible too high/not worth it	14%
Not available	3%	Other	10%
Other	3%	Not available	7%
Deductible too high/not worth it	3%		

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

Over sixty percent of respondents have talked with members of their households about what to do in the case of a natural disaster or emergency whereas only twenty percent have braced unreinforced masonry, concrete walls and chimneys. Table 5 summarizes the activities respondents indicated they have done, plan to do, have not done, or were unable to do to prepare for natural disasters.

Table 5. Survey Respondents' Household Disaster Preparedness Activities

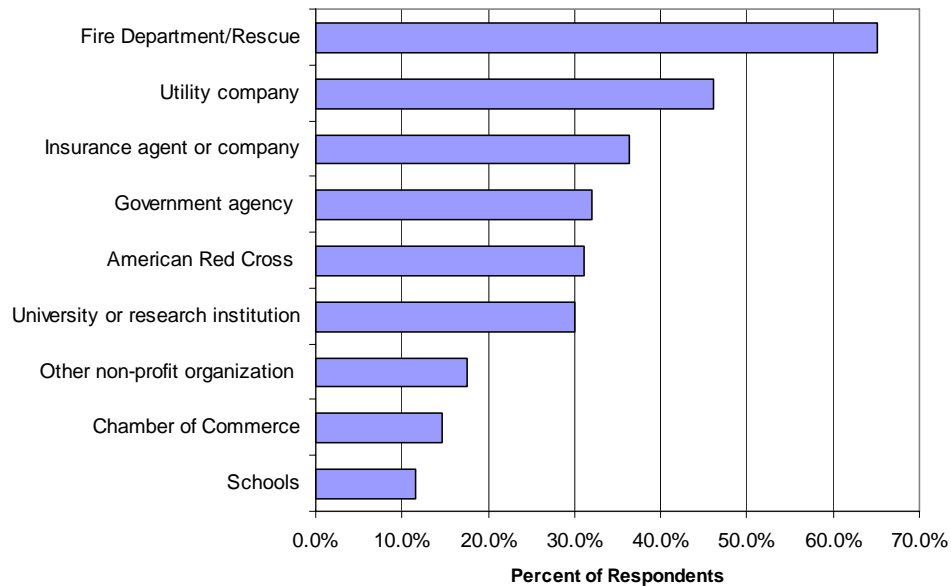
In your household, have you or someone in your household:	Have Done	Plan To Do	Not Done	Unable To Do	Does Not Apply
A. Attended meetings or received written information on natural disasters or emergency preparedness?	52.7%	5.4%	40.9%	1.0%	
B. Talked with members in your household about what to do in case of a natural disaster or emergency?	62.4%	13.9%	20.1%	3.6%	
C. Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	38.5%	24.6%	33.8%	3.1%	
D. Prepared a "Disaster Supply Kit" (Stored extra food, water, batteries, or other emergency supplies)?	46.2%	27.1%	26.1%	0.5%	
E. In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	35.4%	3.1%	57.9%	3.6%	
F. Have you secured your water heater, cabinets and bookcases to the wall?	31.8%	6.0%	56.7%	3.0%	2.5%
G. Have you fit your gas appliances with flexible connections?	25.6%	1.0%	14.1%	2.0%	57.3%
H. Used fire-resistant building or roofing materials?	54.0%	2.5%	28.3%	6.1%	9.1%
I. Secured your home to its foundation?	54.4%	2.1%	26.4%	7.3%	9.8%
J. Braced unreinforced masonry, concrete walls, and chimney?	20.3%	2.0%	31.5%	9.1%	37.1%
K. Elevated your home in preparation for floods?	6.5%	1.0%	20.1%	9.5%	62.8%

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (November 2007)

Preferred Sources and Formats of Information

To develop and implement effective outreach and education activities, it is important to understand the mechanisms for information dissemination. Of the listed organizations that might provide information to households about household preparedness for natural disasters, respondents most frequently preferred the fire department or rescue organization. Figure 5 shows that schools were the least preferred organization to be the primary information source.

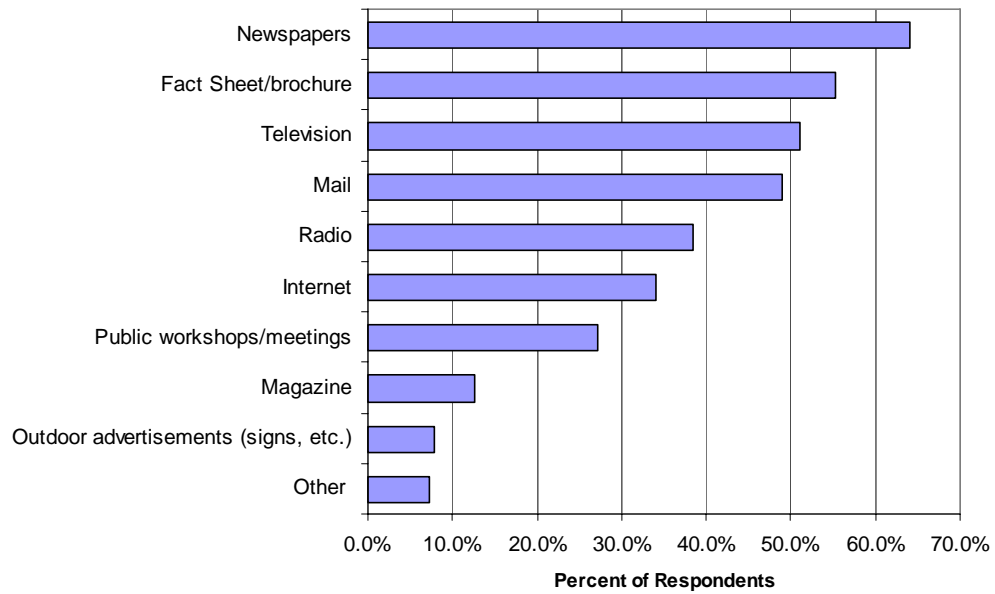
Figure 5. Survey Respondents' Preferred Sources of Information Regarding Household Preparedness



Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

When asked what the most effective way was to receive information, respondents indicated that the local newspaper (64%), fact sheet/brochure (55%), television (51%), and mail (49%) were the most effective. Figure 6 shows how survey respondents rated the effectiveness of dissemination methods presented in the survey.

Figure 6. Survey Respondents' Ranking of Effectiveness of Selected Preparedness Outreach Methods



Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (November 2007)

Section V. Community Natural Hazard Preparedness

To assist the preparation of natural hazard mitigation plans, it is essential to understand the importance community members place on specific community-level risk reduction actions. These questions could help Coastal communities determine their citizens' priorities when planning for natural hazards. They also provide an idea of which types of risk reduction strategies citizens would be willing support. Table 6 illustrates the importance respondents placed on each potential natural hazard goal.

Over 95% of respondents indicated that it is very important or somewhat important to protect private property, protect critical facilities, and protect and reduce damage to utilities. The statement with the lowest priority (74%) is to protect historical and cultural landmarks.

Table 6. Survey Respondents' Goal Prioritization

Statements	Very Important	Somewhat Important	Neither Important nor Unimportant	Not Very Important	Not Important
A. Protecting private property	66.0%	29.0%	2.0%	2.5%	0.5%
B. Protecting critical facilities (e.g., transportation networks, hospitals, fire stations)	90.5%	8.5%	0.5%	0.5%	0.0%
C. Preventing development in hazard areas	58.7%	28.9%	9.0%	2.0%	1.5%
D. Enhancing the function of natural features (e.g., streams, wetlands)	49.0%	32.0%	11.5%	5.0%	2.5%
E. Protecting historical and cultural landmarks	26.4%	48.3%	15.9%	5.0%	4.5%
G. Protecting and reducing damage to utilities	74.1%	24.4%	1.0%	0.0%	0.5%
H. Strengthening emergency services (e.g., - police, fire, ambulance)	73.4%	20.7%	3.9%	1.5%	0.5%
I. Disclosing natural hazard risks during real estate transactions	64.9%	25.7%	6.4%	2.0%	1.0%

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

There are a number of activities a community can undertake to reduce the risk from natural hazards. These activities can be both regulatory and non-regulatory. Table 7 shows respondents' general level of agreement regarding the community-wide strategies included in the survey.

Table 7. Survey Respondents' General Level of Agreement by Percentage Regarding Community-wide Strategies

Community-wide Strategies	Level of Agreement					
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Not Sure
A. I support a regulatory approach to reducing risk.	19.4%	36.7%	20.4%	9.2%	9.7%	4.6%
B. I support a non-regulatory approach to reducing risk.	15.1%	41.1%	27.6%	7.3%	3.1%	5.7%
C. I support a mix of both regulatory and non-regulatory approaches to reducing risk.	27.3%	37.9%	18.7%	7.1%	3.5%	5.6%
D. I support policies to prohibit development in areas subject to natural hazards.	37.0%	36.0%	15.0%	6.5%	2.0%	3.5%
E. I support the use of tax dollars (federal and/or local) to compensate land owners for not developing in areas subject to natural hazards.	6.1%	8.1%	28.4%	33.5%	20.3%	3.6%
F. I support the use of local tax dollars to reduce risks and losses from natural disasters.	8.5%	46.3%	23.4%	9.0%	6.5%	6.5%
G. I support protecting historical and cultural structures.	12.5%	50.5%	27.0%	5.5%	2.5%	2.0%
H. I would be willing to make my home more disaster-resistant.	23.0%	52.0%	19.5%	2.0%	0.5%	3.0%
I. I support steps to safeguard the local economy following a disaster event.	21.6%	52.8%	18.6%	1.5%	1.5%	4.0%
J. I support improving the disaster preparedness of local schools.	39.8%	46.8%	10.9%	1.5%	0.0%	1.0%
K. I support a local inventory of at-risk buildings and infrastructure.	24.8%	46.5%	21.3%	2.5%	1.0%	4.0%
L. I support the disclosure of natural hazard risks during real estate transactions.	8.5%	46.3%	23.4%	9.0%	6.5%	6.5%

Source: Household Natural Hazards Preparedness Survey, Oregon Partnership for Disaster Resilience, (Nov. 2007)

As shown in Table 7, 87% of respondents indicated that they strongly agree or agree improving the disaster preparedness of local schools. Conversely, only 14% indicated that they strongly agree or agree to the use of tax dollars to compensate land owners for not developing in areas subject to natural hazards.

Summary

Survey respondents are most concerned about wind storms, earthquakes, and severe winter storms. Only half of them considered the possible occurrence of a natural hazard when they bought their homes. However, approximately sixty percent have talked with members of their household about what to do in the case of a natural hazard and twenty-five percent plan to develop a "Household/Family Emergency Plan". The best way to

communicate with these survey respondents is through the newspaper and they prefer information from the fire or rescue department. They think that the community should be involved in preparing for natural disasters, specifically by improving the preparedness of schools and developing a local inventory of at-risk buildings.

Open-ended Survey Responses

Q3.1 If “NO” for flood, what is the main reason your household doesn’t not have insurance for flood events? (Other)

- Location not likely to be flooded
- The insurance companies use “act of god” as a clause for getting out of paying Insurers
- Located 200 ft above Col. River
- Had flood insurance 3 years. They did not send yearly bill around 2002. By the time I realized it my policy lapsed. To renew the premium doubled.

Q4.1 If “NO” for earthquake, what is the main reason your household does not have insurance for earthquake events? (Other)

- Never talked to insurance agent about it
- An insurance company likely not to pay out on large catastrophic widespread events...example is Katrina.
- Have not checked
- Rent
- The insurance companies use “act of god” as a clause for getting out of paying Insurers
- Would have to modify foundation
- Inspection rq’d not done
- Event unlikely
- Did not cover in the event of tsunami tidal surge
- No common earthquake action, but they expect a big one
- Faults offshore, homes on solid rock

Q12 County

- Clatsop (38)
- Coos (61)
- Curry (14)
- Douglas (5)
- Lane (18)
- Lincoln (36)
- Tillamook (24)

Q15 Please indicate your level of education (Other)

- Hotel-Motel MGMT
- Art

- State Certified CNA
- CDA
- Fire/police certified

Q17 Do you rent/own? (Other)

- Trailer (3)
- Single apartment over garage
- Cattle Ranch
- Mobile
- Farm
- Travel Trailer
- Business
- 2nd home/commercial
- Lakefront property

Q18 If you have lived in Oregon for less than 20 years, in what state did you live before you moved to Oregon? (Other)

- Arizona (2)
- Arkansas
- Florida (2)
- Louisiana
- Maine
- Maryland
- Minnesota
- Missouri
- Nevada (3)
- New York (3)
- North Carolina
- Ohio
- Pennsylvania
- Texas
- Utah (2)
- Vermont
- Wisconsin
- U.S.A.F-moved a lot
- 4th gen. Oregon
- Canada

Please feel free to provide any additional comments in the space provided below.

- Had earthquake insurance with Allstate, but the now no longer cover earthquakes. Terribly expensive to pick it up elsewhere!!!
- I do not believe the government (i.e. tax dollars) or insurance co. should be required to cover losses in areas known to be subjected to frequent natural risk.

- If building in known hazard area- any services needed in time of an emergency-should be paid by the builder/owner.
- Living on high hill in Astoria, Oregon. Have summer home at Cannon Beach, Oregon. Risky, as close to the ocean, but town has warning whistles, and good escape routes to high hills for safety.
- If this questionnaire is being used to assess individual preparedness in the event of a disaster, then I applaud it. If it is going to be used to implement invasive, expensive gout programs to “safeguard” us, please reconsider. Political finger-pointing, has never been a good, substitute for well-trained, organized local efforts by police, fire, church, and individuals. Some will always be unprepared and some will be capable.
- Some areas of our valley (Hidden Valley-Toledo, OR) are in flood plain. I have neighbors with a great deal of their ranch –that is wetlands-for last several months-they have been spreading human waste over a large area. Water sources have been affected-Animals have been affected-also bringing in untreated animals-running them on human waste-they have brought in black-leg and pink eye-among other disasters in our area-including overuse of Round Up.
- I would be interested to hear your findings from this survey.
- I work for Oregon State Parks about 15 miles from our community. In order to take the job, I had to agree to have an emergency survival pack for 2 persons, including an axe and first-aid kit for sutures, or sign a waiver stating OSP would not be responsible if I got stuck unprepared. I was amazed; given a list of necessary items I would need but never thought of (i.e. can opener, alcohol (whiskey), and H2O purification tabs). Educate.
- We took down a beautiful fir tree in front yard in 2006 because of possible falling hazard to house, wires and neighbors. More people should do more tree/shrub/brush trimming for falling/other hazards.
- New buildings should be required to be built to current knowledge for protection of future occupants and hazards should be revealed on sale of any property.
- I hope you are using this information to educate. Non-regulatory education programs should be an incentive for home owners/land owners to get breaks on their insurance. Personally, I feel Insurance/other agencies use disasters to pump up economics (Disaster economics).
- With on degree in Geology and one in Biology, I’m painfully aware of where I live and I’m probably more prepared for an earthquake or tsunami than anyone living in my town. Enough said...
- Volunteer firefighter for 35 years. When possible, own generator.
- We live in a flood, fire, landslide, earthquake prone state...Most citizens are ignorant of that fact...That needs to change!
- Too many are either unaware of hazards or choose to disregard them, especially if doing so is more financially beneficial to them personally. Thank you for your efforts and interest pertaining to disaster preparedness.

- People who insist on developing in flood hazard and landslide hazard areas should not receive tax dollars to rebuild after a disaster.
- Since I live alone and in a very rural area, a lot of the questions do not necessarily affect me.
- Government intervention stops many projects near our small community. I am leery of our Willamette Valley. They control our communities with their uneducated ideas. What is happening in my community?
- Thank you.
- This state does not need more government to regulate citizens. LCDC is an excellent example of polarizing the public!
- A lot of planning needs to be done. We live in an area where there are many senior citizens who would need help in an emergency. With our tall trees, fire could easily cause a great problem, but no one seems to be concerned. We are! Thanks for your efforts. Keep it going.
- We need to plan to deal with the possibility that bridges along the Oregon coast might be damaged such as from an earthquake or tsunami. If bridges cannot be reinforced, then they should be replaced with more earthquake resistant structures. Also, if the coastal area would be cut off, can supplies be airlifted in? Is there such a plan in place? What about fuel supplies for emergency vehicles? How much medicine should one stockpile for emergencies?
- I would gladly do all I could to protect my family & home - cost is an obstacle, especially for home reinforcement. It is certainly hard to trust FEMA, et al - easier to trust local author. As more personally invested, but again, resources are a likely problem. Thanks for the chance to be involved.
- Disaster preparedness procedures for the disabled in resource poor areas.
- Preparing for natural disasters falls off the radar screen for most busy households! Unless it is in front of us (like the "Enter tsunami zone" signs) to remind us that we should be prepared, aware, plan for, etc. it just won't happen. The California wildfires showed us that recently.
- Living on the coast in Pacific City, the concern of a tsunami and its impact. How to deal with loss of roads, bridges, possibly home, etc.
- Our neighborhood has a disaster preparedness committee & information in our local phone book. We store water & water.
- The one disaster prep in this area is the tsunami warning. Every time they announce a trial run the locals all run to the ocean to see the "big wave" arrive. I can only envision more tax dollars wasted on such endeavors.
- I spent several hours reviewing this before answering. In my opinion it tells you nothing!! The information requested is too vague! It is biased in both political & financial concepts of the person filling it out. An example - I am totally opposed to development in hazard areas, but I support Measure 39 & oppose Measure 49. Government doesn't belong in this business because the wealthy are opposed can fight regulation,

but the middle & lower class cannot!! You have not dealt w/ the interagency & intra-agency jurisdictional process that resulted in the Katrina fiasco. No one wants to be in charge (except egoist law enforcement) due to issues of liability & probably court & legal processes. No one has budgets for interagency tracking nor will agencies respond using the NIMNS structure. No agency is willing to release authority nor take on responsibility beyond what scope is provided by legislative action. I worked 27 years in emergency response in 4 different counties - you just can't make it happen. When the big one comes you better duck!!

- I believe it is unethical & often tragic to allow building on hazardous areas. Extremely short-sighted - self-defeating - to allow building on fragile ecosystems. I have to work to remember that the word "developer" is not a curse. Obviously, some developers are meticulous ethical. I fear that very few are & money motivates!
- Both husband & wife answered questions.
- Q-6. None of these choices are what I would describe as a "preferred choice!"
- I support any federal money to help/assist families upgrading homes and so on. Also, to assist emergency services (medical, FD), use of National Guard/Military to enforce public safety. DO NOT SUPPORT any spending for local gov. Private business, developers - these only help rich get richer at the expense of poor & middle class.
- Coastal communities are isolated by mountains to the east. Hwy 101 is the only link north & south and to roads leading east. Tsunamis are forecasted to hit Hwy 101, isolating many communities. I have seen nothing to indicate any planning to help isolated areas, nor plans to build additional roads.
- I think this subject is important and there are reasons why to bring it up. However, the chance of a natural disaster is very slim. I worry more about being in war with other nations. I also worry about issues like finding a better job, my son to go to a drug-free school, and to improve my financial and moral status for the good of my family!