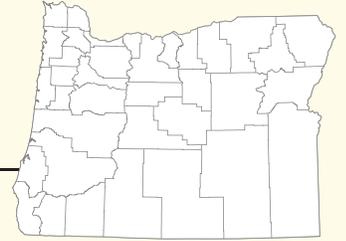




Lake County

Multi-Jurisdictional Natural Hazard Mitigation Plan





Lake County

Multi-Jurisdictional Natural Hazards Mitigation Plan

Report for:

Lake County Emergency Management

513 Center Street
Lakeview, OR
97630

Prepared by:

Oregon Natural Hazards Workgroup
Community Service Center, 1209 University of Oregon, Eugene
OR, 97403

November 2007





FEMA

June 17, 2008

Honorable Ken Kestner
Chair, Board of Commissioners
Lake County
513 Center Street
Lakeview, Oregon 97630

Dear Commissioner Kestner:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the *Lake County Multi-Jurisdictional Natural Hazard Mitigation Plan* 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 June 17, 2013:

Lake County

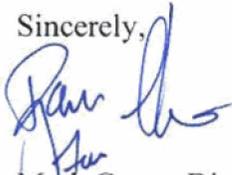
Town of Lakeview

City of Paisley

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: Dennis Sigrist, Oregon Emergency Management

Enclosure

KM:bb

Special Thanks & Acknowledgements

Project Steering Committee:

Lisa Bowler, Lake County Planning Department
Jeff Camp, Lakeview Chief of Police
Luke Campbell, Lake County Sheriff Department
Bill Duke, Lake County Recourse Initiative
Rick Dumilieu, Lake County Roads Department
Sean Gallagher, Lakeview School District 7
Ken Gerschler, Lake County Planning Department
Judy Graham, Lake County School District 7 Superintendent
Ken Kestner, Lake County Commissioner
Hilary Knelleken, Lake County Building Department
Phil McDonald, Lake County Sheriff
Dale Roberts, Mayor, City of Paisley
Ray Simms, Lakeview Town Manager
Tony West, Lake County Building Department
Mary Wilkie, Lake County Public Health
Ron Wilkie, Town of Lakeview Public Works

Project Managers:

Katie Mader, Oregon Natural Hazards Workgroup RARE Participant
(‘Resource Assistance for Rural Environments’)
Phil McDonald, Lake County Sheriff

This Natural Hazard Mitigation Plan was developed through a regional partnership funded by the Federal Emergency Management Agency’s Pre-Disaster Mitigation Competitive Grant Program¹. The Southeast Oregon Region grant was awarded to support the development of natural hazard mitigation plans for the region. The region’s planning process utilized a four-phased planning process, plan templates and plan development support provided by the Oregon Natural Hazards Workgroup at the University of Oregon.

Regional partners include:

- Federal Emergency Management Agency Region 10;
- Oregon Emergency Management;
- Oregon Department of Geology and Mineral Industries;
- Oregon Natural Hazards Workgroup at the University of Oregon’s Community Service Center;
- Resource Assistance for Rural Environments at the University of Oregon’s Community Service Center;
- Harney County;
- Jefferson County;
- Lake County; and
- Malheur County.

¹ Grant: PDM –C-PL-10-OR – 2005-003 Award Number: EMS-2005-PC-004

Lake County
Multi-Jurisdictional Natural Hazards Mitigation Plan

Table of Contents

Volume I: Natural Hazard Mitigation Plan

Executive Summary.....i
Section 1: Introduction..... 1-1
Section 2: Community Sensitivity and Resilience2-1
Section 3: Risk Assessment Summary 3-1
Section 4: Mission, Goals, and Action Items.....4-1
Section 5: Plan Implementation and Maintenance.....5-1

Volume II: Hazard-Specific Annexes

Drought.....DR-1
Earthquake.....EQ-1
Wildfire..... WF-1
Wind Storm.....WI-1
Winter Storm.....WS-1

Volume III: Resource Appendices

Appendix A: Planning and Public Process.....A-1
Appendix B: Region 6 Profile and Risk Assessment.....B-1
Appendix C: Economic Analysis of Natural Hazard Mitigation
ProjectsC-1
Appendix D: Regional Household Survey..... D-1
Appendix E: Resource Directory.....E-1
Appendix F: Mitigation Successes..... F-1
Appendix G: City Addendums.....G-1
Appendix H: Hazard Analysis Score Methodology.....H-1

Executive Summary

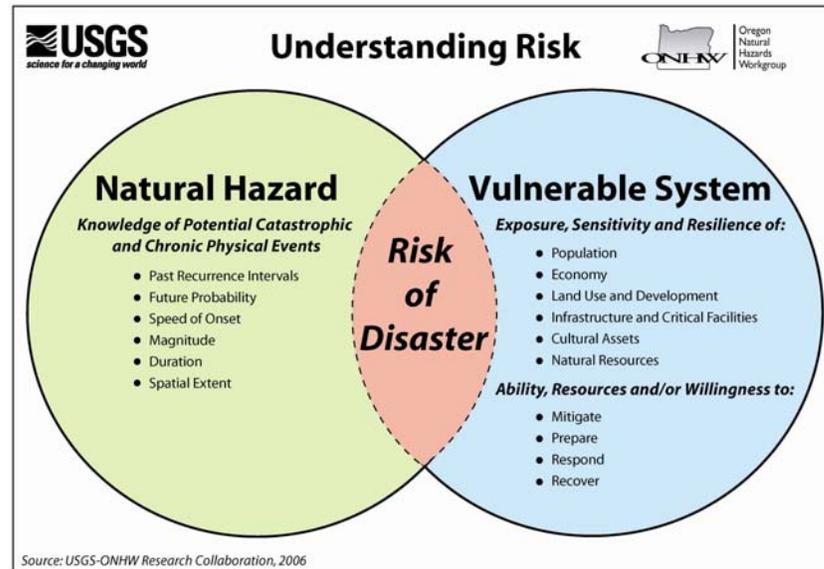
Lake County, including the Town of Lakeview and the City of Paisley developed this Multi-Jurisdictional Natural Hazard Mitigation Plan in an effort to reduce future loss of life and property resulting from natural disasters. It is impossible to predict exactly when these disasters will occur, or the extent to which they will affect the community. 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 disasters.

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 hazard mitigation plan is intended to assist Lake County², the City of Paisley and Town of Lakeview reduce 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 community. The figure below is utilized throughout the plan to illustrate the concept of risk reduction.

Figure i.1 Understanding Risk



Source: Oregon Natural Hazards Workgroup, 2006

² Note: The term "County" used in general throughout the plan also includes the city of Paisley and town of Lakeview since this is a multi-jurisdictional plan.

A natural hazard mitigation plan can assist the community to understand what puts the community at risk. When a community can identify and understand the relationship between the natural hazards it faces, its vulnerable systems, and its existing capacity, it becomes better equipped to identify and implement actions aimed at reducing the community's overall risk to natural hazards.

Who Participated in Developing the Plan?

In Fall 2005, the Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon's Community Service Center partnered with the Department of Geology and Mineral Industries (DOGAMI) and the Southeast Oregon Region (Harney and Malheur as well as Jefferson and Lake) counties to develop a Pre-Disaster Mitigation Planning Grant proposal. Each county joined the Partnership for Disaster Resistance and Resilience (*The Partnership*) by signing (through their County Commissions) a Memorandum of Understanding for this project. FEMA awarded the Southeast Oregon Region grant to support the development of the natural hazard mitigation plans for the four counties in the region. ONHW, DOGAMI and the communities were awarded the grant in the Fall of 2005 and local planning efforts in this region began in the Fall of 2006.

The Lake County Natural Hazard Mitigation Plan is the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector and regional organizations. A project steering committee guided the process of developing the plan. The steering committee was comprised of representatives from the following organizations.

- Lake County Sheriff Department
- Lake County Planning Department
- Lake County Building Department
- Lake County Roads Department
- Town of Lakeview
- Lake County Commissioners
- Lakeview School District #7
- Lake County Resource Initiative
- Lake County Public Health
- Lakeview Public Works
- Lakeview Police
- City of Paisley

The Lake County Planning Department 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.

A Steering Committee with a breadth of local officials and representatives met a total of four times while developing the plan. The Steering Committee guided the development of the plan by setting plan goals, assisting in developing a public

participation strategy with the Project Coordinator, and identifying and prioritizing appropriate mitigation activities and action items.

Local input was collected by means of work sessions attended by a variety of local officials and representatives. Stakeholder interviews conducted and compiled by the Project Coordinator also served as a means of acquiring local information and input.

What is the Plan's Mission?

The mission of the Lake County Natural Hazards Mitigation Plan is to *Create a Disaster Resilient Lake County*

What are the Plan Goals?

The plan goals describe the overall direction that Lake County agencies, organizations, and citizens can take toward mitigating risk from natural hazards.

Goal 1: Protect Human Welfare, Property, Cultural and Natural Resources:

Develop mitigation actions to lessen the impact from natural disasters on human welfare, infrastructure and property, and the cultural and natural resources of Lake County

Goal 2: Safeguard Economy: Develop mitigation actions to lessen the economic impacts from natural disasters on the region's economic development and local businesses.

Goal 3: Increase Education, Outreach, and Awareness: Promote education and outreach programs to increase public awareness of hazards and risk-reduction practices.

Goal 4: Strengthen Community Capacity: Sustain and build upon community partnerships, resources, and collective knowledge to implement mitigation actions.

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 and 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 a description of the action, the coordinating organization, timeline, and the plan goals addressed.

- **Coordinating Organization:** The coordinating organization is the public agency with 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 Partners:** Internal partner organizations are departments within the community that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.
- **External Partners:** External Partner organizations can assist the community 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.

The internal and external partner organizations listed in the mitigation plan are potential partners recommended by the project steering committee, but who were not necessarily contacted during the development of the plan. Partner organizations should be contacted by the coordinating organization to establish commitment of time and or resources to action items.

- **Timeline:** Action items include both short-term and long-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term action items (ST)* are activities which city agencies are capable of implementing with existing resources and authorities within one to two years. *Long-term action items (LT)* may require new or additional resources or authorities, and may take between one and five years to implement.
- **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 the implementation.

How will the plan be implemented?

The plan maintenance section of this document details the formal process that will ensure that the Lake County Natural Hazards Mitigation Plan remains an active and relevant document. 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 community will integrate public participation throughout the plan maintenance process. Finally, this section intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the Comprehensive Plan, Capital Improvement Plans, and Building Codes outlined in the Development Code.

Plan Adoption

The Lake County Board of Commissioners will be responsible for adopting the Lake County Natural Hazards Mitigation Plan and the Lake County Planning Department will provide the support necessary to ensure plan implementation. After the Plan is locally reviewed and deemed complete the Lake County Emergency Manager 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 County will adopt the plan via resolution. At that point the County will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and the Flood Mitigation Assistance program funds.

The accomplishment of the Natural Hazards Mitigation Plan goals and actions depends upon the maintenance of a competent Steering Committee and adequate support from the county departments reflected in the plan in incorporating the outlined action items into existing county plans and procedures. It is hereby directed that the appropriate county 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.ⁱ

ⁱ Based on the City of Beaverton's Promulgation Statement for plan adoption.

Section 1

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.ⁱ

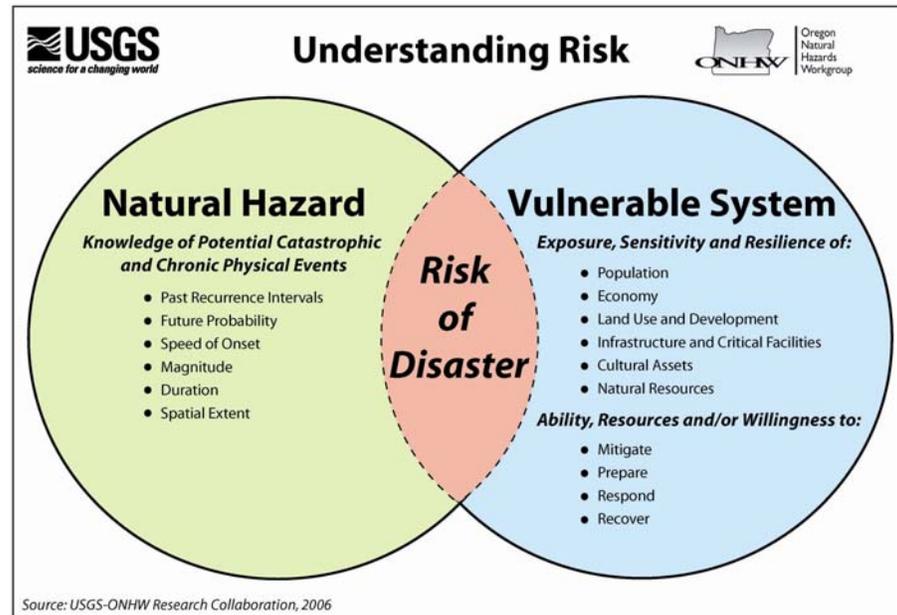
Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within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

Why Develop a Mitigation Plan?

Lake County, the Town of Lakeview and the City of Paisley 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 disasters will occur, or the extent to which they will affect the County. 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 disasters.

Natural disasters occur as a predictable interaction among three broad systems: the natural environment (e.g., climate, river systems, geology, forest ecosystems, etc.), the built environment (e.g., cities, buildings, roads, utilities, etc.), and societal systems (e.g. cultural institutions, regional and community organizations, business climate, service providers, etc.). A natural disaster occurs when a natural hazard impacts the built environment or societal systems and creates adverse conditions within a community.ⁱⁱ The figure below is used to illustrate the relationship between natural hazards and vulnerable systems in terms of understanding risk.

Figure 1.1 Understanding Risk



Source: Oregon Natural Hazards Workgroup

This plan focuses on the primary natural hazards that could affect Lake County, including earthquake, wildfire, drought, flooding and severe winter and wind storms. 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.ⁱⁱⁱ This Natural Hazards Mitigation Plan is intended to assist Lake County 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 County; (2) identification and prioritization of future mitigation activities; (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other County plans and programs such as the Lake County Community Wildfire Protection Plan, Comprehensive Land Use Plan, Emergency Response and Recovery Plan, and 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. The actions described in the plan are intended to be implemented through existing plans and programs within the County.

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 disasters 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 communities 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 fall of 2005, the Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon's Community Service Center partnered with the Department of Geology and Mineral Industries (DOGAMI) and the Southeast Oregon Region (Harney, Malheur, Jefferson and Lake Counties) to develop a Pre-Disaster Mitigation Planning Grant proposal. Each county joined the Partnership for Disaster Resistance and Resilience (The Partnership) by signing (through their County Commissions) a Memorandum of Understanding for this project. FEMA awarded the Southeast Oregon Region a grant to support the development of the natural hazard mitigation plans for the four counties in the region. ONHW,

DOGAMI and the participating communities were awarded the grant in the fall of 2005 and local planning efforts in this region began in the fall of 2006.¹

ONHW provided participating communities 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, ONHW also provided communities 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.

DOGAMI provided communities with updated risk assessment data to be utilized in the local planning process. DOGAMI's efforts include updating the Regional Risk Assessment of the State Natural Hazard Mitigation, completion of the HAZUS model for earthquake losses, and identification of existing state and federal hazards data.

Each community is responsible for facilitating the mitigation planning process locally, utilizing the resources provided by ONHW, DOGAMI and other state partners. Lake County opted to hire a RARE Participant to facilitate the development of the plan. The community 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 the community's overall risk.

The planning process and associated resources used to create Lake County's Natural Hazards Mitigation Plan were developed by the Community Service Center's Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon.^{iv} 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 partners for Disaster Resistance and Resilience; and (3) build a network of jurisdictions and organizations that can play an active role in plan implementation. The following is a summary of major activities included in the planning process.

The planning process included the review and incorporation, if appropriate, of existing plans, studies, reports and technical information. In general, the following regional resources were reviewed and local resources have been cited throughout the plan.

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

¹ Grant: PDM-C-PL-10-OR-2005-003 Award Number: EMS-2005-PC-004

- Lake County Comprehensive Land Use Plan;
- Lake County Zoning Ordinance;
- Lake County Atlas: A Comprehensive Plan Supplement;
- Town of Lakeview Development Code Handbook;
- A Planning Handbook for the City of Paisley;
- Lake County Emergency Operations Plan;
- Lake County Transportation System Plan;
- South Central Oregon Regional Investment Plan; and
- Region 8 Household Preparedness Survey Report.

The following is a summary of major activities included in the planning process.

Phase I: Getting Started

During the first phase of plan development, the RARE Participant, ONHW, and Lake County worked to establish a solid, cooperative base for the year's endeavors. The following activities occurred between October 2006 and January 2007:

The RARE Participant worked with the County Emergency Manager to create a Steering Committee to assist and guide in the plan's development. The first Steering Committee meeting was held on December 18, 2006.

Persons/organizations invited to serve on the Steering Committee included:

- Lakeview School District #7,
- Lake County Resource Initiative,
- Lake County Planning Department,
- Lake County Building Department,
- Lake County Roads Department,
- Town of Lakeview,
- City of Paisley,
- Lake County Public Health Department,
- Lake County Public Works Department,
- Lakeview Police Department, and
- Lake County Sheriff's Department.

This team was chosen because their collective understandings of Lake County's geography, history, and social/cultural issues were important for the plan's development. Please see Appendix A for a description of the Steering Committee's role in plan development, and meeting agendas and minutes.

In an effort to involve the public in the planning process, the RARE Participant began conducting interviews with local stakeholders. Stakeholder interviews allowed for the collection of a wide variety of information on critical issues, needs, and current activities within the community. Additionally, stakeholder interviews

built community support for the plan, ensured that the final plan reflected the community's priorities, and helped to identify opportunities for collaboration on mitigation projects. A "stakeholder" could be an agency, business, academic institution, non-profit organization, or any other interested party. The following organizations were interviewed in Phase I:

- Lake County Recourse Initiative;
- Superintendent Lake County School District 7;
- Director Lakeview Chamber of Commerce;
- Lakeview Fire Chief;
- Quality Compliance Officer Lake District Hospital; and
- Coordinator Lake County Watershed Council.

In addition to conducting stakeholder interviews, the RARE participant presented an overview of Lake County's Natural Hazards Mitigation Planning Process at local meetings, and submitted articles (describing the project) to local publications. Please See Appendix A for a more detailed account of the public-outreach activities.

ONHW developed the regional templates of the multi-jurisdictional plan, including Section 1: Introduction; Sections 2: Community Sensitivity and Resilience; Section 3: Risk Assessment; Section 4: Mission, Goals, and Action Items, and Section 5: Plan Implementation and Maintenance. Prior to commencement of the planning process, ONHW implemented a region-wide household preparedness survey. The survey sought to gauge household knowledge of mitigation tools and techniques and assess household disaster preparedness. The survey results hope to improve public/private coordination of mitigation and preparedness for natural hazards by obtaining more accurate information on household needs. Survey results may be viewed in Appendix D.

Phase II: Risk Assessment

During Phase II, Lake County worked to better understand its risk to natural hazards. The following activities occurred between January and March 2007:

The RARE Participant organized and facilitated the County's second Steering Committee meeting on February 23, 2007. At this meeting, Committee members worked to identify community assets and vulnerabilities, and to determine the County's risks to each natural hazard. To do this, members were given County maps to identify the locations of hazards and vulnerable areas within their community. Please refer to Appendix A for this meeting's agenda and minutes. Following this meeting, the RARE Participant additionally completed Sections 2 and 3 of the Lake County Natural Hazards Mitigation Plan.

The RARE Participant continued to engage the public by conducting stakeholder interviews, attending public meetings, and articles to local publications. Please see Appendix A for a more detailed account of these activities. The following organizations were interviewed in Phase II:

- Director Lake County Development Corp
- Director Lake County Senior Citizens Association

- Agricultural and Natural Resources Agent, OSU Extension
- County Building Official
- Town Manager, Town of Lakeview
- Oregon Forest Service, Bureau of Land Management Fire Management Officer
- District Conservationist, Natural Resource Conservation Service
- Mayor, City of Paisley

Phase III: Developing a Mission, Goals and Action Items

Lake County worked to establish a vision for future progress by establishing a mission and goals for the plan, and mitigation actions. The following activities occurred between April and June 2007:

The RARE Participant organized and facilitated the third Steering Committee Meeting. At this meeting, the RARE Participant presented a draft mission statement and goals, which the Steering Committee unanimously approved. Also at this meeting, Steering Committee members identified a set of mitigation actions.

Two action items in Lake County's Mitigation Plan are also included in the Malheur and Harney County Action Item lists. They were submitted to Lake County's plan by the Harney Electric Cooperative because the Cooperative's service area extends into both Lake and Malheur counties. The Harney Electric Cooperative participated in all phases of Harney County's Natural Hazard Mitigation planning process, but due to limited staffing, they could not participate in all of Lake County's work sessions.

The RARE Participant sought the involvement of Lake County's two incorporated cities: Lakeview and Paisley. Three work sessions were held in Paisley on: March 9, 2006, April 16, 2006, and June 11, 2006. The town of Lakeview held one work session on June 28th, 2006

The following organizations were interviewed in Phase III:

- Pacific Power Regional Community Manager and Pacific Power Operations Manager
- Town of Lakeview Public Works Manager
- County Roads Manager
- Lake County Resource Initiative
- Surprise Valley Electric Coop Member Service Manager
- Surprise Valley Electric Coop Operations Manager
- Midstate Electric Coop Operations Manager
- Midstate Electric Coop Operations Manager

Phase IV: Plan Implementation and Maintenance

Lake County created a plan maintenance schedule and an implementation process for the Lake County Multi-Jurisdictional Natural Hazards Mitigation Plan. The following activities occurred between July and September 2007:

Implementation and maintenance strategies were adopted by the Lake County Steering Committee during their fourth meeting on July 25, 2007. The Lake County Planning Department was designated to assume the role of “convener,” and, as such, will be responsible for maintaining and updating the plan. The existing steering committee will continue to meet bi-annually and will assist in overseeing the implementation of mitigation actions. Please see Appendix A for a more detailed account of this meeting’s minutes. Additionally, please refer to Section 5, ‘Plan Implementation and Maintenance,’ for a greater understanding of plan implementation and maintenance procedures.

How is the Plan Organized?

Each section of the mitigation plan provides specific information and resources to assist readers in understanding the hazard-specific issues facing citizens, businesses, and the environment in Southeast Oregon. Combined, the sections work in synergy to create a mitigation plan that furthers the community’s mission to create a disaster resilient Lake County.

Volume I: Natural Hazard Mitigation Plan

Section 1: Introduction

The Introduction briefly describes the multi-jurisdictional mitigation planning efforts and the methodology used to develop the plan.

Section 2: Community Sensitivity and Resilience

This section documents the community’s sensitivities – those community assets and characteristics that may be impacted by natural hazards, as well as community resilience – the ability to manage risk and adapt to hazard event impacts. Examples of community sensitivity factors include human populations, the local economy, critical facilities and infrastructure, cultural and historic resources, and environmental assets. Community resilience factors include existing plans, policies, programs or community organizations that influence a community’s character, governance or growth trends.

Section 3: Risk Assessment Summary

This section describes the risk assessment process and summarizes the best available local hazard data. A hazard summary is provided for each of the hazards addressed in the plan. The summary includes the hazard’s history, location, extent, probability and previous mitigation efforts.

Section 4: Mission, Goals and Action Items

This section documents the plan, vision, mission, goals, and actions and also describes the components that guide implementation of the identified mitigation strategies.

Section 5: Plan 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.

Volume II: Hazard-Specific Annexes

The purpose of the hazard-specific annexes is to provide additional resources and documentation of the hazard. Where extensive local data is available, beyond the scope of information provided in Section 3, the additional local data is placed in the annex. The hazard specific annexes included with this plan are the following:

- Drought
- Earthquake
- Flood
- Wildfire – Lake County Community Wildfire Protection Plan
- Wind Storm
- Winter Storm

Volume III: Resource Appendices

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

A) Public Participation

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 Steering Committee meetings as well as any other public involvement methods.

B) Regional Profile and Risk Assessment

The Profile and Risk Assessment report serves as the regional overview of community sensitivities and the risk assessment. A component of the State Plan, the report includes a *Demographic Profile* that discusses the population in the region, an *Infrastructure Profile* that addresses the region's critical facilities and systems of transportation and power transmission, and an *Economic Profile* that discusses the scale and scope of the regional economy with a focus on the key industries. This report also includes the regional risk assessment that describes historical impacts, general location, extent, and severity of past natural hazard events as well as the probability of future events.

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 Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon. 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.

D) Regional Household Preparedness Survey

This appendix includes the survey instrument and results from the household preparedness survey implemented by ONHW throughout the region. 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.

E) Resource Directory

This appendix provides local, regional and state and federal resources for some of the hazards addressed in the plan. The directory also includes key publications and additional resources for use by the community in mitigation activities.

F) Mitigation Successes

This appendix provides an example and templates for documenting successful mitigation projects. It is important to document these successes in a formal way for the edification of the community and the plan and as a means to stay competitive when applying for grants and funding sources.

G) City Addendums

The Cities of Lakeview and Paisley completed addendums to the lake County Natural Hazards Mitigation Plan. Addendums include a description of the City's participation in the Lake County Planning Process, an analysis of the City's risks to natural hazards, and a listing of mitigation action items. Cities chose to either partner with Lake County on actions, or to identify their own actions, or both.

H) Hazard Analysis Score Methodology

This appendix includes the methodology used by the County to develop the Hazard Analysis Scores. The methodology was developed by Oregon Emergency Management.

Independent Reports Referenced

The following reports were utilized to develop portions of the mitigation plan. These reports are not included as appendices to this mitigation plan, as they are either a component of the State's approved enhanced mitigation plan or an independent report developed by partner agencies.

Regional Profile and Risk Assessment

This report was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon. This report serves as the nexus between the State Natural Hazard Mitigation Plan and local plans. A component of the State Plan, the report is utilized by local communities to identify specific issues locally and to develop potential action items. Communities review and update the data in the report based on their best available local data. The updates are then incorporated into the State Plan, creating a state level plan that is built upon information and data from the local level. Using the best available data, the regional profile includes a *Demographic Profile* that discusses the population in the region, an *Infrastructure Profile* that addresses the region's critical facilities

and systems of transportation and power transmission, and an *Economic Profile* that discusses the scale and scope of the regional economy with a focus on the key industries. In addition to describing characteristics and trends, each profile section identifies the traits that indicate sensitivity to natural hazards.

This report also includes the regional risk assessment that describes historical impacts, general location, extent, and severity of past natural hazard events as well as the probability of future events. This information is aggregated at the regional level and provides counties with a baseline understanding of past and potential natural hazards.

These assessments were based on best available data from various state agencies related to historical events, repetitive losses, county hazard analysis rankings, and general development trends. The risk assessment was written in 2003 by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon as part of the State Natural Hazards Mitigation Plan.

DOGAMI Regional Risk Assessment Study

The Oregon Department of Geology and Mineral Industries (DOGAMI) provided counties with regional summaries of the flood and earthquake hazards. Earthquake Risk studies, portraying potential damage and losses, are also provided to help identify areas of critical need. These critical needs are the basis of the action items identified for risk reduction in each county.

ⁱ Massachusetts Department of Environmental Management. 1999. "Hazard Mitigation: Managing Risks, Lowering Costs." <http://www.state.ma.us/dem/programs/whatis.htm> Accessed 8/2/02

ⁱⁱ LeDuc, A. "Establishing Mitigation as the Cornerstone for Community Resilience," 2006 Risk Management Yearbook, Public Entity Risk Institute. Fairfax, VA.

ⁱⁱⁱ 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.

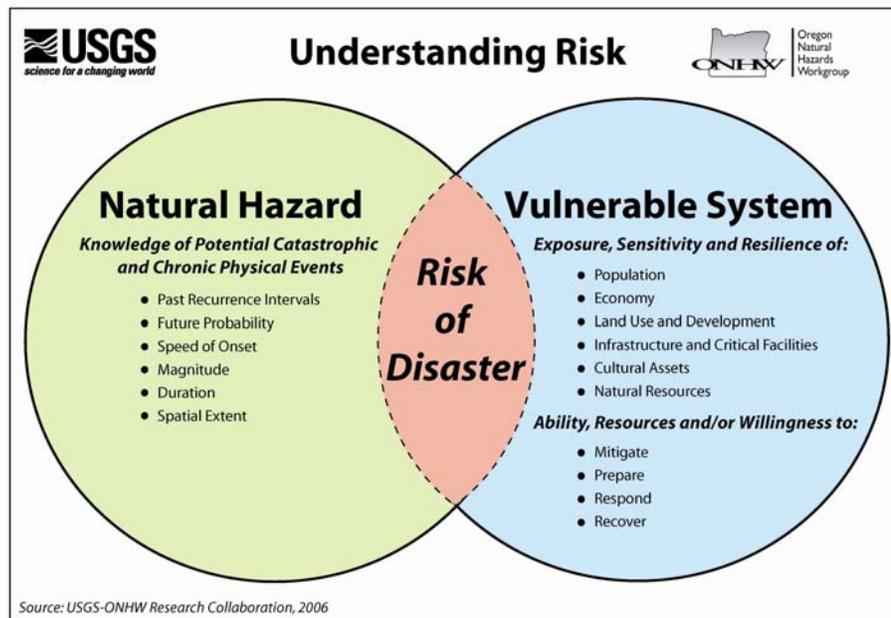
^{iv} More information on the Oregon Natural Hazards Workgroup can be found at <http://www.oregonshowcase.org/onhw>

Section 2

Community Sensitivity and Resilience

This section documents the community’s sensitivity factors, or those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). It also identifies the community’s resilience factors, or 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 community when the plan was developed. The information documented below, along with the findings of the risk assessment, should be used as the local level rationale for the risk reduction actions identified in Section 4 – Mission, Goals, and Action Items. The identification of actions that reduce a community’s sensitivity and increase its resilience assist in reducing the community’s overall risk, or the area of overlap in Figure 2.1 below.

Figure 2.1 Understanding Risk



Source: Oregon Natural Hazards Workgroup, 2006.

Community Sensitivity Factors

Lake County is located in the south central portion of the state. Figure 2.1 illustrates Lake County's location within the state and Figure 2.2 depicts the communities within Lake County.

Figure 2.1. State of Oregon

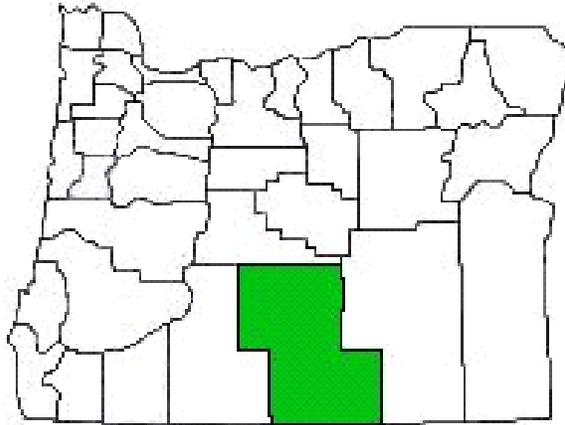


Figure 2.2. Lake County



The following documents key community sensitivity factors in Lake County.

Population

- Lakeview is the largest population center in Lake County. Over one-third of the county's population lives within Lakeview's City limits. Paisley is the second largest incorporated community in Lake County with a population of 250. The rest of the population is dispersed throughout the county in smaller and often remote communities including Christmas Valley, Silver Lake, Summer Lake, Fort Rock, Plush, Adel, New Pine Creek, Drews Gap and Drews Reservoir.
- Seniors (age 65+) comprise 22% of Lake County's total population.
- Lake County has a slow growth rate; 1.1% from 2000-2005
- 15% of Lake County is living below the poverty level, which is 2% higher than Oregon's state average.

Economic Assets

- The largest employer in Lake County is the government.
- Lake County is the second least economically-diverse county in Oregon.
- Lake County's largest generator of revenue is farming and ranching.
- Wood product companies are a large employer for Lake County. These companies are dependant upon the forest resources of the county.
- According to Lake County Development, all businesses in Lake County are considered 'small businesses' (with 20 or fewer employees). Small businesses are particularly susceptible to natural disasters.
- The Fremont Sawmill of Lakeview is dependant on its location and would not be able to relocate if a hazardous event were to occur.
- Many of Lake County's restaurants would be affected by the temporary loss of utilities because food stocks may parish.

Cultural and Historic Assets

- There are eight buildings in Lake County that are on the National Register of Historic Places. These buildings include the Bailey and Massingill Store, Heryford Brothers Building, William P. Heryford House, Lake County Round Sale Barn, Nevada-California-Oregon Railway Passenger Station, Post & King Saloon and the John & Cornelia Watson House of Lakeview, the Ed Eskelin Ranch Complex of Silver Lake.
- Historic buildings identified by the Steering Committee in Lakeview include Daly Middle School, the Favell-Utley Building and The Chamber of Commerce Building.
- The Paisley School is a historic building and is composed of un-reinforced concrete (i.e., susceptible to earthquake damages).
- Residents of Lakeview consider the Lake County Fairgrounds and swimming pool to be cultural assets in their community.
- The Lake County Museum, The Schminck Memorial Museum of Lakeview, and The Fort Rock Valley Museum of Fort Rock are cultural and historic assets in the community.

Critical Facilities & Infrastructure

- Daly Middle School is considered a critical facility; it is a historic unreinforced masonry building. The DOGAMI Statewide Seismic Needs Assessment (See Hazard Annexes) identified this building to be of “high vulnerability” to seismic events.
- Lakeview High School and Fremont/Hay Elementary Schools are considered critical facilities and have been determined to have high vulnerability to seismic events by the DOGAMI Statewide Needs Assessment.
- Paisley School is considered a critical facility; it is a historic building made of unreinforced concrete. The DOGAMI Statewide Seismic Needs Assessment (See Hazard Annexes) identified this building to be of “high vulnerability” to seismic events.
- The Silver Lake Rural Fire Protection District in Silver Lake is a critical facility. The DOGAMI Statewide Seismic Needs Assessment (See Hazard Annexes) identified this building to be of “high vulnerability” to seismic events.
- The Lake County Courthouse and the Lakeview Fire Department are considered critical facilities and are at high seismic vulnerability according to the DOGAMI Statewide Seismic Needs Assessment
- State highways 395, 31 and 140 are primary transportation routes through Lake County. There are many secondary roads, Forest Service roads and Bureau of Land Management roads that can be used should the main highways become unsafe to travel.
- The 911 Center and the ambulance center are located in Lakeview in the Lakeview Police and Fire Department Building. This building has been determined to have high vulnerability to seismic events by the DOGAMI Statewide Seismic Needs Assessment.
- The Lake District Hospital is the only hospital for Lake County and is located in Lakeview
- Lake County Senior Center is considered a critical facility because it is used frequently for community activities.
- Bullard Canyon Dam was completed in 2002. The dam prevents spring melt-off (from the Bullard Canyon Watershed) from flooding downtown Lakeview.
- The Paisley Community Center is considered a critical facility.
- The Warner Creek Correctional Facility is located in Lakeview and is a 400-bed minimum security correctional facility.
- Power is provided to Lake County by Surprise Valley Electric Cooperative, Pacific Power, Midstate Electric and Harney Electric Cooperative.
- There are seven wells and four water storage tanks in Lakeview. All are managed by the Lakeview Public Works Department.
- There are three wells and one water tank in the City of Paisley.

Natural Resources

- The Fremont-Winema National Forest is an important natural resource to Lake County; it provides timber resources and recreational tourism opportunities.
- Local geology in Lake County attracts many tourists to areas such as Abert Rim, Hart Mountain Antelope Reserve, Fort Rock, Hole in the Ground, Crack in the Ground, Christmas Valley Sand Dunes, and numerous hot springs.

- Abert Rim, Black Cap, Doherty Slide and Hadley Butte are all designated Hang-gliding launch sites in Lake County. Lake County is known as “the hang gliding capital of the west.”
- Local wildlife attracts hunters and birders to areas such as Hart Mountain Antelope Reserve, Summer Lake, The Warner Wetlands and Goose Lake.
- Much of Lake County’s annual precipitation comes in the form of snow. This provides winter recreation in the form of snowmobiling and cross country skiing in the Fremont-Winema National Forest, and downhill skiing at Warner Mt. Ski Area.
- Perlite mining is an economic asset to Lake County.
- 2.66% of the county is covered by water, primarily in the form of large, shallow and fluctuating alkali lakes.

78% of Lake County land is owned by federal and state government. Of that land, approximately 65% is used for cattle grazing.

Land Use and Development

- Current growth trends have been in Christmas Valley and Drews Reservoir – both of which are at high risk for wildfire.
- Current growth has been in Christmas Valley which is at high risk for wildfires due to sagebrush cover around the township.
- Over 78% of the land in Lake County is owned and managed by the local, state and federal government.
- Community growth is occurring more in Wildland-Urban Interface (WUI) zones. The Lake County Fire Council Head estimated that 10% of the communities in Lake County are in or near WUI zones.

Community Resilience Factors

The following documents the key community resilience factors in Lake County including a description of the local government’s structure, existing plans and policies, and community organizations and programs.

Government Structure

Lake County Sheriff’s Department

The Emergency Management Team of the Lake County Sheriffs Department coordinates natural hazard mitigation planning and implements measures to accomplish long-term prevention of the adverse impacts of natural hazards as described in Annex Y Entitled Hazard Mitigation of the Emergency Operations Plan. (See Appendix G Resource Directory for contact information)

The Lake County Roads Department

The Lake County Roads Department serves as the focal point for policy and operational direction and coordination of all relevant activities pertaining to road design, construction, and maintenance in accordance with the Lake County Transportation Plan.

Lake County Building Department

The Lake County Building Department implements and enforces the State of Oregon Building Codes including the Oregon Structural Specialty Code for commercial structures and the International Residential Code for residential dwelling. These codes establish the minimum safety requirements to safeguard public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment. This includes enforcing special seismic restrictions for D-1 seismic areas, in which Lake County is located.

Lake County Commissioners

Three elected officials serve on the Lake County Board of Commissioners. The Commissioners' roles are to determine the financial expenditures and other customary local government decisions regarding plans and policies. The Commissioners will participate in the reviewing and updating process of the Lake County Natural Hazard Mitigation Plan every 5 years. They will also take part in implementing and overseeing mitigation action item projects.

Lake County Planning Department

The Lake County Planning Department implements and enforces the Comprehensive Land Use Plan, Zoning Ordinances and Town of Lakeview Development Code Handbook. The Section titled "Areas subject to natural hazards and disasters" of the Comprehensive Land Use Plan and Lake County Zoning Ordinances addresses policies and recommendations to align with State Planning Goal 7 to help limit and protect buildings in disaster prone areas. Chapter 3.7 of the Town of Lakeview Development Code Handbook titled "Sensitive Lands" outlines how planning and building should be conducted in flood plain areas to minimize future personal, physical and financial losses from flooding. (See Appendix E Resource Directory for contact information).

Existing Plans & 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.¹

The Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the county's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the county'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 actions through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the county's resources.

The following are existing plans and policies already in place within the community. A table further defining each of these plans and policies has been included at the end of this section.

- Lake County Comprehensive Land Use Plan
- Lake County Zoning Ordinances
- Town of Lakeview Development Code Handbook
- Lake County Atlas: A Comprehensive Plan Supplement
- Lake County Comprehensive Plan
- A Planning Handbook for the City of Paisley
- Lake County Emergency Operations Plan
- Lake County Transportation System Plan
- South Central Oregon Regional Investment Plan
- Town of Lakeview Comprehensive Plan

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 County 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 organizations are active within the community and may be potential partners for implementing mitigation actions:

- Lake County Chamber of Commerce
- Lake County Crisis Center
- Lake County Extension Office
- Lake County Development
- Lake County Senior Citizens Association
- Lake District Hospital
- Lakeview Rotary Club
- Lakeview Elks Lodge #1536
- Klamath County Head Start
- Lake County Medical Clinic
- Sunshine Children's Center
- Christmas Valley Chamber of Commerce
- Lake County Public Health
- Paisley Wellness Center
- Lake County Disaster Preparedness Group
- Lakeview Lions

- Lakeview Soroptimists

A table including information on each organization or program's service area, types of services offered, populations served, and how the organization or program could be involved in natural hazard mitigation is included at the end of this section. The three involvement methods are defined below.

- Education and outreach – organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.
- Information dissemination – organization could partner with the community to provide hazard-related information to target audiences.
- 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.

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 the community in better understanding its risk and can assist in documenting successes.

Bullard Canyon Dam

To halt annual flooding from melted snow pack down Bullard Canyon directly east of downtown Lakeview, the Bullard Canyon Dam was installed and completed in 2002. The project was designed and built by Anderson Engineering and was funded by a grant through the USDA.

Deadman Canyon Holding Structures

To address annual flooding and melted snow pack down Deadman Canyon just southeast of downtown Lakeview, rock holding structures were constructed by the Army Corps of Engineers in 2002. These structures help regulate flash flooding.

Dams and Diversions along Chewaucan River

Multiple dams and diversions have been installed on the Chewaucan River through the City of Paisley. Although these dams and diversions were installed for irrigation purposes, they assist in mitigating flood issues in the City of Paisley.

Lake County Community Wildfire Protection Plan

The Lake County Community Wildfire Protection Plan (CWPP) was completed in December of 2005 while Phase II of the CWPP was completed in November of 2006. The CWPP addresses risk and vulnerability to wildfire in Lake County. The plan suggests mitigation activities and encourages public involvement in the suggested activities. The plan was prepared on behalf of Lake County Recourse Initiative by WALSH Environmental Scientists and Engineers.

Post and King Saloon Building Structural Retrofit

A structural retrofit and remodel was conducted on the Post & King Saloon Building at 125 North E Street in Lakeview in 2006. The retrofit was managed by ZCS Engineering of Klamath Falls and involved seismic hazard reduction along with seismic and gravity load upgrades. The retrofit was funded entirely through South Valley Bank and Trust who owns the building. The Post & King Saloon Building is also listed on the National Register of Historic Places.

Chamber of Commerce Building Structural Retrofit

A structural retrofit was conducted on the Lake County Chamber of Commerce Building at 126 North E Street in Lakeview in 1996. It was funded through private donations and a number of small grants. The project was managed by a Lakeview contractor with many local residents donating time towards the completion of the project.

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

Lake County
Existing Plans and Policies

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Lake County Comprehensive Land Use Plan	Jun-89	Lake County Planning Commission	The four basic purposes of this plan are 1) to encourage desirable growth, 2) to accommodate anticipated development, 3) to make provisions for those uses which may be needed by a community, but which may have such undesirable characteristics as noise, smoke or odor, and 4) to protect individual and public investments	In the section titled, "Areas subject to natural hazards and disasters" State planning goal 7 is identified with 9 plan policies and 4 recommendations. Both the policies and recommendations could be referred to for creating action items that comply with state planning goal 7.
Lake County Zoning Ordinance	Sep-89	Lake County Planning Commission	Guides growth and development by establishing the County's authority to govern land use zoning and by providing conditions for sustainable land use practices.	<ul style="list-style-type: none"> • Guides growth and development. • Can be linked to action items that shape growth and development so that they do not increase the county's risk to natural hazards. • Can be linked to action items that protect natural and historic areas and areas subject to natural hazards. • Can be linked to action items for how the County will implement Oregon Statewide Planning Goal 7 requirements.
Lake County Atlas: A Comprehensive Plan Supplement	Mar-79	Lake County Planning Commission	Compiled from information gathered primarily for local planning advisory committees to use in preparation of land use plan recommendations reflected in the County's Preliminary Land Use Plan	May include analysis of land uses which may be helpful in guiding future development away from hazard areas.

Lake County
Existing Plans and Policies

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Town of Lakeview Development Code Handbook	Jul-01	Lakeview Planning Department	It is a comprehensive land use and development code that governs all of the land within the incorporated limits of Lakeview. The five chapters are used to review land use applications	Chapter 3.7 titled, "Sensitive Lands" outlines how planning and building should be conducted in flood plain areas to minimize future personal, physical, and financial losses from flooding
Lake County Comprehensive Plan	Jun-83	Lake County Planning Commission	This plan provides long-range guide lines for decision making with regard to land use suitability, development proposal evaluation, public utility, facility and street improvement planning and other considerations related to community growth	Under Subject "Planning Guidelines" Section VII titled "Natural Hazards and Disaster Areas" outlines how planning and building should be conducted in floodplain areas and slopes susceptible to landslides
A Planning Handbook for the City of Paisley	Jan-80	Lake County Planning Department	This plan provides long-range guide lines for decision making with regard to land use including subdivision ordinances, zoning ordinances and plan map and guidelines within Paisley city limits	Under heading "Plan Map and Guidelines", Section VII titled "Areas Subject to Natural Hazards and Disasters" outlines development while protecting water quality from flood inundation and adequate fire protection

Lake County
Existing Plans and Policies

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Lake County Emergency Operations Plan	2002	Lake County Sheriff Department/Emergency Management	This Plan attempts to define in a straightforward manner who does what, when, where, and how in order to mitigate, prepare for, respond to, and recover from the effects of war, natural disaster, technological accidents, and other major incidents	See annexes for flood, fire, earthquake, drought and winter storms
Lake County Transportation System Plan	Dec. 2002	Lake County Roads Department	This plan guides the management of existing transportation facilities and the design and implementation of future facilities for the next 20 years	The Transportation Plan may be a resource to identify which roads and transportation systems are most vulnerable to natural disasters. Likewise, the TSP can be utilized to implement mitigation measures aimed at transportation-related projects. When updated in 2022, the TSP can also include mitigation elements in its implementation considerations."
South Central Oregon Regional Investment Plan	Feb. 2002	South Central Oregon Economic Development	The South Central Oregon Consolidated Development Strategy and Regional Investment Strategy is a plan that is written to guide the economic development strategies and rural investment funds for Klamath and Lake Counties	The SCORIP prioritizes local issues as the plan goals. The following goals pertain to natural hazards: Goal 2: Natural Resources, Goal 3: Education and Training, Goal 7: Public Safety and Emergency Response, Goal 8: Capacity Building

Lake County
Existing Plans and Policies

Name	Date of Last Revision	Author/Owner	Description	Relation to Natural Hazard Mitigation
Town of Lakeview Comprehensive Plan	Jan. 2004	Town of Lakeview	The Plan provides long-range guidelines for decision-making with regard to land use suitability, development proposal evaluation, public utilities, facilities and street improvement planning and other considerations related to community growth	Section VII titled "Areas Subject to Natural Hazards and Disasters" outlines policies and recommendations for developments in areas prone to flooding, wildfires and landslides

Lake County
Existing Community Organizations

Name and Contact Information	Description	Service Area	Populations Served							Involvement with Natural Hazard Mitigation	
			Businesses	Children	Disabled	Elders	English Second Language	Families	Low Income		
Klamath County Head Start 509 Commercial St Klamath Falls, OR 97601 Tel: 541-882-5988 Fax: 541-884-2803	Oregon Head Start PreKindergarten	Klamath and Lake Counties	✓							<ul style="list-style-type: none"> • Education and outreach • Information dissemination 	
Lake County Chamber of Commerce 126 N. 'E' St. Lakeview, OR 97630 Tel: 541-947-6040 Fax: 541-947-4892	Provide economic development assistance to local businesses.	Lake County	✓							<ul style="list-style-type: none"> • Education and outreach • Information dissemination • Plan/project implementation 	
Christmas Valley Chamber of Commerce P.O. Box 65 Christmas Valley OR 97641 Phone: 541-576-3838 Fax: 541-576-3838	Provide economic development assistance to local businesses.	North Lake County	✓							<ul style="list-style-type: none"> • Education and outreach • Information dissemination • Plan/project implementation 	
Lake County Crisis Center 18 South G Street Ste 203 Lakeview, OR 97630	Assistance for people suffering from a person crisis	Lake County		✓	✓	✓			✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination
Lake County Extension Office Courthouse Lakeview, OR 97630 Tel: 541-947-6054 Fax: 541-947-6055	Provides research-based knowledge and education that focus on strengthening communities and economies, sustaining natural resources, and promoting healthy families and individuals.	Lake County	✓								<ul style="list-style-type: none"> • Education and outreach • Information dissemination • Plan/project implementation

Lake County
Existing Community Organizations

Name and Contact Information	Description	Service Area	Populations Served							Involvement with Natural Hazard Mitigation	
			Businesses	Children	Disabled	Elders	English Second Language	Families	Low Income		
Lake County Medical Clinic 624 South J Street Lakeview, OR 97630	Medical Services	Lake County		✓	✓	✓			✓	✓	<ul style="list-style-type: none"> • Information dissemination
Lake County Senior Citizens Association 11 North G St. Lakeview, OR 97630 Tel: 541-947-6035	Senior citizen association	Lake County				✓					<ul style="list-style-type: none"> • Education and outreach • Information dissemination
Lake District Hospital 700 South J Street Lakeview, OR 97630 Tel: 541-947-2114	The District operates a 21-bed acute care hospital, an attached 47-bed skilled long term care facility, a home health and hospice service, outpatient clinic services, provides through leases physician clinic facilities, and buildings to support those operations. The District services include the acute care hospital, obstetrical services, surgery, emergency room, and related ancillary services (lab, x-ray, etc.) associated with these services.	Lake County		✓	✓	✓			✓	✓	<ul style="list-style-type: none"> • Information dissemination

Lake County
Existing Community Organizations

Name and Contact Information	Description	Service Area	Populations Served							Involvement with Natural Hazard Mitigation	
			Businesses	Children	Disabled	Elders	English Second Language	Families	Low Income		
Lakeview Elks Lodge #1536 323 North F PO Box 648 Lakeview, OR 97630 Tel: 541-947-2258	Quoted from the mission statement: the Benevolent and Protective Order of Elks of the United States of America will serve the people and communities through benevolent programs, demonstrating that <i>Elks Care and Elks Share</i> .	Lake County		✓	✓	✓			✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination
Lakeview Rotary Club Tel: 541-947-5113	Rotary is a worldwide organization of business and professional leaders that provides humanitarian service, encourages high ethical standards in all vocations, and helps build goodwill and peace in the world.	Lake County	✓	✓	✓	✓			✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination
Sunshine Children's Center 618 South F St. Lakeview, OR 97630	Child Care	Lake County		✓							<ul style="list-style-type: none"> • Information dissemination
Lake County Public Health 100 N. D Street Suite 100 Lakeview, OR 97630 Tel: 541-947-6045 Fax: 541-947-4563	Public Health offers services in community health and planning, disease prevention and epidemiology, emergency preparedness, environmental public health, family health services and multicultural health	Lake County	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination

Lake County
Existing Community Organizations

Name and Contact Information	Description	Service Area	Populations Served							Involvement with Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	English Second Language	Families	Low Income	
Paisley Wellness Center 723 Chewaucan Rd Paisley, OR 97636 (541) 943- 3551	The Paisley Wellness Center functions as a resource center offering a wide variety of services including public health, domestic violence, meals for senior citizens and hosting a variety of meetings for local organizations	City of Paisley	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination
North Lake County Medical Clinic 87480 Spruce Lane P.O. Box 377 Christmas Valley, OR 97641 Ph (541) 576-2343 Fax (541) 576-2869	Medical Services	North Lake County		✓	✓	✓		✓	✓	<ul style="list-style-type: none"> • Information dissemination
Lake County Disaster Preparedness Group Head: Patti Baker, Lake District Hospital Quality Compliance Officer (541) 947-2114 x218	The Lake County Disaster Preparedness Group is a team of local officials working to prepare Lake County for disasters including natural disasters, epidemics and mass casualty incidents.	Lake County	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> • Education and outreach

Lake County
Existing Community Organizations

Name and Contact Information	Description	Service Area	Populations Served							Involvement with Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	English Second Language	Families	Low Income	
Soroptimist International of Lakeview PO Box 1128 Lakeview, OR 97630 President Ann Logan 947-3855	Soroptimist is an international organization for business and professional women who provide volunteer service to their communities.	Lake County	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination
Lakeview Lions 323 N. F Street Lakeview, OR 97630	Lions are an international organization of men and women who participate in a vast variety of projects important to their communities.	Lake County	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> • Education and outreach • Information dissemination

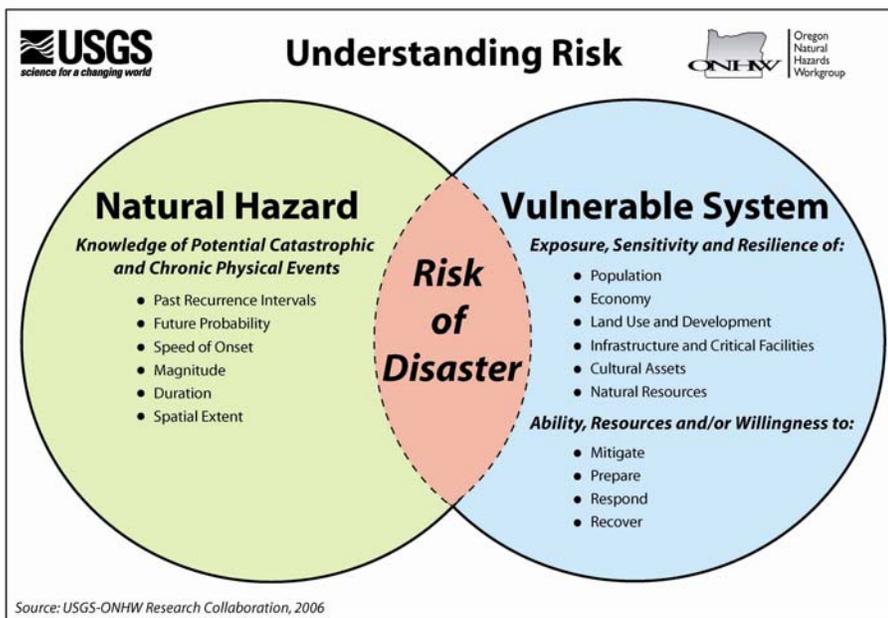
Section 3

Risk Assessment Summary

The foundation of the Lake County 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 community, as highlighted in Figure 3.1 below. The information in this section was paired with the information in Section 2 – Community Sensitivity and Resilience during the planning process in order to identify issues and develop actions aimed at reducing the community’s overall risk, or the area of overlap in the figure below.

Figure 3.1 Understanding Risk



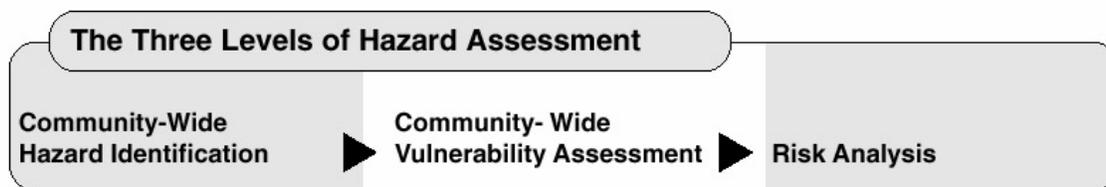
Source: Oregon Natural Hazards Workgroup, 2006

This section drills down to local level information and an understanding of the risks the community faces. In addition to local data, the information here relies upon the Regional Risk Assessment in the State Natural Hazard Mitigation Plan and the Department of Geology and Mineral Industries (DOGAMI) regional risk assessment study completed as part of the larger planning initiative. Additionally, detailed risk assessment information on existing policies, programs and reports for each hazard are included in the individual hazard annexes located at the end of the 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 3.1 The Three Phases of a Risk Assessment



Source: Planning for Natural Hazards: Oregon Technical Resource Guide

The first phase, hazard identification, involves 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.ⁱⁱⁱ

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 communities to justify changes to building codes or development regulations, property acquisition programs, policies concerning critical and public facilities, taxation strategies for mitigation risk, and informational programs for members of the public who are at risk.^{iv}

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.

Hazard Summary

This section provides an overview of the risk assessments for the natural hazards affecting Lake County and address the risk assessment requirements listed below. For more detailed information on each hazard, see Hazard Annexes located in Appendix C.

- **Requirement §201.6(c)(2)(i):** [The risk assessment **shall** include a] description of the type ...of all natural hazards that can affect the jurisdiction...
- **Requirement §201.6(c)(2)(i):** [The risk assessment **shall** include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
- **Requirement §201.6(c)(2) (ii)(A):** [The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community. The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

The majority of the hazard description text comes from the Hazard Chapters of the State of Oregon’s Natural Hazard Mitigation Plan and the Oregon Technical Resource Guide.

Please note that information on the community’s probability and vulnerability rankings in each table, listed as high, moderate, or low, comes from a 2003 analysis of risk conducted by county emergency services and public safety staff for Oregon Emergency Management.

Probability and vulnerability scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of the population or regional assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

The hazard analysis methodology, presented above, was developed by the Oregon Emergency Management Agency. See Appendix H for the detailed hazard analysis methodology.

The Lake County Steering Committee reviewed each hazard profile, including the probability and vulnerability ratings and based on the best available data, determined that volcanic and landslide hazards are not significant threats and there are no cost-effective means for mitigation for these hazards at this time.

According to the best available data, a volcanic event has a low probability and low vulnerability ratings as there have been no volcanic events affecting Lake County in recent history. Lake County's location relative to volcanic activity is distant, and the only impacts to the county would be ash fall. It was determined that there are no cost-effective mitigation actions regarding volcanic events at this time. Therefore, volcanic events have been determined to be a low priority hazard. In an effort to prioritize and optimize time, efforts and resources, this plan will not address volcanic hazards.

According to the best available data, landslides also have low probability and low vulnerability ratings in the county. Past landslide occurrences have been very small in scale, and have occurred in forested areas that do not have population or infrastructure vulnerabilities. There have been no reported damages from landslides. It was determined that there are no cost-effective mitigation actions for landslides at this time. Therefore, landslides have been determined to be a low priority hazard. In an effort to optimize time and resources, this plan will not be addressing landslide hazards. Primary hazards of concern include: wildfires, earthquakes, and floods. Hazards of lesser concerns include wind storms, winter storms, and drought.

Wildfire Summary

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 are fires occurring in areas having large areas of flammable vegetation that require a suppression response. Areas of wildfire risk exist throughout the state with areas in central, southwest and northeast Oregon having the highest risk. The Oregon Department of Forestry has estimated that there are about 200,000 homes in areas of serious wildfire risk.

The impact on communities from wildfire can be huge. In 1990, Bend's Awbrey Hill 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 threatened and 44 homes were lost. The 2002 Biscuit fire in southern Oregon affected over 500,000 acres and cost \$150 million to suppress.

Wildfire can be divided into three categories: interface, wildland, and firestorms.

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 in predominantly in wildland settings.

- The occluded wildland/urban interface where islands of wildland vegetation exist within a largely urbanized area.

Most of the small communities in Lake County exist in mixed wildland/urban interface zones. These communities include Paisley, Drews Gap/ Quartz Mountain, Christmas Valley, Anna Estates, Fort Rock, Summer Lake, Silver Lake, Plush and Adel. Lakeview is considered a classic wildland/urban interface.

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.

Impacts

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 forest 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

Impacts of Wildfire on Lake County

The western third of Lake County is covered by the Fremont-Winema National Forest. This forest consists predominantly of ponderosas and other pine species and juniper. The eastern two-thirds of the county is primarily open grass and sagebrush land with patches of forest at higher elevations. Wildfire occurrence in Lake County is common. Ignition usually results from lightning, although human-caused fire potential is high. Wildfire is a significant hazard in Lake County because of compounded factors including dry forest fuels, overstocked ponderosa pine stands, juniper invasion into sagebrush and grasslands, overstocked sagebrush stands and the pervasiveness of invasive weeds. Fire risk is extreme during the late summer and fall months when grasses and weeds are dry. These flashy fuels are ignited easily, burn rapidly and resist suppression.

Human life and welfare are values at risk to wildfire loss in Lake County because of hazardous fuel build-up around communities and structures that do not have adequate defensible space. Poor emergency vehicle egress and ingress, the constant need for training firefighting personnel and/or upgrading equipment are also contributing factors. Economic values at risk include businesses, farmland, ranchland, grazing land, hunting and other recreation land, historic and cultural sites and some critical facilities.

Natural resource management policy and changing ecological conditions have interacted in ways that result in hazardous fuel situations throughout Lake County. These forces include historical fire suppression policy, juniper invasion into sagebrush and grasslands, overstocked forests and rangelands, invasive weeds, and changing climactic patterns. The accumulation of hazardous fuels may set the stage for catastrophic wildfire occurrences resulting in the loss of many important economic and ecological assets.

For more information on the wildfire hazard in Lake County, please view the Lake County Community Wildfire Protection Plan and the South Central Lake County Wildfire Protection Plan found on-line at the University of Oregon's Scholar's Bank and in the Wildfire Hazard Annex. Also visit the state plan's Wildfire chapter of the Oregon Technical Resource Guide. For wildfire information specific to the jurisdictions of the City of Paisley and the Town of Lakeview, reference the Hazard sections in the Paisley and Lakeview Addendums in Appendix G.

Location of Hazard:

- Wildfire has occurred all throughout Lake County
- Wildland/Urban Interface communities include Paisley, Drews Gap/ Quartz Mountain, Christmas Valley, Anna Estates, Fort Rock, Summer Lake, Silver Lake Plush and Adel.
- Lakeview is a classic WUI community.
- Many fires occur in forest stands and open land where there is no infrastructure at risk.

Extent of Hazard at the Location:

- The extent a fire occupies the community is dependant upon fuel type and load, winds, slope gradient and suppression response.

Previous Occurrences of the Hazard within the Community:

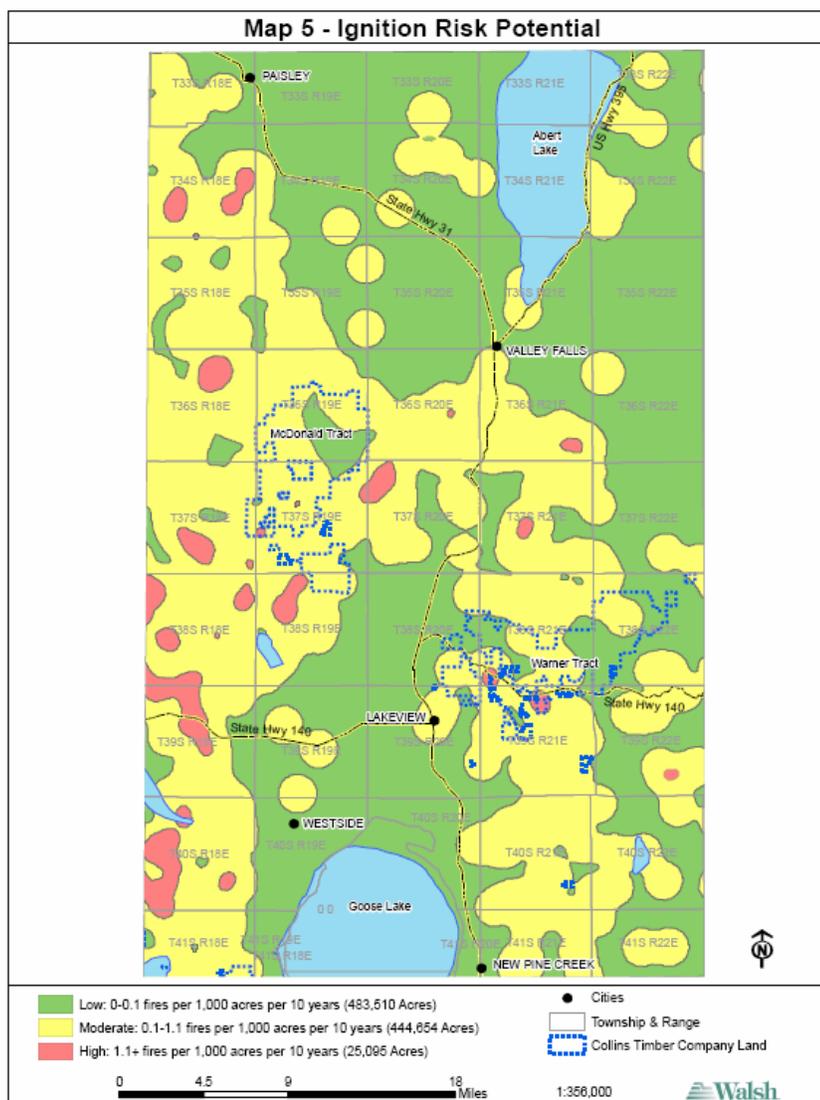
- From 1984 – 2004 there were a total of 7,248 fires in Lake County. This equals out to an average of 362 fires annually. 97% of these fires burned less than 10 acres before they were suppressed as documented in the Lake County CWPP
- The 2002 fire season included three significant fires which in total burned 110,000 acres. These fires - the 'Winter Rim,' 'Silver' and 'Toolbox' were located in the Silver Lake Ranger District as documented in the Lake County CWPP.

Community's Probability of a Future Wildfire Event: High

Community's Vulnerability to a Future Wildfire Event: Moderate

- As mentioned in Section 2: Community Sensitivity Factors, farming and ranching is the largest generator of revenue for Lake County as stated in the Region 6: Central Oregon Profile and Risk Assessment. Ranchers are dependant upon BLM grazeland allotments which occupy 65% of the 78% total federal and state owned land in the county according to the FS/BLM Fire Management Officer.
- Wood product companies, including Fremont Sawmill, McFarland Door and Pacific Wood Products are large employers for Lake County. These companies are dependant upon the forest resources of the county.
- An estimated 10% of communities in Lake County are located in Wildland/Urban Interface zones according to the Head of the Lake County Fire Council.

The following map illustrates wildfire ignition potential and is directly from the South-central Lake County Community Wildfire Protection Plan.



Earthquake Summary

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 off-shore Cascadian Fault 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). A major CSZ event could generate a magnitude earthquake 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 only create ground shaking.

Earthquake-Induced Landslides

These landslides are secondary hazards that occur from ground shaking.

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.

Impacts

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 occurrence. 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, airports, schools, 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.

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.

Impacts of Earthquakes on Lake County

Lake County is located in the physiographic region of Oregon known as The Basin and Range. As such, Lake County is susceptible to shallow, crustal seismic events within the North America Plate. These events typically originate from between 6-12 miles deep and are capable of producing an earthquake with a magnitude of up to 7.0. Historically the area has been shaken and several earthquake sequences (swarms) have occurred in Lake County as recently as the past 15 years.

Fault lines are dispersed throughout the county. Long faults are located to the east and west of the Goose Lake Basin just south of the Town of Lakeview. Long north-south aligned faults exist in the Warner Mountains east of Lakeview. Many smaller faults are clustered to the north and east of Summer Lake and near the Christmas Valley Area. (Please reference *Map of Quaternary Faults and Folds in the Region in the State Regional Profile and Risk Assessment*, Appendix B, for a complete view of faults in Lake County.)

According to a study conducted by DOGAMI,^v Lake County has approximately \$463,194,000 in building exposure and \$2,569,852,000 in transportation exposure. Exposure can be translated as current value or replacement value. That is a total of \$3,033,046,000 in exposure for Lake County.

A HAZUS model ran for Lake County set at a magnitude 6.5 earthquake calculated that 41% of buildings would be moderately damaged by a quake of this size (see DOGAMI HAZUS study in the Earthquake Hazard Annex for more detailed information and model maps).

For more information on the earthquake hazard, please visit the state plan's Earthquake chapter or the Oregon Technical Resource Guide. For earthquake information specific to the jurisdictions of the City of Paisley and the Town of Lakeview, reference the Paisley and Lakeview Addendums.

Please reference maps located in the Earthquake Section of the Region 6: Central Oregon Profile and Risk Assessment in Appendix B.

Location of Hazard:

- Faults are located throughout the county.
- Historically, seismic events have occurred in the Christmas Valley area, SE of Lakeview near the Warner Mountains and Adel.

Extent of Hazard at the Location:

- The extent of an earthquake is dependant upon location of the epicenter and magnitude of the quake. An earthquake with its epicenter within the county would likely affect the entire county and all the cities within the county.

Previous Occurrences of the Hazard Within the Community:

- May 2007 - Lakeview experienced a small swarm of earthquakes. The highest magnitude quake was 3.4
 - June 2004 - Lakeview residence experienced a swarm of at least 20 earthquakes. The source of the earthquakes was SE of Lakeview near the Warner Mountains. The highest magnitude quake was 4.4
 - April 1999 - Christmas Valley experienced a swarm of at least 6 earthquakes. The highest magnitude quake was 3.8
 - May-July 1968 - Adel experienced a swarm of earthquakes. The highest magnitude quake was 5.1
 - 1958 - Adel experienced an earthquake with a magnitude of 4.5
 - 1923 - Lakeview area experienced an earthquake (magnitude unrecorded)
 - 1906 - Lakeview area experienced an earthquake (magnitude unrecorded)
- (See Hazard Annex for resource references)

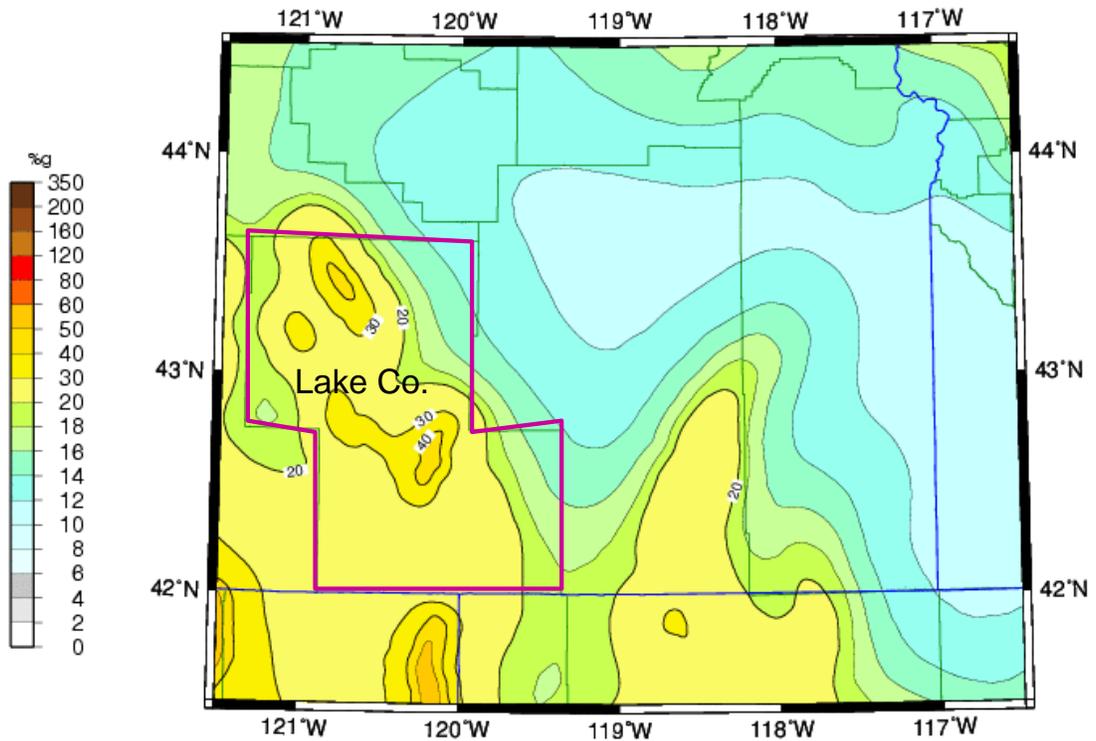
Community's Probability of a Future Hazard Event: Moderate**Community's Vulnerability to a Future Hazard Event: High**

As noted in Section 2 Community Sensitivity and Resilience:

- Daly Middle School is considered a critical facility, is a historic building and is unreinforced masonry. It has been determined to have high vulnerability to seismic events by the DOGAMI Statewide Needs Assessment.
- Lakeview High School and Fremont/Hay Elementary Schools are considered critical facilities and have been determined to have high vulnerability to seismic events by the DOGAMI Statewide Needs Assessment.
- Paisley School is considered a critical facility, is a historic building and is unreinforced concrete. It has been determined to have high vulnerability to seismic events by the DOGAMI Statewide Needs Assessment.
- The Silver Lake RFPD in Silver Lake has been determined a critical facility and to have high vulnerability to seismic events by the DOGAMI Statewide Needs Assessment.

- The Lake County Courthouse and the Lakeview Fire Department are considered critical facilities and are at high seismic vulnerability according to the DOGAMI Statewide Seismic Needs Assessment
- The 911 Center and the ambulance center are located in Lakeview in the Lakeview Police and Fire Department Building. This building has been determined to have high vulnerability to seismic events by the DOGAMI Statewide Needs Assessment.

The following map represents the 2% probability of exceedance in 50 years map of peak ground acceleration (PGA).



Map of peak acceleration (percent g) with a 2% probability of exceedance in 50 years on rock (Frankel, A.D., Petersen, M.D., Mueller, C.S., Haller, K.M., Wheeler, R.L., Leyendecker, E.V., Wesson, R.L., Harmsen, R.C., Cramer, C.H., Perkins, D.M., and Rukstales, K.S., 2002. 2002 Update of the National Seismic Hazard Maps. USGS Open File Report OFR 02-420).

Flood Summary

Oregon has a detailed history of flooding with flood records dating back to the 1860s. There are over 250 flood-prone communities in Oregon.

The principal types of flood that occur in the community include: Flash floods and riverine floods with some playa flooding.

Riverine floods

Riverine floods occur when water levels in rivers and streams overflow their banks. Most communities located along such water bodies have 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 usually 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 Cascade and Coast Ranges.

Flash floods

Flash floods usually result from intense storms dropping large amounts of rain within a brief period. Flash floods usually occur in the summer during thunderstorm season, appear with little or no warning and can reach full peak in only a few minutes. They are most common in the arid and semi-arid central and eastern areas of the state where there is steep topography, little vegetation and intense but short-duration rainfall. Flash floods can occur in both urban and rural settings, often along smaller rivers and drainage ways.

In flash flood situations, waters not only rise rapidly, but also generally move at high velocities and often carry large amounts of debris. In these instances a flash flood may arrive as a fast moving wall of debris, mud, water or ice. Such material can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back in such a manner can cause flooding both upstream and then later downstream if the obstruction is removed or breaks free.

Shallow area floods

These floods are a special type of riverine flooding. FEMA defines a shallow area flood hazard as an area that is inundated by a 100-year flood with a flood depth between one to three feet. Such areas are generally flooded by low velocity sheet flows of water.

Urban floods

Urban flooding occurs where land has been converted from fields or woodlands to developed areas consisting of homes, parking lots, and commercial, industrial and public buildings and structures. In such areas the previous ability of water to filter into the ground is often prevented by the extensive impervious surfaces associated with urban development. This in turn results in more water quickly running off into watercourses which causes water levels to rise above pre-development levels. During periods of urban flooding streets can rapidly become swift moving rivers and basements and backyards can quickly fill with water. Storm drains often may back up with yard waste or other flood debris leading to further localized flooding. Another source of urban flooding is grading associated with development. In some

cases, such grading can alter changes in drainage direction of water from one property to another.

Coastal floods

Coastal flooding occurs in low-lying coastal areas and is caused by heavy rain, large waves, and even tsunamis produced by underwater seismic events. Areas exposed to this intensive wave action are termed by FEMA as high velocity zone, or “V-zones”. Special regulations are usually applied in these areas.

Playa floods

Playa floods are caused by greater than normal runoff into a closed basin. Closed basin systems are those areas that have one or more rivers emptying into one or more lakes that have no outlet. In these situations, water leaves the system primarily through evaporation. Thus, if annual precipitation in the basin increases significantly, evaporation often is not enough to reduce water levels. This in turn causes lake levels to rise and inundate surrounding properties and roads. The best known example of playa-basin flooding in Oregon occurs in Malheur and Harney Lakes in Harney County.

Impacts

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.

Impacts of Floods on Lake County

Lower elevations in Lake County only receive 16 inches of precipitation annually. This is enough precipitation, however, to make flood events an annual occurrence. The composition of much the soil in Lake County is rocky and sandy. This type of soil does not allow for high absorption rates so that when it does rain, much of the moisture is not absorbed into the ground. These factors often contribute to flash flooding, a common occurrence in Lake County. These flash floods typically occur in isolated areas, such as in canyons and other natural drainages. Flash flood events can also be caused by rapid spring snow melt.

The Chewaucan River is the largest river flowing through Lake County. The Chewaucan's source is in the mountains of the Fremont-Winema National Forest southeast of the City of Paisley. The river arches north to flow through Paisley and then curves southwest to eventually drain into Lake Abert. The Chewaucan's waters are greatly depended upon by the farmers and ranchers that are near its banks. There are multiple diversions located in the vicinity of Paisley along the Chewaucan that divert river water for irrigation and for stock watering. Each of these diversions is privately owned.

The Chewaucan has a history of flooding the City of Paisley. Heavy rains and snow melt inundation are the primary culprits for flow increase. An earthen levee was created by the Army Corps of Engineers in the early 1900's as a means of channeling the river for irrigation uses, as the river naturally overflowed its banks creating seasonal marshes. The levee exists today on the south bank of the river through the City of Paisley. Efforts by local citizens have been made throughout the years to maintain the levee and protect the city from further flood issues. In 2006, a weir located on the river and upstream of the City of Paisley that was owned by the city was removed. The removal of the city weir lowered the standard flow of the river by approximately five feet. This has created a generous buffer for river flow increase and in protecting the city from further flooding on regular flood years.

There are many small streams and tributaries in Lake County as well. These streams, like the Chewaucan, become inundated with excess flow from heavy rains and snow runoff. Because the population density is so low in Lake County, the flooding from these creeks rarely affects population and infrastructure.

There are also numerous large lakes that give Lake County its name. Each lake has a considerable sized flood plain, although historically the lakes have dried up more often than they have flooded. As in the same case as the streams in the county, there is little to no infrastructure or population within the flood plains of these lakes. The exception to this is the Goose Lake flood plain. The north end of Goose Lake is located 7 miles south of Lakeview near the border of Oregon and California in central Lake County. The Goose Lake Basin has a 100 year flood plain that stretches north of the Town of Lakeview by approximately 10 miles. The

flood plain extends this far north because there are a few tributary creeks that feed Goose Lake that begin north of Lakeview. There have been no recorded issues with these tributaries flooding and affecting infrastructure or population.

For more information on the flood hazard, please visit the state plan's Flood chapter or the Oregon Technical Resource Guide. For flood information specific to the City of Paisley and the Town of Lakeview, reference the Hazard sections in the Paisley and Lakeview Addendums.

Flood Rate Insurance Maps (FIRM) maps are on file in the Lake County Planning Department.

Location of Hazard:

- The Goose Lake Basin including the Town of Lakeview
- The Chewaucan River floodplain including a small portion of the City of Paisley

Extent of Hazard at the Location:

- Flooding occurs in isolated areas in Lake County. Less than 10% of the county is affected by flooding hazards.

Previous Occurrences of the Hazard within the Community:

- Dec. 2005- Jan 2006 – Presidential Disaster Declaration for flooding effects in Lake County.
- May-June 1998 – Secretarial Natural Disaster Determination for flooding in Lake County.
- Dec. 1996-Jan. 1997 – Presidential Declaration for flood in Lake County. Received \$219,382 from FEMA to repair/replace damages
- Dec.1996-Jan. 1997 – Presidential Declaration for flood in City of Paisley. Received \$2,909 from FEMA to repair/replace damages
- Dec. 1996-Jan. 1997 – Presidential Declaration for flood in Town of Lakeview. Received \$30,701 from FEMA to repair/replace damages
- Feb. 1995-April 1995 – Small Business Agency Declaration for severe flooding in Lake County
- Jan. 1995 – Governor Declaration for severe flooding in Lake County.
- Jan. 1993 – Governor Declaration for severe winter storms and flooding in Lake County
- December 1964 - Severe flooding throughout SE Oregon due to warm rain on snow pack

(See Hazard Annex for resource references)

Community's Probability of a Future Flood Event: High

Community's Vulnerability to a Future Flood Event: Moderate

- Blocked culverts buried from Center St. and T St. to S St. in Lakeview have resulted in flooding damage to private properties.
- The intersection of Stockdrive Rd and Roberta Rd. in Lakeview has flooded during heavy rains and spring snowmelt when ditches have been clogged. This back up has overflowed the traffic intersection and resulted in high-standing water.
- Flooding and water back-up events have occurred about every 5 years, according to Lake County Roads Master.
- Crane Creek floods the intersection at County Road 1-15 and State Highway 395 near New Pine Creek during high flow periods due to insufficient culvert size and clogging.
- County Road 3-12 in Hart Mountain is subject to regular clogging and water back-up due to insufficient culvert size. This flooding has washed out the road in previous flood events.
- A storm drain at the intersection of Highway 31 and Mill Street in the City of Paisley chronically backs up with water every time it rains to a depth of up to 16 inches

Flood Mitigation Assistance Requirement: Type and Number of Structures in the Floodplain

According to FEMA, Lake County, the Town of Lakeview and the City of Paisley joined the National Flood Insurance Program (NFIP) in 1978. Currently, Lake County has a total of 45 policy holders; 6 are located in Lakeview, and one is in Paisley. Lakeview has had a total of four single loss flood claims, amounting to \$14,411. Paisley has had one single loss flood claim at \$392. Lake County has three properties that have each experienced multiple flood losses. The total of these losses is \$21,024.70.

Lake County's Floodplain Insurance Rate Maps (FIRM) were created in 1989.

At the time that the plan was developed, the County and the city of Paisley and town of Lakeview lacked the technical resources and capacity to identify the actual number and type of structures located in the floodplain.

Drought Summary

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.

Impacts

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.

Facilities affected by drought conditions include communications facilities, hospitals, and correctional facilities that are subject to power failures. Storage systems for potable water, sewage treatment facilities, water storage for firefighting, and hydroelectric generating plants also are vulnerable. Low water also means reduced hydroelectric production especially as the habitat benefits of water compete with other beneficial uses. 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 summary). In addition, drought and water scarcity add another dimension of stress to species listed pursuant to the Endangered Species Act (ESA) of 1973.

Impacts of Drought on Lake County

Lake County is located in the High Desert climatic region of the Western United States. Due to this, precipitation for Lake County is very low, averaging 16 inches annually in lower elevations. Although the county is home to a number of large lakes, these lakes are alkali and unusable for drinking and irrigation purposes. Lake County residents rely on just a few sources for water. Underground aquifers

that are filtered through permeable volcanic rock layers are used for public-supply, domestic and commercial, and agricultural (primarily irrigation and livestock watering) purposes. Ranchers living near the banks of the Chewaucan River are able to divert its waters for irrigation. Farmers in Lake County often utilize spring rains and run-off to flood-irrigate their fields.

According to Oregon State University Extension Services, Lake County is the fourth largest county for hay production in Oregon and had gross sales from farming and ranching of \$55.5 million in 2005. Since 2001, the Farm Service Agency through the U.S. Department of Agriculture has paid out \$1,293,700 to Lake County farmers and ranchers for drought-related crop disaster, livestock assistance programs and cost-share assistance programs.^{vi} Cost-share assistance programs include water hauling to need-areas and drilling new wells for livestock watering.

There are six major reservoirs in Lake County: Drews, Anna, Cottonwood, Thompson, Hart Lake and Pridie. These reservoirs are primarily used for agricultural usage and are managed by the State Water Master.

Though drought is a common occurrence in Lake County, residential water supply is rarely affected. According to the Town of Lakeview Public Works Manager in the summer of 1997 one town well went dry. However there has never been an enforced ration on residential water usage for either of the incorporated communities of Paisley or Lakeview. There are four water tanks for the Town of Lakeview; totaling 3,848,000 gallons of storage. There are also seven wells for the Town of Lakeview. There are three wells in the City of Paisley. Local insight shows that agriculture is hit first and hardest by the onset of drought and that residential supply remains relatively unaffected.

At this time there are no specific cost-effective actions to mitigate drought in Lake County and its jurisdictions aside from outreach and education.

For more information on the drought hazard, please visit the state plan's Drought chapter. For drought information specific to the jurisdictions of the City of Paisley and the Town of Lakeview, reference the Hazard sections in the Paisley and Lakeview Addendums.

Location of Hazard:

- Drought affects the entire geographic area of Lake County

Extent of Hazard at the Location:

- Drought affects the entire community including the cities within the county

Previous Occurrences of the Hazard within the Community:

- March 2003 – Secretarial Declaration for Drought in Lake County
- Sept. 2001/2002 – Secretary of Agriculture Declaration for drought in Lake County, the second most intense drought in Oregon's history
- May 2001 – Governor Declaration for drought in Lake County

- Sept. 1993 – Disaster loans made available to Lake County due to losses caused by drought conditions
- Jan. 1992-Sept. 1992 – Secretary of Agriculture Declaration for drought in Lake County with \$12,900 in loss
- Jan. 1991-June 1991 – Secretary of Agriculture Declaration for drought in Lake County
- 1985-94 - Generally dry period, capped by statewide droughts in 1992 and 1994
- 1976-77 - Brief but very intense statewide drought
- 1965-68 - Three-year drought following the big regional floods of 1964-65
- 1939-41 - Three-year intense drought
- 1917-31 - Very dry period punctuated by brief wet spells (1920, 1927)
- 1904-05 - Drought period of about 18 months

(See Hazard Annex for resource references)

Community’s Probability of a Future Hazard Event: High

Community’s Vulnerability to a Future Hazard Event: Moderate

- As noted in Section 2 - Community Sensitivity and Resilience, farming and ranching is Lake County’s largest generator of revenue. Lake county farmers are dependant upon water for irrigation and cattle-foraging purposes.

Windstorm Summary

Extreme winds occur throughout Oregon. The most persistent high winds take place along the Oregon Coast and in the Columbia River Gorge. High winds in the Columbia Gorge are well documented. The Gorge is the most significant east-west gap in the Cascade Mountains between California and Canada. Wind conditions in southeast Oregon are not as dramatic as those along the coast or in the Gorge yet can cause dust storms or be associated with severe winter conditions such as blizzards. A majority of the destructive surface winds striking Oregon are from the southwest. Some winds blow from the east but most often do not carry the same destructive force as those from the Pacific Ocean.

The Columbus Day storm in 1962 was the most destructive windstorm ever recorded in Oregon in terms of both loss of life and property. Damage from this event was the greatest in the Willamette Valley. The storm killed 38 people and left over \$200 million in damage. Hundreds of thousands of homes were without power for short periods, while others were without power for two to three weeks. More than 50,000 homes suffered some damage and nearly 100 were destroyed. Entire fruit and nut orchards were destroyed and livestock killed as barns collapsed and trees blew over. In Portland, the highest gusts were 116 miles per hour.

Although rare, tornados can and do occur in Oregon. In 1996, a small, short-lived tornado touched down near Forest Grove in Washington County. It uprooted

several dozen fruit trees and left a path of damage one-quarter mile long and nearly 60 yards in width at its widest point.

Impacts

Windstorms can have significant impacts on life and property. Debris carried along by extreme winds can contribute directly to injury and loss of life and indirectly through the failure of protective structures (i.e., buildings) and infrastructure. Windstorms have the ability to cause damage more than 100 miles from the center of storm activity. 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.

In addition to the immediate effects of wind damage, the loss of power due to windstorms can have widespread impacts on business and economic activity. A sustained loss of power can also seriously strain provision of emergency services and the operation of water and sewer facilities and transportation systems.

For more information on the windstorm hazard, please visit the state plan's Windstorm chapter.

Impacts of Windstorms on Lake County

Wind is nearly constant in Lake County. The county is subject to continental-influenced weather systems which tend to produce extreme weather, including wind gusts and wind storms. Local topography in Lake County consists of vast sage land with nothing to obstruct wind gusts and north/south oriented mountain ranges and canyons that funnel winds. Goose Lake, just seven miles south of Lakeview, is a primary producer of wind for the southern portion of the county. It is not uncommon for severe wind storms to cause trees to blow down or tree limbs to break and fall on power lines or roofs of homes or businesses. Severe wind storms can also damage roof beams or break shingles. Windstorms can cause power outages. Typically there are other factors contributing to the outage as well; such as water-saturated soils which allow for trees and power poles to fall easier. Wind storms can blow mobile homes off their foundations if not anchored properly or collapse agricultural storage barns with large, paneled sides.

For windstorm information specific to the jurisdictions of the City of Paisley and the Town of Lakeview, reference the Hazard sections in the Paisley and Lakeview Addendums.

Location of Hazard:

- All of Lake County is susceptible to high winds and strong wind gusts.
- Summer Lake and Christmas Valley are particularly susceptible to high winds and strong wind gusts.

Extent of Hazard at the Location:

- Windstorms may affect the entire county

Previous Occurrences of the Hazard within the Community:

- Jan. 2006 – Summer Lake- 82 MPH gusts
- March 2003 – County-wide – 82 MPH gusts
- Dec. 2002 – Summer Lake – 95 MPH gusts
- April 2002 – Summer Lake – 77 MPH gusts
- Jan. 2002 – County –wide – 70 MPH gusts
- Dec. 2001 – Summer Lake – 80 MPH gusts
- Dec. 2001 – Lakeview – 57 MPH gusts
- Nov. 2001 – Summer Lake – 85 MPH gusts
- Jan. 2000 – Lakeview – 60 MPH gusts
- Oct. 1999 – County-wide – 80 MPH gusts
- May 1993 – County-wide – Magnitude unknown. Reports claim two barns were blown off their foundations in Christmas Valley. In Fort Rock roofs were blown off houses and numerous trees and power lines were blown down. County total damage was \$50,000

(See Hazard Annex for resource references)

Community's Probability of a Future Windstorm Event: High

Community's Vulnerability to a Future Windstorm Event: Moderate

- 30% of homes in Lake County are mobile homes. Mobile homes are not required to be securely anchored to a foundation, (although strongly encouraged by Building Inspectors) and therefore can be blown off a foundation if strong winds should occur.

Winter Storm Summary

Destructive winter storms that produce heavy snow, ice, rain and freezing rain, and high winds have a long history in Oregon. 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.

Outside of mountainous areas significant snow accumulations are much less likely in western Oregon than east of the Cascades. However, if a cold air mass moves northwest through the Columbia Gorge and collides with a wet Pacific storm, then a larger than average snow fall may result.

An example of this type of snowstorm occurred in January 1980 when snow, ice, wind and freezing rain struck Oregon statewide. In the Portland area alone, 200,000 utility customers were left without power and phone service for several days.

Impacts

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.

As was noted above under windstorms, 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 as well for the surrounding region, and even outside of Oregon. In the rural areas of Oregon severe winter storms can isolate small communities, farms and ranches and create serious problems for open range cattle operations such as those in southeastern Oregon.

Impacts of Winter Storms on Lake County

Lake County's climate is a result of its geographic placement. Located on the high plateaus of the Basin and Range region of the western United States, Lake County's elevations range from 4,000 feet to just under 8,000 feet. High elevations and a continental weather system often create severe winter storms. These storms consist mostly of heavy snow, freezing rain, rapid freeze and/or high winds. These storms generally occur between the months of December and February and are an annual occurrence. Severe storms can create conditions that disrupt essential regional systems such as public utilities, telecommunications, and transportation routes. Wind, snow, and ice associated with winter storms can knock down or otherwise damage trees, power lines, and utility services. Snow pack coupled with strong winds can create drifts that cover local transportation routes.

Varied elevations and topography of the county mean that the impact of a storm is variable depending on the location. The mountains and buttes scattered throughout the county generally receive the highest amounts of rainfall and snowfall. Large snow packs built during winter months can lead to potentially increased flooding risk in the spring.

At this time there are no specific cost-effective actions to mitigate winter storms in Lake County and its jurisdictions aside from outreach and education.

For more information on the winter storm hazard, please visit the state plan's winter storm chapter. For winter storm information specific to the jurisdictions of the City of Paisley and the Town of Lakeview, reference the Hazard sections in the Paisley and Lakeview Addendums.

Location of Hazard:

- All of Lake County is susceptible to winter storms.

Extent of Hazard at the Location:

- Winter storms affect the entire community.

Previous Occurrences of the Hazard within the Community:

- Dec. 2003-Jan 2004 – Presidential Declaration for winter storm in Lake County. Received \$3,709 from FEMA to repair/replace damages
- Dec. 2003-Jan 2004 – Presidential Declaration for winter storm in Town of Lakeview. Received \$19,869 from FEMA to repair/replace damages
- Dec. 1996-Jan. 1997 – Presidential Declaration for sever winter storms in Lake County with damages totaling \$68,000
- Feb. 1995-April 1995 – Small Business Agency Declaration for severe winter storms in Lake County
- Jan. 1993 –Governor Declaration for severe winter storms and flooding in Lake County

(See Hazard Annex for resource references)

Community's Probability of a Future Winter Storm Event: High**Community's Vulnerability to a Future Wind Storm Event: High**

- State Highways 395, 31 and 140 are primary transportation routes that have historically been closed due to severe winter weather
- The senior population in Lake County is vulnerable to winter cold and the potential results of severe winter storms

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

^{iv} Burby, R. 1998. Cooperating with Nature. Washington DC: Joseph Henry Press. Pg. 133.

^v Burns, et al. 2007. Unpublished report. Geologic Hazards, Earthquake and Landslides Hazard Maps, and Future Earthquake Damage and Loss Estimates for three Counties in the southeastern Region Including Lake, Malheur and Harney. DOGAMI Open File Report.

^{vi} Totals obtained through phone interview with Marti Hamilton, County Executive Director of Lake County Farm Service Agency

Section 4:

Missions, Goals, and Action Items

This section describes the components that guide implementation of the identified mitigation strategies and is based on strategic planning principles. This section also provides information on the process used to develop a 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 County’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 County effort is directed. Goals identify how the community 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 Lake County Multi-Jurisdictional Natural Hazard Mitigation Plan is to: *Create a disaster resilient Lake County.*

This mission statement was drafted by the RARE Participant and is based on previous successful mitigation planning efforts in the State. The mission was agreed upon by the Lake County Steering Committee during the County action item steering committee meeting held on May 21. (See Appendix A for meeting minutes)

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.

The Lake County Multi-Jurisdictional Natural Hazard Mitigation Plan goals were developed by the RARE Participant and the Lake County Emergency Manager following the second Steering Committee meeting on February 23. Goals are intended to work towards the amelioration of vulnerability issues identified in the February work session. On May 21, 2007, Steering Committee members unanimously approved the goals at their third meeting of the year.

Goal 1: Protect Human Welfare, Property, Cultural and Natural Resources: Develop mitigation actions to lessen the impact from natural disasters on human welfare, infrastructure and property, and the cultural and natural resources of Lake County

Goal 2: Safeguard Economy: Develop mitigation actions to lessen the economic impacts from natural disasters on the region's economic development and local businesses.

Goal 3: Increase Education, Outreach, and Awareness: Promote education and outreach programs to increase public awareness of hazards and risk-reduction practices.

Goal 4: Strengthen Community Capacity: Sustain and build upon community partnerships, resources, and collective knowledge to implement mitigation actions.

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 both address 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. A description of how the plan's mitigation actions were developed is provided below.

Figure 4.1 Action Item Sources



Source: Oregon Natural Hazards Workgroup, 2006

Action Items were derived from an issue identification process. Issue identification was a collaborative process undertaken by the plan coordinator involving identifying community assets and vulnerabilities, conducting risk assessments, holding interviews with individual stakeholders, meetings with the Natural Hazard Mitigation Steering Committee on February 23, 2007 and May 21, 2007; meetings with the City of Paisley Council Members held on March 9, 2007 and April 16, 2007; and meetings with the Lake County Emergency Manager. Actions were brainstormed from the issue identification process. Specific actions were generated primarily through stakeholder interviews and general actions were generated at work sessions. Once actions were drafted, they were presented to the Natural Hazard Mitigation Steering Committee in another work session. Actions were approved by the committee as appropriate to the community with few amendments.

For the following hazards there are currently no cost-effective mitigation actions that specifically address each hazard aside from outreach and education:

- Drought
- Winter Storm

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 worksheet components are described below. These action item worksheets are located at the end of this section.

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.

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. This section should also include a description of how the mitigation activity may be implemented through existing community plans, policies and programs.

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 County 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.

Natural Hazard Action Item Proposal Forms

MH#1

Proposed Action Item: M1		Alignment with Plan Goals:	
Enhance small business hazard planning in Lake County		<ol style="list-style-type: none"> 1. Protect Human Welfare, Property, Natural and Cultural Resources 2. Safeguard Economy 3. Increase Education, Outreach and Awareness 	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • All businesses in Lake County are considered small businesses. However, when Lake County schools, Town of Lakeview and other government entities are removed, there is a remaining estimated 450 small businesses according to Lake County Economic Development. • Most small businesses are financially fragile and may not be able to recover losses if a hazardous event should prevent business for even a few days or if there was damage to the assets of the business as determined by stakeholders • There are currently no resources available in the county on business hazard planning • Business continuity plans assist businesses in determining appropriate insurance coverage, review lease stipulations, mitigate against potential risks, and plan for future recovery efforts (Source: Alesch, Daniel J. et al. 2001. "Organizations at Risk: What Happens When Small Businesses and Not-for-Profits Encounter Natural Disasters," The Public Entity Risk Institute). • Research has shown that most small businesses are unable to recover after a disaster. (Source: Wood, N., in preparation,, Variations in the community vulnerability to tsunami hazards on the Oregon coast, U.S. Geological Survey research project 9861-B5C, unpublished data) • Business continuity plans allow businesses and their employees to be better prepared for a disaster. Having plans in place may reduce the impact on the business, allowing employees to continue to work or get back to work faster. (Source: ONHW, Cannon Beach Case Study Report, University of Oregon, July 2006) 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate with Oregon Natural Hazard Workgroup (ONHW) to hold community workshop on business hazard preparation and business continuity planning with Oregon Continuity Planning Association (OCPA) • Provide information on small business hazard planning such as the Institute for Business and Home Safety's <i>Open For Business</i> toolkit at Lakeview and North Lake County Chamber of Commerce. Coordinate with ONHW to acquire brochures • Utilize Chamber's monthly mailings as hazard awareness and to promote mitigation activities and business hazard planning 			
Coordinating Organization:		Lake County Chamber of Commerce	
Internal Partners:		External Partners:	
		Rotary, Soroptomists. Lake County Development, Lakeview Business Association	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Short Term			
Form Submitted by:			

MH#2

Proposed Action Item: M2	Alignment with Plan Goals:
Establish and maintain a public hazard awareness and mitigation campaign as seasonally appropriate to each hazard aiming mitigation actions at households, businesses and special needs populations.	<ol style="list-style-type: none"> 1. Protect Human Welfare, Property, Cultural and Natural Resources 2. Safeguard Economy 3. Increase Education, Outreach and Awareness 4. Strengthen Community Capacity
Rationale for Proposed Action Item:	
<ul style="list-style-type: none"> • The more educated and aware the public is of natural hazards, the more risk can be reduced on an individual level, relieving the potential for response after an event • 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 a public awareness campaign for hazard risk mitigation will help to keep the public informed of, and involved in, awareness of natural hazards and potential mitigation activities the public can implement. • Public education and outreach can be inexpensive and provide information which results in safer households, work places, and other public areas. Some outreach materials include: informational brochures about community seismic risks and mitigation techniques, public forums, newspaper articles, training classes and television advertisements. • 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 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 addresses by the Natural Hazard Mitigation Plan. 	
Ideas for Implementation:	
<ul style="list-style-type: none"> • Create mailing packet with hazard-specific information on impacts of hazards, mitigation activities and preparedness • Determine which media avenue is most effective for local outreach; mailings, posters, flyers, radio, local TV, presentations by local officials, etc. • Print relevant hazard-related articles in local newspaper and other local publications with tips on mitigation actions • Have informational brochures and packets available at identified partner’s office locations • <i>Firewise</i> brochures can be used in the spring to address wildfire • <i>Institute for Business and Home Safety (IBHS)</i> offers materials that address winter storms, flooding, wind storms, wildfire and earthquake for homes and businesses • Check with Lakeview Watershed Council and Natural Resource Conservation District for drought information/water conservation to be sent out in spring • Distribute <i>IBHS Homeowner’s Guide to Non-Structural Retrofit</i> to homes, businesses and medical and care facilities to encourage mitigation actions for earthquake 	
Coordinating Organization:	Citizen Hazard Awareness Group

Internal Partners:	External Partners:
Lake Co. Building Dept, Lake Co. Planning Dept, Lake Co. Public Health,	Lake Co. Chamber of Commerce, Lakeview Crisis Center, OSU Extension, Lake Co. Senior Citizen's Assoc., Lake District Hospital, Paisley Wellness Center, Klamath Co. Head Start, Sunshine Children's Center
Timeline:	If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)
	Long Term/On-Going
Form Submitted by:	

MH#3

Proposed Action Item: M3		Alignment with Plan Goals:	
Form a Citizen Hazard Awareness Committee to oversee facilitation and implementation of community hazard awareness campaigns		1. Protect Human Welfare, Property, Cultural and Natural Resources 3. Increase Education, Outreach and Awareness 4. Strengthen Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Currently there is no group of citizens in place to uphold citizen natural hazard awareness campaign • Government departments are understaffed and would not be able to coordinate campaigns without taking from other mandatory duties • The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Forming a citizen hazard committee will continue to keep the public informed of, and involved in, Lake County’s actions to mitigate hazards. • Mitigation is a shared responsibility between local, state, and federal government; citizens; businesses; non-profit organizations; and others. Forming a hazard awareness committee will help coordinate between different segments of Lake County to effectively implement mitigation actions. • The primary role of the hazard awareness committee is to help Lake County residents prepare and reduce loss from natural hazard events by conducting public outreach and education programs. Public education and outreach can be inexpensive and provide information that result in safer households, work places, and other public areas. Some outreach materials include information brochures about community hazard risks and mitigation techniques, public forums, newspaper articles, training classes, and television advertisements. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Solicit representatives from a variety of government agencies and departments, local businesses, community organizations and groups to form diverse representation • Form as a subcommittee of the Hazard Advisory Committee and have commissioners recognize the Citizen Hazard Awareness Committee as a subcommittee • Citizen Hazard Awareness group will report to Hazard Advisory Committee on progress of outreach accomplished • Have group create an outreach strategy with timeline, resource list and implementation ideas • Establish the hazard awareness group’s role as helping Lake County residents prepare and reduce loss from natural hazard events by providing hazard awareness information 			
Coordinating Organization:		Natural Hazard Mitigation Coordinating Body	
Internal Partners:		External Partners:	
Lake Co. Planning Department, Lake Co. Public Health, Lake Co. Sheriff Department, Lakeview Police Department, Lakeview Fire Department, Oregon Fish and Wildlife, US Forest Service, Oregon Dept. of Forestry, BLM,		Lake County Senior Citizens Association, Lake County Disaster Preparedness Group, Lions, Elks, Soroptomists, Lake District Hospital, Lake Co. Resource Initiative, Lakeview School District. Lakeview Crisis Center	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Long Term / On-Going		
Form Submitted by:			

MH#4

Proposed Action Item: M4		Alignment with Plan Goals:
Shorten spans and anchor poles on utility lines in high wind or heavy icing areas.		1. Protect Human Welfare, Property, Cultural and Natural Resources 2. Safeguard Economy
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> • High wind storms or winter icing storms can cause damage to long spans between power poles and create power outages during storms. If poles are inserted between spans this reduces the risk of outages. Also by anchoring certain poles this can reduce the amount of line which would go down in a storm. Both items reduce the cost of repair and replacement. • Winter storms have a significant impact on the Harney County Electric Cooperative, causing power outages when ice forms on the power lines. This is especially a problem with older power lines constructed in the 1950s that have a larger line span between poles. Placing intermediary poles between these spans cuts the span in half and reduces the likelihood of a power line breaking. • The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards, with an emphasis on new and existing buildings and infrastructure.[201.6(c)(3)(ii)] Shortening the spans between long lines and anchoring poles will reduce the likelihood of lines breaking during wind and winter icing storms. • The two incorporated cities in Lake County –Lakeview and Paisley— rely on the County for certain services and public facilities. Because the cities rely on the County for services, this action is considered to be a multi-jurisdictional action since it benefits both the County and all the participating cities. • The Harney Electric Cooperative’s power lines extend from Harney County into Lake and Malheur Counties to provide services to rural areas in these counties. This action item addresses hazards that affect Harney Electric’s power lines in Lake County as well as Harney and Malheur Counties. This action item is also included in the Harney County Natural Hazards Mitigation Plan and was developed through the 2007 Harney County Pre-Disaster Mitigation (PDM) Planning process, similar to the PDM planning process that took place in Lake County in 2007. 		
Ideas for Implementation:		
<ul style="list-style-type: none"> • The utility company would be responsible to identify high wind and icing areas from previous outages and apply for grants to strengthen the areas by pole inserts and anchoring. 		
Coordinating Organization:	Harney Electric Cooperative, Inc.	
Internal Partners:	External Partners:	
Lake County	Malheur County, Harney County	
Timeline:	If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	N/A
	<u>2-4 years</u>	
Form Submitted by:	Fred Flippence, Office Manager, Harney Electric Cooperative, Inc.	

MH#5

Proposed Action Item: M5		Alignment with Plan Goals:	
Replace primary electrical overhead lines to mountaintop communication services with underground lines.		1. Protect Human Welfare, Property, Cultural and Natural Resources. 2. Safeguard Economy.	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> 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. Most of the services at the top are communication sites. The communication sites are used by ODOT, State Police, county sheriff, emergency services, telephone utilities and cell phone companies. During a disaster the sites are vital for communication. During winter storm access to the line by the utility is difficult and this difficulty delays the time for restoration of power to the services. The utility company has experienced costs each year to repair and maintain the lines. Changing the lines to underground would remove the risk of damage from wind and winter storm. The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards, with an emphasis on new and existing buildings and infrastructure.[201.6(c)(3)(ii)] Replacing primary electrical overhead lines to mountaintop communication services with underground lines will reduce the impact of severe weather on power lines, and will continue power service to rural customers as well as ODOT, State Police, county sheriff, emergency services, telephone utilities, and cell phone companies. The two incorporated cities in Lake County –Lakeview and Paisley—rely on the county for certain services and public facilities. Because the cities rely on the County for services, this action is considered to be a multi-jurisdictional action since it benefits both the County and all the participating cities. The Harney Electric Cooperative’s power lines extend from Harney County into Lake and Malheur Counties to provide services to rural areas in these counties. This action item addresses hazards that affect Harney Electric’s power lines in Lake County as well as Harney and Malheur Counties. This action item is also included in the Harney County Natural Hazards Mitigation Plan and was developed through the 2007 Harney County Pre-Disaster Mitigation (PDM) Planning process, similar to the PDM planning process that took place in Lake County in 2007. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> The utility company would be responsible to identify all the mountaintops and apply for grants to put the lines underground. 			
Coordinating Organization:		Harney Electric Cooperative, Inc.	
Internal Partners:		External Partners:	
Lake County		Companies which are served by the utility and the utility company, Malheur County, Harney County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	n/a	
	<u>3-4 years</u>		
Form Submitted by:		Fred Flippence, Office Manager, Harney Electric Cooperative, Inc.	

EQ#1

Proposed Action Item: EQ1		Alignment with Plan Goals:	
Seismically retrofit Daly Middle School to reduce the building's vulnerability to seismic hazards		1. Protect Human Welfare, Property, Natural and Cultural Resources 4. Strengthen Organizational and Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Daly Middle school was built in 1910 and is un-reinforced masonry • Occupants of the school are primarily middle school children, aged 10-14 and are more vulnerable to potential injury should an event occur • Seismic stability studies have shown that un-reinforced masonry buildings perform very poorly in earthquakes • Daly Middle School has been identified as a critical facility by the Natural Hazard Mitigation Steering Committee • The Statewide Seismic Needs Assessment Study conducted by DOGAMI identifies Daly Middle School as having high risk to seismic activity • Daly Middle School has been prioritized by the Steering Committee as a community icon • Oregon Senate Bill 2 (2005) directs DOGAMI to develop a statewide seismic needs assessment that include seismic safety survey of specific critical facilities and infrastructure, including schools. Incorporating this data once it is published will assist in developing a strategy to seismically retrofit Daly Middle School. • Retrofitting of vital infrastructure, such as schools and community buildings, provides important improvements that reduce hazard exposure and the cost and time associated with recovery (Source: American Planning Advisory Service Report Number 483/484) • The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a high vulnerability for seismic hazards and a medium probability of a future seismic event recurring. Retrofitting Daly Middle School will significantly reduce the school's vulnerability to seismic hazards and improve the safety of students, teachers, and community members that use the school • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community, particularly to buildings and infrastructure [201.6 (c)(3)(ii)]. Seismically retrofitting Daly Middle School will reduce the vulnerability of the students and ensure the viability of this critical facility. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Conduct detailed structural evaluation and recommendations for fix incorporating DOGAMI's seismic assessment data to assist in retrofitting Daly Middle School. • Apply for money from the SB 3, 4 (2005) once it becomes available in 2007-2008 • Apply for FEMA project grant funding • Conduct cost-benefit analysis and potentially consider rebuilding a new structure • Align project with School District Maintenance Plan 			
Coordinating Organization:		Lakeview School District #7	
Internal Partners:		External Partners:	
Town of Lakeview, Lake County		DOGAMI, OEM, FEMA, ODE	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Long Term		
Form Submitted by:			

EQ#2

Proposed Action Item: EQ2		Alignment with Plan Goals:	
Seismically retrofit Paisley High School to reduce the school's vulnerability to seismic hazards		1. Protect Human Welfare, Property, Natural and Cultural Resources	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Paisley High School was built in 1917 and is un-reinforced concrete • Occupants of the school are primarily middle and high school aged students and are more vulnerable should an event occur. Retrofitting Paisley School will protect the current enrollment of 85 students as well as staff and community members using the building. • Seismic stability studies have shown that un-reinforced buildings perform poorly in earthquakes • Paisley School building is also used on a monthly basis as a community meeting center and community theater • Paisley School is considered an icon to the community and has been prioritized by the Steering Committee • The Statewide Seismic Needs Assessment Study conducted by DOGAMI identifies Paisley School as having high risk to seismic activity • Oregon Senate Bill 2 (2005) directs DOGAMI to develop a statewide seismic needs assessment that include seismic safety survey of specific critical facilities and infrastructure, including schools. Incorporating this data once it is published will assist in developing a strategy to seismically retrofit Paisley School. • Retrofitting of vital infrastructure, such as schools and community buildings, provides important improvements that reduce hazard exposure and the cost and time associated with recovery (Source: American Planning Advisory Service Report Number 483/484) • The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a high vulnerability for seismic hazards and a medium probability of a future seismic event recurring. Retrofitting Paisley School will significantly reduce the school's vulnerability to seismic hazards and improve the safety of students, teachers, and community members that use the school • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community, particularly to buildings and infrastructure [201.6 (c)(3)(ii)]. Seismically retrofitting Paisley School will reduce the vulnerability of the students and ensure the viability of this critical facility. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Conduct detailed structural evaluation and recommendations for fix incorporating DOGAMI's seismic assessment data to assist in retrofitting Paisley School. • Apply for money from the SB 3, 4 (2005) once it becomes available in 2007-2008 • Apply for FEMA project grant funding • Conduct cost-benefit analysis and potentially consider rebuilding a new structure Conduct structural evaluation and recommendation for fix 			
Coordinating Organization:		Paisley School District #11	
Internal Partners:		External Partners:	
Lake County, City of Paisley, Paisley		DOGAMI, OEM, FEMA, ODE	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Long Term		
Form Submitted by:			

EQ#3

Proposed Action Item: EQ3		Alignment with Plan Goals:	
Identify historic structures that represent a significant cultural resource for the community, focusing especially on unreinforced masonry buildings, and identify mitigation measures (i.e. structural retrofit) to protect them from seismic natural hazards.		1. Protect Human Welfare, Property, Natural and Cultural Resources 4. Strengthen Organizational and Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Unreinforced masonry buildings are particularly vulnerable to seismic events. There are buildings in Lake County that are unreinforced masonry buildings and are vulnerable to damage in the event of an earthquake. This could have significant impacts on local economies in the event of an earthquake. Identifying mitigating measures for retrofitting masonry buildings will reduce the vulnerability of the buildings to an earthquake event and improve the resiliency of the local economy. • The National Register for Historic Places indicates that Lake County has 16 resources, including 8 structures and 8 archeological sites, listed on the National Register. These sites serve as important cultural and historic resources for Lake County and are worthy of additional protection. Identifying mitigation measures for resources listed on the National Register will help protect Lake County’s historical heritage and ensure their long-term viability. • The Lake County Regional Profile in the <i>State of Oregon Natural Hazard Mitigation Plan</i> states that Lake County has a high vulnerability for seismic hazards and a medium probability of a future seismic event recurring. Mitigating significant historic buildings and structures against natural hazards will reduce the vulnerability of these structures to natural hazard events. This will not only protect the building’s occupants, but it will also ensure the long-term viability of the historic structures. • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community, particularly to buildings and infrastructure [201.6(c)(3)(ii)]. Identifying important cultural historic buildings, especially unreinforced masonry buildings, and seismically retrofitting them will reduce the overall vulnerability of the buildings to natural hazards. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Identify significant cultural and historic resources, whether on the national register or not, that are worthy of additional protection • Determine potential vulnerabilities of these resources to natural hazards that affect Lake County • Identify mitigation measures to help preserve significant historic and cultural resources. 			
Coordinating Organization:		Lake County Historic Society	
Internal Partners:		External Partners:	
County Planning Department, City Planning Departments		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)		
	Long Term		
Form Submitted by:			

EQ#4

Proposed Action Item: EQ4		Alignment with Plan Goals:	
Prioritize critical facilities and public buildings in Lake County based on DOGAMI Seismic Needs Assessments and develop strategy for retrofits		1. Protect Human Welfare, Property, Natural and Cultural Resources 2. Safeguard Economy 4. Strengthen Organizational and Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Statewide Seismic Needs Assessment Study conducted by DOGAMI identifies the Lake County Senior Center, Lake County Courthouse, the Fremont/Hay Elementary School, Lakeview High, the Silver Lake Rural Fire Department and the Lakeview Fire Department as having high risk to seismic activity • Oregon Senate Bill 2 (2005) directs DOGAMI to develop a statewide seismic needs assessment that includes seismic safety surveys of specific critical facilities and infrastructure. Incorporating this data once it is published into a strategy to retrofit critical public buildings and infrastructure will significantly reduce the level of vulnerability in Lake County from seismic hazards. • Retrofitting of vital infrastructure, such as schools and community buildings, provides important improvements that reduce hazard exposure and the cost and time associated with recovery (Source: American Planning Association. 1998. Planning for Post-Disaster Recovery and Reconstruction. Planning Advisory Service Report Number 483/484) • The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a high vulnerability for seismic hazards and a medium probability of a future seismic event recurring. Prioritizing critical facilities based on the DOGAMI seismic vulnerability assessments, and developing a strategy to retrofit high priority buildings, will significantly reduce the vulnerability of critical facilities and public buildings to seismic hazards. • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community, particularly to buildings and infrastructure [201.6(c)(3)(ii)]. Prioritizing seismic vulnerability of critical facilities and public buildings, and developing a strategy to retrofit high-priority buildings, will assist in reducing Lake County’s overall vulnerability to natural hazards. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Conduct detailed structural evaluation and recommendations for fix incorporating DOGAMI’s seismic assessment data to assist in retrofitting critical facilities. • Apply for money from the SB 3, 4 (2005) once it becomes available in 2007-2008 • Apply for FEMA project grant funding • Conduct cost-benefit analysis and potentially consider rebuilding a new structure • Develop a strategy to begin retrofitting high priority buildings 			
Coordinating Organization:		Lake County Emergency Management	
Internal Partners:		External Partners:	
Lake Co. Building Dept., Town of Lakeview Public Works, Lake County		Lake County Historical Society	
Timeline:		If available, estimated cost:	
Short Term (0-2 years)	Long Term (2-4 or more years)		
	Long Term		
Form Submitted by:			

EQ#5

Proposed Action Item: EQ5		Alignment with Plan Goals:	
Seismically retrofit Lakeview High School to reduce the building's vulnerability to seismic hazards		1. Protect Human Welfare, Property, Natural and Cultural Resources 4. Strengthen Organizational and Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Occupants of the school are primarily high school students, ages 15-19 and are more vulnerable to potential injury should an event occur • Lakeview School has been identified as a critical facility by the Natural Hazard Mitigation Steering Committee • The Statewide Seismic Needs Assessment Study conducted by DOGAMI identifies Lakeview High School as having high risk to seismic activity • Oregon Senate Bill 2 (2005) directs DOGAMI to develop a statewide seismic needs assessment that include seismic safety survey of specific critical facilities and infrastructure, including schools. Incorporating this data once it is published will assist in developing a strategy to seismically retrofit Lakeview High School. • Retrofitting of vital infrastructure, such as schools and community buildings, provides important improvements that reduce hazard exposure and the cost and time associated with recovery (Source: American Planning Advisory Service Report Number 483/484) • The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a high vulnerability for seismic hazards and a medium probability of a future seismic event recurring. Retrofitting Lakeview High School will significantly reduce the school's vulnerability to seismic hazards and improve the safety of students, teachers, and community members that use the school • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community, particularly to buildings and infrastructure [201.6 (c)(3)(ii)]. Seismically retrofitting Lakeview High School will reduce the vulnerability of the students and ensure the viability of this critical facility. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Conduct detailed structural evaluation and recommendations for fix incorporating DOGAMI's seismic assessment data to assist in retrofitting Daly Middle School. • Apply for money from the SB 3, 4 (2005) once it becomes available in 2007-2008 • Apply for FEMA project grant funding • Conduct cost-benefit analysis and potentially consider rebuilding a new structure • Align project with School District Maintenance Plan 			
Coordinating Organization:		Lakeview School District # 7	
Internal Partners:		External Partners:	
Town of Lakeview, Lake County		DOGAMI, OEM, FEMA, ODE	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Long Tern		
Form Submitted by:			

WF#1

Proposed Action Item: WF1	Alignment with Plan Goals:
Establish fuelbreaks to the south and west of Christmas Valley as recommended by the Lake County Community Wildfire Protection Plan Phase II	1. Protect Human Welfare, Property, Cultural and Natural Resources 2. Safeguard Economy 4. Strengthen Community Capacity
Rationale for Proposed Action Item:	
<ul style="list-style-type: none"> • Lake County has an average of 362 fires annually (LCCWPP, 17) • Christmas Valley is surrounded by highly-ignitable and quick-burning sagebrush flats • Establishing fuelbreaks and fuel reduction efforts reduce the risk of fire spreading to and from public and private lands • The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a medium vulnerability for wildfire hazards and a high probability for future wildfire events recurring. Establishing breaks to the south and west of Christmas Valley will protect the 750 residents living in the community. • Fuel mitigation projects were identified and prioritized based on proximity to community, hazardous fuel load and continuity, terrain and professional experience (LCCWPP, 21) • Fuelbreaks break up continuity of fuel such as juniper, sagebrush, grass and weeds to reduce wildfire rate of spread and severity to allow fire fighters a chance at suppression (LCCWPP, 24) • Christmas Valley is surrounded by parcels of irrigated and non-irrigated hayfields and wetlands. These may provide wildfire protection because they break up continuity of wildland fuels. However, during late summer and fall the hayfields and some wetlands may dry and become hazardous fuels (LCCWPP, 28) • Fuelbreaks would limit the potential for embers from wildfires to ignite dried vegetation in town causing spot fires (LCCWPP, 28) • Values at risk of wildfire include human welfare, private and public lands, businesses, farmland, ranchland, grazing land, and hunting and other recreation land. They are at risk because of hazardous fuel build-up around communities and structures, poor emergency vehicle ingress and egress, and then on-going need for training and/or upgrading of fire suppression equipment (LCCWPP, 11) • Christmas Valley is under the authority of the Christmas Valley Rural Fire Protection District which is limited by personnel, equipment and funds. Partnering to creating fuelbreaks would ease responsibility of the CVRFPD both in wildfire mitigation and fuels management. 	
Ideas for Implementation:	
<ul style="list-style-type: none"> • Fuelbreaks would be constructed using hand crews, mowers, brush choppers, livestock grazing prescribed fire, or bulldozer depending on the vegetation type and terrain (LCCWPP, 27) • Appropriate best management practices would be followed in fuelbreak implementation (LCCWPP, 27) • Fuelbreaks would be at least 30-50 feet wide or wider on slopes with length varying according to placement and terrain (LCCWPP, 27) • Care is needed to ensure minimal vegetation removals so the fuelbreak does not become potential habitat for annual weeds (LCCWPP, 27) • The economical use of logs and small diameter materials for biomass energy production should be explored (LCCWPP, 24) • All hazardous fuel treatments would be implemented following federal, state and county policy (LCCWPP, 24) 	

Coordinating Organization:		Lake County Fire Council	
Internal Partners:		External Partners:	
BLM, DOF, FS, LIFC		LCRI, Christmas Valley RFPD	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Short Term			
Form Submitted by:			

WF#2

Proposed Action Item: WF2	Alignment with Plan Goals:
Determine appropriate location and establish fuel breaks in and around Drews Gap as recommended by the Lake County Community Wildfire Protection Plan Phase II	<ol style="list-style-type: none"> 1. Protect Human Welfare, Property, Cultural and Natural Resources 2. Safeguard Economy 4. Strengthen Community Capacity
Rationale for Proposed Action Item:	
<ul style="list-style-type: none"> • Lake County has an average of 362 fires annually (LCCWPP, 17) • Drews Gap is located adjacent to the Winema-Freemont National Forest and has been determined to be in a WUI area by head of the Lake County Fire Council • Actions pertaining to Drews Gap have been prioritized by Head of the Lake County Fire Council • Phase II of the LCCWPP did not determine or suggest fuel break location but recommended that fuel breaks be implemented • Establishing fuelbreaks and fuel reduction efforts reduce the risk of fire spreading to and from public and private lands • The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a medium vulnerability for wildfire hazards and a high probability for future wildfire events recurring. Establishing breaks in and near Drews Gap will protect the approximated 150 residents living in the community. • Fuel mitigation projects were identified and prioritized based on proximity to community, hazardous fuel load and continuity, terrain and professional experience (LCCWPP, 21) • Fuelbreaks break up continuity of fuel such as juniper, sagebrush, grass and weeds to reduce wildfire rate of spread and severity to allow fire fighters a chance at suppression (LCCWPP, 24) • Values at risk of wildfire include human welfare, private and public lands, businesses, farmland, ranchland, grazing land, and hunting and other recreation land. They are at risk because of hazardous fuel build-up around communities and structures, poor emergency vehicle ingress and egress, and then on-going need for training and/or upgrading of fire suppression equipment (LCCWPP, 11) • Drews Gap is not under a specified RFPD and therefore has no formal fire protection. Currently, if there is a fire in the area, fire authorities that respond are reimbursed for their efforts. However, response times for initial attack are lengthy (LCCWPP, 9) 	
Ideas for Implementation:	
<ul style="list-style-type: none"> • Fuelbreaks would be constructed using hand crews, mowers, brush choppers, livestock grazing prescribed fire, or bulldozer depending on the vegetation type and terrain (LCCWPP, 27) • Appropriate best management practices would be followed in fuelbreak implementation (LCCWPP, 27) • Fuelbreaks would be at least 30-50 feet wide or wider on slopes with length varying according to placement and terrain (LCCWPP, 27) • Care is needed to ensure minimal vegetation removals so the fuelbreak does not become potential habitat for annual weeds (LCCWPP, 27) • The economical use of logs and small diameter materials for biomass energy production should be explored (LCCWPP, 24) • All hazardous fuel treatments would be implemented following federal, state and county policy (LCCWPP, 24) 	

Coordinating Organization:		Lake County Fire Council	
Internal Partners:		External Partners:	
FS, ODOF, BLM, Lake County Planning		LCRI, RFPDs	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Short Term			
Form Submitted by:			

WF#3

Proposed Action Item: WF3	Alignment with Plan Goals:
Establish fuel breaks east of Lakeview along Deadman and Bullard Canyons as recommended by the South-Central Lake County Wildfire Protection Plan	1. Protect Human Welfare, Property, Cultural and Natural Resources 2. Safeguard Economy 4. Strengthen Community Capacity
Rationale for Proposed Action Item:	
<ul style="list-style-type: none">• Lake County has an average of 362 fires annually (SCLCCWPP, 15)• The East half of Lakeview borders a Wildland-Urban Interface area. Creating a fuel break will both prevent a wildland fire from entering Lakeview and a structure fire from Lakeview to enter into forested lands• The Lake County Regional Profile in the State of Oregon Natural Hazard Mitigation Plan states that Lake County has a medium vulnerability for wildfire hazards and a high probability for future wildfire events recurring. Establishing breaks east of Lakeview will protect the 2,500 residents living in the community.• Fuel mitigation projects were identified and prioritized based on proximity to community, hazardous fuel load and continuity, terrain and professional experience (SCLCCWPP, 21)• Fuelbreaks break up continuity of fuel such as juniper, sagebrush, grass and weeds to reduce wildfire rate of spread and severity to allow fire fighters a chance at suppression (LCCWPP, 24)• Values at risk of wildfire include human welfare, private and public lands, businesses, farmland, ranchland, grazing land, and hunting and other recreation land. They are at risk because of hazardous fuel build-up around communities and structures, poor emergency vehicle ingress and egress, and then on-going need for training and/or upgrading of fire suppression equipment (SCLCCWPP, 9)• Fuelbreaks would limit the potential for embers from wildfires to ignite dried vegetation in town causing spot fires (SCLCCWPP, 25)• Lakeview Fire Department has responsibility for structure, grass and vehicle fires within the Town of Lakeview. However, the department will respond to fires within a 1-mile radius around Lakeview (SCLCWPP, 8)•	
Ideas for Implementation:	
<ul style="list-style-type: none">• Fuelbreaks would be constructed using hand crews, mowers, brush choppers, livestock grazing prescribed fire, or bulldozer depending on the vegetation type and terrain (LCCWPP, 25)• Appropriate best management practices would be followed in fuelbreak implementation (LCCWPP, 25)• Fuelbreaks would be at least 30-50 feet wide or wider on slopes with length varying according to placement and terrain (LCCWPP, 25)• Care is needed to ensure minimal vegetation removals so the fuelbreak does not become potential habitat for annual weeds (LCCWPP, 25)• The economical use of logs and small diameter materials for biomass energy production should be explored (LCCWPP, 24)• All hazardous fuel treatments would be implemented following federal, state and county policy (LCCWPP, 25)	

Coordinating Organization:		Lake County Fire Council	
Internal Partners:		External Partners:	
FS, ODOF, BLM, Lakeview FD, Lake County Planning		LCRI,	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Short Term			
Form Submitted by:			

FL#1

Proposed Action Item: F1		Alignment with Plan Goals:
Replace insufficient drainage culverts with bridge over Crane Creek at Hwy 395 and County Road 1-15		1. Protect Human Welfare, Property, Cultural and Natural Resources 4. Strengthen Community Capacity
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> Existing culverts are 6 foot flat bottom pipes and easily clogged with debris during high flow County Road 1-15 has direct access to State Highway 395 There are 5 residences on county road 1-15 Crane Creek is managed as a Wild Fish Stream for the Red-Band Trout. Replacing the culvert with a bridge will promote stream and fish habitat continuity, helping to preserve this sensitive fish species Past flooding events have washed road out, the most recent incident was in May 2005 		
Ideas for Implementation:		
<ul style="list-style-type: none"> Install pre-fabricated 50 foot bridge Work with ODOT to coordinate updating drainages Coordinate with Lakeview Watershed Council and OFW to outline stream development and restoration program Cost-share on project with Oregon Department of Fish and Wildlife Seek state and federal funding 		
Coordinating Organization:	Lake County Roads Department	
Internal Partners:		External Partners:
Lake Co. Roads Department		OWEB, OFW
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	\$150,000
	Long Term	
Form Submitted by:		

FL#2

Proposed Action Item: F2		Alignment with Plan Goals:
Prioritize replacement of culverts as determined by county culvert assessment and develop implementation strategy		1. Protect Human Welfare, Property, Cultural and Natural Resources 4. Strengthen Community Capacity
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> • There are areas in Lake County that are subject to repeat clogging and back-up over roadways due to insufficient culvert size, including Hart Mountain Road 3-12, Hart Mountain Road 3-12 services 3 ranches and is used by USFW • Culvert back-up has occasionally caused road wash-outs and closures • Flooding events occur about every 5 years, according to Lake County Roads Master 		
Ideas for Implementation:		
<ul style="list-style-type: none"> • Prioritize replacement of problem culverts, focusing on those with repeat clogging and flooding • Coordinate with OFW and local Watershed Council to ensure proper stream and fish habitat 		
Coordinating Organization:	Lake County Roads Department	
Internal Partners:		External Partners:
		OFW, Watershed Council, ODOT, OWEB
Timeline:		If available, estimated cost:
	Long Term	
Form Submitted by:		

FL#3

Proposed Action Item: F3		Alignment with Plan Goals:	
Establish maintenance program on drainage channels from Deadman and Bullard Canyon through Lakeview		1. Protect Human Welfare, Property, Cultural and Natural Resources 2. Safeguard Economy 4. Strengthen Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Drainage channels have been inundated with sediment and are not at sufficient depth to carry drainage load. This creates flooding over channels on public and private lands causing property damage and over roadways • Willows have encroached on channels, blocking entrances to culverts creating back up of drainage flow • Some drainage culverts cannot be replaced with larger diameter culverts because they are buried and there are height limitations on diameter of pipes • Culverts buried at Center St. and T St. to S St. have flooded due to clogging from debris creating standing water on nearby private property where homes are located. Water stood for 3 days. This has never resulted in road closure but it has resulted in standing high water across the intersection. • The intersection of Stockdrive Rd and Roberta Rd has been flooded due to clogged ditches. This back up has overflowed the intersection causing standing high water. Water stood for 3 days. Both Stockdrive Rd and Roberta Rd are secondary roads in Lakeview and are frequently used. • Flooding and water back-up events have occurred about every 5 years, according to Lake County Roads Master • If a heavy rain or snow-melt year were to occur Lakeview would be at risk of flooding due to insufficient drainages 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate with Lakeview Watershed Council and OFW to ensure proper stream habitat and quality • Coordinate with Town of Lakeview Public Works to obtain permits through the Division of State Lands to clean channels 			
Coordinating Organization:		Lake County Roads Department	
Internal Partners:		External Partners:	
Town of Lakeview, Lakeview Public Works		OFW, Lakeview Watershed Council	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Long Term		
Form Submitted by:			

FL#4

Proposed Action Item: F4		Alignment with Plan Goals:	
Organizing tree planting along banks of Chewaucan upriver from the City of Paisley to reduce soil erosion and river sediment load during flood stages		<ol style="list-style-type: none"> 1. Protect Human Welfare, Property, Cultural and Natural Resources 3. Increase Education, Outreach and Awareness 4. Strengthen Community Capacity 	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Chewaucan produces a significant flood on average every five years according to a Paisley resident. Planting trees along its banks upstream from the City of Paisley will help prevent soil erosion which will in turn lessen sediment load and debris build up in the river channel during flood stages through the city • Reducing sediment load and debris will reduce clogging in drainage culverts, preventing back up of water onto roads and property • Planting trees along the banks of river has ecological benefits as well. Trees provide shade on the water which helps keep water temperatures low, promoting healthy stream systems. The Chewaucan River is habitat to the Red-Band Trout, which is a Sensitive Species. • “A natural array of native trees, shrubs, and plants along a river bank helps to hold the soil in place by pronounced and complex root systems. Reaches of streams that do not have trees in the riparian zones exhibit far greater erosion, or mass wasting events, than streams that have a healthy riparian zone.” (Source: Shade the Chehalis, the Chehalis River Council. http://www.crcwater.org/shadethechehalis.html#70) • 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Organize Arbor Day tree planting event • Have trees donated through local nurseries • Coordinate with local clubs and organizations such as Paisley School, Chewaucan Watershed Council, OSU Extension Office, county 4-H Clubs • Cost-share with OFW • Seek funding through OWEB Small Project Grant 			
Coordinating Organization:		Chewaucan Watershed Council	
Internal Partners:		External Partners:	
BLM, DOF, OFW		OSU Extension, 4-H, Chewaucan Watershed Council, City of Paisley, Paisley School	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	Long Term		
Form Submitted by:			

FL#5

Proposed Action Item: F5		Alignment with Plan Goals:
Replace to enlarge and properly construct storm drain at Hwy 31 and Mill Street in Paisley		1. Protect Human Welfare, Property, Cultural and Natural Resources 4. Strengthen Community Capacity
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> • Currently every time it rains the storm drain backs up with water. This occurs approximately 20 times annually according to a Paisley resident. • Water often floods the intersection of Hwy 31 and Mill Street to an average depth of 14-16 inches. • Standing water usually takes about 3 days to drain • Existing culvert is approximately 12” in diameter but is filled with debris only allowing approx. 4-5” drainage room on top portion of culvert • Drainage sink is approximately 2’ deep and is also filled with debris to a depth of approx. 12” • Highway 31 is managed by the State of Oregon, while Mill Street is managed by Lake County Roads Department 		
Ideas for Implementation:		
<ul style="list-style-type: none"> • Coordinate with ODOT and Lake County Roads Department to secure funding and complete project 		
Coordinating Organization:	City of Paisley Council Members	
Internal Partners:		External Partners:
City of Paisley, Lake County Roads Department, ODOT		
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
	Long Term	
Form Submitted by:		

FL#6

Proposed Action Item:		Alignment with Plan Goals:	
Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances.		1. Protect Human Welfare, Property, Cultural and Natural Resources 4. Strengthen Community Capacity	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The National Flood Insurance Program provides communities federally backed flood insurance to homeowners, renters, and business owners, provided that communities develop and enforce adequate floodplain management ordinances. The benefits of adopting NFIP standards for communities are a reduced level of flood damage in the community and stronger buildings that can withstand floods. 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. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continued participation in the NFIP will help reduce the level of flood damage to new and existing buildings in communities while providing homeowners, renters and business owners additional flood insurance protection. The 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. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Actively participate with DLCD and FEMA during Community Assistance Visits. Conduct an assessment of the floodplain ordinances to ensure they reflect current flood hazards and situations, and meet NFIP requirements. The cities should coordinate with the county to ensure that floodplain ordinances and NFIP regulations are maintained and enforced. 			
Coordinating Organization:		Lake County Planning Department	
Internal Partners:		External Partners:	
FEMA, OEM, DLCD		City of Paisley and Town of Lakeview	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Form Submitted by:			

FL#7

Proposed Action Item:		Alignment with Plan Goals:	
Assess the types and numbers of existing buildings (including repetitive loss structures), infrastructure, and critical facilities located in the identified hazard areas?		1. Protect Human Welfare, Property, and Natural Resources	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> ○ Flood Mitigation Assistance funds require that the plan describe the community’s vulnerability to flood in terms of the types and numbers of existing buildings (including repetitive loss structures), infrastructure, and critical facilities located in the identified hazard areas. ○ Currently, Lake County is only able to identify the number of NFIP claims that have been made since FIRM adoption. Flood Insurance Rate Maps in Lake County are too old to be accurate, and counting the numbers of existing buildings, infrastructure, and critical facilities located in flood-prone areas was not possible during the 2006-07 Natural Hazards Mitigation Planning Process. ○ Like many locations in Eastern Oregon, FEMA has not updated the Flood Insurance Rate Maps (FIRMS) in several years. Due to their ages, maps are not guaranteed to accurately represent present flood conditions. Additionally, maps are not digital. Lake County’s FIRM was completed in 1989. ○ Currently, Lake County has a total of 45 policy holders; 6 are located in Lakeview, and one is in Paisley. Lakeview has had a total of four single loss flood claims, amounting to \$14,411. Paisley has had one single loss flood claim at \$392. Lake County has three properties that have each experienced multiple flood losses. The total of these losses is \$21,024.70. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> ○ Hire a person to physically count the number of buildings and/or structures in the floodplain. ○ Update the floodplain maps. Collect topological maps, road maps, base elevation data and a description of at-risk populations/structures to increase chances of receiving a portion of the Flood Map Modernization Program (FMMP) funds (to be discontinued after 2008). ○ Convert existing maps to digital maps. Using GIS, overlay digital FIRM maps against current property maps. Count and document the number of structures lying within the floodplain. 			
Coordinating Organization:		Lake County Planning Department	
Internal Partners:		External Partners:	
City of Paisley, Town of Lakeview		DLCD	
Timeline:		If available, estimated cost:	
Short Term (0-2 years)	Long Term (2-4 or more years)		
	Long Term		
Form Submitted by:			

WS#1

Proposed Action Item: W1		Alignment with Plan Goals:	
Create and disseminate an informational brochure encouraging mobile home owners to orient their homes parallel to prevailing winds in order to minimize exposure to potentially property damaging wind gusts		<ol style="list-style-type: none"> 1. Protect Human Welfare, Property, Cultural and Natural Resources 3. Increase Education, Outreach and Awareness 	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Strong wind gusts normally occur in Lake County with speeds of up to 95 miles an hour recorded by NOAA • Mobile home regulation does not require anchoring dwellings to a solid foundation. Strong winds can knock a mobile home off its foundation • Encouraging mobile home owners to align their homes parallel to prevailing winds reduces the surface area of the dwelling that is exposed to wind gusts • 30% of residential dwellings in Lake County are mobile homes according to the Regional Profile for Lake County in the State Of Oregon Natural Hazard Mitigation Plan • The Regional Profile for Lake County in the State Of Oregon Natural Hazard Mitigation Plan states that Lake County has medium vulnerability for windstorms and high probability that a windstorm will recur. Creating and disseminating informational brochures will help to inform the public about the hazards windstorms pose. • 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 risk 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 Hazard Mitigation Plan 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Work with County Building Inspector to create brochure with relevant information to Lake County • To be disseminated by Building Inspector during mobile home permitting process • Disseminated information in the county and city offices where members of the public frequently visit 			
Coordinating Organization:		Lake County Building Inspector	
Internal Partners:		External Partners:	
Lake County Building Department, Lake County Planning Department			
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Short Term			
Form Submitted by:			

Section 5:

Plan Implementation and Maintenance

This section details the formal process that will ensure that the Lake County Multi-Jurisdictional Natural Hazards Mitigation Plan remain 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. This section also includes an explanation of how the County intends to incorporate the mitigation strategies outlined in the plan into existing planning mechanisms and programs such as the County comprehensive land use planning process, capital improvement planning process, and building codes enforcement and implementation. Finally, this section describes how the County will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

After the Plan is locally reviewed and deemed complete, the County 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 the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the County will adopt the plan via resolution. At that point the County will gain eligibility for funding through the Pre-Disaster Mitigation Grant Program, and the Hazard Mitigation Grant Program funds.

Convener

The Lake County Planning Department has been designated to hold the convening role for the Lake County Natural Hazard Mitigation Plan. The Planning Department will be responsible for the adoption and maintenance of the plan in addition to the following:

- Coordinate Steering Committee meeting dates, times, locations, agendas, and member notification;
- Document outcomes of Committee meetings;
- Serve as a communication conduit between the Steering Committee and key plan stakeholders;
- 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.

Coordinating Body

The Steering Committee will serve as the coordinating body for the mitigation plan. Roles and responsibilities of the Coordinating Body are described below:

- Serve as the local evaluation committee for funding programs such as the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds;
- Prioritize and recommend funding for natural hazard risk reduction projects;
- Document successes and lessons learned;
- 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 will continue to serve on the Lake County Steering Committee:

- Lake County Sheriff Department
- Lake County Planning Department
- Lake County Building Department
- Lake County Roads Department
- Town of Lakeview
- Lake County Commissioners
- Lakeview School District #7
- Lake County Resource Initiative
- Lake County Public Health
- Lakeview Public Works
- Lakeview Police
- City of Paisley

Additional organizations to potentially involve in the future include:

- Oregon Department of Transportation
- Oregon Fish and Wildlife
- Paisley School District #11
- Lake County Historic Society
- Lake County Chamber of Commerce
- Mid-State Electric Cooperative
- Chewaucan Watershed Council

To make the coordination and review of the Lake County Multi-Jurisdictional Natural Hazard Mitigation Plan as broad and useful as possible, the Steering Committee will

engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items.

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan. Proper maintenance of the plan will ensure that this plan will maximize the County's efforts to reduce the risks posed by natural hazards. This section was developed by the University of Oregon's Oregon Natural Hazards Workgroup and includes a process to ensure that a regular review and update of the plan occurs. The Steering Committee and local staff will be 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 Committee will meet on a semi-annual basis to complete the following tasks. During the first meeting of the year the Committee will:

- Educate and train new members on the plan and on mitigation in general
- Review existing action items to determine appropriateness for funding;
- 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 Committee will:

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

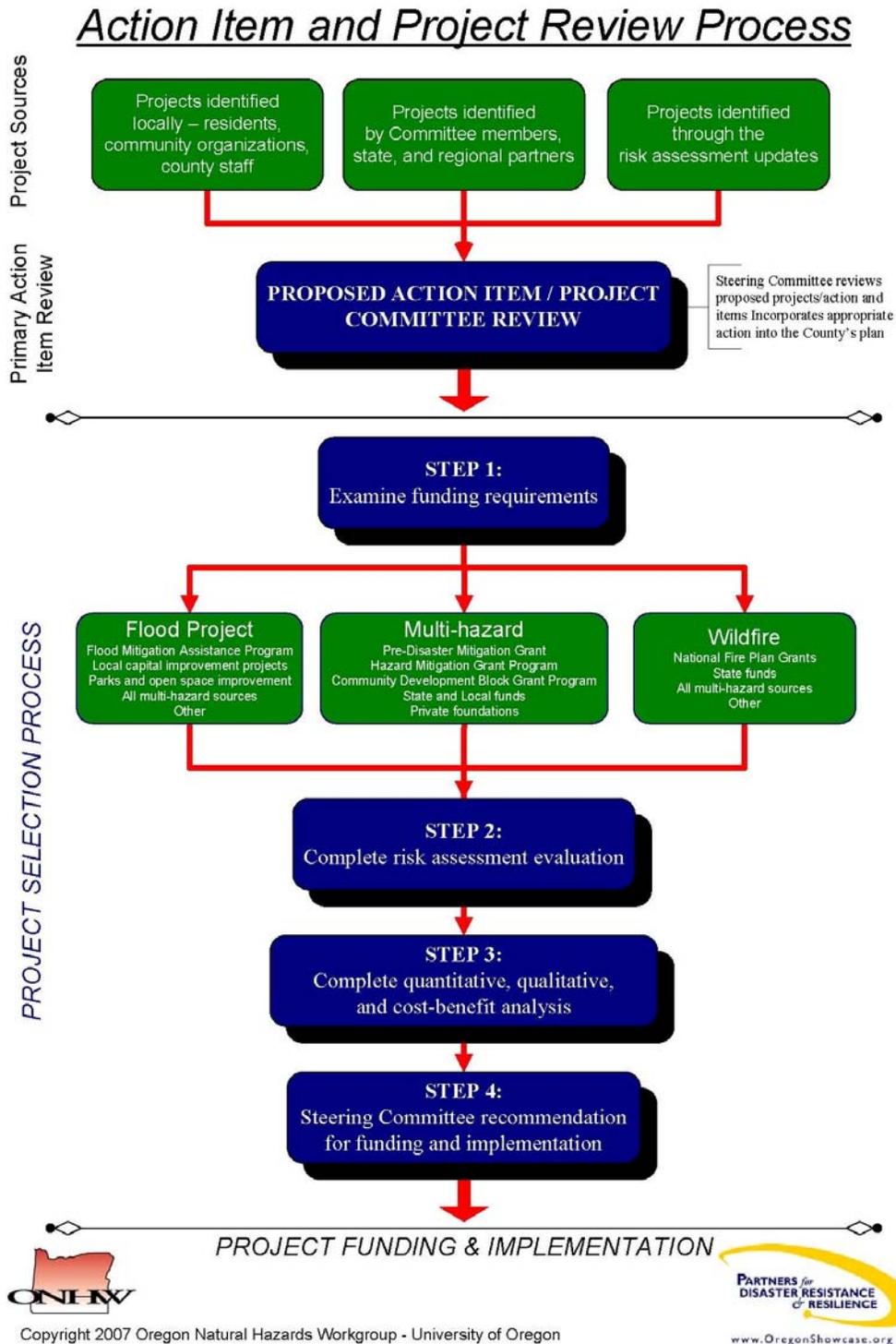
The convener will be responsible for documenting the outcome of the semi-annual meetings. The process the Committee will use to prioritize mitigation projects is detailed in the section below. The plan's format allows the County to review and update sections when new data becomes available. New data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

Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that the County identify a process for prioritizing potential actions. Potential mitigation activities will often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by committee 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. Some of these examples are used in Figure 5.1 to illustrate the project development and prioritization process.

Figure 5.1 Action Item and Project Review Process



Step 1: Examine funding requirements

The Steering Committee will identify how best to implement individual actions within the appropriate existing plan, policy, or program. The committee will examine the selected funding stream's requirements to ensure that the mitigation activity would be eligible through the funding source. The Committee 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

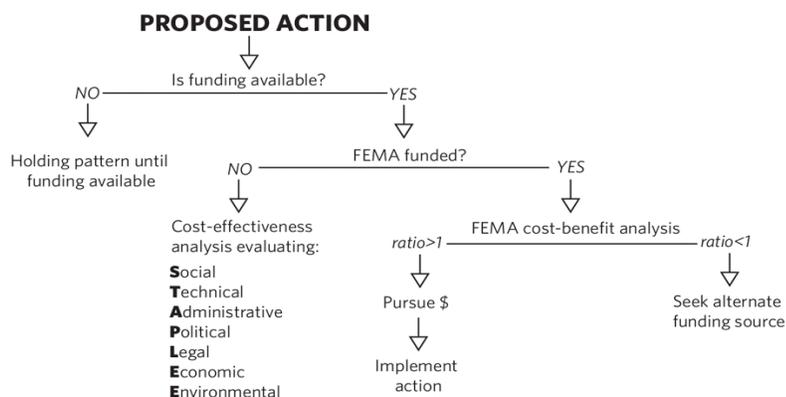
The second step in prioritizing the plan's action items is to examine which hazards they are associated with and where these hazards rank in terms of community risk. The Committee will determine whether or not the plan's risk assessment supports the implementation of the mitigation activity. This determination 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. Each of the action items in the Plan addresses risk from one or more of these hazards.

Step 3: Complete quantitative and qualitative assessment, and economic analysis

The third 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 can assist communities 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 can provide 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 5.2 shows decision criteria for selecting the method of analysis.

Figure 5.2 shows decision criteria for selecting the method of analysis.

Figure 5.2: Cost – Benefit Analysis Overview



Source: Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon, 2006.

If the activity requires federal funding for a structural project, the Committee 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 committee 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 University of Oregon's Oregon Natural Hazards Workgroup. See Economic Analysis of Natural Hazard Mitigation Projects Appendix for a description of the STAPLE/E evaluation methodology.

Step 4: Committee Recommendation

Based on the steps above, the committee will recommend whether or not the mitigation activity should be moved forward. If the committee decides to move forward with the action, the coordinating organization designated on the action item form will be responsible for taking further action and documenting success upon project completion. The Committee 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 Committee 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 committee 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 Committee to prioritize the plan's action items during the annual review and update process.

Continued Public Involvement & Participation

Lake County is dedicated to involving the public directly in the continual reshaping and updating of the Lake County Natural Hazard Mitigation Plan. Although members of the Steering Committee represent the public to some extent, the greater public will also have the opportunity 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 County will keep an updated copy of the Lake County Natural Hazard Mitigation Plan in the Lakeview, Silver Lake, Christmas Valley and the Paisley Public Libraries. In addition to the involvement activities listed above, the county's mitigation plan will also be archived and posted on the Partnership for Disaster Resilience 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 should be asked to determine what actions are necessary to update the plan. The convener will be responsible for convening the Committee to address 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 Committee determine what components of the mitigation plan need updating. The Committee will be responsible for updating any deficiencies found in the plan based on the questions above.

Drought Annex

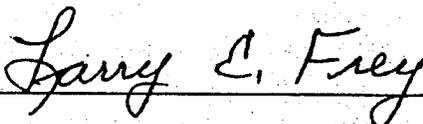
The following drought annex includes documentation of historic drought declarations in Lake County.

For: County Offices

Secretarial Natural Disaster Determination S2081

Approved By: State Executive Director

LEF:LEV:th



1 Overview

A Background

Effective March 22, 2005, Secretary Mike Johanns declared a major disaster in **Klamath County**, Oregon, due to losses caused by drought that occurred from January 1, 2004 and continuing.

As a result, the following Oregon counties were named as contiguous counties to Klamath County, where eligible family farmers may qualify for Farm Service Agency (FSA) Emergency (EM) loan assistance:

DESCHUTES DOUGLAS JACKSON LAKE LANE

B Purpose

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C Contact

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

FILING: Preceding FSA Handbook 3-FLP, FmHA Instruction 1945-A & Operational File FLP 3

Disposal

Distribution

December 31, 2005

STO, DD, COR, COC, COF - Including Farm Loan Programs

03-29-2005

For: County Offices

Secretarial Natural Disaster Determination S1762

Approved By: State Executive Director

LEF:LEV:th

Larry E. Frey

1 Overview

A

Background

Effective March 21, 2003, Secretary Ann M. Veneman declared a major disaster in the LAKE and MALHEUR Counties, Oregon due to losses caused by drought that occurred from September 1, 2001, and continuing. The disaster declaration number is S1762. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

DESCHUTES

KLAMATH

B

Purpose

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C

Contacts

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

Continued on the next page

FILING: Preceding 3-FLP and FmHA Instruction 1945-A and Operational File 14-1

Disposal
December 31, 2003

Distribution
STO, DD, COR, COC, COF - Including Farm Loan Programs

04-24-03

Page 1

For: County Offices

Secretarial Natural Disaster Determination S1713

Approved By: State Executive Director

LEF:LEV:th

Larry E. Frey

1 Overview

**A
Background**

Effective October 24, 2002, Secretary Ann M. Veneman declared a major disaster in the State of Nevada, due to losses caused by drought and insect infestation that occurred from January 1, 2001 and continuing. The disaster declaration number is S1713. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

HARNEY LAKE MALHEUR

**B
Purpose**

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

**C
Contacts**

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

Continued on the next page

FILING: Preceding 3-FLP and FmHA Instruction 1945-A and Operational File 14-1

Disposal
September 30, 2003

Distribution
STO, DD, COR, COC, COF - Including Farm Loan Programs

12-10-02

EXECUTIVE ORDER NO. 01 - 05

DETERMINATION OF A STATE OF DROUGHT EMERGENCY IN CROOK COUNTY, HOOD RIVER COUNTY, AND LAKE COUNTY DUE TO CONDITIONS CAUSED BY DROUGHT, LOW WATER CONDITIONS, AND ENERGY SHORTAGES IN THE WESTERN STATES.

Pursuant to ORS 401.055, I find that the weather pattern, ongoing drought and low water conditions, and the energy shortages in the western states have the imminent potential for causing a natural and economic disaster of catastrophic proportions. It is anticipated that the projected outlook will not significantly alleviate the current conditions, and that they will continue to worsen during the summer months. This will have profound consequences on the county's agricultural and natural resources, as well as the likelihood for stark energy and economic impacts.

Current conditions are being addressed by state agencies including the Department of Agriculture, the Department of Water Resources, and the Department of State Police and its Office of Emergency Management.

A timely response to this situation being vital to the well being and economic security of the citizens and businesses of Crook County, Hood River County, and Lake County I am therefore declaring a "state of drought emergency" and directing the following activities;

IT IS HEREBY ORDERED AND DIRECTED:

I. The Oregon Department of Agriculture is directed coordinate assistance in seeking federal resources available to mitigate conditions and effect agricultural recovery.

II. The Department of Water Resources is directed to coordinate and provide assistance and regulation it determines necessary in accordance with ORS 536.700 to 536.780.

III. The Department of State Police Office of Emergency Management is directed to coordinate and assist as needed with assessment and mitigation activities to address current and projected conditions.

EXECUTIVE ORDER NO. 01 - 05

Page Two

IV. All other departments are directed to coordinate with the above agencies and to provide appropriate state resources as determined essential to assist affected political subdivisions.

Done at Salem, Oregon this _____ day of May, 2001.

John A. Kitzhaber, M.D.
GOVERNOR

ATTEST:

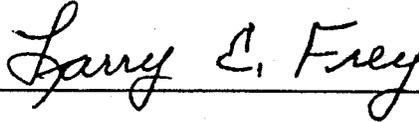
Bill Bradbury
SECRETARY OF STATE

For: County Offices

Secretarial Natural Disaster Determination S1534

Approved By: State Executive Director

LEF:LEV:th



1 Overview

**A
Background**

Effective April 18, 2001 Secretary Ann M. Veneman declared a natural disaster in **Klamath County, Oregon**, due to losses caused drought that occurred from September 1, 2000, and continuing. The disaster declaration number is S1534. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

DESCHUTES JACKSON LANE
DOUGLAS LAKE

**B
Purpose**

The purpose of this Oregon Notice is to:

- obsolete Oregon Notice FLP-80, issued 04-25-01, as the stated date before the beginning of the incidence period of the disaster in Subparagraph 2 A was incorrect. The correct day is August 31, 2000.
- inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

**C
Contacts**

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

FILING: Preceding FmHA Instruction 1945-A and Operational File 14-1

Disposal

Distribution

December 1, 2001

STO, DD, COR, COC, COF - Including Farm Loan Programs

For: County Offices

Secretarial Natural Disaster Determination S1606

Approved By: State Executive Director

LEF:LEV:th

by *Ly E Voigt*

1 Overview

A

Background

Effective January 8, 2002, Secretary Ann M. Veneman declared a major disaster in 7 Counties in the State of Nevada, due to losses caused by extreme fires and ongoing drought conditions that occurred from May 1 through September 30, 2001. The disaster declaration number is S1606. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

HARNEY LAKE

B

Purpose

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C

Contacts

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

Continued on the next page

FILING: Preceding FmHA Instruction 1945-A and Operational File 14-1

Disposal

Distribution

September 30, 2002

STO, DD, COR, COC, COF - Including Farm Loan Programs

01-18-02

Page 1

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL ECONOMIC AND COMMUNITY DEVELOPMENT
101 SW Main Suite 1410
Portland, Oregon 97204

ISSUE NO. 498
DATE 08-07-95
DISTRIBUTION CODE
"S" STATE OFFICE
"D" DIST. OFFICE
"C" COUNTY OFFICE

TO
SDC

STATE PROCEDURE NOTICE

OREGON MANUAL CHANGES

INSERT OREGON INSTRUCTION 1945-A
(S,D,C)

EMERGENCY
Disaster Assistance
(General)

Exhibit A has been revised to provide an updated listing of the RECD Emergency Support Team Leader and Team Members.

Exhibit B has been revised to provide a current listing of all Oregon Counties where Emergency Loans are now available, and show the assigned termination date for each designation.

REMOVE
Exhibit A and B revised
5-31-94

INSERT
Exhibit A and B revised
08-07-95

Notice:

PARAGRAPH NOTATIONS
NATIONAL PROCEDURES

The notation "State Supplement" will be made on the margin of each paragraph of the National Instruction that has been supplemented by any Oregon Instruction on this State Procedure Notice.

o o o

.....
READ PROCEDURE-DISCUSS IN STAFF CONFERENCE-KEEP PROCEDURE MANUAL UP TO DATE
(FOR MANUAL MAINTENANCE SEE 021 SERIES)

Rural Economic and Community Development
101 SW Main Suite 1410
Portland, OR 97204

PART 1945 - EMERGENCY, SUBPART A DISASTER ASSISTANCE - GENERAL

FmHA Emergency Support Team

I. 1945.30(b) With the advice and concurrence of District Directors, Oregon's FmHA Emergency Loan Support Team (ELST) has been revised to include the following members:

Team Leader: Robert B. Perry

Team Members: Patrick C. Joerger, County Supervisor
Patricia L. Dadey, County Supervisor
Patricia A. Good, County Office Assistant
Paul K. Kershisnik, Assistant County Supervisor
Harry L. Smith, Assistant County Supervisor
Billy L. Clonts, County Supervisor
Karen M. Boyles, Assistant County Supervisor
Evelyn L. Mauratt, County Office Clerk
Sharilyn K. Skare, Assistant County Supervisor

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S815	Deschutes* Douglas* Jackson* Jefferson* Klamath* Sherman* Coos Crook Curry Gilliam Harney Josephine Lake Lane Linn Marion Wasco Wheeler	12-30-94	Secretarial Natural Disaster	Damages and losses caused by drought conditions.	09-01-93 and Continuing	08-30-95
S819	Baker Wallowa	01-10-95	Secretarial Natural Disaster	Damages and losses caused by drought conditions.	11-01-93 to the present	09-11-95
M1044	Curry Klamath Lake Josephine	01-10-95	Presidential Major Disaster	Damages and losses caused by flooding, landslides, mud and debris flow.	01-03-95 and Continuing	09-18-95
S835	Umatilla* Grant Morrow Union Wallowa	02-07-95	Secretarial Natural Disaster	Damages and losses caused by drought.	09-01-93 and Continuing	10-10-95
S844	Grant* Josephine* Malheur	04-27-95	Secretarial Natural Disaster	Damages and losses caused by drought.	09-01-93 and Continuing	12-27-95

In plan ✓

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S847	Gilliam Hood River Morrow Sherman Umatilla Wallowa Wasco	05-04-95	Secretarial Natural Disaster	Damages and losses caused by extreme drought and low temperatures.	09-01-93 and Continuing	01-04-96
S855	Baker	06-26-95	Secretarial Natural Disaster	Damages and losses caused by drought.	04-01-94 and Continuing	02-26-96

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

UNITED STATES DEPARTMENT OF AGRICULTURE
FARMERS HOME ADMINISTRATION
Room 1590, Federal Building
1220 SW Third Avenue
Portland, Oregon 97204

TO
SDC

ISSUE NO.	474
DATE	01-01-93
DISTRIBUTION CODE	
"S"	STATE OFFICE
"D"	DIST. OFFICE
"C"	COUNTY OFFICE

STATE PROCEDURE NOTICE

OREGON MANUAL CHANGES

INSERT OREGON INSTRUCTION 1945-A
(S,D,C)

EMERGENCY
Disaster Assistance
(General)

Exhibit B has been revised to provide a current listing of all Oregon Counties where Emergency Loans are now available, and show the assigned termination date for each designation.

REMOVE
Exhibit B revised
04-28-92

INSERT
Exhibit B revised
01-01-93

Notice:

PARAGRAPH NOTATIONS
NATIONAL PROCEDURES

The notation "State Supplement" will be made on the margin of each paragraph of the National Instruction that has been supplemented by any Oregon Instruction on this State Procedure Notice.

o o o

.....
READ PROCEDURE-DISCUSS IN STAFF CONFERENCE-KEEP PROCEDURE MANUAL UP TO DATE
(FOR MANUAL MAINTENANCE SEE 021 SERIES)

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL
 Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
5628	Wallowa	10-14-92	Secretarial Natural Disaster	Damages and losses caused by drought conditions Late frost Very hot weather Unprecedented heavy rains	09-01-91 thru 07-31-92 05-01-92 thru 05-03-92 05-01-92 thru 06-30-92 06-01-92 thru 06-30-92	06-14-93
5629	Harney* Jackson* Malheur* Umatilla* Wasco* Baker Clackamas Crook Deschutes Douglas Gilliam Grant Hood River Jefferson Josephine Klamath Lake Marion Morrow Sherman Union Wallowa Wheeler	10-20-92	Secretarial Natural Disaster	Damages and losses caused by drought conditions	01-01-92 thru 06-30-92 and Continuing	06-21-93

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S633	Morrow Umatilla Wallowa	11-05-92	Secretarial Natural Disaster	Damages and losses caused by drought and heavy rains, with continuing drought conditions	01-01-92 thru 07-27-92 and Continuing	07-05-93
S642	Clackamas* Crook* Lake* Lincoln* Linn* Morrow* Multnomah* Polk* Benton Columbia Lane Tillamook Washington Yamhill	12-03-92	Secretarial Natural Disaster	Damages and losses caused by drought conditions	01-01-92 thru 09-03-92 and Continuing	08-03-93

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

UNITED STATES DEPARTMENT OF AGRICULTURE

FARMERS HOME ADMINISTRATION
 Room 1590, Federal Building
 1220 SW Third Avenue
 Portland, Oregon 97204

ISSUE NO.

454

DATE

03-04-91

DISTRIBUTION CODE *

S STATE OFFICES

C COUNTY OFFICES

TO

S, D, C

(City and State)

STATE PROCEDURE NOTICE

OREGON MANUAL CHANGES

INSERT OREGON INSTRUCTION 1945-A
 (S,D,C)

EMERGENCY
 Disaster Assistance
 (General)

Exhibit B has been revised to correct an error in the Incidence Period column for Designation Number M883, provide a current listing of all Oregon Counties where Emergency Loans are now available, and show the assigned termination date for each designation.

REMOVE

Exhibit B revised
 01-14-91

INSERT

Exhibit B revised
 03-04-91

Notice:

PARAGRAPH NOTATIONS ON
 NATIONAL PROCEDURES

The notation "State Supplement" will be made on the margin of each paragraph of the National Instruction that has been supplemented by any Oregon Instruction on this State Procedure Notice.

o o o

READ PROCEDURE - DISCUSS IN STAFF CONFERENCE - KEEP PROCEDURE MANUAL UP TO DATE
 (FOR MANUAL MAINTENANCE SEE 021 SERIES)

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S462	Harney* Crook Deschutes Grant Lake Malheur	09-14-90	Secretarial Natural Disaster	Damages and losses caused by severe drought conditions	01-01-90 thru 06-28-90 & Continuing	05-14-91
M883 (Amend. 2)	Clatsop Columbia	12-01-90	Presidential Major Disaster	Damages and losses caused by severe storms and flooding	11-09-90	08-01-91
S483	Gilliam* Sherman* Morrow Wasco Wheeler	12-03-90	Secretarial Natural Disaster	Damages and losses to crops caused by drought conditions	01-01-90 thru 08-31-90	08-05-91
S488	Umatilla Wallowa	12-24-90	Secretarial Natural Disaster	Damages and losses caused by extreme weather conditions (Excessive rain, hail, and unseasonal warm period)	06-01-90 thru 08-31-90	08-26-91
S489	Morrow Umatilla	12-28-90	Secretarial Natural Disaster	Damages and losses to all crops caused by extreme weather conditions (Excessive rain, hail, unseasonal warm period, and freezing)	03-24-90 thru 06-30-90	08-28-91

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

PLAN 1

Drought

Incident Date	Hazard Type	Primary	Contiguous	Declaration Type	Physical	EIDL	\$ Impact for Lake County
06/25/90	HIGH WINDS, HAIL STORM & HEAVY RAINS	Klamath	Lake	Secretary of Agriculture n/a	n/a	689401	\$0
01/01/91-06/07/91	DROUGHT	Harney, Lake, & Malheur	Lake	Secretary of Agriculture n/a	n/a	742901	\$0
01/01/92-06/30/92	DROUGHT	Harney, Jackson, Malheur, Umatilla, & Wasco	Lake	Secretary of Agriculture n/a	n/a	778401	\$0
01/01/92-09/03/92	DROUGHT	Clackamas, Crook, Lake, Lincoln, Linn, Morrow, Multnomah & Polk		Secretary of Agriculture n/a	n/a	782501	\$12,900
01/05/93-01/22/93	SEVERE WINTER STORMS, MUD & ROCK SLIDES & FLOODING	Jackson, Josephine, Klamath & Lake		Governor	n/a	784700	\$0
09/20/93	EARTHQUAKE & AFTERSHOCKS	Klamath	Lake	Agency	268502	806900	\$135,700
01/03/95-02/10/95	FLOODING, LANDSLIDES, MUD & DEBRIS FLOWS	Klamath & Lake		Governor	n/a	842700	\$0
09/01/93	DROUGHT	Deschutes, Douglas, Jackson, Jefferson, Klamath & Sherman	Lake	Secretary of Agriculture n/a	n/a	845501	\$0
02/13/95-04/19/95	SEVERE WINTER STORMS, FLOODING, LANDSLIDES, MUD & DEBRIS FLOWS	Jackson, Josephine, Klamath & Lake		Agency	n/a	849400	\$0
12/20/96-01/17/97	SEVERE STORMS, FLOODING, MUD & LAND SLIDES	Harney & Lake		Agency	n/a	933100	\$0
12/25/96-01/06/97	SEVERE WINTER STORMS, LAND & MUD SLIDES & FLOODING	Coos, Douglas, Jackson, Josephine, Klamath, Lake, Lane & Wallowa		Presidential	292811	935500	\$68,000
02/01/99 & continuing	INCREASING WATER LEVELS & FLOODING	Harney	Lake	Secretary of Agriculture n/a	n/a	9D5001	\$0
05/01/98-06/30/98	THUNDERSTORMS, HAIL, EXCESSIVE RAINS & HIGH WINDS (SEVERE STORMS)	Klamath	Lake	Secretary of Agriculture n/a	n/a	9B8301	\$0
05/30/00-06/01/00	UNSEASONABLY COLD SPRING TEMPERATURES	Klamath	Lake	Secretary of Agriculture	n/a	9I6301	\$0
09/01/00 & continuing	DROUGHT	Klamath	Lake	Secretary of Agriculture	n/a	9I5101	\$47,400
09/11/01	TERRORIST ATTACKS	State of New York	Lake	Secretary of Agriculture	n/a	9TOR00	\$0
01/01/01 & continuing	EXTREME DROUGHT	State of Nevada	Lake	Secretary of Agriculture	n/a	9M6601	\$0
05/01/01-09/30/01	CONDIIONS	State of Nevada	Lake	Secretary of Agriculture	n/a	9O4001	\$0
01/01/01 & continuing	DROUGHT	State of Nevada	Lake	Secretary of Agriculture	n/a	9S9701	\$0
09/01/01 & continuing	DROUGHT	Lake	Lake	Secretary of Agriculture	n/a	9U8101	\$0
08/19/03 & continuing	WILDFIRE (B & B COMPLEX WILDFIRE)	Jefferson	Lake	Agency	n/a	9X0600	\$0
01/01/03 & continuing	DROUGHT & INSECT INFESTATION	State of Nevada	Lake	Secretary of Agriculture	n/a	9X6501	\$0
12/26/03-01/14/04	SEVERE WINTER STORMS	Lake	Lake	Public Assistance	n/a	P02111	\$0

01/01/04 & continuing	DROUGHT & RELATED INSECT INFESTATIONS	State of Nevada	Lake	Secretary of Agriculture	N/A	9AH701	\$0
12/30/05 - 01/04/06	SEVERE STORMS & FLOODING	Washoe, NV	Lake	Agency	10370	10371	\$0

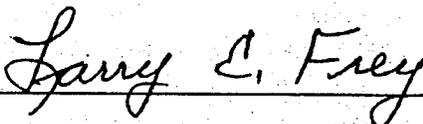
From Joseph Murray who asked SBA to gather info on Lake Co.

For: County Offices

Secretarial Natural Disaster Determination S2081

Approved By: State Executive Director

LEF:LEV:th



1 Overview

A Background

Effective March 22, 2005, Secretary Mike Johanns declared a major disaster in **Klamath County**, Oregon, due to losses caused by drought that occurred from January 1, 2004 and continuing.

As a result, the following Oregon counties were named as contiguous counties to Klamath County, where eligible family farmers may qualify for Farm Service Agency (FSA) Emergency (EM) loan assistance:

DESCHUTES DOUGLAS JACKSON LAKE LANE

B Purpose

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C Contact

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

FILING: Preceding FSA Handbook 3-FLP, FmHA Instruction 1945-A & Operational File FLP 3

Disposal

Distribution

December 31, 2005

STO, DD, COR, COC, COF - Including Farm Loan Programs

03-29-2005

For: County Offices

Secretarial Natural Disaster Determination S1762

Approved By: State Executive Director

LEF:LEV:th

Larry E. Frey

1 Overview

A
Background Effective March 21, 2003, Secretary Ann M. Veneman declared a major disaster in the LAKE and MALHEUR Counties, Oregon due to losses caused by drought that occurred from September 1, 2001, and continuing. The disaster declaration number is S1762. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

DESCHUTES

KLAMATH

B
Purpose The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C
Contacts Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

Continued on the next page

FILING: Preceding 3-FLP and FmHA Instruction 1945-A and Operational File 14-1

Disposal
December 31, 2003

Distribution
STO, DD, COR, COC, COF - Including Farm Loan Programs

04-24-03

Page 1

For: County Offices

Secretarial Natural Disaster Determination S1713

Approved By: State Executive Director

LEF:LEV:th

Larry E. Frey

1 Overview

**A
Background**

Effective October 24, 2002, Secretary Ann M. Veneman declared a major disaster in the State of Nevada, due to losses caused by drought and insect infestation that occurred from January 1, 2001 and continuing. The disaster declaration number is S1713. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

HARNEY LAKE MALHEUR

**B
Purpose**

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

**C
Contacts**

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

Continued on the next page

FILING: Preceding 3-FLP and FmHA Instruction 1945-A and Operational File 14-1

Disposal
September 30, 2003

Distribution
STO, DD, COR, COC, COF - Including Farm Loan Programs

12-10-02

EXECUTIVE ORDER NO. 01 - 05

DETERMINATION OF A STATE OF DROUGHT EMERGENCY IN CROOK COUNTY, HOOD RIVER COUNTY, AND LAKE COUNTY DUE TO CONDITIONS CAUSED BY DROUGHT, LOW WATER CONDITIONS, AND ENERGY SHORTAGES IN THE WESTERN STATES.

Pursuant to ORS 401.055, I find that the weather pattern, ongoing drought and low water conditions, and the energy shortages in the western states have the imminent potential for causing a natural and economic disaster of catastrophic proportions. It is anticipated that the projected outlook will not significantly alleviate the current conditions, and that they will continue to worsen during the summer months. This will have profound consequences on the county's agricultural and natural resources, as well as the likelihood for stark energy and economic impacts.

Current conditions are being addressed by state agencies including the Department of Agriculture, the Department of Water Resources, and the Department of State Police and its Office of Emergency Management.

A timely response to this situation being vital to the well being and economic security of the citizens and businesses of Crook County, Hood River County, and Lake County I am therefore declaring a "state of drought emergency" and directing the following activities;

IT IS HEREBY ORDERED AND DIRECTED:

I. The Oregon Department of Agriculture is directed coordinate assistance in seeking federal resources available to mitigate conditions and effect agricultural recovery.

II. The Department of Water Resources is directed to coordinate and provide assistance and regulation it determines necessary in accordance with ORS 536.700 to 536.780.

III. The Department of State Police Office of Emergency Management is directed to coordinate and assist as needed with assessment and mitigation activities to address current and projected conditions.

EXECUTIVE ORDER NO. 01 - 05

Page Two

IV. All other departments are directed to coordinate with the above agencies and to provide appropriate state resources as determined essential to assist affected political subdivisions.

Done at Salem, Oregon this _____ day of May, 2001.

John A. Kitzhaber, M.D.
GOVERNOR

ATTEST:

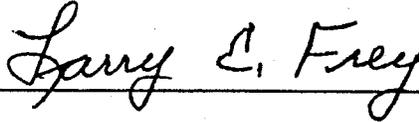
Bill Bradbury
SECRETARY OF STATE

For: County Offices

Secretarial Natural Disaster Determination S1534

Approved By: State Executive Director

LEF:LEV:th



1 Overview

A Background

Effective April 18, 2001 Secretary Ann M. Veneman declared a natural disaster in **Klamath County, Oregon**, due to losses caused drought that occurred from September 1, 2000, and continuing. The disaster declaration number is S1534. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

DESCHUTES JACKSON LANE
DOUGLAS LAKE

B Purpose

The purpose of this Oregon Notice is to:

- obsolete Oregon Notice FLP-80, issued 04-25-01, as the stated date before the beginning of the incidence period of the disaster in Subparagraph 2 A was incorrect. The correct day is August 31, 2000.
- inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C Contacts

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

FILING: Preceding FmHA Instruction 1945-A and Operational File 14-1

Disposal

Distribution

December 1, 2001

STO, DD, COR, COC, COF - Including Farm Loan Programs

For: County Offices

Secretarial Natural Disaster Determination S1606

Approved By: State Executive Director

LEF:LEV:th

by *Ly E Voigt*

1 Overview

A

Background

Effective January 8, 2002, Secretary Ann M. Veneman declared a major disaster in 7 Counties in the State of Nevada, due to losses caused by extreme fires and ongoing drought conditions that occurred from May 1 through September 30, 2001. The disaster declaration number is S1606. As a result, the following Oregon Counties were named as contiguous Counties where eligible family farmers may qualify for FSA EM loan assistance:

HARNEY LAKE

B

Purpose

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

C

Contacts

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Direct questions concerning the designation to Peter Halvorson at (503) 692-3688, ext. 255.

Continued on the next page

FILING: Preceding FmHA Instruction 1945-A and Operational File 14-1

Disposal

Distribution

September 30, 2002

STO, DD, COR, COC, COF - Including Farm Loan Programs

01-18-02

Page 1

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL ECONOMIC AND COMMUNITY DEVELOPMENT
101 SW Main Suite 1410
Portland, Oregon 97204

ISSUE NO. 498
DATE 08-07-95
DISTRIBUTION CODE
"S" STATE OFFICE
"D" DIST. OFFICE
"C" COUNTY OFFICE

TO

SDC

STATE PROCEDURE NOTICE

OREGON MANUAL CHANGES

INSERT OREGON INSTRUCTION 1945-A
(S,D,C)

EMERGENCY
Disaster Assistance
(General)

Exhibit A has been revised to provide an updated listing of the RECD Emergency Support Team Leader and Team Members.

Exhibit B has been revised to provide a current listing of all Oregon Counties where Emergency Loans are now available, and show the assigned termination date for each designation.

REMOVE
Exhibit A and B revised
5-31-94

INSERT
Exhibit A and B revised
08-07-95

Notice:

PARAGRAPH NOTATIONS
NATIONAL PROCEDURES

The notation "State Supplement" will be made on the margin of each paragraph of the National Instruction that has been supplemented by any Oregon Instruction on this State Procedure Notice.

o o o

.....
READ PROCEDURE-DISCUSS IN STAFF CONFERENCE-KEEP PROCEDURE MANUAL UP TO DATE
(FOR MANUAL MAINTENANCE SEE 021 SERIES)

Rural Economic and Community Development
101 SW Main Suite 1410
Portland, OR 97204

PART 1945 - EMERGENCY, SUBPART A DISASTER ASSISTANCE - GENERAL

FmHA Emergency Support Team

I. 1945.30(b) With the advice and concurrence of District Directors, Oregon's FmHA Emergency Loan Support Team (ELST) has been revised to include the following members:

Team Leader: Robert B. Perry

Team Members: Patrick C. Joerger, County Supervisor
Patricia L. Dadey, County Supervisor
Patricia A. Good, County Office Assistant
Paul K. Kershisnik, Assistant County Supervisor
Harry L. Smith, Assistant County Supervisor
Billy L. Clonts, County Supervisor
Karen M. Boyles, Assistant County Supervisor
Evelyn L. Mauratt, County Office Clerk
Sharilyn K. Skare, Assistant County Supervisor

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S815	Deschutes* Douglas* Jackson* Jefferson* Klamath* Sherman* Coos Crook Curry Gilliam Harney Josephine Lake Lane Linn Marion Wasco Wheeler	12-30-94	Secretarial Natural Disaster	Damages and losses caused by drought conditions.	09-01-93 and Continuing	08-30-95
S819	Baker Wallowa	01-10-95	Secretarial Natural Disaster	Damages and losses caused by drought conditions.	11-01-93 to the present	09-11-95
M1044	Curry Klamath Lake Josephine	01-10-95	Presidential Major Disaster	Damages and losses caused by flooding, landslides, mud and debris flow.	01-03-95 and Continuing	09-18-95
S835	Umatilla* Grant Morrow Union Wallowa	02-07-95	Secretarial Natural Disaster	Damages and losses caused by drought.	09-01-93 and Continuing	10-10-95
S844	Grant* Josephine* Malheur	04-27-95	Secretarial Natural Disaster	Damages and losses caused by drought.	09-01-93 and Continuing	12-27-95

In plan ✓

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S847	Gilliam Hood River Morrow Sherman Umatilla Wallowa Wasco	05-04-95	Secretarial Natural Disaster	Damages and losses caused by extreme drought and low temperatures.	09-01-93 and Continuing	01-04-96
S855	Baker	06-26-95	Secretarial Natural Disaster	Damages and losses caused by drought.	04-01-94 and Continuing	02-26-96

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

UNITED STATES DEPARTMENT OF AGRICULTURE
FARMERS HOME ADMINISTRATION
Room 1590, Federal Building
1220 SW Third Avenue
Portland, Oregon 97204

TO
SDC

ISSUE NO.	474
DATE	01-01-93
DISTRIBUTION CODE	
"S"	STATE OFFICE
"D"	DIST. OFFICE
"C"	COUNTY OFFICE

STATE PROCEDURE NOTICE

OREGON MANUAL CHANGES

INSERT OREGON INSTRUCTION 1945-A
(S,D,C)

EMERGENCY
Disaster Assistance
(General)

Exhibit B has been revised to provide a current listing of all Oregon Counties where Emergency Loans are now available, and show the assigned termination date for each designation.

REMOVE
Exhibit B revised
04-28-92

INSERT
Exhibit B revised
01-01-93

Notice:

PARAGRAPH NOTATIONS
NATIONAL PROCEDURES

The notation "State Supplement" will be made on the margin of each paragraph of the National Instruction that has been supplemented by any Oregon Instruction on this State Procedure Notice.

o o o

.....
READ PROCEDURE-DISCUSS IN STAFF CONFERENCE-KEEP PROCEDURE MANUAL UP TO DATE
(FOR MANUAL MAINTENANCE SEE 021 SERIES)

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL
 Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S628	Wallowa	10-14-92	Secretarial Natural Disaster	Damages and losses caused by drought conditions Late frost Very hot weather Unprecedented heavy rains	09-01-91 thru 07-31-92 05-01-92 thru 05-03-92 05-01-92 thru 06-30-92 06-01-92 thru 06-30-92	06-14-93
S629	Harney* Jackson* Malheur* Umatilla* Wasco* Baker Clackamas Crook Deschutes Douglas Gilliam Grant Hood River Jefferson Josephine Klamath Lake Marion Morrow Sherman Union Wallowa Wheeler	10-20-92	Secretarial Natural Disaster	Damages and losses caused by drought conditions	01-01-92 thru 06-30-92 and Continuing	06-21-93

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type	Description	Incidence Period	Termination Date For Physical & Production Loss Applications
S633	Morrow Umatilla Wallowa	11-05-92	Secretarial Natural Disaster	Damages and losses caused by drought and heavy rains, with continuing drought conditions	01-01-92 thru 07-27-92 and Continuing	07-05-93
S642	Clackamas* Crook* Lake* Lincoln* Linn* Morrow* Multnomah* Polk* Benton Columbia Lane Tillamook Washington Yamhill	12-03-92	Secretarial Natural Disaster	Damages and losses caused by drought conditions	01-01-92 thru 09-03-92 and Continuing	08-03-93

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

UNITED STATES DEPARTMENT OF AGRICULTURE

FARMERS HOME ADMINISTRATION
 Room 1590, Federal Building
 1220 SW Third Avenue
 Portland, Oregon 97204

ISSUE NO.

454

DATE

03-04-91

DISTRIBUTION CODE *

S STATE OFFICES

C COUNTY OFFICES

TO

S, D, C

(City and State)

STATE PROCEDURE NOTICE

OREGON MANUAL CHANGES

INSERT OREGON INSTRUCTION 1945-A
 (S,D,C)

EMERGENCY
 Disaster Assistance
 (General)

Exhibit B has been revised to correct an error in the Incidence Period column for Designation Number M883, provide a current listing of all Oregon Counties where Emergency Loans are now available, and show the assigned termination date for each designation.

REMOVE

Exhibit B revised
 01-14-91

INSERT

Exhibit B revised
 03-04-91

Notice:

PARAGRAPH NOTATIONS ON
 NATIONAL PROCEDURES

The notation "State Supplement" will be made on the margin of each paragraph of the National Instruction that has been supplemented by any Oregon Instruction on this State Procedure Notice.

o o o

READ PROCEDURE - DISCUSS IN STAFF CONFERENCE - KEEP PROCEDURE MANUAL UP TO DATE
 (FOR MANUAL MAINTENANCE SEE 021 SERIES)

Part 1945 - EMERGENCY, SUBPART A - DISASTER ASSISTANCE - GENERAL

Counties in Oregon Where Emergency Loans are Available

Designation Number	Counties Designated	Date Designated	Type of Disaster or Emergency		Incidence Period	Termination Date For Physical & Production Loss Applications
			Designation Type	Description		
S462	Harney* Crook Deschutes Grant Lake Malheur	09-14-90	Secretarial Natural Disaster	Damages and losses caused by severe drought conditions	01-01-90 thru 06-28-90 & Continuing	05-14-91
M883 (Amend. 2)	Clatsop Columbia	12-01-90	Presidential Major Disaster	Damages and losses caused by severe storms and flooding	11-09-90	08-01-91
S483	Gilliam* Sherman* Morrow Wasco Wheeler	12-03-90	Secretarial Natural Disaster	Damages and losses to crops caused by drought conditions	01-01-90 thru 08-31-90	08-05-91
S488	Umatilla Wallowa	12-24-90	Secretarial Natural Disaster	Damages and losses caused by extreme weather conditions (Excessive rain, hail, and unseasonal warm period)	06-01-90 thru 08-31-90	08-26-91
S489	Morrow Umatilla	12-28-90	Secretarial Natural Disaster	Damages and losses to all crops caused by extreme weather conditions (Excessive rain, hail, unseasonal warm period, and freezing)	03-24-90 thru 06-30-90	08-28-91

* Denotes Primary County Designation. Other Counties named as Contiguous Counties.

PLAN 1

Drought

Incident Date	Hazard Type	Primary	Contiguous	Declaration Type	Physical	EIDL	\$ Impact for Lake County
06/25/90	HIGH WINDS, HAIL STORM & HEAVY RAINS	Klamath	Lake	Secretary of Agriculture n/a	n/a	689401	\$0
01/01/91-06/07/91	DROUGHT	Harney, Lake, & Malheur	Lake	Secretary of Agriculture n/a	n/a	742901	\$0
01/01/92-06/30/92	DROUGHT	Harney, Jackson, Malheur, Umatilla, & Wasco	Lake	Secretary of Agriculture n/a	n/a	778401	\$0
01/01/92-09/03/92	DROUGHT	Clackamas, Crook, Lake, Lincoln, Linn, Morrow, Multnomah & Polk		Secretary of Agriculture n/a	n/a	782501	\$12,900
01/05/93-01/22/93	SEVERE WINTER STORMS, MUD & ROCK SLIDES & FLOODING	Jackson, Josephine, Klamath & Lake		Governor	n/a	784700	\$0
09/20/93	EARTHQUAKE & AFTERSHOCKS	Klamath	Lake	Agency	268502	806900	\$135,700
01/03/95-02/10/95	FLOODING, LANDSLIDES, MUD & DEBRIS FLOWS	Klamath & Lake		Governor	n/a	842700	\$0
09/01/93	DROUGHT	Deschutes, Douglas, Jackson, Jefferson, Klamath & Sherman	Lake	Secretary of Agriculture n/a	n/a	845501	\$0
02/13/95-04/19/95	SEVERE WINTER STORMS, FLOODING, LANDSLIDES, MUD & DEBRIS FLOWS	Jackson, Josephine, Klamath & Lake		Agency	n/a	849400	\$0
12/20/96 - 01/17/97	SEVERE STORMS, FLOODING, MUD & LAND SLIDES	Harney & Lake		Agency	n/a	933100	\$0
12/25/96 - 01/06/97	SEVERE WINTER STORMS, LAND & MUD SLIDES & FLOODING	Coos, Douglas, Jackson, Josephine, Klamath, Lake, Lane & Wallowa		Presidential	292811	935500	\$68,000
02/01/99 & continuing	INCREASING WATER LEVELS & FLOODING	Harney	Lake	Secretary of Agriculture n/a	n/a	9D5001	\$0
05/01/98-06/30/98	THUNDERSTORMS, HAIL, EXCESSIVE RAINS & HIGH WINDS (SEVERE STORMS)	Klamath	Lake	Secretary of Agriculture n/a	n/a	9B8301	\$0
05/30/00-06/01/00	UNSEASONABLY COLD SPRING TEMPERATURES	Klamath	Lake	Secretary of Agriculture	N/A	9I6301	\$0
09/01/00 & continuing	DROUGHT	Klamath	Lake	Secretary of Agriculture	N/A	9I5101	\$47,400
09/11/01	TERRORIST ATTACKS	State of New York	Lake	Secretary of Agriculture	N/A	9TOR00	\$0
01/01/01 & continuing	EXTREME DROUGHT	State of Nevada	Lake	Secretary of Agriculture	N/A	9M6601	\$0
05/01/01-09/30/01	CONDIIONS	State of Nevada	Lake	Secretary of Agriculture	N/A	9O4001	\$0
01/01/01 & continuing	DROUGHT	State of Nevada	Lake	Secretary of Agriculture	N/A	9S9701	\$0
09/01/01 & continuing	DROUGHT	State of Nevada	Lake	Secretary of Agriculture	N/A	9U8101	\$0
08/19/03 & continuing	DROUGHT	Lake	Lake	Secretary of Agriculture	N/A	9X0600	\$0
01/01/03 & continuing	WILDFIRE (B & B COMPLEX WILDFIRE)	Jefferson	Lake	Agency	N/A	9X6501	\$0
12/26/03-01/14/04	DROUGHT & INSECT INFESTATION	State of Nevada	Lake	Secretary of Agriculture	N/A	P02111	\$0
	SEVERE WINTER STORMS	Lake		Public Assistance	N/A		\$0

01/01/04 & continuing	DROUGHT & RELATED INSECT INFESTATIONS	State of Nevada	Lake	Secretary of Agriculture	N/A	9AH701	\$0
12/30/05 - 01/04/06	SEVERE STORMS & FLOODING	Washoe, NV	Lake	Agency	10370	10371	\$0

From Joseph Murray who asked SBA to gather info on Lake Co.

Earthquake Annex

The following drought annex includes relevant articles about Lake County's earthquake history.

The Pacific Northwest Seismic Network



[Google Search](#)

All about earthquakes and geologic hazards of the Pacific Northwest

31 May 2007 - Due to ongoing eruption, lists of Mt. St. Helens events may be incomplete.

[HOME](#) | [Latest Quakes](#) | [Volcanoes](#) | [Catalogs & Data](#) | [Hazards & Preparation](#) | [Research](#) | [Outreach & Education](#) | [Operations & Projects](#)

[UW](#) | [Dept. of E&SS](#) | [REPORT AN EARTHQUAKE](#) | [USGS EQhazards](#) | [USGS PNW](#) | [Seismosurfing](#) | [Site Map](#) | [CONTACT US](#)

Latest Quakes

Big Earthquakes in Pacific Northwest Map Area

[Recent Quakes](#) ◀

Earthquakes recorded by the Pacific Northwest Seismograph Network during the past two weeks. Times are local (PST or PDT). Most recent earthquakes are at the top of the list. Click on the word "map" or "MAP" to see a map view. Click on a "DATE" to get additional text information. Magnitude 3 and greater earthquakes are printed in bold type. The top three magnitudes greater than or equal to 3 are in red.

[Notable Quakes](#)

[Webicorders - Real-time displays](#)

NEWS

Update time = Thu May 31 5:00:02 PDT 2007

[ShakeMap - Instrumental Shaking](#)

	MAG	DATE	LOCAL-TIME	LAT	LON	DEPTH	LOCATION
		y/m/d	h:m:s	deg	deg	km	
Did You Feel It? - Human Shaking Reports	MAP 3.4	2007/05/30	19:00:57	41.989N	120.549W	29.4	28 km (17 mi)
	MAP 3.0	2007/05/30	18:56:10	41.993N	120.494W	33.4	25 km (15 mi)

[Volcano Quakes](#)

Most recent earthquakes are at the top of this list.

[Tsunami Warning Center](#)

[Back to Pacific Northwest earthquake map](#)

[US Earthquakes](#)

[Canadian Earthquakes](#)

[World Earthquakes](#)

This file is wrapped in the "recenteq" wrapper last modified 10/4/02





The Pacific Northwest Seismograph Network



All about earthquakes and geologic hazards of the Pacific Northwest

[HOME](#) | [Latest Quakes](#) | [Volcanoes](#) | [Catalogs & Data](#) | [Hazards & Preparation](#) | [Research](#) | [Outreach & Education](#) | [Operations & Projects](#)

[UW](#) | [Dept. of E&SS](#) | [REPORT AN EARTHQUAKE](#) | [USGS EQhazards](#) | [USGS PNW](#) | [Seismosurfing](#) | [Site Map](#) | [CONTACT US](#)

[PNSN](#) > [Catalogs and Data](#) > [Historic Earthquakes](#) > [Recent Notable Earthquakes](#) > [Special Event](#)

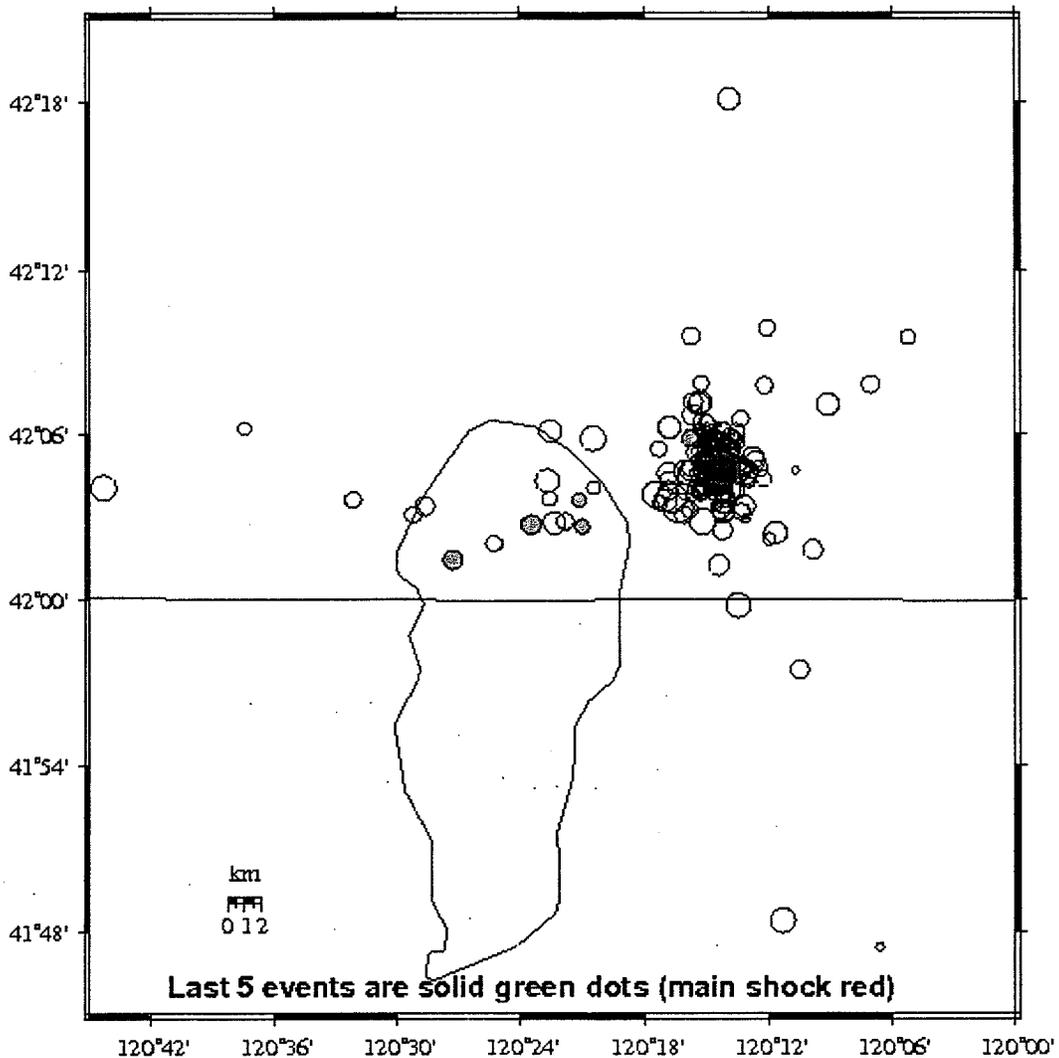
Earthquake Report

2004 Earthquake Sequence, SE of Lakeview, OR

This is a special web page produced to give essential information about an ongoing earthquake sequence and previous earthquake activity in the region. Information here will be updated as the sequence progresses. The "main shock" shown here refers to the magnitude 4.4 earthquake of Wednesday June 30, 2004 at 05:21:45.80 AM (PDT)

Note that the epicenters shown here are preliminary. This area in southeast Oregon has few seismographs and falls outside of the earthquake region that the PNSN normally covers (this area is normally covered by the [NEIC](#)). However, to make the epicenter map as accurate as possible we have integrated seismic data from the PNSN, the USGS, and the University of California, Berkeley. The map below, showing routinely processed locations, indicates an apparent N-S scatter of epicenters that is misleading. The N-S scatter is caused by the fact that most seismograph stations are located to the west; there are very few seismic stations north and south of the epicenters in this region. A more careful analysis shows that almost all of the epicenters are actually located at one spot.

Epicentral Region



GMT 2006 Nov 9 14:01:51

Earthquakes in the sequence - The following information will be updated as new earthquakes occur. Included are:

- **An Earthquake Catalog** listing the location and magnitude of all earthquakes we have located in the epicentral region (including the mainshock and any aftershocks) for the current year.
- **Seismic Activity** as a function of time in the epicentral region since the time of the mainshock.

Additional Information - PNSN Press release on this sequence

Did You Feel It? - You can report shaking and damage at your location. You can also view a map displaying a summary of data received from all reports.

View Seismograms - View web-based seismograms by station and date.

Maps and History of Earthquakes in this Region

- **A map of the Pacific Northwest** showing the location of the mainshock (in red) plus prior earthquakes $M > 3.0$. Shallow events are black. Events deeper than 35 km are green.
- **A map showing a closer view** of the earthquake and prior historical earthquakes with magnitude 3.0 or greater. Shallow events are black. Events deeper than 35 km are green.
- **A list of 10 big earthquakes preceding the mainshock** that are closest to it and have a magnitude greater than 4.0. These are the most significant historical earthquakes in the vicinity of the mainshock (see closer view map above).
- **A map** showing the location of the mainshock relative to cities.
- **A map** showing the location of the mainshock relative to the nearest seismograph stations that recorded it.
- **A general map of significant historical earthquake locations** in the Pacific Northwest.
- **A detailed list of all earthquakes** ($M > 1.5$) that occurred in the two years prior to the mainshock in the area shown on the next map.
- **A map of all earthquakes** ($M > 1.5$) that occurred in the two years prior to the mainshock. Detailed area shown is just few kilometers around the mainshock.
- **A list of the nearest 20 strong motion sites**

Focal Mechanism - Information for this earthquake.

Related Information - Most Up-to-Date Local and Global Earthquake Summaries

- **Latest Quakes** from the Pacific Northwest, the nation and the world

*This is file /spikehome/HTML/SEIS/EQ_Special/WEBDIR_04063012214k/04063012214k/welcome.html
Created Wed Jun 30 15:19:01 PDT 2004. Template last modified 7/18/02*



The Pacific Northwest Seismograph Network



All about earthquakes and geologic hazards of the Pacific Northwest

[HOME](#) | [Latest Quakes](#) | [Volcanoes](#) | [Catalogs & Data](#) | [Hazards & Preparation](#) | [Research](#) | [Outreach & Education](#) | [Operations & Projects](#)

[UW](#) | [Dept. of E&SS](#) | [REPORT AN EARTHQUAKE](#) | [USGS EQhazards](#) | [USGS PNW](#) | [Seismosurfing](#) | [Site Map](#) | [CONTACT US](#)

[PNSN](#) > [Catalogs and Data](#) > [Historic Earthquakes](#) > [Recent Notable Earthquakes](#) > Special Event

Earthquake Report

Magnitude 3.0, SW of Adel, OR Thursday June 24, 2004 at 06:41:32.01 PM (PDT)

Magnitude 3.0

Time Friday June 25, 2004 at 01:41:32.01 Z (UTC)
Thursday June 24, 2004 at 06:41:32.01 PM (PDT)

Distance 40.2 km SW of Adel, OR
from 119.4 km ENE of Medicine Lakes Volc area, CA
443.8 km SSE of Portland, OR

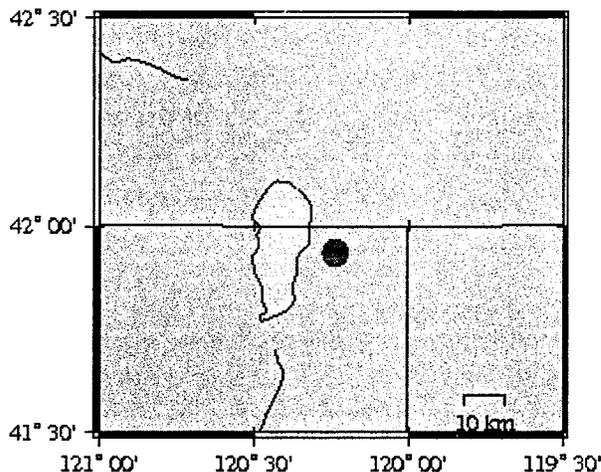
Coordinates 41.936 deg N
120.235 deg W

Depth 23 km

Quality poor (DC)

Note: 1 km = 0.621 mile or 1 mile = 1.61 km

Name of Event File: 04062501410k



This is an automated web page produced after a significant earthquake to give essential information about the earthquake, its aftershocks, and previous earthquake activity in the region. Some of the information here will be updated as aftershocks occur.

Shake Map - For certain earthquakes a map of shaking intensity based on measurements from strong-motion seismographs will be available.

Did You Feel It? - You can report shaking and damage at your location. You can also view a map

displaying a summary of data received from all reports.

View Seismograms - View web-based seismograms by station and date.

Maps and History of Earthquakes in this Region

- **A map of the Pacific Northwest** showing the location of the mainshock (in red) plus prior earthquakes $M > 3.0$. Shallow events are black. Events deeper than 35 km are green.
- **A map showing a closer view** of the earthquake and prior historical earthquakes with magnitude 3.0 or greater. Shallow events are black. Events deeper than 35 km are green.
- **A list of 10 big earthquakes preceding the mainshock** that are closest to it and have a magnitude greater than 4.0. These are the most significant historical earthquakes in the vicinity of the mainshock (see closer view map above).
- **A map** showing the location of the mainshock relative to cities.
- **A map** showing the location of the mainshock relative to the nearest seismograph stations that recorded it.
- **A general map of significant historical earthquake locations** in the Pacific Northwest.
- **A detailed list of all earthquakes** ($M > 1.0$) that occurred in the two years prior to the mainshock in the area shown on the next map.
- **A map of all earthquakes** ($M > 1.0$) that occurred in the two years prior to the mainshock. Detailed area shown is just few kilometers around the mainshock.
- **A list of the nearest 20 strong motion sites**

Focal Mechanism - A diagram and table of the P-wave fault plane solution. If sufficient P-wave first motion data are available, a fault plane determination for the earthquake will be available.

Strong-Motion Information - Data from digital accelerographs.

Related Information - Most Up-to-Date Local and Global Earthquake Summaries

- **Latest Quakes** from the Pacific Northwest, the nation and the world

*This is file /spikehome/HTML/SEIS/EQ_Special/WEBDIR_04062501410k/04062501410k/welcome.html
Created Fri Jun 25 09:48:43 PDT 2004. Template last modified 7/18/02*



Special Event

Basic Information

Time of Occurrence (GMT): Wednesday April 28, 1999 at 08:06:16.04 Z
Time of Occurrence (PDT): Wednesday April 28, 1999 at 01:06:16.04 AM
Time of Occurrence (PST): Wednesday April 28, 1999 at 00:06:16.04 AM

Depth (km) 24.01
Magnitude (Mc) 3.8

Location 43.1707N 120.3822W

92.3 km SE of Newberry Caldera, Oregon
123.8 km SE of Bend, OR
317.7 km SE of Portland, OR

This earthquake is located in the southeast corner of the Christmas Lake Valley, Oregon

Name of data file: 99042808061o

This is an automated web page produced after a significant earthquake to give essential information about the earthquake, its aftershocks, and previous earthquake activity in the region. Some of the information here will be updated as aftershocks occur.

Detailed Information and Graphics about the Earthquake

Our data base of earthquake hypocenters contains information from the 19th century to the present. Included are:

- A regional map showing the location of the mainshock (in red) plus previous earthquakes $M > 3.5$ since 1990.
- A Intermediate scale map showing the location of the mainshock and prior historical earthquakes

with magnitude 3.5 or greater.

- A list of 10 big earthquakes preceding the mainshock that are closest to it and have a magnitude greater than 4.0. These are the most significant historical earthquakes in the vicinity of the mainshock (see intermediate scale map above).
- A map showing the location of the mainshock relative to cities.
- A map showing the location of the mainshock relative to the nearest seismograph stations that recorded it.
- A general map of significant historical earthquake locations in the Pacific Northwest.
- A detailed list of all earthquakes (M > 1.0) that occurred in the two years prior to the mainshock in the area shown on the next map
- A map of all earthquakes (M > 1.0) that occurred in the two years prior to the mainshock. Detailed area shown is just few kilometers around the mainshock.
- A List of the nearest 20 strong motion sites

Foreshocks and Aftershocks

The following information will be updated as new aftershocks occur. Included are:

- An Earthquake Catalog listing the location and magnitude of all earthquakes we have located in the epicentral region (including the mainshock and any aftershocks) for the current year.
- Detailed Map of the earthquakes in this catalog for the epicentral region.
- Seismic Activity as a function of time in the epicentral region since the time of the mainshock.

Earthquake Mechanism

If sufficient P-wave first motion data are available, a fault plane determination for the earthquake will be available in the form of

- A diagram of the fault plane solution(s). In some cases more than one solution may fit the data.
- A table describing the fault plane solution(s) summarizing the characteristics of possible fault planes ("A" and "B") that are consistent with the recorded first-motion data.

Moment Tensor Estimates of the Earthquake size may also be available. To see, check at Oregon State U.

- Moment-Tensor Web site at Oregon State University

Preliminary Strong Motion Information

- Strong-motion information from digital accelerographs.

Related Information: Most Up-to-Date Local, National, and Global Earthquake Summaries

- Catalog and Map of Pacific Northwest earthquakes, Mag>2 from the PNSN
- Catalog and Map of United States earthquakes, from the ANSS
- Catalog and Map of world earthquakes, from the IRIS

United States Earthquakes, 1968

By Jerry L. Coffman and William K. Cloud, 1970, U.S. Department of Commerce, Environmental Science Services Division, Coast and Geodetic Survey, U.S. Government Printing Office, pp. 52-54.

WASHINGTON AND OREGON

(120th MERIDIAN OR PACIFIC STANDARD TIME)

- January 27: 00:28:25.2*. Epicenter 45.7 degrees north, 122.8 degrees west, Washington-Oregon border region, W. Intensity IV at Portland, Oreg.
- March 6: 05:15:05*. Magnitude 2.0, S. Felt at Kirkland, Wash.
- May 26: Observer at Adel, Oreg., reported series of shocks began on May 26 (time not given) and were felt daily to June 11.
- May 29: 16:35:59.8*. Epicenter 42.3 degrees north, 119.8 degrees west, southern Oregon, W. Magnitude 5.1. Felt at Adel and Lakeview (IV), Oreg., and Fort Bidwell and Willow Ranch (east side of Goose Lake, IV), Calif.
- May 29: After 21:00. Intensity V at Adel, Oreg.
- June 3: 05:27:39.7*. Epicenter 42.2 degrees north, 119.8 degrees west, southern Oregon, W. Magnitude 5.0. Intensity V at Lakeview and Plush, Oreg., and Fort Bidwell, Calif. Also felt at Adel, Oreg.
- June 3: 18:34:15.7*. Epicenter 42.3 degrees north, 119.9 degrees west, southern Oregon, W. Magnitude 4.7. VI. Felt over approximately 7,000 square miles of southern Oregon and northeastern California. At Adel, Oreg., old chimneys fell or were cracked, and part of an old rock cellar fell and rest of building cracked. Ground fissured 2.5 miles northwest of Fort Bidwell, Calif., along Bidwell Creek; a house sustained some foundation cracking and shifting.

INTENSITY VI IN OREGON:

Adel.-"This was the worst shock to date. Lasted about 30 seconds." Chimneys (all old) fell or were cracked. Stock fell off shelves in store. Part of old rock cellar wall came down, and rest of building cracked. Dishes, glassware, etc., came out of cupboard shelves. Lamps overturned. After-shock about 10 minutes later with east-west motion.

INTENSITY VI IN CALIFORNIA:

Fort Bidwell (2.5 miles northwest of, in Bidwell Creek Canyon).-"Most severe of all the shocks." Fissure opened about 50 feet east of one house and extended at least 550 feet in a northerly direction to edge of steep bank leading down to Bidwell Creek. This fissure was roughly paralleled in places by a smaller one, ranging

from several to 8 or 9 feet, east of the main fissure. The main fissure had a number of vertical drops up to about 18 inches, and the maximum gap width was about 10 inches. The initial maximum depth was about 6 feet and occurred in several places. House sustained foundation cracking and shifting, with resultant slight disturbance to door frames and walls.

INTENSITY V IN OREGON:

Paisley.

INTENSITY IV IN OREGON:

Valley Falls (23 miles north of Lake-view) .

INTENSITY IV IN CALIFORNIA:

Davis Creek, Lake City, and Willow Ranch (east side of Goose Lake).

INTENSITY I-III IN CALIFORNIA:

Eagleville.

- June 3: 18:38:29.0*. Epicenter 42.3 degrees north, 119.8 degrees west, southern Oregon, W. Magnitude 4.0. Slight damage reported at Adel.
- June 3: 22:22:19.0*. Epicenter 42.2 degrees north, 119.8 degrees west, southern Oregon, . W. Magnitude 4.3. Felt at Adel, and at Fort Bidwell, Calif.
- June 4: 02:58:22.8*, 20:51:56.8*. Epicenter 42.3 degrees north, 119.9 degrees west, southern Oregon, W. Magnitudes 4.2 and 4.7, respectively. Felt at Fort Bidwell, Calif.
- June 11: 17:20:56*, 17:46:22.4*. Epicenter (1) 42.1 degrees north, 120.0 degrees west; (2) 42.1 degrees north, 119.9 degrees west, southern Oregon, W. Magnitudes 3.4 and 4.3, respectively. Felt at Fort Bidwell, Calif.
- June 11: Between 21:00 and 22:00. Very light shock felt at Fort Bidwell, Calif.
- June 18: 21:51:43.0*. Epicenter 47.2 degrees north, 122.5 degrees west, Washington, W. Magnitude 4.0, S. Intensity IV at Auburn, Dash Point, Des Moines, Dockton, Indianola, Issaquah, Milton, Preston, Puyallup, Renton, Seattle, Tacoma, and Vashon; intensity I-III at North Bend, Port Orchard, and Wauna.
- June 25: 16:43. Press reported shock in Lake County, Oreg., at this time.
- June 26: 02:48. Press reported shock in Lake County, Oreg., at this time.
- September 6: 04:16:32.7*. Epicenter 47.8 degrees north, 122.8 degrees west, about 7 miles southeast of Dabob, Wash., S. Magnitude 4.3. over Felt about 4,000 square miles, but no damage was reported. Intensity V at Baring, Edmonds, La Conner, Langley, Preston, Seabeck, and Tracyton; intensity IV at Anacortes, Blanchard, Bow, Brinnon, Carlsborg, Clallam Bay, Clinton, Concrete, Conway, Coupeville, Greenbank, Hadlock, Hansville, Index, Indianola, Lyman, Marblemount, Medina, Monroe, Mukilteo, Nordland, Oak Harbor, Olympia, Port Gamble, Poulsbo, Renton, Roll-

ing Bay, Silvana, Stanwood, and Sultan;
intensity I-III at Bremerton, Darrington,
Edison, Kingston, Marysville, Orcas, Seattle,
Startup, and Woodinville.

September 25: 12:09:34.2*. Epicenter
47.8 degrees north, 122.7 degrees west, Washington,
S. Magnitude 2-2 1/2. Aftershock of September
6 earthquake located in same region. In-
tensity IV at Brinnon and Port Orchard;
intensity I-III at Hobart and Port Gamble.

November 30: 06:40:08.8*. Epicenter
46.5 degrees north, 122.4 degrees west, Washington,
W. Magnitude 4.3. Felt over approximately
1,000 square miles of Lewis County. Inten-
sity V at Ajlune, Cinebar, Glenoma, Min-
eral, Morton, and Mossyrock; intensity IV
at Silver Creek and Toledo; intensity I-III
at Davidson Lake (in area of former com-
munity of Riffe).

Back to... US Earthquakes 1928-1970..... About Isoseismals and US Earthquakes

UW Dept. of Earth and Space Sciences PNW EARTHQUAKES

***University of Washington Dept. of Earth and Space Sciences, Box 351310 Seattle, WA, 98195-1310
Modified 12/24/98 - If you see any problems e-mail: seis_web@ess.washington.edu***

homes not tied to their foundations Earthquakes strike suddenly, without warning. Earthquakes can Arkansas, and Mississippi experiencing the strongest ground shaking.

Prepare property before quakes strike

Earthquakes strike suddenly, violently and without warning. Identifying potential hazards ahead of time and advance planning can reduce the dangers of serious injury or loss of life.

Check for hazards in the home.

- Fasten shelves securely to walls.

- Place large or heavy objects on lower shelves.

- Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.

- Hang heavy items such as pictures and mirrors away from beds, couches, and anywhere people sit.

- Brace overhead light fixtures.

- Repair defective electrical wiring and leaky gas connections. These are potential fire risks.

- Secure a water heater by strapping it to the wall studs and bolting it to the floor.

- Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects.

- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shelves.

Identify safe places in each room.

- Under sturdy furniture such as a heavy desk or table.

- Against an inside wall.

- Away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcases

or other heavy furniture could fall over.

Locate safe places outdoors — in the open, away from buildings, trees, telephone and electrical lines, overpasses, or elevated expressways.

Make sure all family members know how to respond after an earthquake. Teach all family members how and when to turn off gas, electricity, and water.

Teach children how and when to call 9-1-1, police, or fire department and which radio station to tune to for emergency information.

Have disaster supplies on hand.

- Flashlight and extra batteries.

- Portable battery-operated radio and extra batteries.

- First aid kit and manual.

- Emergency food and water.

- Nonelectric can opener.

- Essential medicines.

- Cash and credit cards
- Sturdy shoes,

Develop an emergency communication plan.

In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster.

Ask an out-of-state relative or friend to serve as the "family contact." After a disaster, it's often easier to call long distance. Make sure everyone in the family

knows the name, address, and phone number of the contact person.

If indoors during a quake:

- Take cover under a piece of heavy furniture or against an inside wall and hold on.

- Stay inside.

- The most dangerous thing to do during the shaking of an earthquake is to try to leave the building because objects can fall on you.

If outdoors:

- Move into the open, away from buildings, street lights, and utility wires.

- Once in the open, stay there until the shaking stops.

If in a moving vehicle:

- Stop quickly and stay in the vehicle.

- Move to a clear area away from buildings, trees, overpasses, or utility wires.

- Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.

Pets after an Earthquake:

- The behavior of pets may change dramatically after an earthquake. Normally quiet and friendly cats and dogs may become aggressive or defensive. Watch animals closely. Leash dogs and place them in a fenced yard.

- Pets may not be allowed into shelters for health and space reasons. Prepare an emergency pen for pets in the home that includes a three-day supply of dry food and a large container of water.

Be prepared for aftershocks.

Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. Aftershocks can occur in the first hours, days, weeks, or even months after the quake.

Help injured or trapped persons.

Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.

Listen to a battery-operated radio or television for the latest emergency information.

Remember to help your neighbors who may require special assistance—infants, the elderly, and people with disabilities.

Stay out of damaged buildings. Return home only when authorities say it is safe.

- Use the telephone only for emergency calls.

- Clean up spilled medicines, bleaches or gasoline or other flammable liquids immediately. Leave the area if you smell gas or fumes from other chemicals.

- Open closet and cupboard doors cautiously.

- Inspect the entire length of chimneys carefully for damage. Unnoticed damage could lead to a fire.

All information has been taken from the FEMA website: www.fema.gov/hazards/earthquakes/quakef.shtm.

History and notable acts about earthquakes

- The largest recorded earthquake in the United States as a magnitude 9.2 that struck Prince William Sound, Alaska on Good Friday, March 28, 1964.

- The largest recorded earthquake in the world was a magnitude 9.5 (Mw) in Chile on May 22, 1960.

- The earliest reported earthquake in California was in 1769 by the exploring expedition of Gaspar de Portola while the group was

LEGALS

REQUEST FOR BIDS

Lake County is requesting bids for the replacement of the roof of the Lake County Museum Building. The replacement roof will be 26 gauge colored, delta rib style, or equivalent. metal

In the matter of the Estate of

MARIE G. MONACO

Deceased.

NOTICE IS HEREBY GIVEN that Albert M. Monaco, Jr. has been

1-ANA

If you Poel You of C Ju Ea

Fea C Ali

If you to the r Cox an dish t Wanda to you. 947-3882

Sa Y

Offer go ar Not

M Ho

"Lakev Daze is Street profits 947-3188

2-PER!

ADOPT love aw: time st fun-lov give you al love : ories. Cindy a 3868.

I, Bob longer i Constr 06/21/04

As of Leehm: be resp other th

Why w: Oregon 1-800-766

is thought that the epicenter of the recent earthquakes that have been shaking Lakeview are located in the Warner mountains about four miles south of Town. For more information on earthquakes see page 14.

Whole lot of shaking go on south of Town

By Vicki Reynolds
Managing Editor

The earthquakes in this area typically happen in swarms, he said, and although usually a big one will hit with smaller ones following, that doesn't always happen with the type of terrain in this area.

"In the basin and range area that you have the faults lay dormant for hundreds and thousands of years and stress builds up as the mountains are being pulled apart," he said, adding that when the strain becomes too great, something has to give and the earth moves, causing the earthquake. Earthquakes always occur where the earth's plates meet.

"I drove through your area not too long ago," Qamar said, "and knew by looking at those mountain fronts that it was not a natural situation. They have been created by thousands of years of slippage."

When the stress on the plates against each other becomes too great, one plate will slip down and the other will lift up, he explained. The amount the earth moves is what causes the magnitude.

"All that motion is what makes it an interesting place to live," Qamar said.

Since the big one on Wednesday, there have been several that have been quite noticeable adding up to 34 in the last two weeks,

Earthquake packets offered

During a severe earthquake, Lake County Sheriff Phil McDonald recommends people stay close to an interior wall, hang on and definitely not go outside because of the possibility of being injured by flying glass and falling structures.

If anyone's house is destroyed they can go to the emergency operations center at search and rescue once the ground stops shaking. Search and Rescue is just past the county road shop on Hwy. 140.

Packets of information about how to prepare for an earthquake are available at public health and the sheriff's office. In addition earthquake information is available on the Federal Emergency Management Association website.

"Please don't call 911 unless it's an emergency, because the phone lines can get clogged up," McDonald said. "The Town emergency response met last week to discuss response and preplanning and if a quake does happen we're prepared."

according to the USGS website. There were three on Sunday, July 4: One at 5:25 a.m. registering 2.2, one at 10:17 p.m. registering 2.1 and one at 10:42 p.m. registering 3.2.

A glance at the USGS latest quakes website shows that the epicenters of the quakes appear to be moving north along the Goose Lake Fault line.

Qamar said there are hundreds of computers monitoring seismograph data and when something is triggered on the station, the network automatically sends out e-mails to people who need to be notified of emergency situations.

Although the quakes so far have been relatively mild, not above the 5.0 level, and therefore not really noticeable, Qamar said for every step the magnitude increases, it intensifies the effect by a factor of 10.

According to the USGS, a previous sequence in this area (near Adel in 1968) included 20 earthquakes of magnitude 4.0 or larger, with two of them magnitude 5.0 or above. Based on the geology of the area, and its previous history, it is considered possible—and probable—that the current sequence will continue, and may produce larger earthquakes.

Commissioners hear Deep Creek Bridge details

By Vicki Reynolds
Managing Editor

The Lake County Commissioners

held a special session Tuesday, June 29, to adopt the 2004/2005 budget and get an update on the Adel Bridge construction project.

After opening the meeting by declaring a public hearing on community development block grants, the commissioners listened as Darryl



vices. I received in the Project Res sewer ex budget. ' enue to (the Town The Arlene C Bogardu Town wi retainer Beyond t The sonal ser services services report, at After into exec tions and Follow ing, the w the coun: The n of the prof "We'r ing off," h Council rubberize that the cl Clark mainten of all the Anderson inventory Ander treatment water. "Prel: clear up tl about \$11 adding the million. Thorn treatment locate her facility wo 2nd St. The Co and movec posed hous the urban cussed the voted agair "Two k have asked said. He a for schools Clark s was detrim Council growth, bu urban grow other unkn of. Town / cerned abo to dig up to water level tored once ; cease using until the w control the

ferences. 947-

1974 Mileys 2 horse trailer, tires. 947-2883.

mobile home
s, just outside
cm, 2 full bath,
000. 947-4515.

RAMPERS
railer, self con-
ad., 947-3892 or

Lakeview's Low Down
at area restaurants
every Tuesday & Saturday
Get the Low Down

19-SERVICES

 **First American Title Insurance** Company of Oregon
Folks you know and trust...
Sherry Hoglan Escrow Officer
Brenda Thornton Escrow Secretary
Lakeview Office: 540 Center St. 947-3425
Klamath Falls Office: 422 Main St. 884-5155

21-REAL ESTATE FOR SALE

Open House

Saturday, April 17th
1 pm to 4 pm

Home - Six miles west of Lakeview on Hwy 140.
Manufactured home on 40 acres with
v. Four bedrooms / 3 baths.
APPRECIATE!
WANTS TO SERVE YOU:
ate - Owner **Burt Swingle**, Sales Associate
r **Sharon Grogan**, Sales Associate
ibertson, Sales Associate
FAX 947-2497 209 No. F St. Lakeview, OR 97630

Tim Tucker
Action REALTY

19-SERVICES

SERVICE DIRECTORY

AUNTING
LIDDYCOAT CPA,
g, Bookkeeping,
ccounting Services.
947-3636.

LAUNDRY & DRY CLEANERS
DIANE'S CORNER. Pro-
sional dry cleaning and laun-
service done on premises
8am-6pm. 1103 No. 4th
947-3886.

LIANCES
rigidaire & May-
h F Street. Phone

MOTELS

**Earthquake
shakes North
Lake County**

By **Tracie C. Dickens**
Staff Writer

At the time when most peo-
were sleeping, Silver Lake
ident **Dixie Shuffield** was
ried that her house was col-
-ing.
Shuffield had been wide
ake for the first in a series of
all, but scary earthquakes
in North Lake County on
ly Tuesday morning, April

"My house was making this
ribble creaking noise, like the
ills were going to come
in," said Shuffield. Fortu-
ely they did not and as of
s time there had still been
amage reported.

The largest of the quakes
e just after 1 a.m. and reg-
red at 3.8 tremblers. It was
tered at approximately 25
es northwest of Christmas
ey.

There was a smaller series
quakes, commonly called
r shocks that began at
roximately 4:30 p.m. Tues-
nd continued overnight.
The University of Washing-
eismology lab reports that
quakes were about 12 miles
the surface, which would
e them less noticeable to
people. Especially during
iddle of the night.

In the event of an emergen-
any kind, people should
emergency supplies avail-
The Lake County Emer-
Services has a list avail-
or "72 Hour Kits" that can
ed in the event of any
gency. Emergency Ser-
Director **Phil McDonald**
reached at 541-947-6012
information available.



Back row l-r: **Don Cates** (acting as candidate is p
Eric Meyers, and **Tom Winters** (acting coach). For
ments: first place: **Anderson**, as **Loyal Knight**;
Esquire; **Joe Rosales** as **Lecturing Knight**. Third pl

Elks win ritual

First time in six decades

By **Dee Lambert**
Staff Writer

For the first time since the 1930's, the Lake-
view Elks Lodge has won first place in the annu-
al Ritual Team competition for the southeast dis-
trict held Friday - Saturday, April 23 - 24 in
Bend. The Lakeview Elks competed against
eight other teams from the district. First place
winners from the six Oregon Districts will com-
pete for State championship on June 5 in
Lebanon. The winners of State will go on to
National competition to be held in Kansas City,
Mo., in July.

In addition to the team's accomplishment,
several members of the team were awarded on
individual performance. **Fine Anderson** won
first place for his performance as **Loyal Knight**;

moges named as new l

daughters **Jordan**,
Taylor, 3; and **P**
planning on arriv-
view "as soon as I
... 4"

Wildfire Annex

The following wildfire annex includes the Lake County Community Wildfire Protection Plan.

South-central Lake County Community Wildfire Protection Plan

December 23, 2005

Prepared for:

Lake County Resource Initiative
25 North E Street, Suite 3
Lakeview or 97630

Prepared by:

Jerry R. Barker, Ph.D.
Range & Fire Ecologist

Reviewed by:

Angela Glenn
Natural Resources Specialist

Submitted by

WALSH ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC

4888 Pearl East Circle, Suite 108
Boulder, Colorado 80301
(303) 443 3282

WALSH Project Number: 6216 010

TABLE OF CONTENTS

1 [Introduction](#)

- [1.1 CWPP Purpose and Process](#)
- [1.2 South-central Lake County's need for CWPP](#)
- [1.3 Wildland Fire Management Primer](#)
- [1.4 Regulator Framework](#)
- [1.5 South-central Lake County Wildfire Management Goals](#)

2 South-central Lake County Profile

- [2.1 County Setting](#)
- [2.2 Communities](#)
- [2.3 Climate](#)
- [2.4 Vegetation](#)
- [2.5 Fire Protection Authorities](#)
- [2.6 Values at Risk](#)

3 Cwpp Process

- [3.1 South-central Lake County CWPP Requirements](#)
- [3.2 South-central Lake County CWPP Core Team](#)
- [3.3 Federal Agency Collaboration](#)

4 WILDFIRE RISK ASSESSMENT

- [4.1 Approach to Wildfire Risk Assessment](#)
- [4.2 Wildfire History](#)
- [4.3 Wildfire Risk to Communities](#)
- [4.4 Wildfire Risk to Structures](#)
- [4.5 Oregon Senate Bill 360 Classification](#)

5 WILDFIRE MITIGATION PLAN

- [5.1 Approach to Mitigation Planning](#)
- [5.2 Suggested Actions to Achieve Desired Results](#)
- [5.3 Hazardous Fuel Projects and Priority](#)
- [5.4 Non-fuels Mitigation Needs](#)
- [5.5 Protection of Homes and Structures](#)
- [5.6 Need for Action](#)

6 EMERGENCY OPERATIONS

- [6.1 County Wildfire Preparedness and Outreach](#)
- [6.2 Emergency Procedures and Evacuations Routes](#)
- [6.3 Wildfire-suppression Operations](#)

7 south-central lake county cwpp monitoring and evaluations

- [7.1 CWPP Plan Adoption](#)
- [7.2 Sustaining CWPP Efforts](#)
- [7.3 CWPP Oversight, Monitoring and Evaluation](#)
- [7.4 Funding and Technical Resources](#)
- [7.5 Community Fire Assistance](#)

8 BIBLIOGRAPHY

List of Figures Located in Appendix A

[Map 1 Land Ownership](#)

[Map 2 Vegetation](#)

[map 3 Historic Fire Regime](#)

[map 4 Fire Regime Condition Class](#)

[Map 5 Fire History](#)

[Map 6 Ignition Risk Potential](#)

[Map 7 OSB 360 Land Classification](#)

List of tables

[Table 1 Summary Community Information](#)

[Table 2 Monthly Climate Summary for Lakeview oregon for the years of 1971–2000](#)

[Table 3 The Eight Steps to Developing a CWPP for South-central Lake County](#)

[Table 4 South-central Lake County CWPP Core Team Members](#)

[Table 5 Fire Regime Condition Class Descriptions](#)

[Table 6 Lake County Wildfire History for the Years 1984–2004](#)

[Table 7 Community Risks](#)

[Table 8 Rural South-central Lake County Structure Classifications with Hazard Ratings and Contributing Factors](#)

[Table 9 Classification of Forest – Urban Interface Lands \(OSB 360\)](#)

[Table 10 Number of Acres \(percent\) that Occur in Each Hazard Class](#)

[Table 11 Emergency Evacuation Routes](#)

[Table 12 Monitoring and Evaluation Tasks](#)

list of appendices

Appendix A Maps (see list above)

[Appendix B](#) Wildland Fire Risk and Hazard Severity Assessment Form

[Appendix C](#) Firewise Brochure – Firewise Communities

List of Acronyms and Abbreviations

BIFZ	Burns Interagency Fire Zone
BLM	Bureau of Land Management
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWPP	Community Wildfire Protection Plans
EAP	Environmental
EQUIP	Environmental Quality Incentives Program
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FEPP	Federal Excess Personal Property
FLEP	Forest Land Enhancement Program
FRCC	Fire Regime Condition Class
FRT	Forest Resource Trust
FSP	Forest Stewardship Program
GIS	Geographic Information System
HFRA	Healthy Forests Restoration Act
IMT	Incident Management Team
IRP	Ignition Risk Potential
LIFC	Lakeview Interagency Fire Center
NAPA	National Academy of Public Administration
NEPA	National Environmental Protection Act
NFPA	National Fire Protection Association
NWCC	Northwest Coordination Center
NWCG	National Wildfire Coordinating Group
ODF	Oregon Department of Forestry
OFPA	Oregon Forest Protection Act
OWEB	Watershed Improvement Grants
RFA	Rural Fire Assistance
RFPA	Rangeland Fire Protection Associations
RFPD	Rural Fire Protection Districts

SEAT	Small Engine Air Tanker
SWCD	Soil & Water Conservation District
USFWS	U.S Fish and Wildlife Service
USFS	US Forest Service
VFA	Volunteer Fire Assistance
WFU	Wildland Fire Use
WHIP	Wildlife Habitat Incentives Program
WUI	Wildland Urban Interface

Oregon Senate Bill 360 findings

Forestland – urban interface lands (OSB 360) are classified using fuel hazard, weather hazard and topography hazard. ODF classifies the weather factor for the assessment area (all of Lake County) as high-hazard or class 3. The topography hazard is classified as low (class 1) or high (class 2) for slopes < 25 percent of >25 percent, respectively. The vegetation hazard is based on fuel attributes. For this assessment, the Fire Regime Condition Classes (FRCC) represent low (class 1), moderate (class 2) and high (class 3) hazard.

A total of 726,327 acres were classified according to the OBS 360 system. The FRCC classification does not include agricultural lands. All possible classes within the *severe weather hazard* category are found within south-central Lake County. Sixty-six and thirty-four percent of the areas are categorized as extreme-hazard or high-hazard, respectively.

**Number of Acres (percent) that Occur in each Hazard Class
for Non-Agricultural Land in South-central Lake County**

Natural Vegetative Fuel Hazard Factor Value	Wildfire Weather Hazard Factor Value					
	1		2		3	
	Topography Hazard Factor Value					
	1	2	1	2	1	2
1	0	0	0	0	74,187 (10)	13,100 (2)
2	0	0	0	0	158,655 (22)	44,358 (6)
3	0	0	0	0	302,538 (42)	133,489 (18)

Executive summary

The Healthy Forests Restoration Act (HFRA) of 2003 and Oregon Forestland – Urban Interface Fire Protection Act of 1997 (Oregon Senate Bill 360) provide the impetus for wildfire risk

assessment and planning at the county and community level in Oregon. HFRA refers to this level of planning as Community Wildfire Protection Plans (CWPP). The CWPP allows a community to evaluate its current situation with regards to wildfire risk and ways to reduce risk for protection of human welfare and other important economic or ecological values. The CWPP may address issues such as community wildfire risk, structure flammability, hazardous fuels/non-fuels mitigation, community preparedness and emergency procedures. The Core Team is composed of representatives from local government and local fire authorities at the State agency responsible for forest practices. The Core Team provides oversight to the development and implementation of the CWPP in south-central Lake County.

The focus of this CWPP is on south-central Lake County with emphasis on the communities of Lakeview, Valley Falls, New Pine Creek, Westside and Paisley; Collins Timber Company lands; and rural residences. Human life and welfare are values at risk to wildfire loss in south-central Lake County because of hazardous fuels buildup around communities and structures, poor emergency vehicle ingress and egress and constant need for training firefighting personnel and/or upgrading equipment. Throughout the county, there are scattered small communities and ranches with houses and out buildings without structural fire protection because they are outside the Lakeview Fire Department, Paisley Volunteer Fire Department and the Rural Fire Protection Districts. Other economic values at risk include businesses, farmland, ranchland, grazing land, hunting and other recreational land, historic and cultural sites and critical infrastructure.

Wildland fire is a common occurrence in Lake County. During the years of 1984–2004, there were 374 human-caused fires and 6,874 natural fires. Approximately 5 percent of the fires were human-caused. Approximately, 60 percent of all wildfires burn less than 0.25 acres regardless of ignition source, while less than 1 percent burn over 5,000 acres.

Natural resource management policy and changing ecological conditions have interacted in ways that result in hazardous fuel situations throughout south-central Lake County. These forces include historic fire-suppression policy, juniper invasion into sagebrush and grasslands, overstocked forests and rangelands, invasive weeds and changing climatic patterns. The accumulation of hazardous fuels may set the stage for catastrophic wildfire occurrence in the assessment area resulting in the loss of important economic and ecological values.

There are varieties of fuels in south-central Lake County around communities, ranches and structures that create problems for fire protection. Fuels include ponderosa pine forests and juniper woodlands, sagebrush habitat, grasslands and weed fields. Many of these fuels, such as dried grass and weeds, are highly flammable, burn rapidly and resist control. A coordinated effort among all fire authorities and private landowners in the County is needed to manage hazardous fuels and reduce the risk of wildfire.

Currently, fire-suppression authorities in the assessment area include the Lakeview Fire Department, two Rural Fire Protection Districts (RFPD), Lakeview Interagency Fire Center (LIFC)

and Paisley Volunteer Fire Department. Mutual Aid Agreements exist among the fire authorities for mutual aid and support in the event of a wildfire incident. However, each fire authority operates under regulations that dictate their area of responsibility and specify limitations.

Field surveys, Core Team meetings, interviews, questionnaire and a public meeting were used to obtain various types of information to assess the risk of wildfire in south-central Lake County. All information was gathered, analyzed and synthesized by Walsh Environmental Scientists and Engineers, LLC.

Public meetings were convened on September 15 and November 29, 2005 at 7:00 pm in the Lakeview Senior Center and Elks Lodge, respectively. Newspaper and radio releases announced the meetings. Telephone calls and mailings were made to key people inviting them to the meetings. The purpose of the meetings was to explain the wildfire risk assessment and mitigation planning process, present its findings and provide an opportunity for the public to participate in a review of findings and comment on proposed mitigation possibilities such as hazardous fuels management.

The National Fire Protection Association (NFPA) Form 1144, *Standard for Protection of Life and Property from Wildfire, 2002 Edition* was used to assess the level of risk and hazard to communities and individual houses. The evaluation consisted of rating attributes such as means of access, surrounding vegetation (fuels), presence of defensible space, topography, roofing and other construction materials, available fire protection and placement of utilities. Scores were assigned to each element and then totaled to determine the level of risk. Low, moderate and high-hazard risk were determined based on the total score. Field surveys were conducted during September 2005 to assess the level of risk and hazard to the 5 communities, Collins Timber Company lands and 126 dwellings.

Three of the five communities received a high-hazard rating because of issues with hazardous fuels proximity, the use of combustible construction material, inadequate emergency ingress and egress and the lack of structure fire protection. The Collins Timber Company properties received a high-hazard rating because the presence of hazardous fuels within and on adjoining public lands.

Community Risk

Community	Fire Authority	Fire Hazard	Surrounding Fuels and contributing factors
Lakeview	Lakeview Fire Department	High	<ul style="list-style-type: none"> • Fuels east and south of town sagebrush, dried grass and weeds in proximity to some structures; west and north agricultural land and; dried grasses and weeds in empty lots and around some of structures within town • Surrounding terrain • Lack of defensible space around some homes • Combustible roof or siding on some homes

Paisley	Paisley Vol. FD	Moderate	<ul style="list-style-type: none"> Fuels west and south of town sagebrush, dried grass and weeds in proximity to structures; and, agricultural land east and south of town <ul style="list-style-type: none"> Lack of structure defensible space
Westside	Thomas Creek/ West side RFPD	Moderate	<ul style="list-style-type: none"> Fuels sagebrush, grass, agricultural land, weeds in town Lack of structure defensible space Continuous fuels between public and private boundaries
New Pine Creek	New Pine Creek RFPD	High	<ul style="list-style-type: none"> Fuels sagebrush dried grasses on east and south, weeds and dried grasses in town Lack of defensible space for structures
Valley Falls	No Authority	High	<ul style="list-style-type: none"> Fuels west and south of town sagebrush, dried grass and weeds in proximity to structures; and, agricultural land east and north of town <ul style="list-style-type: none"> Lack of structure defensible space
Collins Timber Company Lands	Oregon Department of Forestry	High	<ul style="list-style-type: none"> Fuels overstock timber, ladder fuels, sagebrush and dried grass of adjoining public land and on property Lack of fuel break network

126 structures were evaluated throughout rural south-central Lake County. There were no apparent patterns to structure hazard within the assessment area. High-hazard structures are just as likely to be associated with low-hazard structures as with moderate-hazard structures.

Rural South-central Lake County Structure Classification as to Hazard Rating and Contributing Factors

Hazard Class	Percent of Structures	Contributing Factors
Low	24	<ul style="list-style-type: none"> Two or more roads in/out Main access road is wide, all season, less than 300 ft. long with turnaround Fuel type is predominately grass or other crop Defensible space of 71–100 ft. Terrain is generally flat Noncombustible roof and/or siding Heating and electrical utilities placed underground
Moderate	54	<ul style="list-style-type: none"> One road in/out Access road is moderately wide, non surfaced with grade < 5%, < 300 ft. with turnaround Fuel type is predominately grass or other crop Defensible space of 30–70 ft. Terrain is such to adversely affect wildfire behavior Noncombustible roof with combustible siding Electrical utilities usually below ground but heating fuel is above ground

High/Extreme	22	<ul style="list-style-type: none"> • One road in/out • Access road is narrow, non surfaced with grade > 5%, < than 300 ft. long and without turnaround • Fuel type is predominately sagebrush, rabbitbrush and/or juniper; weeds are abundant • Defensible space < 30 ft. • Terrain is such to adversely affect wildfire behavior • Combustible roof and siding • Heating and electrical utilities above ground
--------------	----	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

A total of 726,327 acres were classified according to the OBS 360 system. All possible classes within the severe weather hazard category are found within the assessment area. 66 percent of the lands are categorized as extreme-hazard. The remaining 34 percent of the lands are classified as high-hazard. Fire ignition risk potential for the high- and extreme-hazard areas is generally moderate. Therefore, the risk for wildfire is high in the assessment area and hazardous fuels mitigation and development of defensible spaces is warranted for communities and structures, respectively. Also, fuels management is needed to restore FRCC 3 vegetation close to communities to FRCC 1.

Based on the interviews with fire authority officials, field observations and questionnaire responses, the following prioritized mitigation actions are proposed for south-central Lake County to reduce the risk of wildfire:

- Continue to strengthen the cooperation among the federal agencies (BLM, USFWS and USFS), Lakeview and Paisley Fire Departments, RFPDs Oregon Department of Forestry and private landowners.
- Strengthen the firefighting ability of the RFPDs through motivation, training and improved equipment. Consider expanding the RFPD to include areas not under protection.
- Organize Rangeland Fire Protection Associations (RFPDs) for unprotected lands. RFPDs operate under ORS 183.335 to provide wildfire protection within their jurisdiction and have contractual relationships with the federal agencies to provide wildfire protection as first responders. RFPDs are formed to provide wildfire protection where protection is not available. The RFPDs would not provide structure fire protection. The RFPDs operate as non profit corporations with volunteer membership. Dues are assessed to RFPD residences for membership. Dues and grant money are sources for funding. Expenses are incurred for insurance, fuel and equipment repair. Equipment consists of donated, loaned or secured on grant wildfire fighting vehicles such as brush trucks and tenders. Response times to a wildfire are variable depending on fire location, accessibility and availability of volunteers.
- Encourage weed abatement along roadways, vacant lots within the communities and around homes. A member of the Lake County Weed Board should serve on the CWPP Core

Team to coordinate fuels treatments with federal and state agencies.

- Encourage the development of defensible spaces around homes and other important structures throughout the County. Recent research has demonstrated that houses with a non-flammable roof and defensible space have a significantly higher probability of surviving a wildfire than those lacking one or both defense mechanisms.
- Develop strategically located fuel breaks around Lakeview, New Pine Creek, Valley Falls, West Side, Paisley and around Collins Timber Company lands.
- Create and maintain additional water storage points in the private forested areas and rural areas outside of the RFPDs.
- Continue the distribution of Firewise educational materials to residents in order to promote knowledge and understanding in implementing proper Firewise activities such as landscaping, use of fire resistant building materials, proper access roads and emergency evacuation procedures.

Implementing and sustaining the CWPP is key to success. This is the responsibility of the Core Team. Building partnerships among community based organizations, fire protection authorities, local governments, public land management agencies and private landowners is necessary in identifying and prioritizing measures to reduce wildfire risk. Maintaining this cooperation is a Long-term effort that requires commitment of all partners involved. The CWPP encourages citizens to take an active role in identifying needs, developing strategies and implementing solutions to address wildfire risk by assisting with the development of local community wildfire plans and participating in countywide fire prevention activities.

The Core Team will oversee the implementation and monitoring of the CWPP by working with fire authorities, community organizations, private landowners and public agencies to coordinate hazardous fuels management and other mitigation projects.

SOUTH-CENTRAL LAKE COUNTY COMMUNITY WIDLFIRE PROTECTION PLAN

1 Introduction

1.1 CWPP Purpose and Process

The Healthy 2003 Forests Restoration Act (HFRA) and the 1997 Oregon Forestland Urban Fire

Protection Act (Oregon Senate Bill 360) provide the impetus for wildfire risk assessment and planning at the community level. HFRA refers to this level of planning as Community Wildfire Protection Plans (CWPP). The purpose of the CWPP is for communities to take full responsibility and advantage of wildland fire and hazardous fuel management opportunities offered under HFRA legislation. The CWPP provides for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities for forest and rangeland management and hazardous fuel reduction projects.

Oregon Senate Bill 360 established policies regarding the protection of the wildland urban interface (WUI) by:

- Defining WUI in Oregon and establishing a process and system for classifying the interface.
- Establishing standards for WUI property owners so they can manage or minimize fire hazards and risks.
- Providing the means for establishing adequate, integrated fire protections systems in WUI areas, including education and prevention efforts.

The CWPP allows communities and private landowners to evaluate their current situations with regards to wildfire risks and suggests ways in which to reduce risks for protection of human welfare and other important economic or ecological values. The CWPP may address issues such as community wildfire risk, structure flammability, hazardous fuels and non-fuels mitigation, community preparedness and emergency procedures. The CWPP should be tailored to the needs of the community. The CWPP reference in this document is inclusive of Oregon Senate Bill 360 requirements. The CWPP process consists of the following steps:

- Organize the CWPP Committee – The committee should consist of representatives from city and county government, local fire authority and the state agency responsible for forest management.
- Federal Agency Involvement – Representatives from the USFS and/or BLM should be engaged in the CWPP process as consultants.
- Community Interested Parties – The CWPP committee must involve interested community members, private landowners, business, stakeholders and interest groups in the planning process.
- Community Base Map – A community base map needs to be developed that illustrates

important features such as landownership, structures, roads, surface water, fire districts or major utility corridors. The map's importance is that it illustrates community values from which recommendations concerning wildfire planning can occur.

- Develop a Community Wildfire Risk Assessment – The risk assessment will provide critical information to the CWPP committee to inform in decision making. Community members should be actively involved in this step. Items that may be addressed include such things as risk of wildfire occurrence, structure hazard and risk, economic and ecological values at risk, local fire authority, preparedness and capability and hazardous fuels.
- Hazard Reduction Priorities and Recommendations to Reduce Structure Flammability – Mitigation projects will be identified and designed to reduce the risk of wildfire loss to the community and other values. Mitigation projects should be prioritized and may include such things as hazardous fuels management, improving the wildfire-suppression capability of the local fire authority, developing a permanent water supply, reducing structure flammability, improved emergency procedures and public education.
- Develop an Action Plan and Assessment Strategy – The action plan should identify who will do what by when. Funds for hazard reduction projects through grants need to be obtained. The finished CWPP is essential for seeking grant money. Also, an assessment and monitoring strategy needs to be in place to ensure the CWPP remains current and relevant for future years.
- Finalize the CWPP – The Core Team needs to approve the CWPP and implement the recommended actions in a timely manner.

1.2 South-central Lake County's need for CWPP

Wildland fire is a common occurrence in south-central Lake County. Historic fire occurrence was a major ecological influence in shaping the natural vegetation of south-central Lake County. The threat of wildfire continues today. However, wildfire risk to human welfare and economic and ecological values is more serious today than in the past because of hazardous fuels buildup and the construction of houses in proximity to forests and rangelands.

The 2001 Federal Register (Vol. 66, No. 160, Friday, August 17, 2001) listed communities throughout the United States at risk to wildfire. The communities in south-central Lake County that were identified are Camas Valley, Drews Gap, Lakeview Basin, New Pine Creek, Paisley, Valley Falls and Westside. These communities are at risk to wildfire because of the accumulation of hazardous fuels nearby and within the area.

Lightning has been the dominant fire ignition source for hundreds of years and continues to be the

main cause of fire in south-central Lake County. However, human-caused fires have occurred and their frequency will likely increase as the County's population grows and outdoor recreation increases.

Natural resource management policy and changing ecological conditions have interacted in ways that have resulted in hazardous fuel situations throughout the County. These forces include historic fire-suppression policy, juniper invasion into sagebrush and grasslands, overstocked forests and rangelands, invasive weeds and changing climatic patterns. The accumulation of hazardous fuels may set the stage for continued catastrophic wildfire occurrence in the County resulting in the loss of important economic and ecological values. Currently, fire-suppression authorities in the assessment area include the Lakeview Fire Departments, the Paisley Volunteer Fire Department, the Thomas Creek/Westside Rural Fire Protection District (RFPD), the New Pine Creek RFPD and the Lakeview Interagency Fire Center (LIFC). LIFC is the dispatch center for the USFS, BLM, USFWS and ODF. Mutual Aid Agreements exist among the fire authorities for mutual aid and support in the event of a wildfire incident. However, each fire authority operates under regulations that dictate their area of responsibility and specifies limitations. The CWPP provides the means to identify wildfire risk, prioritize mitigation projects, improve public awareness and improve fire authority coordination to better manage wildland fire.

1.3 Wildland Fire Management Primer

Wildland fire is defined as any non structure fire occurring in the wildland and includes prescribed fire, wildland fire use and wildfire. Prescribed fires are planned fires ignited by land managers to accomplish resource objectives. Fires that occur from natural causes, such as lightning and are then used to achieve management purposes under carefully controlled conditions with minimal suppression costs are known as wildland fire use (WFU). Wildfires are defined as unwanted and unplanned fires that result from natural ignition, unauthorized human-caused fire, escaped WFU or escaped prescribed fire.

It is possible that prescribed fire could be used for specific management goals in south-central Lake County. Prescribed fire could be used to accomplish a number of resource management purposes, such as reducing the amount of hazardous fuels, increasing plant species diversity, increasing livestock forage production, abating noxious and invasive weeds and improving wildlife habitat. Multiple resource management objectives are often achieved concurrently.

Prescribed fire is used either in a defined area or in localized burn piles. Area prescribed fires are used to burn vegetation in place and can vary in the number of acres burned. Burn piles are heaps of woody fuel that are accumulated after a mechanical treatment. Consistency with State fire and air pollution laws and BLM, USFS Oregon Department of Forestry (ODF) and County policy would be maintained during prescribed fires. Acceptable burn days would be determined in consultation with the ODF and local agencies.

Fire risk is defined as the probability that wildfire will start from natural or human-caused ignitions. Fire hazard is defined as the presence of ignitable fuel coupled with the influences of terrain and weather. The nature of fuels, terrain and weather conditions combine to dictate fire behavior—or its rate of spread and intensity. Wildland fuel attributes refer to both dead and live vegetation and include such factors as ground cover, bed depth, continuity, loading, vertical arrangement and moisture content. Structures are also considered a fuel source. Fire tends to burn more rapidly and intensely upslope than on level terrain. However, evening “sundowner” winds may rapidly drive wildfire down slope. Weather conditions such as high ambient temperatures, low relative humidity and windy conditions favor fire ignition and may cause erratic fire behavior.

Natural and human-caused fire has long been an integral part of vegetation communities in the assessment area. Lightning-ignited fire is a natural component of south-central Lake County ecosystems and its occurrence is important to maintaining the health of forest and rangeland ecosystems. Native Americans used fire for activities such as hunting, improving wildlife habitat, land clearing and warfare. As such, many of the plant species and communities have adapted to recurring fire through phenological, physiological or anatomical attributes. Some plants such as lodgepole pine and western wheatgrass require reoccurring fire to persist.

European settlers, land use policy and changing ecosystems have altered fire behavior and fuels accumulation from their historic setting. European settlers into south-central Lake County changed the natural fire regime in several interrelated ways. The alterations are directly in response to changes in human intervention. The nature of vegetation (fuel) changed due to land use practices such as homesteading, livestock grazing, agriculture, water development and road construction. Livestock grazing reduced the amount of fine fuels such as grasses and forbs, which carried fire across the landscape. In addition, continuous stretches of forest and rangeland fuels were broken up by land clearing activities. The removal of the natural vegetation allowed introduced weedy plants to colonize and occupy—in many instances—large expanses of land. The establishment of cheatgrass and other annual weeds are examples. Many of these weedy plants become flashy fuels as they age, causing fires to burn faster and hotter than with normal wildland fuels. The invasion of western juniper into big sagebrush stands and grasslands has also increased fuel loads and changed the nature of fire in these ecosystems. In addition, more than a century of fire-suppression policy has resulted in an unusually large accumulation of hazardous fuels such as big sagebrush and bitterbrush in many forest and rangeland ecosystems. The presence of flashy fuels coupled with the large accumulation of naturally occurring fuels has created hazardous situations for public safety and fire management.

Modern day land managers continue the use of fire in south-central Lake County by using prescribed fire as a tool to improve livestock grazing, wildlife habitat and reduce weeds or hazardous fuels. In areas such as the WUI where prescribed fire is not desirable, the wise implementation of silvicultural practices can mimic the effects of fire on the ecosystem. Their

primary efforts in managing fuels and fire are to protect human life, as well as economic and ecological values. Proactive and vigilant fire and fuels management is necessary to protect human welfare, as well as economic and ecological values from fire.

1.4 Regulator Framework

There are several Federal and State legislation acts that set policy and provide guidance for the development of the CWPP for south-central Lake County:

- Healthy Forest Restoration Act (2003) – Federal legislation to promote healthy forest and rangeland management, hazardous fuels reduction on federal land, community wildfire protection planning and biomass energy production.
- National Fire Plan and 10 year Comprehensive Strategy (2001) – Interagency plan that focuses on firefighting coordination, firefighter safety, post fire rehabilitation, hazardous fuels reduction, community assistance and accountability.
- Oregon Statewide Land Use Planning Goal 7 – Directs local government to adopt plans for minimizing risk from natural hazards.
- Federal Emergency Management Agency (FEMA) Disaster Mitigation Act (2000) – Provides criteria for state and local multiple hazard and mitigation planning.
- Oregon Forestland – Urban Interface Fire Protection Act of 1997 (SB 360) established policy for the WUI.

1.5 South-central Lake County Wildfire Management Goals

The goals for the CWPP process are several and include:

- Identify fire risks and hazardous fuels
- Assess structure risks to wildfire
- Strengthen coordination, communication and fire-suppression capabilities among the several fire authorities
- Develop strategies and priorities to reduce hazardous fuels
- Identify non-fuels mitigation projects to reduce the risk of wildfire
- Increase community/citizen awareness and responsibility to reduce the risk of wildfire

2 South-central Lake County Profile

2.1 County Setting

Lake County was established in 1874 with a land base of 8,360 square miles. The county population is estimated at 7,422 people. Lake County is in south-central Oregon and was named because of the many large lakes that are within its borders. The county seat was Linkville until the voters selected a permanent site at Lakeview, which overlooks Goose Lake. The landownership in the assessment area includes BLM (177,777 acres), USFS (286,284 acres), State (4,230 acres) and private (484,957 acres) ([Map 1](#)).

A fire swept through Lakeview in 1890 that destroyed about 75 businesses; in 1901 the town was rebuilt. Lakeview is known as “The Tallest Town in Oregon” because of its elevation.

The County's main industries include agriculture, livestock, wood products, mining and recreation. Lake County is famous for both its hang gliding and for having Oregon's only geyser, Old Perpetual. Vegetation in the County is diverse and varies from ponderosa pine forest in the north to sagebrush and grasslands in the south, with wetlands interspersed throughout ([Map 2](#)).

The economy of south-central Lake County is primarily ranching, manufacturing and forest products. The ecological resources such as Goose Lake, Lake Abert and Fremont National Forest draw hikers, hang gliders, geologists, bird watchers and rock climbers from around the country.

2.2 Communities

Lakeview and Paisley are the two incorporated cities in south-central Lake County. The rural unincorporated communities of New Pine Creek, Westside and Valley Falls are also included in the CWPP (Table 1). Lakeview is supported by a fire department, which consists of a paid fire chief and volunteer staff. Paisley is supported by a volunteer fire department. The unincorporated communities are located in RFPD (Thomas Creek/Westside and New Pine Creek). Lakeview is the business center of the County, with US Highway 395 and State Highway 140 providing access to southeastern Oregon from California and Nevada, respectively. New Pine Creek, Westside and Valley Falls are ranching and farming communities, which service their respective surrounding areas and usually consist of businesses, hotel, service station, post office, school and/or church and residences. Lakeview provides the major commercial services for the assessment area.

Collins Timber Company lands are analyzed with the communities in this plan because of their ecological and economic importance in the assessment area. Collins employs approximately 100 people and provides land for timber production, wildlife habitat and recreational uses. Collins fire management practices are proactive and they have taken action such as training forest managers as firefighters, equipping trucks with 40–100 gallon slip in units and not letting slash accumulate. However, hazardous fuels on adjoining public lands and within Collins Timber Company lands pose a high-hazard.

Table 1 Summary Community Information

Community	Location	Fire Authority	Population	Surrounding Fuels
Lakeview	US Highway 395	Lakeview Fire Department	2420	Sagebrush/grass on east and south and agricultural land on west and north, weeds in town
Paisley	State Road 31	Paisley RFPD	246	Sagebrush/grass on west and south and agricultural land east and north, weeds in town
Westside	West Hwy 140, South Tunnel Road	Thomas Creek/ West side RFPD	300	Sagebrush, grass, agricultural land, weeds in town
New Pine Creek	US Highway 395	New Pine Creek RFPD	220	Sagebrush/grass on east and south and agricultural land, weeds in town
Valley Falls	Junction of US Highway 395 and State Road 31	No Authority	20	Sagebrush/grass on west and south and agricultural land east and north, weeds in town
Collins Timber Company	McDonald Tract Warner Tract	ODF	NA	Fuels: overstock timber on adjacent property, ladder fuels, sagebrush and dried grass

2.3 Climate

South-central Lake County climate is semi arid with long, severe winters and short, dry summers (Table 2). With a typical high desert climate, the County experiences over 300 days of sunshine per year and receives an average of 15 inches of annual precipitation, most in the form of snow. Warm and sunny days of summer record highs in the 80s with cool nights. Winter temperatures are typically in the low 30s. In the open valleys, temperatures for Lakeview in January average 29° Fahrenheit (F). In July, it is 67° F with an annual average of 47° F. The frost free period extends from the last day of spring with a minimum temperature of 32° F or below to the first day of fall with a minimum temperature of 32° F. Data taken from remote automated weather stations show a significant increase in moisture as elevation increases. The low precipitation months are July, August and September.

Table 2 Monthly Climate Summary for Lakeview Oregon for the years of 1971–2000

Climate Attribute	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Maximum Temperature (F °)	38.5	42.3	48.8	56	64.6	73.9	83.5	83	75	62.7	44.6	38.7	59.5

Average Minimum Temperature (F °)	20.3	23.5	27.4	31.1	37.3	43.9	49.8	48.1	41.4	33.2	25.1	20.5	33.6
Average Total Precipitation (inches)	1.91	1.8	1.68	1.33	1.44	0.97	0.51	0.47	0.69	1.05	1.86	1.94	15.63

2.4 Vegetation

The vegetation of south-central Lake County is diverse and varies from ponderosa pine forest in the north and east to sagebrush and grasslands in the south ([Map 2](#)). Wetlands are widespread. Cropland and hay fields are common throughout the assessment area.

2.5 Fire Protection Authorities

South-central Lake County receives wildland fire management from the BLM, Forest Service, ODF, US Fish and Wildlife Service (USFWS), Lakeview Fire Department, Paisley Volunteer Fire Department and two RFPDs (Thomas Creek/Westside and New Pine). Mutual Aid Agreements exist among the various fire authorities for support and help when needed. However, each authority has its regulations and limitations, which dictates its fire management activity. Rural areas outside of the RFPDs do not have formal fire protection. Currently, if there is a fire within these areas, fire authorities have to be reimbursed for their efforts.

Lakeview Interagency Fire Center (LIFC) –LIFC is comprised of the Fremont/Winema National Forest, BLM, USFWS and ODF. LIFC functions to manage wildland fire and fuels on public and some private lands within the County. These lands include federal land in the Fremont National Forests, BLM lands and Oregon State lands. Firefighters are trained to National Wildfire Coordinating Group (NWCG) standards as appropriate. During the fire season the following equipment is “readily” available to LIFC:

- Two, type 4 heavy engines
- Five, type 6 light engines
- One, 3,500 gallon water tender
- Type II Helicopter with six person crew
- Single engine air tanker (400 to 600 gallon capacity)
- Ten person hand crew

Lakeview Fire Department – The Lakeview Fire Department has responsibility for structure, grass and vehicle fires within the City of Lakeview. However, the Department will respond to fires within a one-mile radius around Lakeview. The Lakeview rural fire department has one engine and one water tender. The department consists of a paid fire chief and 30 volunteer members. The volunteers are trained at the Firefighter I level with some working on Firefighter II level and

specialist skills. Major equipment consists of two fire engines and one ambulance.

Paisley Volunteer Fire Department – The Paisley Volunteer Fire Department has responsibility for structure, grass and vehicle fires within the City of Paisley. However, they will respond to fires within a one-mile radius around Paisley. The department consists of a volunteer fire chief and 15 volunteer members. Volunteers are trained at the Firefighter I level with some working on Firefighter II level and specialists skills. Major equipment consists of one fire engine, one water tender and one rescue vehicle.

Thomas Creek/Westside RFPD – The Thomas Creek/Westside RFPD has responsibility for structure, grass and vehicle fires within the RFPD. The department has two stations (Westside and Five Corners), two volunteer fire chiefs and 20 volunteer members. The volunteers are trained at the Firefighter I level with some working on Firefighter II level and specialists skills. Major equipment consists of one old fire engine (needs replacing), two structural engines and three 3,000 gallon water tenders.

New Pine Creek RFPD – The New Pine Creek RFPD has responsibility for structure, grass and vehicle fires within the RFPD. The department consists of volunteer fire chief and 12 volunteer members. The volunteers are trained at the Firefighter I level with some working on Firefighter II level and specialists skills. Major equipment consists of one new one new 1,800 gallon attack water tender and one 2,600 gallon water tender.

Collins Timber Company Land – ODF has responsibility for timber and grass fires within their private property. The timber company has field trucks equipped with 40–100 gallon slip in units, shovels, hoes and fire extinguishers. Some of the employees should be trained at the Firefighter I level.

2.6 Values at Risk

Human welfare, private timberlands and other values are at risk to wildfire in south-central Lake County because of the buildup of hazardous fuels around communities and structures, poor emergency vehicle ingress and egress and the ongoing need for training and/or upgrading of fire-suppression equipment. Other economic values at risk include businesses, private forests, farmland, ranchland, grazing land, hunting and other recreational land and critical infrastructure. The communities of Lakeview, New Pine Creek, Paisley, Valley Falls, Westside and the Collins Timber Company lands are at risk to wildfire for one or more of the following reasons:

- Buildup of hazardous fuels such as juniper, sagebrush, annual weeds or seasonal dry grasses
- No jurisdictional responsibility for structure suppression
- Lack of wildfire-suppression authority

- Poor or limited response time
- Limited access
- Limited trained volunteer staff
- Lack of proper equipment
- Not adhering to county approved fire use procedures and restrictions

In addition, numerous individual structures throughout the assessment area are at risk to wildfire loss because of one or more of the following reasons:

- Hazardous fuels in vicinity of structure
- Poor emergency ingress or egress
- Lack of defensible space
- Lack of noncombustible building materials
- Lack of available water

Ecological values within south-central Lake County are important for continued economic growth and human welfare. The degree of loss will depend on wildfire severity and time needed for recovery. Wildfire is a natural part of the assessment area ecology and normally occurring fire is necessary to maintain many desirable attributes such as wildlife habitat and livestock forage. Under a normally occurring fire regime, many ecological values will recover within a few years. Air quality should recover within days after a fire but wildlife habitat may take years. However, catastrophic wildfire may change wildlife habitat beyond its capacity to recover if the biophysical nature of the area is altered. In addition, wildfire may produce conditions conducive to the spread of noxious and invasive weeds such as cheatgrass. Ecological values at risk to wildfire loss include such things as:

- Wildlife and aquatic habitat
- Rangeland and forests
- Scenic areas
- Farmlands
- Water quality
- Air quality
- Natural vegetation communities

3 Cwpp Process

3.1 South-central Lake County CWPP Requirements

The steps to developing the south-central Lake County CWPP are listed in Table 3. These steps are

defined in the pamphlet, *Preparing a Community Wildfire Protection Plan*.

Table 3 The Eight Steps to Developing a CWPP for South-central Lake County

Step	Task	Explanation
One	Convene Decision makers	Form a core team made up of representatives from local and federal governments, fire authorities Collins Timber Company and Oregon Department of Forestry.
Two	Involve Federal Agencies	Engage local representatives of the BLM and USFS and other land management agencies as appropriate.
Three	Engage Interested Parties	Contact and encourage participation from a broad range of interested organizations and stakeholders.
Four	Establish a Community Base Map	Develop a base map of the County that defines communities at risk, critical infrastructure and forest/rangeland at risk.
Five	Develop a Community Risk Assessment	Develop a county risk assessment that considers fuel hazards, risk of wildfire occurrence, homes, business and at risk infrastructure and other values and preparedness capability. Rate the level of risk and incorporate into the base map as appropriate.
Six	Establish Community Priorities and Recommendations	Use the risk assessment and base map to facilitate a collaborative public discussion that prioritizes fuel treatments and non-fuel mitigation practices to reduce fire risk and structural ignitability.
Seven	Develop An Action Plan and Assessment Strategy	Develop a detailed implementation strategy and a monitoring plan that will ensure Long-term success.
Eight	Finalize the CWPP	Finalize the County CWPP and communicate the results to interested parties and stakeholders.

3.2 South-central Lake County CWPP Core Team

The initial step in developing the south-central Lake County CWPP is to organize a core decision making team. The members of this team have the responsibility for CWPP implementation and oversight. The south-central Lake County team is composed of representatives from local government, local fire authorities, Collins Timber Company and the ODF representative (Table 4). Representatives from organizations such as communities, utilities, Chamber of Commerce, hunting clubs, water districts and homeowners associations may choose to participate as appropriate.

Table 4 South-central Lake County CWPP Core Team Members

Team Member	Organization	Phone Number
Bill Duke	Lake County Resources Initiative	541 947 5461

Greg Pittman	Oregon Department of Forestry	541 947 3311
Robert Carlson	Lakeview Fire Assistant Fire Chief	541 947 4400
Roland Glade	Thomas Creek/Westside PD	541 947 4685
Lee Fledderjohann	Collins Timber Company	541 947 2018 x27

3.3 Federal Agency Collaboration

Federal agencies such as the BLM and USFS participate in the CWPP planning process as advisors. The BLM and Forest Service have a major interest in the implementation and success of the South-central Lake County CWPP because of their vested interest in wildfire fuels management. Wildfire does not respect political boundaries, so all fire authority organizations must work together to reduce the risk of wildfire. Federal agency advisories to the South-central Lake County CWPP include Chuck McElwain (541 947 6264) and Dan Shoun (541 947 2177).

4 WILDFIRE RISK ASSESSMENT

4.1 Approach to Wildfire Risk Assessment

Field surveys, Core Team meetings, interviews, public questionnaires and public meetings were used to obtain various types of information to assess the risk of wildfire in south-central Lake County. All information was gathered and analyzed by Walsh Environmental Scientists and Engineers, LLC.

The National Fire Protection Association (NFPA) Form 1144, *Standard for Protection of Life and Property from Wildfire, 2002 Edition* was used to assess the level of risk and hazard to communities and individual homes (See Appendix B for NFPA Form 1144). NFPA Form 1144 can be adapted for communities or individual structures. The evaluation consisted of rating attributes such as means of access, surrounding vegetation (fuels), presence of defensible space, topography, roofing and other construction materials, available fire protection and placement of utilities. Scores were assigned to each element and then totaled to determine the level of risk. Low, moderate, high and extreme hazard were determined based on the total score.

Field surveys were conducted during September 2005 to assess the level of risk to wildfire loss to the five communities, Collins Timber Company lands and to 126 individual homes located in rural south-central Lake County. Community evaluations consisted of scoring the entire community using NFPA Form 1144. In addition, notes were taken on the type of fuels and terrain surrounding

the community. At times these observations were made several miles from the community. Hazardous fuel situations were recorded during the surveys.

Approximately 10 percent of the homes in rural south-central Lake County were evaluated for risk to wildfire. The evaluations were conducted through observation of the structure from the driveway or road leading to the home. Only homes that appeared to be occupied were assessed. The survey was not statistically sufficient because a random sample of all possible structures did not occur. The approach was to evaluate every third or fourth house along a road to get a representative sample. Through this sampling method an attempt was made to evaluate homes throughout the assessment area. These homes were evaluated using the NFPA Form 1144. Conclusions that were drawn concerning structure hazard cannot be applied to all structures in south-central Lake County but limited to those surveyed. However, the results are still useful for evaluating the level of structure hazard in the assessment area and for determining ways to reduce the hazard.

One meeting with the Core Team was convened to discuss the approach and findings of the risk assessment and to assess wildfire risk in the County. The meeting occurred on August 30, 2005 to initiate the project.

Specific interviews were held with several members of the Core Team. The interviews included the Lakeview assistant fire chief, representatives from Collins Timber Company and representatives of the RFPDs, ODF, BLM and USFS. Information obtained during the interview included such things as level of preparedness, existing equipment, level of training for volunteer staff, equipment needs, training needs, concerns, hazardous fuels and situations and mitigation opportunities.

The first public meeting occurred on September 15, 2005 at 7:00 pm in the Lakeview Senior Center. The public meeting's purpose was to discuss fire risk and mitigation possibilities. The Firewise pamphlet was available at the meeting to help explain proper home construction and landscaping practices to reduce the risk of wildfire loss.

The second public meeting convened on November 29, 2005 at 7:00 pm in the Elks Lodge. Newspaper and radio releases announced the meeting. The purpose of the meeting was to explain the purpose of the wildfire risk assessment, present the findings of the risk assessment, provide an opportunity for the public to participate in the process, review the risk assessment findings and comment on proposed mitigation possibilities such as hazardous fuels management and non-fuel projects. The draft report of the wildfire risk assessment and mitigation plan was posted on the LCRI website to encourage public review and comment.

Several maps were produced to assist in the fire risk assessment and also to illustrate information. The maps were produced based on Geographic Information System (GIS) data obtained from BLM and ODF. The CWPP calls for a baseline map to be developed that conveys information such as communities at risk, critical infrastructure, water supplies, utilities and mitigation opportunities. In

order to present complex information in a readily understandable way, several maps were developed at the same scale and reference. The different maps are south-central Lake County base map, vegetation, historic fire regime, current fire regime condition class, fire ignition potential and OSB 360 land classification.

4.2 Wildfire History

Wildfires have historically occurred in the assessment area from lightning and from Native American ignitions sources. The natural fire regime of an area is the role of fire—including Native American—across a landscape in the absence of modern human intervention. The different natural (historical) fire regimes are classified based on the average number of years between fires (fire frequency) and its severity (degree of vegetation damage or destruction) on the dominant overstory vegetation. There are six historic fire regime classes that occur in the assessment area ([map 3](#)). Fire frequency and severity varied throughout the assessment area depending on vegetation type and elevation. The most common fire regime occurred with a return frequency of 0–35 years and with low to mixed severity.

The current fire regime condition is an estimate of the degree of departure from the historic fire regime. Three classes are used to describe the current fire regime condition (FRCC, Table 5). The FRCC in the assessment area is complex ([map 4](#)). The FRCC 3 class is the most common, but both FRCC classes 1 and 2 also occur. For the purposes of this CWPP, the FRCC classes 1, 2 and 3 represent low-, moderate- and high-hazardous fuel situations respectively.

Table 5 Fire Regime Condition Class Descriptions

Fire Regime Condition Class	Description
1	Fire behavior, effects and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g. native species, large trees and soil) is low.
2	Fire behavior, effects and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of loss of key ecosystem components is moderate.

3	Fire behavior, effects and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.
----------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Wildfire occurrence in Lake County is common (Table 6, [Map 5](#)). Ignition usually results from natural causes, although human-caused ignition risk is also high. An analysis of the fire occurrence history from 1984 to 2004 indicates a high level of fires. During the 20 year period studied, there were 375 human-caused fires and 6,874 natural fires. This is an average of 362 fires per year. Approximately five percent of the fires were human-ignited, while 95 percent were lightning-caused. Ninety-one percent of wildland fires originated on public lands. The human ignitions were caused in variety of ways, including abandoned campfires or equipment. The highest cause was abandoned campfires at 20 percent. Lightning fires occurred in June, July and August with most during August.

The main concentration of human-caused fires is around reservoirs and other developed areas ([Map 5](#)). Many human-caused fires are related to recreational activities. The most recent large fire was just outside the assessment area around Silver Lake. The Silver Lake fire had a significant impact on the surrounding area and brought home the fact the wildfires are a threat to local communities. Wildfires in the assessment area can be intense, but they tend to require strong winds and dry fuel conditions to burn. Fuel loading, weeds, terrain and flammable buildings put communities at risk.

Table 6 Lake County Wildfire History for the Years 1984–2004¹

Fire Size Class (Acres)	Acres Burnt	Number of Fires	Fire Ignition Source	
			Lightning	Human
A 0 – 0.25	628	5,689	5,498	191
B 0.25 – 9.9	1,867	1,389	1,234	155
C 9.9 – 99.9	7,717	118	105	13
D 100 – 299.9	3,481	19	13	6
E 300 – 999.9	2,387	5	3	2
F 1,000 – 4,999.9	32,077	20	16	4
G 5,000 – 9,999.9	141,316	9	5	4

¹ Statistics are county wide and not just for south-central lake County.

Even though the vast majority of wildfires in south-central Lake County are suppressed before they burn large areas, wildfire risk to communities and structures is still considerable given the number of annual fires and high level of hazardous fuels. Residents need to be vigilant with Firewise practices (Appendix C).

Ignition Risk Potential (IRP) is the prospective for either lightning- or human-caused fire to start and is defined as the number of wildfires per 1,000 acres per 10 years ([Map 6](#)). The classes are low (0 0.1 fires per 1,000 acres per 10 years), moderate (0.1 1.1 fires per 1,000 acres per 10 years) and high (> 1.1 fires per 1,000 acres per 10 years). The IRP varies throughout the assessment area. The low class is the most common while the high class is the least common.

4.3 Wildfire Risk to Communities

The five communities within south-central Lake County and Collins Timber Company lands were assessed for potential risks and hazards. Several factors in and around communities lead to the increased risk of wildfire:

- No jurisdictional authority for structure protection
- Initial attack time to structures
- Lack of trained people and appropriate equipment to take action on structures
- Fuel loading in and around living sites
- Very poor access
- Location of structures (i.e. in draw bottoms, south slope, etc.)
- Construction of structures (combustible roofing, etc.)

The NFPA Form 1144 was used to evaluate community risks and hazards to wildfire and assign each a hazard class. Focus was within the communities and the surrounding wildland urban interface (WUI). The CWPP definition of the WUI is 0.5 miles surrounding a community unless the hazardous fuel situation requires adjustment. For this NFPA 1144 assessment, the WUI was defined as 0.5 miles from the community. All of the communities within the assessment area have protection with fire departments or RFPDs. Each of the fire departments is in need of continued training, current equipment and personnel to be fully effective. The houses and subdivisions not within the protection districts are at higher risk (Table 7).

Table 7 Community Risks

Community	Fire Authority	Fire Hazard	Surrounding Fuels and contributing factors
Lakeview	Lakeview Fire Department	High	<ul style="list-style-type: none"> ● Fuels east and south of town: sagebrush, dried grass and weeds in proximity to some structures; west and north agricultural land and; dried grasses and weed in empty lots and around some of structures within town ● Surrounding terrain ● Lack of defensible space around some homes ● Combustible roof or siding on some homes

Paisley	Paisley Vol. FD	Moderate	<ul style="list-style-type: none"> Fuels west and south of town: sagebrush, dried grass and weeds in proximity to structures; and, agricultural land east and north of town <ul style="list-style-type: none"> Lack of structure defensible space
Westside	Thomas Creek/ West side RFPD	High	<ul style="list-style-type: none"> Fuels: sagebrush, grass, agricultural land, weeds in town Lack of structure defensible space Continuous fuels between public and private boundaries
New Pine Creek	New Pine Creek RFPD	Moderate	<ul style="list-style-type: none"> Fuels: sagebrush dried grasses on east and south, weeds and dried grasses in town Lack of defensible space for structures
Valley Falls	No Authority	High	<ul style="list-style-type: none"> Fuels west and south of town: sagebrush, dried grass and weeds in proximity to structures; and, agricultural land east and north of town <ul style="list-style-type: none"> Lack of structure defensible space
Collins Timber Company Lands	ODF	High	<ul style="list-style-type: none"> Overstocked timber, ladder fuels, sagebrush and dried grass on adjoining public land and on property Lack of fuel break network

Three of the five communities received a high-hazard rating because of issues with hazardous fuels proximity, the use of combustible construction material, inadequate emergency ingress and egress and the proximity to slopes greater than 31 percent. Collins Timber Company lands received a high-hazard rating because of issues with fuel continuity between public and private land, slopes greater than 31 percent and highly flammable property at risk. The risk of fire starting on private or public lands and burning onto public or private lands is high.

Dried grass and weeds were prevalent in and around all communities. Dried grass and weeds are a serious fuel concern during the late summer and fall months. These flashy fuels are highly flammable, cause fire to spread rapidly and resist suppression. Grasses and weeds should be mowed or grazed in the late summer to reduce the risk of wildfire.

The nature of the wildland fuel (i.e., vegetation) around a community will influence its risk to wildfire. Priority fuels management must first take action within the WUI. However, fuels specialists must consider hazardous fuels situations for several miles away from the community. Wildfire can spread rapidly given flammable fuels (e.g., juniper, dried grass and sagebrush), windy conditions and sloping terrain. The Fire Regime Condition Class was used to assess hazardous fuel conditions ([map 4](#)).

4.4 Wildfire Risk to Structures

The NFPA Form 1144 was used to evaluate structure risk to wildfire and assign each to a hazard class (Table 8). The structures evaluated are those located in rural south-central Lake County. Structures are defined as houses for human occupancy. Barns, sheds, stables or other similar

buildings were not assessed. A total of 126 homes were assessed. There is no apparent pattern to hazard classification within the assessment area ([map 4](#)). High-hazard structures are just as likely to be associated with low-hazard structures as with moderate-hazard structures. The contributing factors are those that seem to define structure placement in one of the hazard classes.

Table 8 Rural South-central Lake County Structure Classifications with Hazard Ratings and Contributing Factors

Hazard Class	Percent of Structures	Contributing Factors
Low	16	<ul style="list-style-type: none"> • Two or more roads in/out • Main access road is wide, all season, less than 300 ft long with turnaround • Fuel type is predominately grass or other crop • Defensible space of 71–100 ft • Terrain is generally flat • Noncombustible roof and/or siding • Heating and electrical utilities placed underground
Moderate	58	<ul style="list-style-type: none"> • One road in/out • Access road is moderately wide, non surfaced with grade < 5%, < 300 ft with turnaround • Fuel type is predominately grass or other crop • Defensible space of 30–70 ft • Terrain is such to adversely affect wildfire behavior • Noncombustible roof with combustible siding • Electrical utilities usually below ground but heating fuel is above ground
High	22	<ul style="list-style-type: none"> • One road in/out • Access road is narrow, non surfaced with grade > 5%, < than 300 ft. long and without turnaround • Fuel type is predominately sagebrush, rabbit brush and/or juniper; weeds are abundant • Defensible space < 30 ft • Terrain is such to adversely affect wildfire behavior • Combustible roof and siding • Heating and electrical utilities above ground

The survey confirmed that there are structures with poor defensible space, combustible building materials, fuel loading, poor ingress and egress and poor placement of utilities. Many of the houses were more than 5 miles from the nearest available fire protection. Areas of highest concern are bordering public lands with slopes greater than 31 percent, moderate to heavy fuels and less than 30 feet of defensible space.

A functional defensible space consists of non-flammable vegetation no closer than 30 feet to the structure, the use of low flammable landscaping plants, mowed grass and lack of firewood stacks and fuel tanks (See Appendix C for complete instructions). The defensible space should be larger for structures built on slopes.

Due to the variety of fuels in the assessment area these structures (mostly farms and ranches) create a wide variety of protection problems. Fuels range from grasses and brush to woodlands, which have the ability to burn rapidly in severe weather conditions and spread quickly. This has produced a significant issue in the protection of life and property and has pushed existing fire protection systems beyond their design capabilities.

Structures at the greatest risk are in areas which fall outside of the established fire districts. These structures are outside of the town limits of Paisley, New Pine Creek, Westside and Lakeview. LIFC can respond to fires within 1 mile of public lands, if the fire is threatening the public land or paying private land if outside the ODF protection boundary.

4.5 Oregon Senate Bill 360 Classification

Forestland – urban interface lands (OSB 360) are classified using fuel hazard, weather hazard and topography hazard (Table 9). ODF classifies the weather factor for the assessment area (all of Lake County) as high-hazard or class 3. The topography hazard is classified as low (class 1) or high (class 2) for slopes < 25 percent or >25 percent, respectively. The vegetation hazard is based on fuel attributes. For this assessment, the FRCC classes represent low (class 1), moderate (class 2) and high (class 3) hazard.

Table 9 Classification of Forest – Urban Interface Lands (OSB 360)

Natural Vegetative Fuel Hazard Factor Value	Wildfire Weather Hazard Factor Value					
	1		2		3	
	Topography Hazard Factor Value					
	1	2	1	2	1	2
1	Low	Moderate	Moderate	Moderate	High	High
2	Moderate	Moderate	Moderate	Moderate	High	Extreme
3	Moderate	Moderate	Moderate	High	Extreme	Extreme

A total of 726,327 acres were classified according to the OBS 360 system (Table 10 and [Map 7](#)). The FRCC system does not include agricultural lands and therefore they are not considered in this analysis. All possible classes within the severe weather hazard category are found within the assessment area. Sixty-six percent of the area is categorized as extreme hazard. The remaining 34 percent is classified as high-hazard. Fire ignition risk potential for the high- and extreme-hazard areas is generally moderate ([Map 5](#)). Therefore, the risk for wildfire is high in the assessment area and hazardous fuels mitigation as well as development of defensible spaces is warranted for communities and structures, respectively. Also, fuels management is needed to restore FRCC 3 vegetation close to communities to FRCC 1.

Table 10 Number of Acres (percent) that Occur in Each Hazard Class for Non-Agricultural Land

Fire Regime Condition Class	Topography Hazard	
	1	2

(Vegetation Hazard)	1	2
1	74,187 (10)	13,100 (2)
2	158,655 (22)	44,358 (6)
3	302,538 (42)	133,489 (18)

5 WILDFIRE MITIGATION PLAN

5.1 Approach to Mitigation Planning

Wildfire mitigation is defined as “to reduce the chances of its occurrence or the loss of structures and other important community values”. Hazardous fuels management, non-fuels mitigation projects and public outreach are ways to mitigate the risk of wildfire. For maximum effectiveness the three should be implemented concurrently.

Hazardous fuels and non-fuels mitigation projects were identified based on interviews with fire-suppression experts as well as through field surveys conducted when assessing community and structure risk. Fuels mitigation projects were identified and prioritized based on proximity to community, hazardous fuel load and continuity, terrain and professional experience.

The south-central Lake County CWPP is not a legal document, it is a planning document. The wildfire mitigation recommendations are for planning purposes, thus implementation is not required. Actions on public lands will be subject to federal, state and county policies and procedures such as adherence to HFRA, National Environmental Protection Act (NEPA) and Oregon Forest Practices Act (OFPA). Action on private land may be required to be in compliance with policy such as OFPA, county zoning laws and building codes. However to be most effective in reducing wildfire risk, cooperation among federal, state, county and private landowners is essential. Wildfire does not respect land ownership boundaries. Any action taken will be limited in its effectiveness if either public land managers or private landowners choose not to take similar actions on their property.

5.2 Suggested Actions to Achieve Desired Results

The CWPP provides recommendations for hazardous fuels reduction, defensible space, building materials, education, outreach, infrastructure needs, water availability and access. There is only so much a RFPD can do to protect individual life and property from wildland fires. The most effective form of mitigation is education and outreach. The purpose of a community wide education program is to:

- 1) educate the public to the risks of wildfire to property and life (during the summer months)
- 2) urge property owners to take responsibility in reducing the risk of wildfire and to create

defensible space around their structures

3) teach the benefits of different types of fire resistant building materials and

4) increase awareness of the natural role of low intensity fire in grassland and woodland ecosystems and the benefits from thinning fuel loaded areas. Education makes other mitigation programs possible.

Defensible space: Defensible space is a fuel break with a minimum 30-foot area around structures (Appendix C). The purpose of the defensible space is to reduce the rate of fire spread and intensity so that it may burnout or to allow firefighters a chance at suppression. The defensible space also provides room for firefighters to maneuver safely around the structure.

Hazardous Fuel Management: The chance that a wildfire will start on public lands and burn onto private lands and visa versa is high. Communities, homeowners, Collins Timber Company lands and other private lands in the assessment area are at risk. The USFS and BLM are partners in a nationwide fuels reduction and forest health project. The objective of fuel breaks is to manage the buildup of hazardous fuels to alter fire behavior (i.e., rate of spread and burning intensity) and to allow firefighters a chance at suppression. Hazardous fuels, such as those classified as FRCC 3, need to be managed to restore forest or rangeland vegetation to FRCC 1. Private landowners and the federal agencies may choose to enter into agreements to reduce the accumulation of hazardous fuels in the assessment area. Long-term and project-specific planning is required to ecologically, economically and effectively manage hazardous fuels.

There are a variety of tools available for hazardous fuel treatments including prescribed fire, mechanical removal, hand crews, herbicides, livestock grazing or a combination of the above. Specific planning is needed for each treatment area to determine the best ecological and economical approach. Treatments will depend on fuel location, terrain, spatial extent, proximity to values at risk and fuel attributes. Hazardous fuels management will potentially result in large amounts of woody plant materials that will need to be disposed of. Appropriate disposal practices will depend on the amount of woody material generated and they may include spreading the debris over a large area, burning, chipping and spreading or burying in a landfill facility. Economical use of the woody debris such as small diameter wood products or biomass energy production should be explored. Livestock grazing should be used to reduce herbaceous plant materials to the extent possible.

All treatments would be implemented following federal, state and local policy. Post treatment management may be necessary to ensure that a productive plant community will establish instead of weeds. Post treatments may include seeding with desirable grasses and forbs and/or erosion control. Monitoring will determine the need for additional management.

Hazardous fuels management can be resource intensive. Coordination with the BLM and USFS and project planning will allow resources to be used in the most efficient manner possible. This CWPP will position the County to apply for grant money for fuels reduction projects (see Section

7.4)

Water storage facilities: Within the assessment area there are numerous streams, ponds, lakes and irrigation systems available as water sources for wildfire-suppression. In areas where water is not readily available, wells, storage tanks or portable water storage systems, as appropriate, could be established. All water refilling sites should be identified and maintained.

Access: Many of the routes to the structures in the assessment area are not adequate to provide easy access. There is typically a one-lane driveway in and out of the property, sometimes with a locked gate. In the areas where access is difficult, encourage property owners to have fire fighting equipment and water availability. Identify properties with access issues and work with owners on improving access for firefighting personnel.

Emergency response: Improving the infrastructure of the existing fire protection departments and fire departments will improve response time to an incident. The quality of wildland fire response is dependant on staff training, distance to fire, equipment, personnel, facilities and current deployment.

Based on the interviews with community officials, field observations and questionnaire responses, the following prioritized actions should occur in south-central Lake County:

- Continue to strengthen the cooperation among the federal agencies (BLM, USFWS and USFS), Lakeview and Paisley Fire Departments, RFPDs, ODF and private landowners.
- Strengthen the firefighting ability of the RFPDs through motivation, training and improved equipment. Consider expanding the RFPD to include the areas not under protection.
- Consider organizing Rangeland Fire Protection Associations (RFPDs) for unprotected lands. RFPDs operate under ORS 183.335 to provide wildfire protection within their jurisdiction and have contractual relationships with the federal agencies to provide wildfire protection as first responders. The Associations are formed to provide wildfire protection where protection is not available. The RFPDs would not provide structure fire protection. The RFPDs operate as non-profit corporations with volunteer membership. Dues are assessed to RFPD residences for membership. Dues and grant money are sources for funding. Expenses are incurred for insurance, fuel and equipment repair. Equipment consists of donated, loaned or secured on grant wildfire fighting vehicles such as brush trucks and tenders. Response times to a wildfire are variable depending on fire location, accessibility and availability of volunteers.
- Encourage the development of defensible spaces around homes and other important structures throughout the assessment area (see Appendix C). Recent research has

demonstrated that dwellings with a non-flammable roof and defensible space have a significantly higher probability of surviving a wildfire than those lacking one or both defense mechanisms. Defensible space is a priority fuel break to protect structures from wildfire.

- Encourage weed abatement along roadways, vacant lots, within communities and around homes. A member of the Lake County Weed Board should serve on the CWPP Core Team to coordinate fuels treatment with federal and state agencies.
- Develop strategically located fuel breaks around Lakeview, Valley Falls, New Pine Creek, West Side, Paisley and around and within Collins Timber Company lands, as appropriate.
- Create and maintain additional water storage points in the private forested areas and rural areas outside of the RFPDs. Possibilities include irrigation system hookups, wells where power is available and buried storage tanks.
- Continue the distribution of Firewise educational materials to residents in order to promote knowledge and understanding in implementing proper activities such as landscaping, use of fire resistant building materials, proper access roads and emergency evacuation procedures.

5.3 Hazardous Fuel Projects and Priority

The proposed hazardous fuel projects are both general and specific because of locations and timing. General guidelines are those following catastrophic events such as wildfire, insect kill and wind and resulting in a large accumulation of hazardous fuels. Appropriate fuel treatments such as prescribed fire, mechanical chipping or mastication or a combination that would reduce the hazard to acceptable levels. Economical use of logs and small diameter materials would be explored. Planning for these projects would occur on a case by case basis and in collaboration with interested stakeholders.

The following are specific hazardous fuel projects for south-central Lake County. The projects are associated with communities and are presented in priority based on wildfire risk, values at risk, structure flammability and resources protected.

The first line of defense is weed abatement and defensible space installation within and around communities and structures. Strategically placed fuel breaks located within the WUI and within one to three miles of the community would be constructed. The focus of the fuel breaks would be within the WUI. Since winds are from the south southwest during the fire season, fuel breaks establishment could extend out approximately one to three miles in this direction. Given ideal fuel and weather conditions, wildfire can move rapidly through dry grass, weeds and shrubs. The fuel

breaks would provide a chance for the fire to be controlled. However, firebrands may be carried by wind over the fuel breaks and ignite spot fires in or near communities or structures. Thus, the need for weed abatement and defensible space installation.

The intent of the fuel breaks is to break up the continuity of fuel such as juniper, sagebrush, grass and weeds to reduce wildfire rate of spread and severity to allow firefighters a chance at suppression. The general locations of the fuel breaks are presented below. However, these locations are just suggestions and on the ground reconnaissance is necessary to identify specific locations. Fire behavior models such as BehavePlus2, FARSITE and FlamMap can help predict fuel breaks locations given historic weather patterns, terrain, fuels and proposed fuels management. The software and user manuals for these fire behavior models are available at <http://farsite.org>. Federal and state fire managers may have to work with private landowners in some areas to establish fuel breaks.

Compliance with federal and state policy will be followed for fuel break construction. Also, funding will need to be secured. These steps will take time. However, wildfire mitigation can occur immediately within all communities with the construction of defensible spaces around structures and mowing grasses and weeds as they dry in the late summer. This action alone will greatly reduce the risk of wildfire.

Fuel breaks would be constructed using hand crews, mowers, brush choppers, livestock grazing, prescribed fire or bulldozer depending on the vegetation type and terrain. Appropriate best management practices would be followed in fuel break implementation. The fuel breaks would be at least 30 to 50 feet wide or wider on slopes with length varying according to placement and terrain. The intent of the fuel treatments is to reduce the kind and/or amount of vegetation and to minimize soil disturbance. Fuel breaks would not restrict appropriate land uses such as livestock grazing. Care is needed to ensure minimal vegetation removal so the fuel break does not become potential habitat for annual weeds such as cheatgrass and tumble mustard. Annual weeds are flashy fuels that would exacerbate fire spread. For this reason, the use of bulldozers should be minimal unless the seeding of perennial grasses occurs after treatment. Likewise, post-fire rehabilitation and monitoring will be necessary on-site where prescribed fire is used. All sites will require yearly monitoring to ensure that the fuel breaks are functional. Fuel break maintenance would be achieved by mowing, livestock grazing, hand crews or herbicide use as appropriate.

In areas where sagebrush or bitterbrush ground cover is greater than fifty percent, efforts would be to reduce the cover to fifteen to twenty-five percent. Hand crews or a shrub chopper could be used for this purpose. This level of sagebrush or bitterbrush cover would still provide adequate wildlife habitat for species such as sage grouse and provide soil protection. Established perennial grass stand should be mown or grazed annually to a height of no less than six inches. Mowing or grazing during the late summer would allow the plants to set seed and maintain vigor.

Lakeview – Establish a fuel break east of town along Deadman and Bullard Canyons in T39S R20E, Sections 34, 14, 22 and 23. Defensible space and non-flammable roofs should be encouraged for all structures and houses on the east and south sides of Lakeview that are within 300 feet of juniper and sagebrush covered slopes. Firebrands could blow onto these structures and cause fire. Fuels mitigation and defensible space constructions for the rural areas to the north of town are also needed. Fuels such as sagebrush and juniper need to be considerably reduced with defensible space construction around homes. Weed abatement by mowing is needed throughout Lakeview. Embers from wildfire could ignite these weeds and cause spot fires in town.

Collins Timber Company Lands – Shaded fuel breaks should be constructed along its boundaries as appropriate to reduce the chance of fire spreading onto or from public lands. Existing roads to the property and existing timber cuts could be used as the basis for the fuel breaks. An effort should be made to reduce ladder fuels, reduce crown cover continuity and limb up trees in FRCC 3 vegetation. Establish shaded fuel breaks along all the boundaries to the width of at least canopy tree height. Develop shaded fuel breaks in association with roads to break up fuel continuity, to contain fire and to keep fire to ground fuels. Restore FRCC 3 vegetation on USFS lands in proximity to Collins property and within the property to FRCC 1. On the ground reconnaissance will be necessary to identify priority areas. Improve water storage facilities and during summer months and consider installing temporary 3,000 gallon bladder storage in critical areas. Ponds that are suitable for dipping and drafting should be maintained. Construct signs at all entry roads that show the level of fire risk and rules concerning fire use. Prohibit campfires on property and smoking outside of vehicles and use spark arresters on saws and other portable harvesting equipment. Work with LIFC to train employees at Firefighter I level. Consider prescribed burns to reduce ground fuels. Follow recommendations in the 2004 “*Collins Lakeview Fire Risk Assessment*”.

Paisley – The west side of town needs sagebrush reduction and development of defensible space. Cultivated lands should continue to be maintained around the community but dried plant materials should be mowed or removed. A series of strategically placed fuel breaks should be constructed on the west of town in T33S, R18E, Sections 23 and 26. Risk of fires starting on the public lands to the west is high. Dried grass and weeds within the community need to be mowed during the fall. The use of non-flammable roofs and defensible spaces should be encouraged. Reduce FRCC 3 areas in proximity of the town to FRCC 1.

New Pine Creek – A series of three to four strategically placed fuel breaks should be constructed on the east and south sides of town in the sagebrush vegetation of T41S, R20E, Sections 8, 17, 20 and 32. Dry wheat fields should be reduced around community by cultivating or watering. Eliminate wood piles next to structures and continuous fuels. Existing roads may be used as the basis for the fuel breaks. The amount of sagebrush, dried grass and weeds in town should be reduced. Hand crews or pesticide use could reduce the sagebrush cover. The grass and weeds within the community need to be mowed as they mature. The use of non-flammable roofs and defensible

spaces should be encouraged especially for those houses adjacent to the sagebrush covered slopes. Embers from wildfire could ignite these weeds and cause spot fires in the towns. Reduce FRCC 3 areas in proximity of the town to FRCC 1.

Valley Falls – Sagebrush reduction and development of defensible space is needed on the west side of town. Continue to maintain cultivated lands around the community. Dried grass and weeds within the community need to be mowed during the fall. The use of non-flammable roofs and defensible spaces should be encouraged. Manage FRCC 3 areas in proximity of the town to FRCC 1.

Westside – Grass and weeds need to be mowed or grazed as they mature in the late summer within the community and the surrounding area.

5.4 Non-fuels Mitigation Needs

The proposed non-fuels mitigation needs for the most part are not specific projects like the hazardous fuel needs but they are on going and need to occur concurrently. The following are the proposed non-fuels mitigation needs presented in order of priority:

Fire Protection Authority Communication and Coordination – Continue the cooperation and communication among LIFC, the RFPDs and private landowners concerning wildfire issues. Collective action is needed to reduce the threat of wildfire through implementation of this plan. Yearly meetings and/or newspaper releases are needed to inform the public of projects implemented in the last year and of proposed action for the near future. This type of teamwork and coalition building among federal, state, counties and private landowners is supported by the National Fire Plan and HFRA.

Community Firewise Outreach – The purposes of the community Firewise program are to:

- Provide information on ways to reduce human-caused fires
- Urge landowners to take action to construct defensible space around their homes and structures (Appendix C)
- Encourage the use of non-flammable roofs and siding on new construction and the retrofit of existing houses
- Increase the awareness of the natural role of fire in ecosystems and the need for hazardous fuel management

An annual “Firewise Clean Up Week” held in the spring and/or in October in association with National Fire Prevention Week is recommended to encourage residents to create defensible space around their residence. In conjunction with the Firewise Clean Up Week, specific demonstration projects may be designed and utilized to educate residents about longer term investments they could

make to increase fire safety. The clean up week could occur in conjunction with public demonstrations, education programs and speakers on wildfire and Firewise practices.

Strengthen the Rural Fire Protection Districts – LIFC, the rural section of the Lakeview Fire Department, Paisley Volunteer Fire Department and the two RFPDs provide wildfire protection in south-central Lake County. For the most part, the federal and state agencies are fully staffed and equipped for wildfire and fuels management in their area of jurisdiction. However, the RFPDs are not. Given that the RFPDs are volunteer organizations, the same level of wildfire preparedness cannot be expected. However, the RFPDs provide a valuable service for a large percentage of residents. Efforts should be made to expand the RFPDs through public awareness, economic aid appreciation, proper equipment and training. All members of the RFPDs should have basic training in wildfire fighting procedures, fiscal management and wildfire preparedness. Support for the RFPDs should come from the County and LIFC. The RFPDs would be responsible for Firewise outreach in their respective areas. The RFPDs currently have sufficient vehicles needs as first responders. Improved communication among the volunteer firefighters and with the federal and state agencies is needed. Handheld, LIFC compatible radios would be appropriate for this need.

5.5 Protection of Homes and Structures

The main principle concerning structure ignitability is that the structure is a source of fuel and may burn just as readily as juniper or sagebrush. Structure loss to wildfire can occur by conduction, convection or firebrand. Conduction is the flame of the fire coming in direct contact with the structure. Convection occurs where the structure becomes hot enough to combust without direct flame contact. Firebrands are embers or burning pieces of limbs, leaves or twigs that are blown onto a structure. Firebrands may lodge in crevices of roofs, eaves or side paneling and smolder for several hours before combustion. Firebrands ride on air currents resulting from the fire and may be carried over one mile from the fire front. Recent studies have shown that structure ignitability is the principle cause of structure loss during a wildland fire and not the character of the wildland fuel or fire intensity *per se*.

Fire spread occurs by a propagating process, not as a moving mass such as a flood. For fire to spread, material such as a tree or shrub in the flame front must meet the conditions of ignitability. The conditions are the presence of oxygen, flammable fuel and heat. Oxygen in a wildland fire situation is almost never limiting. Heat is supplied by the flame front. Potential fuel in the path of the flame that meets the conditions of combustion will ignite. If fuel does not meet the conditions of combustion, it will not ignite. This explains why some trees, patches of vegetation or structures may survive a wildland fire and others in the near vicinity are completely burned.

Structure ignitability, not the nature of wildland fuels, is the main cause of structure loss during wildfires. Critical factors that increase the chances of structure loss are flammable roofing

materials (e.g., cedar shingles) and flammable vegetation (e.g. ornamental trees, shrubs and debris/wood piles) near the structure. A wildland fire does not burn a structure unless it meets fuel and heat requirements sufficient for ignition and continued combustion. With this understanding of fire behavior, the flammability of the structure and its immediate surroundings can be managed to reduce the chances of ignition and loss during a fire incident. The primary and ultimate responsibility for structure protection during wildland fire lies with the structure owner. The following are two actions that home owners can take to greatly reduce the chances of wildfire burning their structures:

- Develop a defensible space around the structure that is at least 30 feet wide, use low combustibility plant material for landscaping and remove wood piles next to structures (Appendix C). If the structure occurs on a slope, the defensible space must be greater on the down slope side of the house corresponding to the steepness of the slope.
- Use noncombustible construction material to the extent possible. The minimum is noncombustible roofing material.

5.6 Need for Action

Wildfire occurrence in south-central Lake County is common. Ignition usually results from lightning, although human-caused fire potential is high. The hazard of wildland fire is high because of the ladder fuels and overstocked ponderosa pine stands, juniper invasion into sagebrush and grasslands, overstocked sagebrush stands and the pervasiveness of invasive weeds. Fire risk is extreme during the late summer and fall months when grasses and weeds are dry. These flashy fuels are ignited easily, burn rapidly and resist suppression. Many structures are at risk because owners do not follow Firewise guidelines for protection (Appendix C).

Both general and specific actions are needed to mitigate wildfire risk, improve forest and rangeland health and enhance vegetative diversity. General actions include the adherence to Firewise practices on a continual basis. Specific actions would be the establishment of fuel breaks and restoring FRCC 3 vegetation to FRCC 1 by improving forest and rangeland health. Also, sagebrush, weeds and grasses growing within and around communities, structures and along roads should be maintained as appropriate.

6 EMERGENCY OPERATIONS

6.1 County Wildfire Preparedness and Outreach

The County should continue its efforts to strengthen the RFPDs and work closely with the federal

and state agencies. The RFPDs will continue to need wildfire training, as well as updating of equipment. Emergency evacuation routes, evacuation centers and other considerations need to be in place. Good communication and cooperation among all fire authorities are essential to reducing wildfire risk throughout the County.

County preparedness occurs before a wildfire emergency through the use of appropriate Firewise building codes for new construction and encouragement of retrofits for existing structures. Briefly, these codes include the use of non-flammable building materials, the creation of access roads suitable for emergency vehicles, the preservation of available water for structure protection and the development of a defensible space.

The purpose of a community wide education program is to:

- 1) educate the public to the risks of wildfire to property and life (during the summer months)
- 2) urge property owners to take responsibility in reducing the risk of wildfire and to create defensible space around their structures
- 3) inform the public as to the benefits of different types of fire resistant building materials and
- 4) increase awareness of the natural role of low intensity fire in grassland and woodland ecosystems and the benefits of thinning fuel loaded areas.

Citizen involvement in wildfire mitigation in and around communities is a necessary element for success. Public education and outreach are effective means of engaging the public in the process of reducing risks to a community, can help identify problems and solutions for both federal and private landowners and can offer opportunities for partnerships and agreements. Such education and outreach has been shown to motivate homeowners to take Firewise measurements around their individual properties, thereby contributing to the reduction of wildfire hazards in a community.

6.2 Emergency Procedures and Evacuations Routes

In the event that the County Sheriff orders a community to evacuate because of threatening wildfire, residents should leave in an orderly manner. The preferred evacuation routes would be proclaimed by the Sheriff.

Before residents leave, they should take every precaution to reduce the chance of structure loss as time allows. Human safety is the number one concern in an evacuation. Action could include thoroughly irrigating the defensible space, watering down the roof and removing all debris from rain gutters. Remove all flammable materials thirty feet or more from the house such as wood piles, leaves, debris and patio furniture. Windows and doors should be closed but not locked. Other openings should be covered. A ladder should be placed for roof access by firefighters. A fully charged hose that reaches around the house should also be available for firefighter use.

Families should have in place meeting locations and phone numbers to call in case family members are separated. Families should take with them important papers, documents, pets, food, water and other essential items. The house should be monitored for smoke for several hours after return. Embers may lodge in small cracks and crevices and could smolder for several hours before flaming.

Evacuation routes for each community are listed in Table 11. Even though some communities such as New Pine Creek have only one road, it is unlikely that wildfire would threaten both directions.

Table 11 Emergency Evacuation Routes

Community	Evacuation Route
Lakeview	State Highway 140, State Highway 31, US Highway 395
New Pine	US Highway 395
Valley Falls	State Highway 31, US Highway 395
Westside	Tunnel Hill Road
Paisley	State Highway 31

6.3 Wildfire-suppression Operations

Currently, all wildfires in south-central Lake County are aggressively suppressed regardless of cause. A Mutual Aid Agreement exists among the various County fire authorities to aid and support suppression activities as appropriate. Fire authorities responsible for wildfire-suppression in south-central Lake County are:

- Lakeview Interagency Fire Center
- New Pine Creek RFPD
- Westside/Thomas Cree RFPD
- Paisley Volunteer Fire Department

Air and land are the two modes for initial wildfire attack. The location of fire dictates the mode of initial attack. An air attack would most likely occur in roadless or limited-access areas. The BLM, USFS and ODF have air attack resources at their disposal. Smoke jumpers and a retardant base are located in Roseburg. Air tanker bases are located in Klamath Falls and Medford. All of these fire support facilities are fully capable of initial attack on fires that are not accessible by roads.

Initial attack on land to suppress a wildfire would depend on its location in the assessment area. A RFPD could provide a first response to wildfire occurring in their jurisdiction. The interagency fire crews would respond to wildfire on BLM, USFS and private forestlands. If the wildfire escapes initial attack, then the other fire authorities may be called to action through the Mutual Aid Agreement. If conditions warrant, the federal and state agencies can call in more support from other areas. LIFC has seven engines working out of Lakeview. ODF has engines stationed throughout Lake County and additional engines stationed at Klamath Falls. Federal resources are

available through the Northwest Coordination Center (NWCC) located in Portland. State resources are coordinated through the ODF Salem Coordination Center. ODF has an agreement with Oregon Department of Corrections for the use of inmate resources to fight fires and support fire-suppression activities. There is also a very large private work force that can be activated through contractual arrangements to support wildfire suppression. Contracting equipment consists of dozers, Lowboys, water tenders, engines and 20 person crews and personnel with specialized talents.

Extended attack would be handled through an Incident Management Team (IMT). The IMT has the ability to activate all resources needed to suppress wildfire. They would also set up a small city-type camp with the capabilities of feeding and housing all crews. The IMT supports the crews with equipment and supplies to safely suppress the fire. The important factor is that the IMT uses outside agency help and contractors so local firefighting personnel can be released to their regular initial-attack duties. The size of the IMT and suppression forces depends on many aspects such as fire size, location, management objectives and values at risk. The Central Oregon IMT, Blue Mountain IMT Oregon Department of Forestry IMT and Pacific Northwest National IMT are available and all partially staffed by local agency personnel.

Structure fires are handled much differently than wildfires because specialized training and equipment are needed. The Lakeview FD, Paisley Volunteer FD, New Pine Creek FD and Westside Thomas Creek FPD are the only fire authorities in south-central Lake County properly trained and authorized for structure fire fighting. The federal agencies are not trained or equipped for structure fire-suppression. Although federal agencies personnel are not trained, equipped or organized to fight structure fires, they will assist the fire departments in protecting exposures and surrounding vegetation by cleaning around houses, setting up pumps and locating and constructing fire lines.

In the event that numerous structures are threatened by wildfire, the County can request the Governor declare an emergency and invoke the Conflagration Act. This will make available additional resources to protect structures. However, all local structural resources must first be depleted.

7 south-central lake county cwpp monitoring and evaluations

7.1 CWPP Plan Adoption

A meeting was convened on November 29, 2005 at the Lakeview Elks Lodge to present the South-central Lake County CWPP to the Core Team, fire authorities, stakeholders and the public. A 10 day public response period occurred before the CWPP was finalized and presented to the Core Team.

The south-central Lake County CWPP provides a foundation and resources for understanding wildfire risk and opportunities to reduce potential losses from wildfire. Individual communities, RFPDs and private landowners can take action by developing specific fire plans or by participating in countywide activities for prevention and protection.

HFRA and FEMA Disaster – Mitigation Act of 2000 require adoption of this plan by the Core Team and Lake County Commissioners. This plan will allow the County to be competitive for hazardous fuels and non-fuels mitigation funding that may assist with its implementation. Furthermore, adoption of this plan highlights the partnerships among fire districts, local government, community based organizations and public agencies.

7.2 Sustaining CWPP Efforts

Implementing and sustaining the CWPP is the key to success. This is the responsibility of the Core Team. Building partnerships among community based organizations, fire protection authorities, local governments, public land management agencies and private landowners is necessary in identifying and prioritizing measures to reduce wildfire risk. Maintaining this cooperation is a long-term effort that requires the commitment of all partners involved. The CWPP encourages citizens to take an active role in identifying needs, developing strategies and implementing solutions to address wildfire risk by assisting in the development of local community wildfire plans and participating in county-wide fire prevention activities.

Lake County is committed to supporting the RFPDs in their fire protection efforts, both short and Long-term. The County will continue to provide support in maintaining countywide risk assessment information and emergency management coordination. The Core Team will work on implementing the fire plan by working with fire authorities, community organizations, private land owners and public agencies to coordinate fuels reduction and other mitigation projects.

7.3 CWPP Oversight, Monitoring and Evaluation

The south-central Lake County Core Team will be responsible for CWPP monitoring and evaluation through regular meetings, public involvement and coordination with all fire protection authorities (Table 12). Monitoring is the collection and analysis of information to assist with decision making and accountability and to provide the basis for change. Evaluation will include the effectiveness of past fuels reduction and non-fuels mitigation projects and recent wildfire-suppression efforts. Overtime, monitoring and evaluation measures will progress in a way that will determine if the CWPP goals and objectives are being obtained.

Table 12 Monitoring and Evaluation Tasks

Objective	Tasks	Timeline
-----------	-------	----------

Risk Assessment	<ul style="list-style-type: none"> • Use reliable data that is compatible among the partner agencies • Update the CWPP as new information becomes available • Continue to assess wildfire risk to communities and private landowners 	<p>Annual</p> <p>Annual</p> <p>Bi-annual</p>
Fuels Reduction	<ul style="list-style-type: none"> • Identify and prioritize fuels treatment projects on public and private lands • Track fuels reduction and defensible space projects on private land • Monitor fuels reduction projects on evacuation routes • Track grants and other funding sources and make appropriate application 	<p>Annual</p> <p>Bi-annual</p> <p>Annual</p> <p>On-going</p>
Emergency Management	<ul style="list-style-type: none"> • Review suitability and the need for fuels reduction along evacuation routes 	<p>Annual</p>
Public Outreach	<ul style="list-style-type: none"> • Plan and hold Firewise education week • Provide Firewise pamphlets at public events • Evaluate techniques used to motivate and educate private landowners. 	<p>Annual</p> <p>Annual</p> <p>Annual</p>

7.4 Funding and Technical Resources

Financial resources that provide support for various wildland fire mitigation action items include various State and Federal grants administered through ODF, BLM, the Natural Resource Conservation Service and FEMA. Some funding sources are not targeted at fuel management, but oftentimes multiple resource management objectives can still be achieved when the focus is on only one. Funding requests should be coordinated with ODF, BLM and the USFS. Potential funding sources include, but are not limited to, the following:

- **Rural Fire Assistance:** Assistance is funded 90/10 by USFS grants to State Foresters.
- **Federal Excess Property:** USFS equipment is loaned to State Foresters. Recipients include State Forestry Programs and Volunteer Fire Services.
- **Economic Action Programs (EAP):** A USFS, State and Private program that can assist in diversification for uses of forest products, including utilization of hazardous fuels byproducts; eighty percent federal funding, twenty percent nonfederal funding (<http://www.fs.fed.us/r3/spf/community/>).
- **Assistance to Fire Fighters:** The FEMA and US Fire Administration Program can improve fire fighting operations, services and equipment; ninety percent federal funding, ten percent nonfederal funding (www.usfa.fema.gov).

- **Pre-Disaster Mitigation Program:** A FEMA program delivered through the State's emergency management agency to be used for emergency management and assistance to local governments to develop all hazard mitigation plans.
- **Hazardous fuels reduction grants** for south-central Lake County can be combined from developments in the County and applied for through ODF. Grant administration costs should be included into countywide grant requests.

The following information was summarized from "*Incentive Programs for Resource Management and Conservation*" (OSU Extension Publication #EC1119) and other sources. This lists the major incentive programs available to assist communities and landowners with the management of their lands. These programs are not limited to the issues of Communities at Risk and are able to provide similar types of cost share opportunities on private lands in all areas of south-central Lake County. Landowners need to check with the participating agency for applicability to their property and needs:

- **Forest Stewardship Program (FSP):** Cost shares consultant written/ODF approved stewardship plans — apply with your local ODF Stewardship Forester using FLEP application form.
- **Forest Resource Trust (FRT):** Loan/grant to cover costs (normally 100 percent of costs) to convert under producing forest land or marginal agricultural land into conifer forest. *Applies only to DF "high" Site 4 or better sites.* Apply by completing FRT application form at local ODF offices.
- **Forest Land Enhancement Program (FLEP):** Cost shares a variety of upland forestry practices (site prep, tree planting, non commercial thinning, release, etc.) Apply with local ODF Stewardship Forester using FLEP application form. Projects are funded from one "pot" of funds in Salem. Funds are allocated to applications that arrive in Salem on a first come, first served basis, by priority. Current funding available is \$6,300. Unused funds continually recycle back into the "pot" as projects are completed or cancelled. In addition, we anticipate that "new" funds will be made available to Oregon in late 2005.
- **Oregon 50 percent under producing Forest Land Conversion Tax Credit:** State tax credit on cost of converting under producing forestland (brush land and low value /low volume forest) to well stocked forest. Apply by completing tax credit form and submitting it to the local ODF Stewardship Forester (The form is available on the [ODF Private and Community Forest](#) web site or at the local ODF office). The State tax credit is available to qualified landowners and projects on a continuous basis. Proposed projects should be pre qualified by

the local ODF Stewardship Forester.

- **Afforestation Incentive (OAR 629 611 Forest Practices Rules):** Provides landowners an incentive to convert parcels of idle land or land in other uses to commercial forest use. Provides assurance that no State forest practices regulation will prohibit harvesting most of the planted timber established and grown as the first crop rotation. Contact the local ODF Stewardship Forester for more information.
- **Federal (ten percent) reforestation tax credit:** Federal tax credit on cost of most afforestation or reforestation projects is available for project work completed before October 22, 2004. For reforestation/afforestation work done after October 21, 2004, landowners can "deduct" a certain amount of project expenses (Note: The ten percent federal tax credit has been repealed but landowners will be able to deduct some reforestation/afforestation expenses going forward from now). Landowners need to contact the IRS or their tax professional to get the required forms and properly utilize this incentive. Additional information can be found at: www.timbertax.org
- **Environmental Quality Incentives Program (EQIP):** Cost shares a wide variety of agricultural and forestry practices. However, availability of funding for upland forestry practices depends on a number of woodland owners applying for EQIP funding and actively participating in local EQIP working group. Apply for EQIP funds at local NRCS (Natural Resource Conservation Service) office.
- **Watershed Improvement Grants (OWEB):** Cost shares riparian (usually near stream or in stream) work check with local watershed counsel and/or SWCD (Soil & Water Conservation District). Grant applications are available on line at OWEB or at the local SWCD office.
- **Wildlife Habitat Incentives Program (WHIP):** Cost shares a variety of wildlife enhancement practices which can include forest establishment and thinning for wildlife purposes. Apply with local NRCS office.
- **Conservation Reserve Program (CRP):** Cost shares a variety of conservation practices on agricultural land including forest establishment and thinning. Pays rental on acres enrolled for ten to fifteen years. Apply at local FSA (Farm Services Agency) office.
- **Conservation Reserve Enhancement Program (CREP):** Cost shares primarily riparian and wetland improvement projects on agricultural land. Practices include riparian forest buffer establishment. Pays rental on acres enrolled for ten to fifteen years. Apply at local FSA office.

7.5 Community Fire Assistance

- Volunteer Fire Assistance (VFA): Assistance to Volunteer Fire Departments for equipment and supplies. Contact the local ODF office.
- Rural Fire Assistance (RFA): Assistance to Rural Fire organizations for equipment and supplies. Contact the local ODF office.
- Federal Excess Personal Property program (FEPP): Provides federal excess equipment and supplies to city & rural fire departments for firefighting purposes. Contact the local ODF office.
- Special funding for Insect & Disease control: The cost share amounts vary depending on the acreage owned. It varies from thirty-three percent to fifty percent, with the larger landowners being eligible for only thirty-three percent of the costs. Contact the local ODF office.
- Title II: Funding is available from the County Commissioners for projects to enhance forest objectives. Contact the County Commissioners.

Numerous technical resources are available for wildfire mitigation. Internet home pages of ODF, the U.S. Forest Service, the Bureau of Land Management and NFPA can be accessed for additional information:

- Oregon Department of Forestry (ODF), internet address for information about Oregon forests and lands; Website: [Oregon Department of Forestry](#)
- Federal Wildland Fire Policy, Wildland /Urban Interface Protection Federal report describing areas that need improvement nationally; Website: www.fs.fed.us/land/wildfire
- National Academy of Public Administration (NAPA), Wildfire-suppression: Strategies For Containing Costs; Website: [National Academy of Public Administration](#)
- Bureau of Land Management (BLM), National Fire Plan and links; Website: [Bureau of Land Management](#)
- USFS Fire Sciences Laboratory, structure protection information; Website: www.firelab.org
- Firewise, community wildfire planning and outreach tools and information, construction

and landscaping practices; Website: www.firewise.org

- Federal Emergency Management Agency (FEMA), information on emergency planning, protection and funding; Website: www.fema.gov

1 BIBLIOGRAPHY

Agee, J.K. 1993. Fire Ecology of Pacific Northwest Forests. Island Press, Washington, D.C.

Anderson, H.D. 1982. Aids to determining fuel models for estimating fire behavior. General Technical Report INT 122, USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.

Brown, J.K. 2000. Ecological Principles, Shifting Fire Regimes and Management Considerations, In: Proceedings of the Society of American Foresters National Convention, September 18-22, 1994. Anchorage, Alaska. Society of American Foresters, Washington, D. C.

Cohen, J. and J. Saveland. 1997. Structure Ignition Assessment Can Help Reduce Fire Damages in the WUI. Fire Management Notes 57(4): 19-23.

Collins Lakeview Fire Risk Assessment. 2004. Unpublished photocopied manuscript obtained from Collins Timber Company, Lakeview or.

Fire Regime Condition Class. Internet Access: <http://www.frcc.gov/index.html>.

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

Grant County Community Wildfire Protection Plan. Undated and unpublished photocopied draft manuscript obtained from Oregon Department of Forestry, John Day or.

Hann, W.J. and D.L. Bunnell. 2001. Fire and Land Management Planning and Implementation Across Multiple Scales. International J. Wildland Fire 10:389-403.

Hardy, CC. et al. 2001. Spatial Data for National Fire Planning and Fuel Management. International J. Wildland Fire 10:353-372.

National Firewise Communities Program. Undated video set. Wildland/Urban Interface Hazard Assessment Training. (order at www.firewise.org).

National Firewise Communities Program. Undated pamphlet. Communities Compatible with Nature. (Order at www.firewise.org).

National Fire Protection Association. 2002. Standards for Protection of Life and Property from Wildfire. NFPA 1144, Quincy, MA.

National Wildfire Coordinating Group, March 1998. Wildfire prevention strategies. PMS 455 or NFES 1572, National Interagency Fire Center, BLM National Fire & Aviation Training Support Group, Boise, ID.

National Wildfire Coordinating Group, 1991. Inspecting fire prone property P 110: Instructors Guide. NFES 2190, National Interagency Fire Center, BLM National Fire & Aviation Training Support Group, Boise, ID.

Omi, P.N and L.A. Joyce (Technical Editors). 2003. Fire, Fuel Treatments and Ecological Restoration: Conference Proceedings. RMRS P 29, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Oregon Department of Forestry. 2004. Fire Protection Coverage Working Group: White Paper. Internet Access: <http://www.oregon.gov/ODF/FIRE/docs/FireProtectionCoverageGrp.pdf>

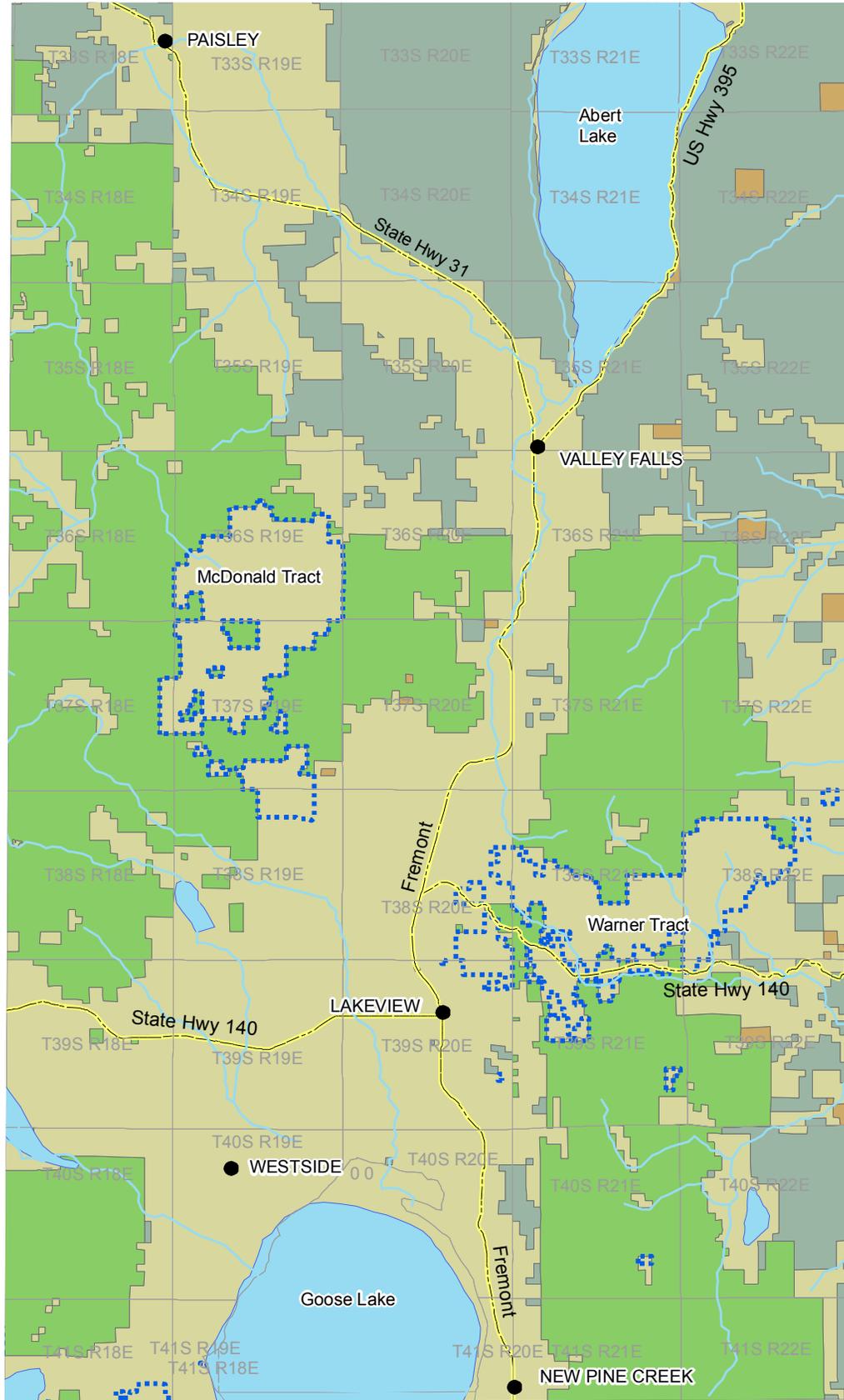
Oregon Department of Forestry. 2004. Oregon Forestland Urban Interface Protection Act: Property Evaluation and Self Certification Guide. Oregon Department of Forestry, Salem or.

Oregon Revised Statues. 477.015. The Oregon Forestland Urban Interface Fire Protection Act of 1997 (Oregon Senate Bill 360).

Schmidt, K.M., et al. 2002. Development of Coarse Scale Data for Wildland Fire and Fuel Management. General Technical Report, RMRS GTR 87, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Society of American Foresters. 2004. Preparing a Community Wildfire Protection Plan: A Handbook for Wildland Urban Interface Communities. Bethesda, Maryland.

Map 1 - Land Ownership



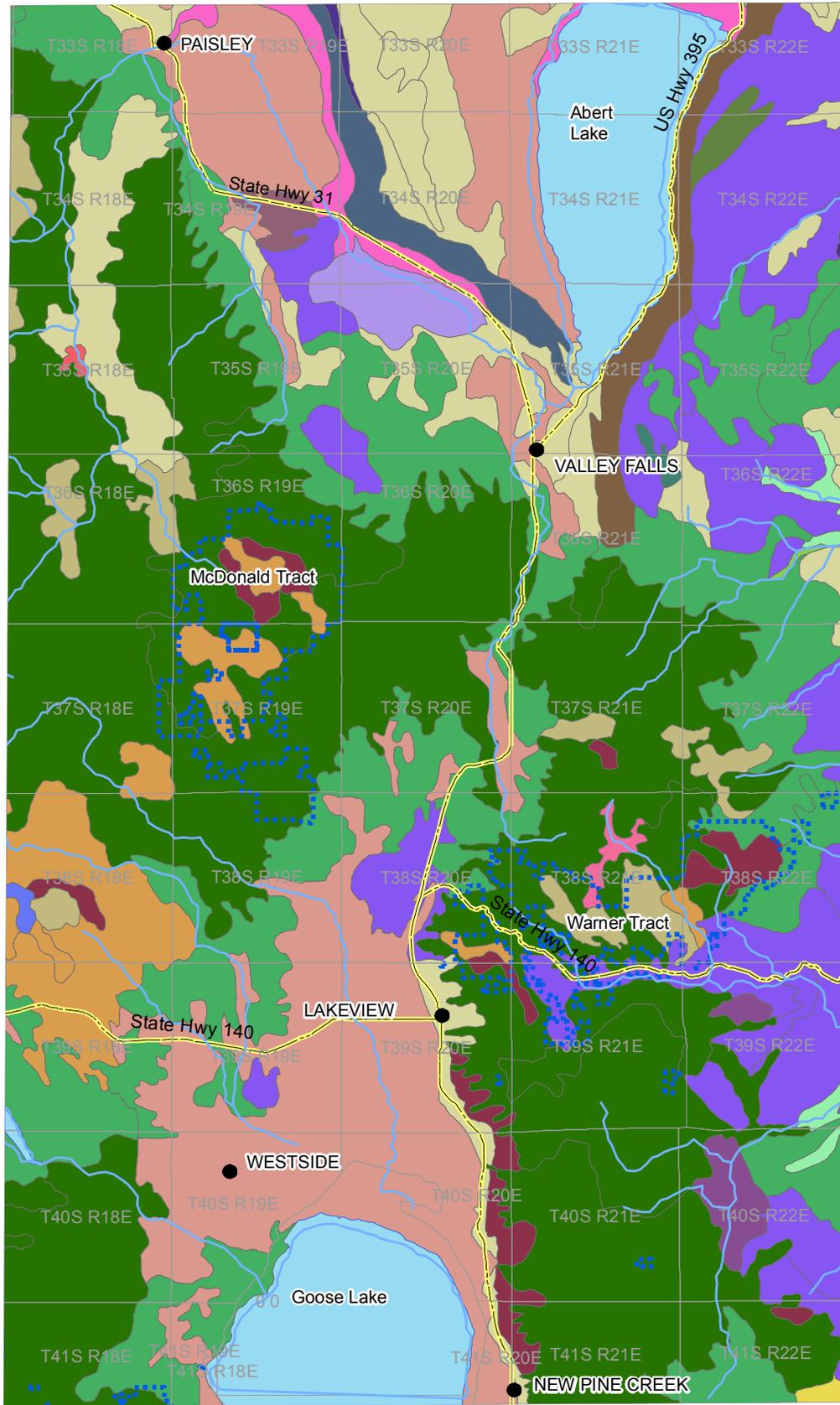
Land Ownership

- BLM (177,777 Acres)
- Private (484,957 Acres)
- State Lands (4,230 Acres)
- US Forest Service (286,284 Acres)
- Collins Timber Company Land
- Highways
- Cities
- Township & Range
- Rivers

1:358,000



Map 2 - Vegetation



Vegetation

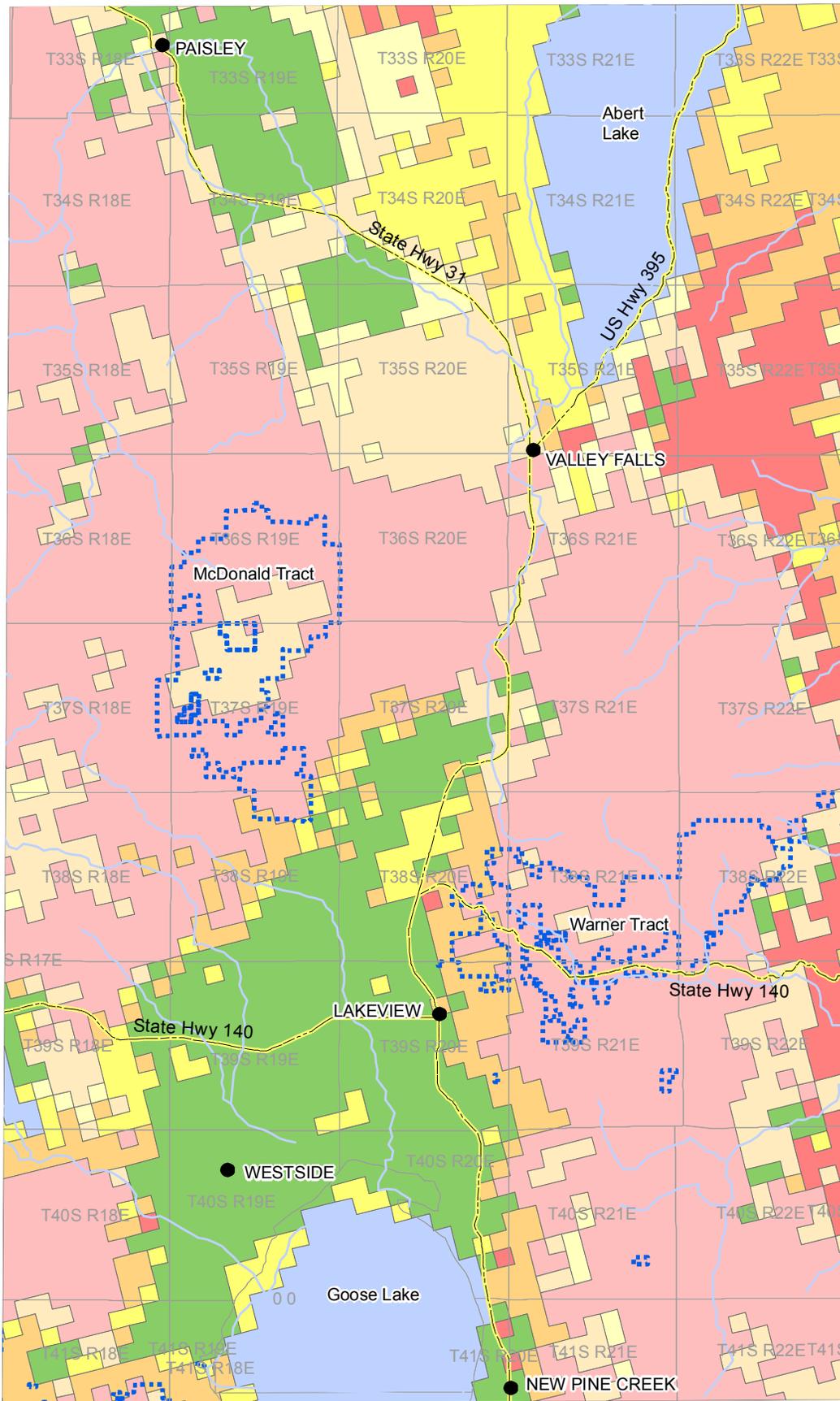
- | | | | |
|--------------------------------------|--------------------------|------------------------------------|------------------------------------|
| Agricultural cropland | Bottlebrush squirreltail | Recent timber harvest areas | Willow species floodplain riparian |
| Alkaline grasslands | Douglas fir | Rimrock and canyon shrubland | Open water |
| Annual grasslands | Hardstem bulrush | Sandy bitterbrush steppe | Collins Timber Company Land |
| Big sagebrush | Low sagebrush | Sedge montane meadows and wetlands | Cities |
| Bitterbrush | Mountain mahogany | Subalpine fir | Rivers |
| Black greasewood | Ponderosa pine forest | True fir | Highways |
| Black greasewood playa or bottomland | Ponderosa pine forests | Tufted hairgrass | Township & Range |
| | Quaking aspen groves | Western juniper | |



1:360,000



Map 3 - Historic Fire Regime



- 0-35 yrs; Condition Class 1 (25,344 Acres)
- 0-35 yrs; Condition Class 2 (124,195 Acres)
- 0-35 yrs; Condition Class 3 (393,771 Acres)
- 35-100+ yrs; Condition Class 1 (62,242 Acres)
- 35-100+ yrs; Condition Class 2 (81,194 Acres)
- 35-100+ yrs; Condition Class 3 (44,260 Acres)

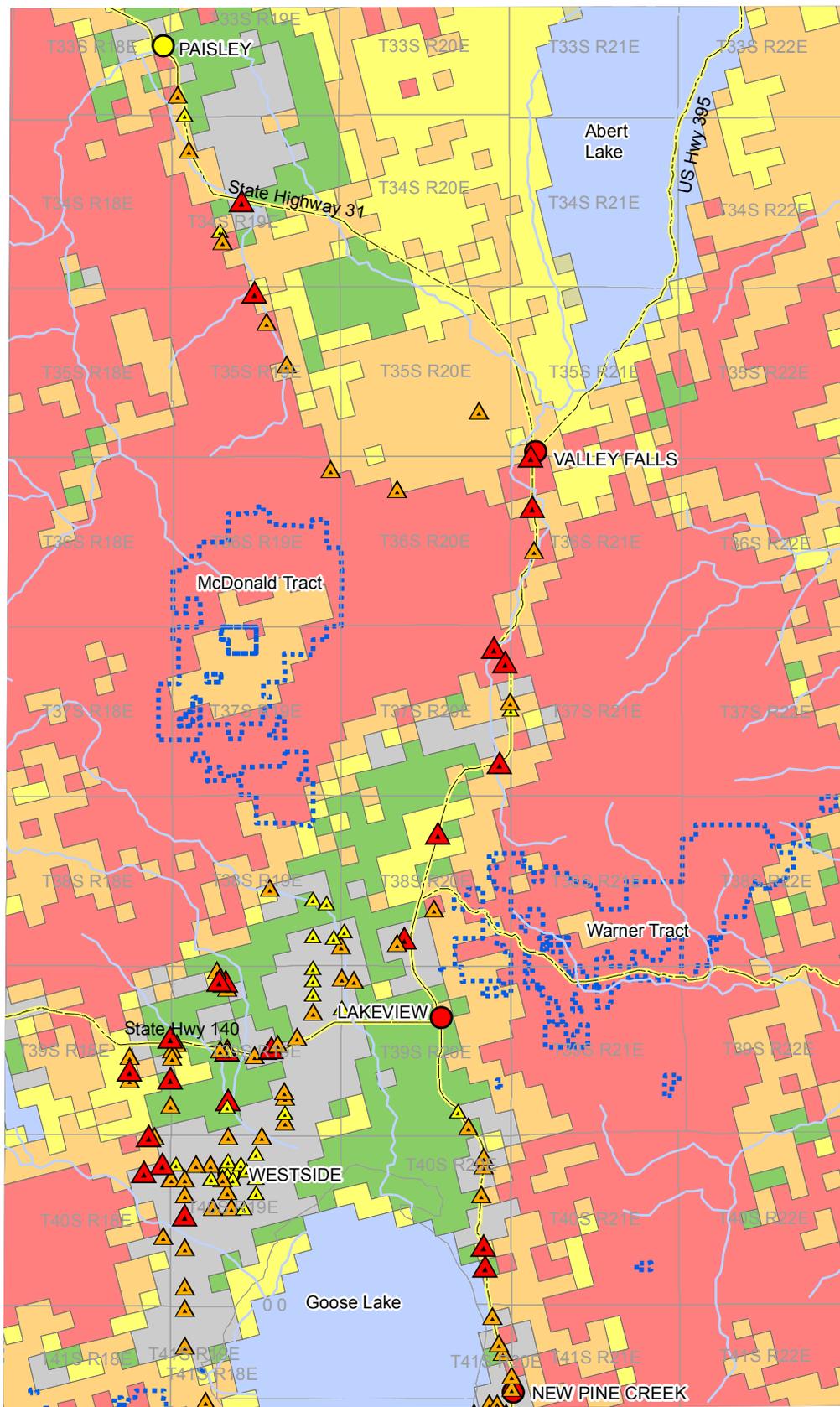
- Agriculture & Non-Vegetative Areas
- Water
- Communities
- Rivers
- Highways
- Collins Timber Company Lands



1:350,000



Map 4 - Fire Regime Condition Class



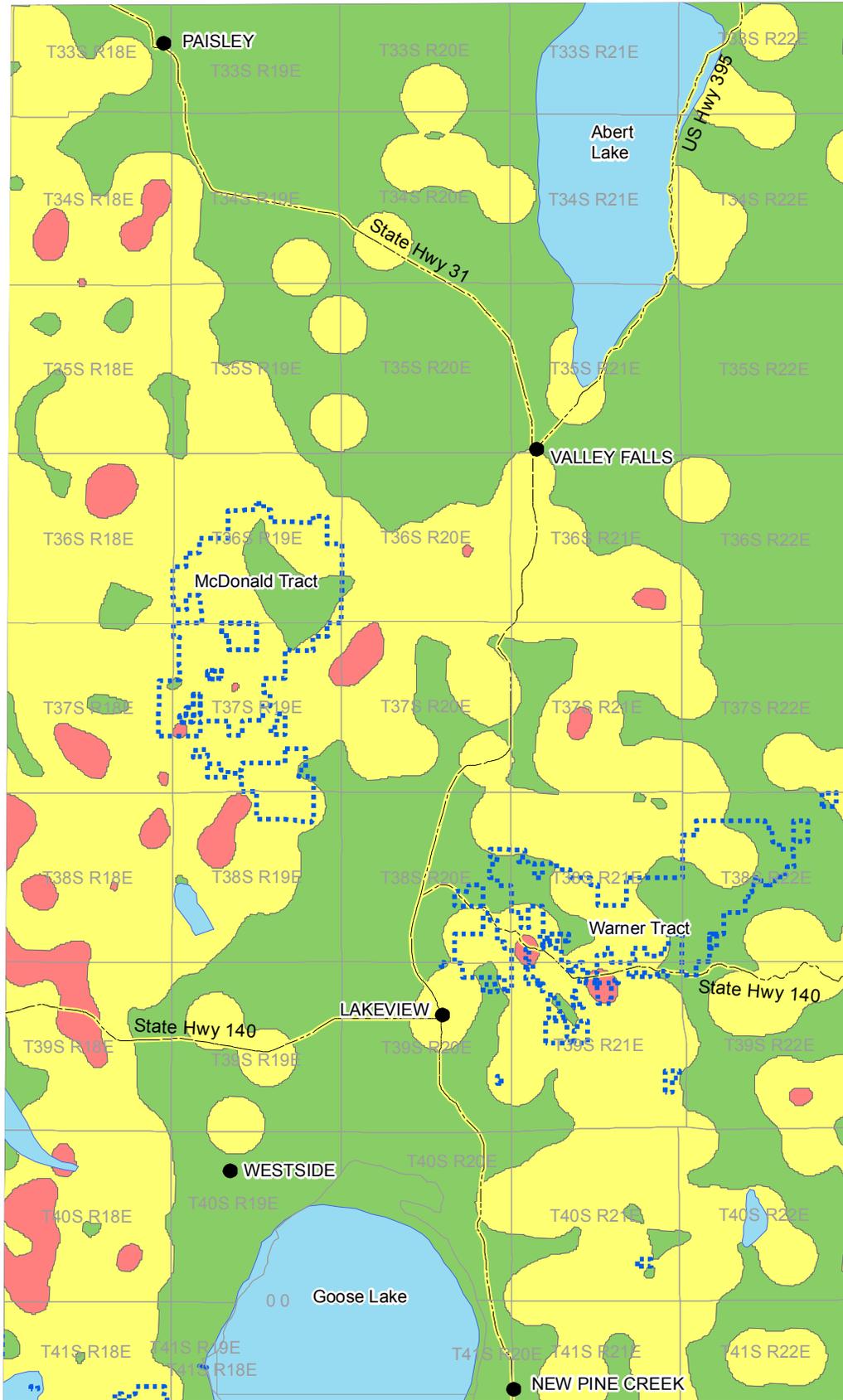
 Condition Class 1 (87,587 Acres)	 Agriculture	Structure Hazard	Community Hazard	 Rivers
 Condition Class 2 (205,930 Acres)	 Non-Vegetation	 Low Hazard	 High	 Highways
 Condition Class 3 (438,031 Acres)	 Development	 Moderate Hazard	 Moderate	 Township and Range
 Water		 High Hazard		 Collins Timber Company Land



1:360,000



Map 5 - Ignition Risk Potential



- Low: 0-0.1 fires per 1,000 acres per 10 years (483,510 Acres)
- Moderate: 0.1-1.1 fires per 1,000 acres per 10 years (444,654 Acres)
- High: 1.1+ fires per 1,000 acres per 10 years (25,095 Acres)

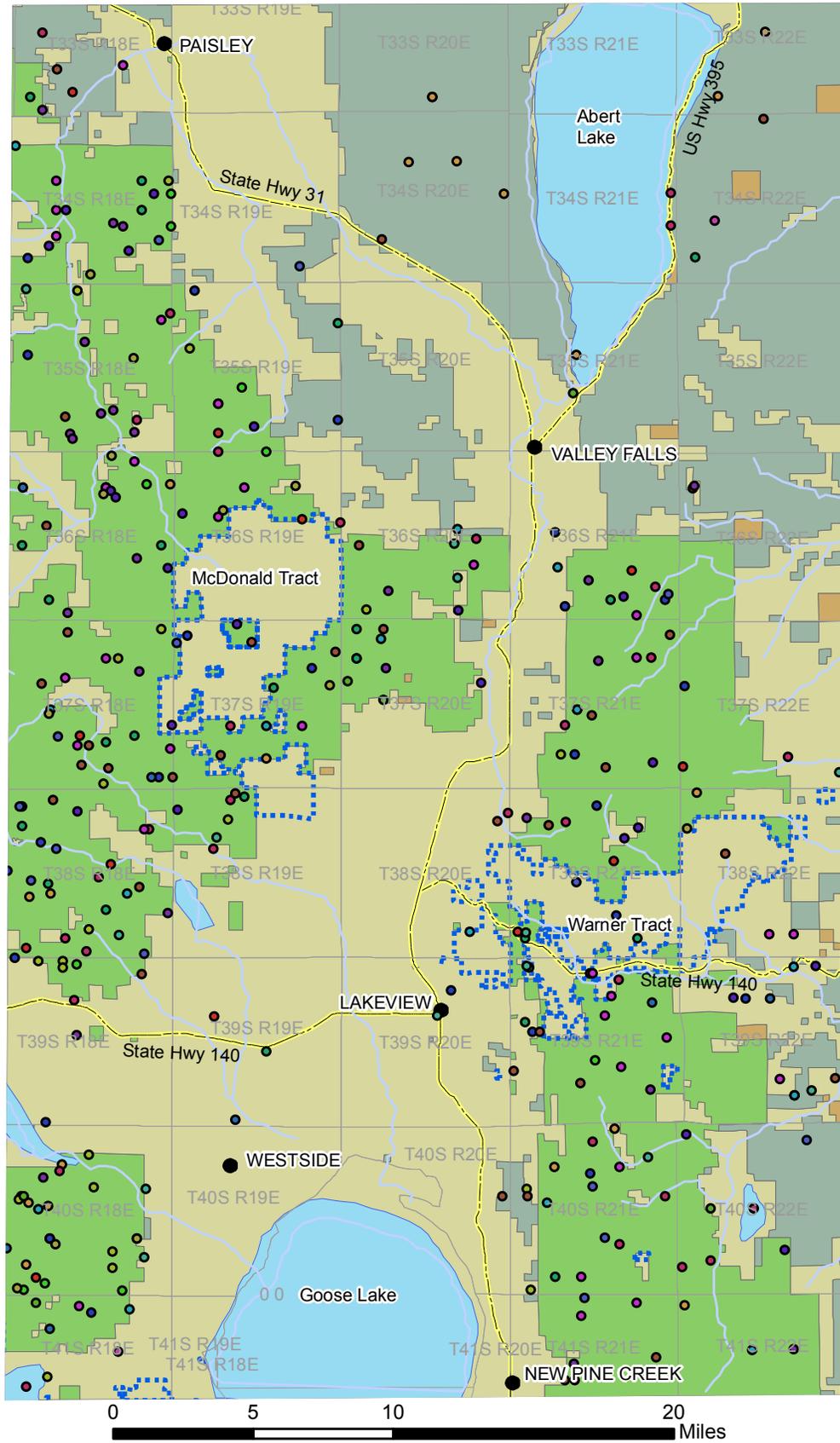
- Cities
- Township & Range
- Collins Timber Company Land



1:356,000



Map 6 - Fire History



1:368,000

Land Ownership

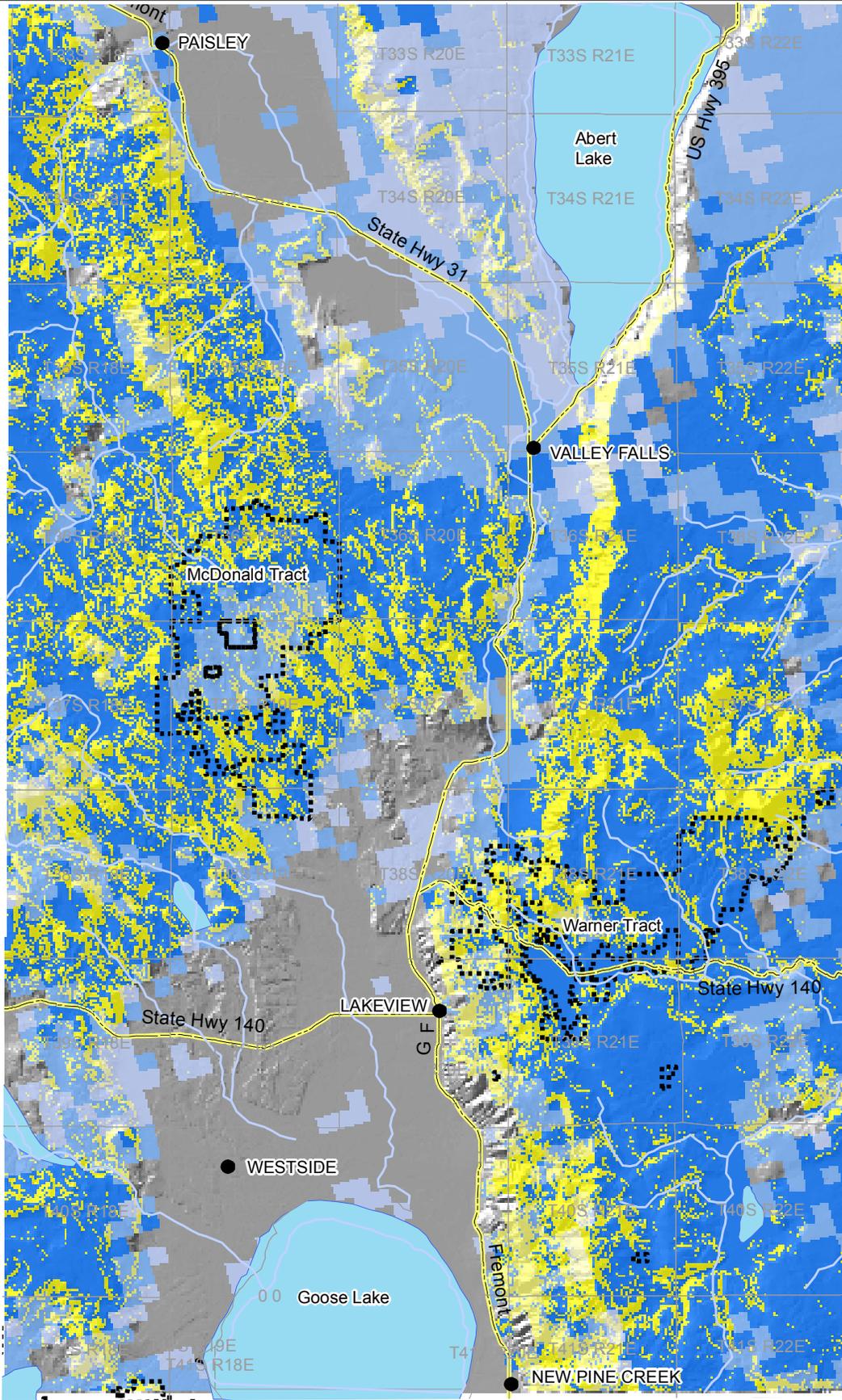
- BLM (177,777 Acres)
- Private (484,957 Acres)
- State Lands (4,230 Acres)
- US Forest Service (286,284 Acres)

- Collins Timber Company Land
- Highways
- Cities
- Township & Range
- Rivers

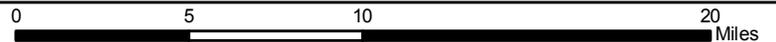
Fire History

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 1980 | 1995 | 2000 |
| 1986 | 1996 | 2001 |
| 1987 | 1997 | 2002 |
| 1988 | 1998 | 2003 |
| 1989 | 1999 | |

Map 7 - OSB 360 Land Classification



- Fire Regime Condition Class 1 on Slope of 25% or less (74,187 Acres)
- Fire Regime Condition Class 2 on Slope of 25% or less (158,655 Acres)
- Fire Regime Condition Class 3 on Slope of 25% or less (302,538 Acres)
- Fire Regime Condition Class 1 on Slope more than 25% (13,100 Acres)
- Fire Regime Condition Class 2 on Slope more than 25% (44,358 Acres)
- Fire Regime Condition Class 3 on Slope more than 25% (133,489 Acres)



- Collins Timber Company Land
- Cities
- Highways
- Township & Range



1:348,600



WILDLAND FIRE RISK AND HAZARD SEVERITY ASSESSMENT FORM

Assign a value to the most appropriate element in each category and place the number of points in the column on the right.

Element	Points	
A. Means of Access		
1. Ingress and egress		
a. Two or more roads in/out	0	_____
b. One road in/out	7	_____
2. Road width		
a. ≥7.3 m (24 ft)	0	_____
b. ≥6.1 m (20 ft) and <7.3 m (24 ft)	2	_____
c. <6.1 m (20 ft)	4	_____
3. All-season road condition		
a. Surfaced road, grade <5%	0	_____
b. Surfaced road, grade >5%	2	_____
c. Non-surfaced road, grade <5%	2	_____
d. Non-surfaced road, grade >5%	5	_____
e. Other than all-season	7	_____
4. Fire Service Access		
a. ≤91.4 m (300 ft) with turnaround	0	_____
b. >91.4 m (300 ft) with turnaround	2	_____
c. <91.4 m (300 ft) with no turnaround	4	_____
d. ≥91.4 m (300 ft) with no turnaround	5	_____
5. Street signs		
a. Present [10.2 cm (4 in.) in size and reflectorized]	0	_____
b. Not present	5	_____
B. Vegetation (Fuel Models)		
1. Characteristics of predominate vegetation within 91.4 m (300 ft)		
a. Light (e.g., grasses, forbs, sawgrasses, and tundra) NFDRS Fuel Models A, C, L, N, S, and T	5	_____
b. Medium (e.g., light brush and small trees) NFDRS Fuel Models D, E, F, H, P, Q, and U	10	_____
c. Heavy (e.g., dense brush, timber, and hardwoods) NFDRS Fuel Models B, G, and O	20	_____
d. Slash (e.g., timber harvesting residue) NFDRS Fuel Models J, K, and L	25	_____
2. Defensible space		
a. More than 30.48 m (100 ft) of vegetation treatment from the structure(s)	1	_____
b. 21.6 m to 30.48 m (71 ft to 100 ft) of vegetation treatment from the structure(s)	3	_____
c. 9.14 m to 21.3 m (30 ft to 70 ft) of vegetation treatment from the structure(s)	10	_____
d. <9.14 m (30 ft) of vegetation treatment from the structure(s)	25	_____
C. Topography Within 91.4 m (300 ft) of Structure(s)		
1. Slope <9%	1	_____
2. Slope 10% to 20%	4	_____
3. Slope 21% to 30%	7	_____
4. Slope 31% to 40%	8	_____
5. Slope >41%	10	_____

(NFPA 1144, 1 of 2)

FIGURE A.4.2 Example of Hazard Assessment Form

Element	Points
D. Additional Rating Factors (rate all that apply)	
1. Topographical features that adversely affect wildland fire behavior	0-5 _____
2. Areas with a history of higher fire occurrence than surrounding areas due to special situations (e.g., heavy lightning, railroads, escaped debris burning, and arson)	0-5 _____
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds	0-5 _____
4. Separation of adjacent structures that can contribute to fire spread	0-5 _____
E. Roofing Assembly	
1. Class A roof	0 _____
2. Class B roof	3 _____
3. Class C roof	15 _____
4. Nonrated	25 _____
F. Building Construction	
1. Materials (predominate)	
a. Noncombustible/fire-resistive siding, eaves, and deck (see Chapter 8)	0 _____
b. Noncombustible/fire-resistive siding and combustible deck	5 _____
c. Combustible siding and deck	10 _____
2. Building setback relative to slopes of 30% or more	
a. ≥9.14 m (30 ft) to slope	1 _____
b. <9.14 m (30 ft) to slope	5 _____
G. Available Fire Protection	
1. Water source availability	
a. Pressurized water source availability	
1892.7 L/min (500 gpm) hydrants ≤304.8 m (1000 ft) apart	0 _____
946.4 L/min (250 gpm) hydrants ≤304.8 m (1000 ft) apart	1 _____
b. Nonpressurized water source availability (off site)	
≥946.4 L/min (250 gpm) continuous for 2 hours	3 _____
<946.4 L/min (250 gpm) continuous for 2 hours	5 _____
c. Water unavailable	10 _____
2. Organized response resources	
a. Station ≤8 km (5 mi.) from structure	1 _____
b. Station >8 km (5 mi.) from structure	3 _____
3. Fixed fire protection	
a. NFPA 13, 13R, 13D sprinkler system	0 _____
b. None	5 _____
H. Placement of Gas and Electric Utilities	
1. Both underground	0 _____
2. One underground, one aboveground	3 _____
3. Both aboveground	5 _____
I. Totals for Home or Subdivision (Total of all points)	<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div>

Hazard Assessment	Total Points
Low hazard	<40
Moderate hazard	40-69
High hazard	70-112
Extreme hazard	>112

(NFPA 1144, 2 of 2)

FIGURE A.4.2 Continued

Wind Storm Annex

The following wind storm annex includes wind storm event records for Lake County.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field:](#)

[Search NCDC](#)

Event Record Details

Event: **Thunderstorm Winds**

State: **Oregon**

Begin Date: **12 May 1993, 1700 PST**

[Map of Counties](#)

Begin Location: **Not Known**

County: **Lake**

End Location: **Not Known**

Magnitude: **0**

Fatalities: **0**

Injuries: **0**

Property \$ **0.0**

Damage:

Crop Damage: **\$ 50.0K**

Description:

Thunderstorms moved across Central Oregon accompanied by high winds. In Lake County in Christmas Valley 2 barns were blown off of their foundations by high winds. One was reportedly blown down like a "house of cards". In nearby Fort Rock roofs were blown off of houses and numerous trees and power lines were blown down.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
THE U.S. GOVERNMENT'S OFFICIAL WEB PORTAL

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**
 Begin Date: **23 Oct 1999, 06:43:00 PM PST**
 Begin Location: **Not Known**
 End Date: **23 Oct 1999, 08:30:00 PM PST**
 End Location: **Not Known**
 Magnitude: **70 knots**
 Fatalities: **0**
 Injuries: **0**
 Property \$ **0.0**
 Damage:
 Crop Damage: \$ **0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast
 Zones **Klamath Basin, Lake**
 affected:

Description:

Spotter KL78 reported winds 40 MPH gusting to 60 to 70 MPH. Based on the above spotter reports, a High Wind Warning was issued for zones ORZ029, ORZ030, and ORZ031 at 2031 PDT on 10/27 and cancelled at 0235 PDT on 10/28. No other verifying reports were received.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**
 Begin Date: **11 Jan 2000, 02:56:00 PM PST**
 Begin Location: **Not Known**
 End Date: **11 Jan 2000, 02:56:00 PM PST**
 End Location: **Not Known**
 Magnitude: **53 knots**
 Fatalities: **0**
 Injuries: **0**
 Property \$ **0.0**
 Damage:
 Crop Damage: **\$ 0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast
 Zones **LAKE**
 affected:

Description:

The Lakeview ASOS reported sustained wind of 53 KT gusting to 79 KT. A sudden and short-lived wind storm struck the Lakeview airport on this date. Winds exceeding warning criteria began at 11/1455 PST and ended at 11/1520 PST. A High Wind Warning was issued after the fact at 11/1539 PST and was cancelled at 11/1652 PST after no further winds were reported. The highest sustained wind and gust is listed above. The only reported damage was that a few signs were blown over.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
THE U.S. GOVERNMENT'S OPEN SOURCE PLATFORM

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

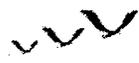
<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field:](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**
 Begin Date: **22 Nov 2001, 01:41:00 PM PST**
 Begin Location: **Not Known**
 End Date: **22 Nov 2001, 01:41:00 PM PST**
 End Location: **Not Known**
 Magnitude: **74 knots**
 Fatalities: **0**
 Injuries: **0**
 Property \$ **0.0**
 Damage:
 Crop Damage: **\$ 0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast
 Zones **LAKE**
 affected:

Description:

A spotter at Summer Lake reported a 74 mph gust at 1341 PST. A Wind Advisory was issued for zone ORZ031 at 1224 PST on 11/22/01 and cancelled at 1830 PST. The above reported gust actually exceeded High Wind Warning criteria, but it was the only reported observation to do so.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field:](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**

State: **Oregon**

Begin Date: **01 Dec 2001, 07:10:00 AM PST**

[Map of Counties](#)

Begin Location: **Not Known**

Forecast

End Date: **01 Dec 2001, 07:10:00 AM PST**

Zones **LAKE**

End Location: **Not Known**

affected:

Magnitude: **50 knots**

Fatalities: **0**

Injuries: **0**

Property \$ **0.0**

Damage:

Crop Damage: \$ **0.0**

Description:

Spotter LA21 at Lakeview reported winds of 50 mph, blowing snow with visibilities 1/4 mile, 4-5 foot snowdrifts, and 5 inches of snow overnight. A High Wind Warning was issued for ORZ031 at 2225 PST on 11/30/01 and cancelled at 0430 PST on 12/01/01. Judging from the above spotter report, the cancellation was premature. A Blizzard Warning may have been a more appropriate product for this weather situation.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRST GOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field:](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**

State: **Oregon**

Begin Date: **16 Dec 2001, 07:56:00 AM PST**

[Map of Counties](#)

Begin Location: **Not Known**

Forecast

End Date: **16 Dec 2001, 07:02:00 PM PST**

Zones **Lake, Lake, Lake**
affected:

End Location: **Not Known**

Magnitude: **70 knots**

Fatalities: **0**

Injuries: **0**

Property \$ **0.0**

Damage:

Crop Damage: \$ **0.0**

Description:

Spotter LA20 at Summer Lake at 4272 feet reported southerly wind 35-40 MPH gusting to 64 MPH. Based on the 0756 report above, a High Wind Warning was issued for zone ORZ031 at 0818 PST on 12/16/01 and expired at 0400 PST on 12/17/01. The other reports above verified the warning.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRST GOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#) Search Field:

Search NCDC

Event Record Details

Event: **High Wind**
 Begin Date: **07 Jan 2002, 07:44:00 PM PST**
 Begin Location: **Not Known**
 End Date: **07 Jan 2002, 07:44:00 PM PST**
 End Location: **Not Known**
 Magnitude: **61 knots**
 Fatalities: **0**
 Injuries: **0**
 Property \$ **0.0**
 Damage:
 Crop Damage: \$ **0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast
 Zones **LAKE**
 affected:

Description:

Spotter LA20 reported sustained winds 30-40 mph since 1800 PST with a peak gust of 61 mph recorded at 1838 PST. No warning was in effect when this report was received, but a Wind Advisory was issued at 2000 PST in response to this report. The advisory expired at 0410 PST on 01/08.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
THE U.S. GOVERNMENT'S OFFICIAL WEB PORTAL

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field:](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**
 Begin Date: **14 Apr 2002, 10:00:00 AM PST**
 Begin Location: **Not Known**
 End Date: **14 Apr 2002, 10:00:00 AM PST**
 End Location: **Not Known**
 Magnitude: **67 knots**
 Fatalities: **0**
 Injuries: **0**
 Property Damage: **\$ 0.0**
 Crop Damage: **\$ 0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast
 Zones **LAKE**
 affected:

Description:

Spotter LA20 at Summer Lake reported southwest winds 30-40 mph gusting to 67 mph. This spotter report contained a wind gust that met High Wind Warning criteria. However, after talking to Law Enforcement and emergency officials in Lake County, it was determined that the area of high winds was very small in areal coverage. As one officer put it "it always blows there". After reviewing the weather situation, it was also determined that the event would be short-lived. Therefore, no High Wind Warning was issued for this event. No other reports of winds meeting even Wind Advisory criteria were received.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRST GOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC Search Field:](#)

[Search NCDC](#)

Event Record Details

Event: **High Wind**

Begin Date: **12 Dec 2002, 05:26:00 AM PST**

Begin Location: **Not Known**

End Date: **12 Dec 2002, 02:08:00 PM PST**

End Location: **Not Known**

Magnitude: **35 knots**

Fatalities: **0**

Injuries: **0**

Property \$ **0.0**

Damage:

Crop Damage: **\$ 0.0**

State: **Oregon**

[Map of Counties](#)

Forecast Zones affected: **Klamath Basin, Lake, Lake**

Description:

See below. A High Wind Warning was issued for the above zones at the above times, but winds were not as strong as expected and the warning did not verify.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRST GOV
The U.S. Government's First in Class Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#) Search Field:

Search NCDC

Event Record Details

Event: **High Wind**
 Begin Date: **13 Dec 2002, 11:01:00 PM PST**
 Begin Location: **Not Known**
 End Date: **14 Dec 2002, 09:00:00 AM PST**
 End Location: **Not Known**
 Magnitude: **84 knots**
 Fatalities: **0**
 Injuries: **0**
 Property \$ **0.0**
 Damage:
 Crop Damage: \$ **0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast Zones **Klamath Basin, Lake,**
 affected: **Lake, Lake, Lake**

Description:

Klamath Falls ASOS recorded winds 44g54 mph at 0100 PST. A High Wind Warning was issued for south central Oregon zones ORZ029/030/031 at 2125 PST on 12/13 and expired at 1900 PST on 12/14. The above spotter reports verified the warning. No reports were recieved for ORZ030, but it is very likely that winds in that zone met warning critiria.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NCAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#) Search Field:

Search NCDC

Event Record Details

Event: **High Wind**

Begin Date: **30 Dec 2002, 08:00:00 PM PST**

Begin Location: **Not Known**

End Date: **30 Dec 2002, 08:00:00 PM PST**

End Location: **Not Known**

Magnitude: **83 knots**

Fatalities: **0**

Injuries: **0**

Property \$ **0.0**

Damage:

Crop Damage: \$ **0.0**

State: **Oregon**

[Map of Counties](#)

Forecast

Zones **LAKE**

affected:

Description:

A spotter at Summer Lake reported wind 50 mph gusting to 83 mph. A High Wind Warning was issued for the Summer Lake area of ORZ031 at 2025 PST on 12/30 in response to this report. It was cancelled at 1800 PST on 12/31.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRST GOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#) Search Field:

Search NCDC

Event Record Details

Event: **High Wind**
 Begin Date: **12 Mar 2003, 11:00:00 PM PST**
 Begin Location: **Not Known**
 End Date: **13 Mar 2003, 11:00:00 AM PST**
 End Location: **Not Known**
 Magnitude: **72 knots**
 Fatalities: **0**
 Injuries: **0**
 Property \$ **0.0**
 Damage:
 Crop Damage: \$ **0.0**

State: **Oregon**
[Map of Counties](#)
 Forecast Zones affected: **Lake, Lake, Lake, Lake, Lake**

Description:

Calimus RAWs recorded sustained winds of 40 mph during this two hour stretch. A High Wind Warning was issued for Oregon zones ORZ029/030/031 and California zones CAZ084/085 at 0523 PST on 03/13 and expired at 1517 PST on 03/13. The above observations verified the warning and are the highest recorded at those locations, but both locations are on ridges. The highest winds were also recorded before the warning went into effect, although verifying winds also occurred while it was. Warning verifying winds likely did not occur in the valleys.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRST GOV
The U.S. Government's Official Web Portal

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



National Climatic
Data Center
U.S. Department of Commerce



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#) Search Field:

Search NCDC

Event Record Details

Event: **High Wind**

State: **Oregon**

Begin Date: **13 Jan 2006, 01:18:00 PM PST**

[Map of Counties](#)

Begin Location: **Not Known**

Forecast

End Date: **13 Jan 2006, 01:18:00 PM PST**

Zones **LAKE**

End Location: **Not Known**

affected:

Magnitude: **72 knots**

Fatalities: **0**

Injuries: **0**

Property \$ **0.0**

Damage:

Crop Damage: \$ **0.0**

Description:

Reported by a spotter 1N Summer Lake in Lake County. No warnings or advisories were in effect for this event. The high winds were likely isolated in coverage.

[Privacy Policy](#)

HOW ARE WE DOING?
A user survey

FIRSTGOV
THE U.S. GOVERNMENT'S FIRST WEB PORTAL

[Disclaimer](#)

This page dynamically generated 05 Apr 2007 from:

<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms>

Please send questions or comments about this system to Stuart.Hinson@noaa.gov

Please see the [NCDC Contact Page](#) if you have questions or comments.

Winter Storm Annex

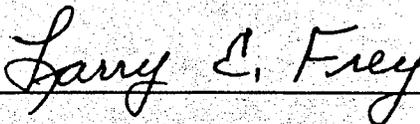
The following winter storm annex includes winter storm event records for Lake County.

For: County Offices

Presidential Major Disaster Declaration M1510

Approved By: State Executive Director

LEF:LEV:th



1 Overview

A Background

Effective February 19, 2004, President Bush declared a major disaster in Oregon, due to losses caused by severe winter storms that occurred from December 26, 2003 through January 14, 2004. The following Oregon counties were declared eligible for Federal disaster assistance including FSA emergency loans:

UMATILLA	GILLIAM	WASCO	LANE	CLACKAMAS
YAMHILL	SHERMAN	UNION	LINN	JEFFERSON
MORROW	WALLOWA	BENTON	LAKE	MULTNOMAH
CLATSOP	COLUMBIA	HARNEY	POLK	HOOD RIVER
MALHEUR	WHEELER	MARION	BAKER	DOUGLAS
DESCHUTES	TILLAMOOK	LINCOLN		

As a result, the following Oregon counties were named as contiguous counties to one or more of these Oregon Counties, where eligible family farmers may qualify for Farm Service Agency (FSA) Emergency (EM) loan assistance:

JACKSON	GRANT
CROOK	COOS
KLAMATH	WASHINGTON
JOSEPHINE	CURRY

B Purpose

The purpose of this Oregon Notice is to inform FSA employees of the counties eligible to receive and process emergency (EM) loan applications under this declaration.

FILING: Preceding FSA Handbook 3-FLP, FmHA Instruction 1945-A & Operational File FLP 3

Disposal

Distribution

January 1, 2005

STO, DD, COR, COC, COF - Including Farm Loan Programs

For: County Offices

Secretarial Natural Disaster Determination S1452

Approved By: State Executive Director

by Royce Teesham

JLS:TSH

1 Overview

**A
Background**

Effective August 28, 2000, Secretary Dan Glickman declared a major disaster in **KLAMATH COUNTY** due to losses caused by unseasonably cold spring temperatures that occurred from May 30, 2000 through June 1, 2000.

As a result, the following five Oregon counties were named as contiguous counties to Klamath County, where eligible family farmers may qualify for FSA EM loan assistance:

DESCHUTES JACKSON LANE
DOUGLAS LAKE

**B
Purpose**

The purpose of this Oregon Notice is to inform County Office employees of the counties eligible to receive and process emergency (EM) loan applications under this designation.

**C
Contacts**

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Any questions you may have concerning the designation should also be directed to Lynn Voigt, Farm Loan Chief at (503) 692-3688, ext. 256.

Continued on next page

FILING: FLP 14 and Preceding FmHA Instruction 1945-A

Disposal

October 1, 2001

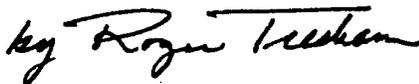
Distribution

**STO, DD, COR, COC, COF - Including Farm
Loan Programs**

For: County Offices

Secretarial Natural Disaster Determination S1377

Approved By: State Executive Director



JLS:TSH

1 Overview

**A
Background**

Effective November 15, 1999, Secretary Dan Glickman declared a major disaster in **KLAMATH COUNTY** due to losses caused by unseasonably cold summer temperatures that occurred from June 26 through August 29, 1999.

As a result, the following five Oregon counties were named as contiguous counties to Klamath County where eligible family farmers may qualify for FSA EM loan assistance:

DESCHUTES DOUGLAS JACKSON LAKE LANE

**B
Purpose**

The purpose of this Oregon Notice is to inform County Office employees of the counties eligible to receive and process emergency (EM) loan applications under this designation.

**C
Contacts**

Please inform the STO Farm Loan Staff of the commodities for which you will need yield and price information. Any questions you may have concerning the designation should also be directed to Lynn Voigt, Farm Loan Chief at (503) 692-3688, ext. 256.

Continued on next page

FILING: FLP 14-1 and Preceding FmHA Instruction 1945-A

Disposal

September 30, 2000

Distribution

STO, DD, COR, COC, COF - Including Farm Loan Programs

Winter Storms

in Plan?

Incident Date	Hazard Type	Primary	Contiguous	Declaration Type	Physical	EIDL	\$ Impact for Lake County
06/25/90	HIGH WINDS, HAIL STORM & HEAVY RAINS	Klamath	Lake	Secretary of Agriculture	n/a	689401	\$0
01/01/91-06/07/91	DROUGHT	Harney, Lake, & Malheur		Secretary of Agriculture	n/a	742901	\$0
01/01/92-06/30/92	DROUGHT	Harney, Jackson, Malheur, Umatilla, & Wasco	Lake	Secretary of Agriculture	n/a	778401	\$0
01/01/92-09/03/92	DROUGHT	Clackamas, Crook, Lake, Lincoln, Linn, Morrow, Multnomah & Polk		Secretary of Agriculture	n/a	782501	\$12,900
01/05/93-01/22/93	SEVERE WINTER STORMS, MUD & ROCK SLIDES & FLOODING	Jackson, Josephine, Klamath & Lake		Governor	n/a	784700	\$0
09/20/93	EARTHQUAKE & AFTERSHOCKS	Klamath	Lake	Agency	268502	806900	\$135,700
01/03/95 -02/10/95	FLOODING, LANDSLIDES, MUD & DEBRIS FLOWS	Klamath & Lake		Governor	n/a	842700	\$0
09/01/93	DROUGHT	Deschutes, Douglas, Jackson, Jefferson, Klamath & Sherman	Lake	Secretary of Agriculture	n/a	845501	\$0
02/13/95 -04/19/95	SEVERE WITNER STORMS, FLOODING, LANDSLIDES, MUD & DEBRIS FLOWS	Jackson, Josephine, Klamath & Lake		Agency	n/a	849400	\$0
12/20/96 - 01/17/97	SEVERE STORMS, FLOODING, MUD & LAND SLIDES	Harney & Lake		Agency	n/a	933100	\$0
12/25/96 - 01/06/97	SEVERE WINTER STORMS, LAND & MUD SLIDES & FLOODING	Coos, Douglas, Jackson, Josephine, Klamath, Lake, Lane & Wallowa		Presidential	292811	935500	\$68,000
02/01/99 & continuing	INCREASING WATER LEVELS & FLOODING	Harney	Lake	Secretary of Agriculture	n/a	9D5001	\$0
05/01/98-06/30/98	THUNDERSTORMS, HAIL, EXCESSIVE RAINS & HIGH WINDS (SEVERE STORMS)	Klamath	Lake	Secretary of Agriculture	n/a	9B8301	\$0
05/30/00-06/01/00	UNSEASONABLY COLD SPRING TEMPERATURES	Klamath	Lake	Secretary of Agriculture	N/A	9I6301	\$0
09/01/00 & continuing	DROUGHT	Klamath	Lake	Secretary of Agriculture	N/A	9L5101	\$47,400
09/11/01	TERRORIST ATTACKS	State of New York	Lake	Agency	N/A	9TOR00	\$0
01/01/01 & continuing	EXTREME DROUGHT	State of Nevada	Lake	Secretary of Agriculture	N/A	9M6601	\$0
05/01/01-09/30/01	EXTREME FIRES & ONGOING DROUGHT CONDITIONS	State of Nevada	Lake	Secretary of Agriculture	N/A	9O4001	\$0
01/01/01 & continuing	DROUGHT	State of Nevada	Lake	Secretary of Agriculture	N/A	9S9701	\$0
09/01/01 & continuing	DROUGHT	Lake	Lake	Secretary of Agriculture	N/A	9U8101	\$0
08/19/03 & continuing	WILDFIRE (B & B COMPLEX WILDFIRE)	Jefferson	Lake	Agency	N/A	9X0600	\$0
01/01/03 & continuing	DROUGHT & INSECT INFESTATION	State of Nevada	Lake	Secretary of Agriculture	N/A	9X6501	\$0
12/26/03-01/14/04	SEVERE WINTER STORMS	Lake	Lake	Public Assistance	N/A	P02111	\$0

01/01/04 & continuing	DROUGHT & RELATED INSECT INFESTATIONS	State of Nevada	Lake	Secretary of Agriculture	N/A	9AH701	\$0
12/30/05 - 01/04/06	SEVERE STORMS & FLOODING	Washoe, NV	Lake	Agency	10370	10371	\$0

From Joseph Murray who asked SBA to gather info on Lake Co.

in plan

Lake County Presidential Major Disaster Declarations, 1990 to 2006 (Public Assistance Information Only)				
Jurisdiction	Disaster Date*	Hazard Type	Disaster #	Dollar Amount **
✓ Lake County	1/1/1997	flood	FEMA-1160-DR-OR	\$219,382
✓ City of Lakeview	1/1/1997	flood	FEMA-1160-DR-OR	\$30,701
✓ City of Paisley	1/1/1997	flood	FEMA-1160-DR-OR	\$2,909
✓ Lake County	12/26/2003	winter storm	FEMA-1510-DR-OR	\$3,709
✓ City of Lakeview	12/26/2003	winter storm	FEMA-1510-DR-OR	\$19,869

* "Disaster Date" is the date the event started: for "1160," it may have started on December 31, 1996.

** Public Assistance Program only

With respect to disaster "1160," the dollar amounts in the attached MSexcel file represent only the money spent on repairing/replacing public infrastructure that was eligible under the FEMA Public Assistance (PA) Program. It does not include the money FEMA spent helping individuals and families, nor ineligible costs under PA, nor money from other federal agencies, such as SBA and FSA (though you are going to end-up with those number from those sources).

Information provided by Joseph Murray at OEM

Appendix A

Planning and Public Process

The following appendix summarizes and documents public outreach and education that was conducted during the planning process and also summarizes and documents the public's involvement in the development of the Lake County Natural Hazard Mitigation Plan.

Stakeholder Interviews

Stakeholder Interviews provided an excellent avenue for involving the public. They allowed for detailed conversation about local perspectives, issues and concerns.

Stakeholder Interviews Completed:

*All interviews conducted in person unless otherwise noted

- Bill Duke, Lake County Recourse Initiative
Held 11.9.2006
- Judy Graham, Superintendent Lake County School District 7
Held 11.14.2006
- Caro Johnson, Director Lakeview Chamber of Commerce
Held 11.16.2006
- Sam Goss, Lakeview Fire Chief
Held 11.15.2006
- Patti Baker, Quality Compliance Officer Lake District Hospital
Held 12.5.2006
- Marcie Schreder, Coordinator Lake County Watershed Council
Held 12.6.2006
- Ronne Lindsay, Director Lake County Development Corp
Held 1.8.2007
- Suzie Cahill, Director Lake County Senior Citizens Association
Held 1.9.2007
- Pete Schreder, Agricultural and Natural Recourses Agent, OSU Extension
Held 1.17.2007
- Tony West, County Building Official
Held 2.26.2007
- Ray Simms, Town Manager, Town of Lakeview
Held 3.2.2007
- Matt Webb, Oregon Forest Service, Bureau of Land Management Fire Management Officer
Held 3.6.2007
- Max Corning, District Conservationist, Natural Resource Conservation Service
Held 3.9.2007
- Dale Roberts, Mayor, City of Paisley
Held 3.5.2007

- Toby Freeman, Pacific Power Regional Community Manager and Warren DiNapoli, Pacific Power Operations Manager
Held 4.16.2007 (phone interview)
- Ron Wilke, Town of Lakeview Public Works Manager
Held 4.17.2007
- Rick DuMileiu, County Roads Manager
Held 4.18.2007
- Bill Duke, Lake County Resource Initiative
Held 4.26.2007
- Lynn Culp, Surprise Valley Electric Coop Member Service Manager
Held 4.27.2007 (phone interview)
- Jim Hayes, Surprise Valley Electric Coop Operations Manager
Held 4.27.2007 (phone interview)
- Darwin Thurston, Midstate Electric Coop Operations Manager
Held 5.23.2007 (phone interview)
- Darwin Thurston, Midstate Electric Coop Operations Manager
Held 7.30.2007 (phone interview)

Steering Committee Meetings

A Steering Committee was formed to guide in the development of Lake County's Natural Hazard Mitigation Plan. Over the course of eleven months, the Committee provided input on plan content. Specifically, the committee provided information for the plan's risk assessment, community profile, and plan mission, goals, and actions. The Steering Committee will continue to participate in future meetings to update the plan and implement actions.

Members of the Steering Committee:

- Phil McDonald, Lake County Sheriff
- Luke Campbell, Lake County Sheriff Department
- Lisa Bowler, Lake County Planning Dept.
- Tony West, Lake County Building Dept.
- Hilary Knelleken, Lake County Building Dept.
- Rick Dumilieu, Lake County Roads Dept.
- Ray Simms, Lakeview Town Manager
- Judy Graham, Lake County School District 7 Superintendent
- Bill Duke, Lake County Recourse Initiative
- Ken Kestner, Lake County Commissioner
- Dale Roberts, Mayor, City of Paisley
- Mary Wilkie, Lake County Public Health
- Ron Wilkie, Town of Lakeview Public Works
- Jeff Camp, Lakeview Chief of Police
- Ken Gershler, Lake County Planning Dept.
- Sean Gallagher, Lakeview School District 7

For the Lake County Natural Hazard Mitigation Plan Steering Committee Meeting Kickoff; held Monday December 18, 2006 from 2-3:30 p.m. in the Lake County Courthouse Commissioners Hearing Room, the following persons were present:

- Phil McDonald; Lake County Sheriff
- Luke Campbell; Lake County Sgt. Sheriff
- Ray Simms; Town of Lakeview Manager
- Judy Graham; Lake County School District #7 Superintendent
- Bill Duke; Lake County Recourse Initiative
- Lisa Bowler; Lake County Planning Dept.
- Rick Dumilieu; Lake County Road Dept.
- Ken Kestner; Lake County Commissioner – Elect
- Hilary Knelleken; Lake County Building Dept.

Facilitators:

- Katie Mader; Recourse Assistance for Rural Environments (RARE) Participant, Project Coordinator
- Andre LeDuc; Director Oregon Natural Hazard Workgroup (ONHW) (Via telephone)
- Krista Mitchell; ONHW (Via telephone)

The meeting was called to introduce and discuss the year-long development of a Natural Hazard Mitigation Plan covering Lake County.

The meeting began with introductions and covering the agenda for the meeting. Following that, the project coordinator discussed with the group their roles as members of the Natural Hazard Mitigation Steering Committee. Via telephone conference, Andre LeDuc and Krista Mitchell discussed the Regional Recourse Planning Initiative and funding sources for the project. The project coordinator then began to present what mitigation is and why it is important to the community. She had the group talk about what kinds of mitigation have already taken place in Lake County. Katie then moved into the project outline and planning process, consisting of five phases including: 1) Organize Recourses and Plan, 2) Community Sensitivity and Resilience, 3) Risk Assessment, 4) Mission, Goals and Actions and 5) Plan Implementation and Maintenance. The group moved on to discuss public participation including a list of Stakeholder Interviews completed, a brainstorm of future Stakeholders to contact, and a brainstorm of public outreach ideas.

Documents were given to Steering Committee Members to review and change or add information as they felt necessary and to be returned to Katie Mader along with any other existing mitigation-related documents.

The next meeting was set for Monday, February 12, 2007 at 10 a.m. to be held in the Lake County Courthouse Commissioner's Hearing Room. This next meeting Members will assist with the Risk Assessment process for Lake County.

For the Lake County Natural Hazard Mitigation Plan Steering Committee Meeting on Risk Assessment; held Friday, February 23rd from 9:00 a.m. to 11:30 a.m. in the Lake County Courthouse Commissioners Hearing Room, the following persons were present:

- Phil McDonald; Lake County Sheriff
- Mary Wilke; Lake County Public Health
- Tony West; Lake County Building Dept.
- Ron Wilke; Town of Lakeview Public Works
- Judy Graham; Lake County School District 7 Superintendent
- Bill Duke; Lake County Resource Initiative
- Jeff Kamp; Lakeview Chief of Police
- Hilary Knelleken; Lake County Building Dept.

Facilitators:

- Katie Mader; Recourse Assistance for Rural Environments (RARE) Participant, Project Coordinator
- Jim Knight; Oregon Natural Hazard Workgroup (ONHW) Community Assistance Liaison

The meeting was called to undergo the Risk Assessment portion of the Lake County Natural Hazard Mitigation Plan.

Following welcome and introductions, Katie Mader updated the committee on the progress of the project. Katie presented what has been accomplished in stakeholder interviews, public outreach and in the development of the plan. Next the Community Resilience Factors were presented to the committee to be reviewed and updated. The committee had a few more community organizations to add to the list.

The meeting then moved on to the Community Asset Identification Exercise. Katie explained the premise of the exercise to the group. After completing one section of community assets, the group decided it was easier to discuss assets as a group. Katie scribed assets on butcher paper as the group called them out. The committee completed identifying assets under the headings of Population, Critical Facilities, Economics, Natural Resources, and Critical Facilities.

After a short break, the committee gathered again to begin to map these assets. Large maps were hung on the wall and Phil McDonald began to map identified assets. The group suggested this project could be done without the presence of the Steering Committee and it was decided that Phil McDonald and Katie Mader would finish the mapping exercise at a later time. Katie Mader then led the committee in a discussion on prioritizing the hazards that affect Lake County. The committee decided that fire, flood and earthquake were the top concerns for the community.

Katie Mader reintroduced the Action Item proposal form to the committee and encouraged them to be thinking of possible proposals. She recapped the meeting to the committee and discussed what the next steps would be. The next meeting

was set for Friday, April 13th for a morning meeting to be held in the Commissioner's Hearing Room.

For the Mission, Goals and Action Items section of the Lake County Natural Hazard Mitigation Plan, a Steering Committee Meeting was called for Monday, May 21st from 9-10 a.m. at the Commissioner's Hearing Room in the Lake County Courthouse. Those present include:

- Bill Duke, Lake County Resource Initiative
- Dale Roberts, Mayor, City of Paisley
- Judy Graham, Lake County School District 7 Superintendent
- Rick DuMileiu, Lake County Roads Department

Facilitators:

- Katie Mader; Recourse Assistance for Rural Environments (RARE) Participant, Project Coordinator
- Jim Knight; Oregon Natural Hazard Workgroup (ONHW) Community Assistance Liaison

The meeting was called to review Mission, Goals and Action Items for the Lake County Natural Hazard Mitigation Plan.

Project coordinator Katie Mader began the meeting with welcome and introductions. She then reviewed the agenda for the meeting and reminded the committee of what mitigation is and why a mitigation plan is being created. She reviewed with the committee where she was in the development of the plan.

Katie then moved on to review the purpose of the mission statement in the plan and present the committee members with a brainstormed mission statement. The committee approved this mission statement without amendment unanimously. Katie then explained the purpose of the goals in the plan and presented the committee members with brainstormed goals. The committee approved the goals without amendment unanimously.

Next Katie reviewed Action Items with the committee. She reviewed what they are, what function they serve, what the FEMA requirements are and what additional information Katie hoped to gather from the committee members regarding Action Items Katie had drafted.

The bulk of the meeting was spent reviewing drafted Action Items with the Steering Committee. Each of the 16 proposed Action Items were reviewed individually. Additional local information was gathered to support each proposal and coordinating organizations and partners were identified. Each Action Items was given approval from the Steering Committee Members.

To close the meeting Katie explained what the next steps in the planning process would be and a tentative date was set for the last Steering Committee Meeting.

For the Implementation and Maintenance section of the Lake County Natural Hazard Mitigation Plan, a Steering Committee Meeting was called for Wednesday, July 25th from 9-10 a.m. at the Commissioner's Hearing Room in the Lake County Courthouse. Those present include:

- Sean Gallagher, Lakeview School District 7 Superintendent
- Ken Kestner, Lake County Commissioner
- Anne Crumrine, Lake County Roads Department
- Ken Gerschler, Lake County Planning Department
- Ray Simms, Town of Lakeview Manager

Facilitators:

- Katie Mader; Recourse Assistance for Rural Environments (RARE) Participant, Project Coordinator
- Jim Knight; Oregon Natural Hazard Workgroup (ONHW) Community Assistance Liaison

To begin the meeting Katie welcomed members and reviewed the agenda for the meeting. Katie reviewed the planning process that had taken place over the past ten months and described each component of the finalized plan and how the plan is organized. She then moved into describing the implementation process. She talked about the process for FEMA's review of the plan including how and when the county and its jurisdictions will be able to adopt it.

Katie then moved into describing the roles of the convener of the plan and the continued roles of the steering committee. Ken Gerschler, Lake County Planner agreed to be convener of the plan. Katie described the meetings that are required for the maintenance of the plan and what should be accomplished at each meeting. She also described what is required for the 5-year update for the plan.

After describing the maintenance of the plan, Katie began to discuss the process of prioritizing projects and moving them forward. She talked about first finding a funding source, determining the risk and conducting the cost-benefit analysis. The final step in moving a project forward is committee approval. Katie briefly discussed FEMA's requirements for continued public involvement in the plan and described ways to fulfill that requirement.

To conclude the meeting Katie thanked the committee for their involvement and contributions over the past year and gave each member a copy of the drafted plan to review and return with any comments.

Work Sessions

Work sessions were held for the purpose of gathering local information and brainstorming ideas for the county plan in the format of an informal meeting.

For the Risk Assessment Process for the City of Paisley, held on Friday, March 9, 2007 from 6:00 p.m. to 7:15 p.m. at the Paisley Community Center the following persons were present:

- Rosie Bagley, City of Paisley Council Member
- Lawrence Duckworth, City of Paisley Council Member
- Ken Hamlington, City of Paisley Council Member
- Dale Roberts, City of Paisley Mayor
- Duane Young, City of Paisley Roads and Sewers

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments (RARE) Participant, Project Coordinator

The meeting was called to undergo the Risk Assessment portion of the Lake County Natural Hazard Mitigation Plan for the City of Paisley

After introductions, Katie Mader began to inform the council members about what mitigation is, why it is important to mitigate and why it is important to create a Natural Hazard Mitigation Plan. Next Katie outlined the structure of the plan, describing each section and the timeline for completion. Katie then described to the members the requirements the City of Paisley must meet for the plan to cover the City of Paisley jurisdiction.

Katie then led the members in a discussion to identify what mitigation activities have already been undertaken in the City of Paisley. They also discussed what organizations exist in Paisley that could be used as avenues for outreach and education on mitigation activities to the community. Next the group was asked to identify assets in the Paisley community under the headings of Population, Economy, Critical Facilities, Natural Resources and Cultural and Historic Assets. A Map was then laid on the table and the members were asked to locate identified assets on the map. Once community assets had been located on the map, the members were asked to identify where different hazards affect their community and draw that out on the map. Lastly, Katie introduced the Action Item worksheet to the council and encouraged them to begin thinking about future mitigation activities for the City of Paisley.

A work session on brainstorming action items for the City of Paisley was held on Monday, April 16th from 6 -6:30 p.m. at the Paisley Community Center. Those present include:

- Dale Roberts, Mayor, City of Paisley
- Rosie Bagely, Paisley City Council Member
- Lawrence Duckworth, Paisley City Council Member

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments (RARE) Participant, Project Coordinator

Project manager Katie Mader reviewed issues identified at the previous Risk Assessment meeting for the city of Paisley. The issues presented were confirmed

to be accurate by the council members. Katie then described what actions items are and what role they will play in the plan and in the implementation of the plan. Katie proposed action items that she thought were relevant to the City of Paisley. The council members gave their local input on each action item proposed resulting in a proposed list of action items for the City of Paisley.

For the creation of the City of Paisley Addendum a work session was held on Monday, June 11, 2007 from 7 to 8 p.m. at the Paisley Community Center. The following persons were present:

- Dale Roberts, Mayor City of Paisley
- Rosie Bagley, City of Paisley Council Member
- Lawrence Duckworth, City of Paisley Council Member

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments (RARE)
Participant, Project Coordinator

The meeting was called to gather information for the City of Paisley Addendum for the Lake County Natural Hazard Mitigation Plan.

In order to assess the city's risks to natural hazards, Katie presented a summary of each hazard taken from the Region 6: Central Oregon Profile and Risk Assessment. Katie explained the Probability and Vulnerability ratings to the City Council and asked the members to agree or amend the ratings as pertaining specifically to the City of Paisley. Each hazard was discussed individually and the impacts of each hazard specific to the City of Paisley were recorded. Action Items specific to the City of Paisley were briefly discussed and reviewed. A brief overview regarding the final steps for implementing the plan was presented to the Council members to finish the work session.

For the creation of the Lakeview Addendum, a work session was held on Thursday, June 28th 2007 from 2-3 p.m. in the Commissioner's Hearing Room of the Lake County Courthouse. The following persons were present:

- Bill Duke, Lake County Resource Initiative
- Ray Simms, Town of Lakeview
- Caro Johnson, Lake County Chamber of Commerce
- Judy Graham, Lakeview School District #7
- Sean Gallagher, Lakeview School District #7

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments (RARE)
Participant, Project Coordinator

The meeting was called to gather information for the Town of Lakeview Addendum for the Lake County Natural Hazard Mitigation Plan

Katie began by welcoming members and reviewing the agenda. She then began to explain the role of the addendum in the county's plan and what will be

included in the addendum. She also explained the advantages of Lakeview signing off on the addendum.

Next Katie led the group in a discussion on the impacts of hazards on the Town of Lakeview. The group reviewed the State hazard rating and either agreed that the rating was accurate or amended the rating based on local knowledge.

Lastly Katie reviewed the progress of the plan and outlined the final steps for completion and implementation.

Stakeholder Interviews

Stakeholder interviews served as a medium to obtain detailed and specific information from individuals representing specific agencies, groups or organizations.

Stakeholder Interview with Bill Duke of Lake County Recourse Initiative

Held 11.9.2006

Bill felt that wildland fires are the biggest threat to Lake County. He said this is due to the arid climate and sagebrush covering most of the county. He said that although his organization does not keep information on the impact of previous disasters, they have access to agencies that do. Bill suggested that the Forest Service, the BLM, Oregon Department of Forestry and ODOT should be involved in risk reduction activities for Lake County.

In looking at economic assets of the county, Bill thought that the Fremont Saw Mill would be significantly impacted by the temporary loss of utilities. He also felt that the saw mill is dependant upon their location (relocation would be difficult). Bill suggested that the town of Lakeview is a historical and cultural asset in itself and worthy of protection. One Critical facility that the community relies upon to function is the Lake District Hospital.

Bill noted that the significant natural recourses in Lake County are the timber lands and grazing lands. He felt that if these recourses were lost or damaged there could be a significant long-term economic impact on the county. Bill also noted that as Lake County continues to grow, there are more developments on the Wildland-Urban Interface that would be in a potentially high-hazard zone.

Stakeholder Interview with Judy Graham, Lakeview School District 7 Superintendent

Held 11.14.2006

Judy felt that severe weather storms, infectious diseases, earthquake and fire were the hazards that pose the greatest threat to Lake County. The school district maintains historical information on school buildings; such as building procedures and maintenance records. Judy felt that the students of the school district were a conduit for conveying risk-reductions activities to parents that may not read the newspapers, listen to the radio or are not up to date on local issues. Some students may also serve as interpreters to parents that may not be fluent in English. The school district has emergency evacuation plans for students in case of fires, earthquakes, severe weather. These plans may be coupled in implementation with other risk-reduction activities.

Judy felt that the BLM, Police, Sheriff, City Health, Mental Health, and the school district should all be involved in risk-reduction activities.

Judy noted that the nursing home would be at risk of greater impact if there were an event that required evacuation. She also noted this would be the case for those in the community that do not own or have access to a vehicle. When asked which businesses would be affected by the temporary loss of utilities, Judy felt that the schools and the nursing home would be at greatest risk. If the utilities loss was for an extended time period, she noted that restaurants and grocery stores would be affected, and possibly the petroleum fuel supplies would be affected as well. Judy noted that from a financial perspective, many local businesses would have difficulty relocating, and in fact would probably not relocate. Aside from small, local businesses, the railroad, schools and sawmill would all have difficulty relocating. Cultural or historic assets that are important to the community are the three museums in town, the swimming pool, the courthouse and the western 'feel' or character of the town.

Judy expressed that the water systems, the hospital the schools, the telecommunications network, the electrical systems and the hiways are all critical infrastructures that the county relies upon. She felt that the natural recourses in the area are the geyser, hang gliding sites, national forest, the lakes and the Abert Rim area. She noted that if the timberland, rangeland or agriculture land were lost or damaged there could be significant economic impacts.

Stakeholder Interview with Sam Goss, Lakeview Fire Chief

Held 11.15.2006

Sam felt that the greatest hazards to Lake County are wildland fires, floods and earthquakes. Sam also felt that in an event of a natural disaster, the short-staffed recovery team and Lakeview's isolation may exacerbate the situation. Lakeview Fire keeps an incident report for every call on fire, floods and earthquake. The Fire Department plays a role in reducing risk by hosting a Fire Safety program for kids in the community. Sam suggested that the Sheriff, Police (specifically the School Recourse Officer) and the Fire Department Disaster Team also be involved in risk reduction activities in the community.

Sam noted that all businesses, aside from those that are self-contained would be affected by the temporary loss of utilities. Sam felt that most local businesses would be able to relocate if it was necessary. The critical facilities that Sam felt the community relied upon are the Hospital, Fire Department, Police, Jail, the functions within the County Courthouse, Pacific Power and Light and Surprise Valley Power. The natural recourses in the area that Sam observed are the perlite mine, timber and cattle grazeland.

He noted that if the timber industry and/or the cattle industry were lost or damaged there would be significant long-term economic impact. He felt that the loss of the perlite mine would have minor impact. Sam noted that the county and the city do an effective job of regulating where developments are placed, and therefore there was little risk of future developments in high hazard zones.

Stakeholder Interview with Caro Johnson, Director of Lake County Chamber of Commerce

Held 11.16.2006

Caro felt that flooding, wildfire, earthquake and severe weather (snow, wind, rain) storms are the greatest threat to Lake County. She also expressed that the isolated location of Lakeview could exacerbate a natural disaster. The Chamber does not keep any information on the impact of previous natural disasters. Caro mentioned that a public monthly forum hosted by the Chamber would be an excellent conduit for risk-reduction information dissemination. Caro suggested that the Senior Citizen's Association, Emergency Services, local media and Search and Rescue be involved in risk-reduction activities.

Caro noted that the Senior population is at greater risk in the community. Meals on Wheels, independent care providers and Oregon Project Independence provide services to this population. Caro observed that both restaurants and gas stations would be significantly impacted by the temporary loss of utilities. She also felt that most businesses would have difficulty relocating, and that in fact, there would be no place to relocate to. Caro said that the cultural assets that are important to Lake County are the Western culture and the Irish culture.

Caro observed that the critical facilities that the community relies upon to function are the grocery stores and Emergency Services. Caro felt that the natural recourses in the area are the recreation sites (for hiking, biking, ATV use, hang gliding and equestrian use). Also the natural scenery and Warner Mtn. Ski hill. She said that if these were lost or damaged there would be an impact on tourism and hunting in the area, which are sources of income for the county. Caro noted that some roads become submerged in times of flooding.

Other concerns that Caro expressed were lack of public education on procedures in event of a natural disaster. Issues to be addressed are location of shelters in town and services to the elderly in the community.

Stakeholder Interview with Patti Baker, Quality Compliance Officer with Lake District Hospital and Director of Lake County Disaster Preparedness Group

Held 12.5.2006

Patti feels that floods, fire and ice storms are the biggest threat to Lake County. She suggested that I also work with Christmas Valley, Silver Lake, the Mormon Church, Public Health, Public Works and the Road Department. She also suggested social groups such as the Rotary Club, The Lions and Suroptomists and the Merchants Club.

Patti also explained to me the formation and proceedings of the Lake County Disaster Preparedness Group.

Stakeholder Interview with Marcie Schreder, Lake County Watershed Council Coordinator

Held 12.6.2006

Marcie felt that the hazards that held the greatest threat to Lake County are fires, floods, earthquake and drought. She noted that drought could have impact on lake levels, agricultural irrigation, wildlife and aquatic life. The Lakeview Watershed

Council does not keep information on the impact of previous disasters. Marcie recommended that the BLM, Forest Service, OSU Extension Office, City Police, and the city Manager Ray Simms also be involved in this project.

Marcie noted that residents of North Lake County may be more susceptible to drought, and that residents of the Goose Lake Basin would be more susceptible to floods. She felt that both timber and agricultural industries would be affected by the temporary loss of utilities. She felt that the natural recourses in the Lake county area are the lakes, watersheds, stream restoration areas, rangelands, the general geographic landscape and the wildlife; specifically certain species such as the sage grouse. Marcie noted that if the rangelands were lost or damaged there could be significant economic impact. She noted this also for the wetlands which are duck habitat. This would affect the hunting economy. Marcie observed that more developments are on wetlands and near wildland-urban interface boundaries.

Stakeholder Interview with Ronne Lindsay, Director Lake County Development Corp
Held 1.8.2007

Ronne felt that drought and fire are the biggest natural hazards to Lake County. Lake County Development Corp has no current initiatives, plans or policies that could have been used for implementing mitigation actions. Ronne recommended that the Lakeview Business Association be involved in the planning process. She noted that vulnerable populations in Lake County are all the small, outlying and unincorporated communities such as Adel, Plush, New Pine Creek, Fort Rock and Christmas Valley. She suggested that these areas are more vulnerable due to their small population, the recourses available to them and due to their remote location.

Ronne observed that all the restaurants would be impacted by the temporary loss of utilities because of the food stocks they hold. This is also true of Lakeview Lockers. She also noted that most businesses would not be capable of relocating not because they are dependant on their location, but because of financial constraints. The cultural and historic recourses Ronne felt were important to the community are its Western “feel”, the museums, the historic buildings and the fairgrounds. The critical facilities or infrastructures that the community relied upon to function as Ronne noted are the telephones, power companies, technology sources and the Senior Citizen Association.

The natural recourses in the area are the natural landscape, petroglyphs and other Native sites. She felt that if the natural landscape were significantly impacted by natural hazard that the tourism industry could be impacted as well.

Stakeholder Interview with Suzie Cahill, Director Lake County Senior Citizens Association

Held 1.9.2007

Suzie feels that earthquake, floods and windstorms hold the greatest threat to Lake County. She feels that senior citizen population is extra vulnerable to natural hazards. She noted that the population is spread relatively evenly over the entire county. Within Lakeview, however, most of the seniors are located on the south end of town.

Suzie also noted that a large percentage of the senior citizens are at or under poverty level.

Suzie felt that all the businesses in the community would be significantly impacted by the temporary loss of utilities. She also noted that most would not be able to relocate because most businesses are financially vulnerable. Suzie feels that the historic buildings and the Native and Irish cultures are the historic and cultural recourses that are important to the community.

Suzie suggests that the roads, power, water and fuel suppliers are the critical facilities that the community relies upon to function. She feels that the forests are the most significant natural recourse in the area. She agrees that if these were lost or damaged that there could be long-term economic impact.

Suzie's greatest concern regarding natural hazards is the town does not have communications set up, that there is not plan to be prepared to aid citizens and there are not supplies in stock to disperse to those who may need them.

Suzie said that Lake County Senior Citizens Association provides services for up to 17% of the total population of Lake County. She said that up to 10% of the senior citizen population has a caregiver. Suzie also mentioned that the thrift store operated by the LCSSA has a stock of winter clothes and other supplies that can be dispersed to those that are in need. She noted that the LCSSA building is maybe the most used building in the community, hosting a wide range of organization and club meetings.

Stakeholder Interview with Pete Schreder, Agricultural and Natural Recourse Agent Held 1.17.2007

Pete feels that wildfire is the biggest threat to Lake County. Closely after that are earthquake and drought. He feels the lowest on the scale is flooding. Pete feels that any of the population centers are more at risk simply because of the condensed population. He noted that these towns are dispersed throughout the county.

Pete noted that the Fremont Saw Mill or any of the other companies that are on a production schedule would be impacted by the temporary loss of utilities. He suggested that any of the companies that are dependant on natural recourses would have difficulty relocating. Two he mentioned are the Fremont Saw Mill and the Perlite Mine. Pete suggested that the historic and cultural recourses in the area are its history and heritage, the museums, the ranching culture and the Native American culture.

The critical facilities and infrastructures are the Police department, the Fire department and Search and Rescue. The significant natural recourses in the area are the rangeland and the timberland. Pete said if these were lost or damaged that there definitely would be long-term economic impact. Pete did not note any existing developments in high hazard zones. He did note that there are some houses going in near Wildland-Urban Interface zones.

Stakeholder Interview with Tony West, Lake County Building Inspector Held 2.26.07

Tony suggested that seismic is the biggest hazard to the community. He suggested that if there were a large seismic event that the hillside underneath the town's water

tanks would give releasing the water onto the town. He also mentioned that a seismic event may cause the earthen dams of sewage holding tanks to give. After seismic, Tony felt that fire and flood are also prominent hazards. The Lake County Building Department enforces the International Residential Code for 1 to 2 family dwellings and the Oregon Structural Specialty Code for commercial buildings.

Tony thinks that the towns of Lakeview and Paisley are most at risk because of the densities of population. He mentioned that Paisley is near the Chewaucan River which may be a flood hazard. Tony noted that the Emergency Services building would be significantly impacted by the temporary loss of utilities. He also noted that this building, and Safeway would be in the flood line if the water tanks burst.

Historic and cultural assets Tony noted are the Herford Building, Daly Middle School, the Train Station, and local museums. He suggested that the timberland, perlite and water are the significant natural resources of the community. Tony mentioned that there are two subdivisions (Roberta Rd and Creekside) that are in the floodplain. He also noted that much of Christmas Valley is susceptible to wildland fires. Tony observed that much of the growth in Lake County is occurring in the North of the county, particularly in Christmas Valley. Tony also mentioned that mobile homes are more at risk to natural hazards because they are not held to the same structural codes as permanent residences. For example, the foundation is hollow, unreinforced masonry. The home is designed to simply fall off its base in an earthquake. Because they aren't required to be strapped, they may sometimes blow over in a strong windstorm. Also the snow load for the roof is much lower than what may be required for the area.

Stakeholder Interview with Ray Simms, Town of Lakeview City Manager

Held 3.2.07

Ray felt that fire is the greatest threat to the community because of the potential for injury or property damage that fire holds. He feels that flooding is also a threat because of property damage. He also feels that earthquake is a threat. The Town Hall has some documents such as plans, policies and incident reports. Ray thinks that the Forest Service, Department of Forestry, Fish and Wildlife Service and the Soil Conservation District should also be involved in creating this plan.

Ray feels that kids and seniors of the community are more at risk to hazards. He noted that most seniors are located in Lakeview and Paisley, and some in Christmas Valley. Ray suggested that the Fremont Sawmill, Lakeview Lockers, Safeway, Stewarts and the Governmental buildings could be significantly impacted by the temporary loss of utilities. Ray thought that many of the businesses would be able to relocate in the event of a hazard; however he noted that some may not try to relocate. Ray felt that the cultural and historic assets of the community are the geyser, Hunter's Hot Springs, and the historic buildings in downtown Lakeview.

Ray suggested the critical facilities that that community relies upon are the railroad, the hiway system, airport, hospital, water systems, sewer systems, Warner Creek Correctional facilities and the communications systems. Ray noted that the natural resources of the area are the forests, water, perlite, wetlands and the sunstone

mine. He suggested that of these, if we lost the forests and the wetlands there could be significant economic impacts. Ray observed that there are developments along the Urban-Wildland Interface near Drews Gap and Drews Reservoir.

Stakeholder Interview with Matt Webb, Bureau of Land Management and Forest Service Fire Management Officer

Held 3.6.2007

Matt feels that earthquake is the greatest threat to Lakeview. He feels that fire is the greatest threat to the county as a whole. He also mentioned that drought is a threat because it enhances fire risk. Matt mentioned that the FS and BLM are becoming more involved in all-risk incident management, where the agencies have been called upon to help with sandbagging during floods in Lakeview. Matt noted that the agencies have done outreach projects including modeling prescribed fires to small communities throughout the county and carrying information packets for home owners that are interested in home fire safety.

Matt feels that seniors that may need assistance and kids who cannot drive are the populations more at risk of a hazardous event. He noted that the temporary loss of utilities would impact the small businesses due to loss of revenue. He also noted that because Lake County is a fragile economic community, many businesses would not be able to relocate due to financial reasons.

Matt observed that some of the buildings in downtown Lakeview are considered historic. Matt suggested that the hospital, fire department, EMS, Sheriff Department, Federal Government buildings, Social Services are all critical facilities. He also noted that if the Fremont Mill were lost there would be significant impact because they are the largest non-governmental employer. Matt said timber, graze land and recreation areas are the County's natural resources. He noted that if any of these resources were lost there could potentially be significant economic impact on the community. Matt observed that Christmas Valley is in a high-hazard zone because many homes do not have any defensible space around their homes. Matt also observed that future growth trends are occurring in the Urban-Wildland Interface zones with isolated ranchettes.

Matt estimated that about 70% of the federally owned land in Lake County is used for grazing allotments. He also noted that some windstorms and severe winter storms have caused timber blow-down on federal lands.

Stakeholder Interview with Max Corning, District Conservationist, Natural Resource Conservation Service

Held 3.9.2007

Max feels that floods have the greatest potential to affect the community. He also feels that fire is a great threat. Max suggested that no populations are at greater risk than others. He noted that Lakeview Lockers, Safeway and Stewarts grocery stores and any of the restaurants in the county would be impacted by the temporary loss of utilities. Max noted that if a significant earthquake were to hit Lakeview, many of the businesses in downtown on E street would be affected and may not be able to relocate. He also noted that many of the buildings in downtown Lakeview are historic

and important to the community. Max suggested that the critical facilities are the hospital, utility lines, water systems and hiway systems.

Max observed the significant natural resources of the county to be the forests, the landscape, the rangeland, Old Perpetua, and the hot springs. He noted that if we were to lose the forests or rangeland that the timber and cattle industry would be significantly impacted economically. Max told that the small sub-development on Roberta Rd. in Lakeview is in a floodplain.

Dale Roberts, Mayor of City of Paisley

Held 3.5.2007

Dale feels that wildfire and windstorm are the greatest threat to the City of Paisley. He feels that the populations that are more at risk are seniors and those of the low economic status. He noted that the Wellness Center of Paisley and the Lake County Senior Citizens Association provide services to the seniors of Paisley.

Dale suggested that all the businesses of Paisley would be affected by the temporary loss of utilities. Business of Paisley include the store, gas station, restaurant, saloon and saddle shop. He noted that if businesses were forced to relocate due to a hazardous event, that there would be no where to go. Dale feels the Paisley Ranger District buildings are historic assets and the Native American rock art in the area are cultural assets.

Dale observed that the water, electricity, sewer and school are the critical facilities that the community relies on. He noted that the timber, agricultural land and rangeland are the significant natural resources of the area. He said that if the community were to loose any of those natural resources there would be significant economic impact. Dale also noted that there is zero growth in the community.

Stakeholder Interview via phone with Toby Freeman, Pacific Power Regional Community Manager and Warren DiNapoli, Pacific Power Operations Manager

Held 4.16.2007

Toby and Warren noted that there are 2300 meters, 68 miles of overhead distribution lines, 10 miles of underground distribution lines and a few transmitters in the Lakeview area. Pacific Power only provides services to the Lakeview area within Lake County. Both noted that windstorms and winter storms are the hazards that affect their utilities most often. However the extent of damage is dependant upon what other conditions are on-going at the time of the event. These conditions include wind speed and water content of soil, presuming that higher water content loosens soil with can result in more trees and poles coming down.

When asked about the opportunity to apply for funds to underground lines that are currently overhead, both men agreed that damage from storms was not sufficient enough to justify cost of undergrounding. They did note, however, that some cities are creating ordinances that all new lines must be undergrounded and that this is an option to consider for Lake County.

Stakeholder Interview with Ron Wilke, Town of Lakeview Public Works Manager

Held 4.17.2007

Ron detailed that Public Works manages Town of Lakeview water, sewer, streets, parks and geothermal system. When asked what hazards affect Town of Lakeview Public Works and how, he mentioned that the only problems that have occurred where with flooding. He mentioned that drainages from Deadman and Bullard Canyon would sometimes overflow the ditches and wash debris onto streets, but that all these events happened before the Bullard Canyon Dam was installed. Since the dam has been installed there have been no problems with drainages overflowing. Ron also noted that drought can sometimes impact residential water supply. He noted that 10 years ago one of the town wells went dry. He noted that the Town has one portable back-up generator that they can transport to different lift-stations in the event of an extended power-outage. Ron mentioned that there is an update project going on in town. A major sewer lift station is being redone on South 3rd and that a generator is being installed for the pump if power is lost. Also, a well #4 is being capped in order to create a road where the well currently exists. A new well is being established in another well field.

Ron noted that the million gallon water tank on the east edge of town is safe. He said only an extremely large earthquake could potentially cause slope failure and that the concrete was poured on solid bedrock buried in the slope. Regarding the sewage ponds Ron said they are constructed with rock and wire on the inside to prevent erosion and wall collapse. The ponds maintain a buffer in the event of rain inundation and there are pumps installed that are able to discharge large amounts of water in the event of heavy rains. Ron noted that the older ponds were constructed in 1978 and that the newer ones were constructed in 1997. Regarding Deadman Canyon Ron did not think a permanent structure was necessary at this point, that the rock holding structures in place currently are working sufficiently.

Stakeholder Interview with Rick DuMileiu, County Roads Manager
Held 4.18.07

The Lake County Roads Department maintains 709 miles of roads. Rick mentioned past mitigation projects in Crane Creek where small culverts that were frequently blocked by debris were replaced by bridges. This opened the waterway and created better habitat for fish. Rick noted areas in the southern portion of the county that have been subject to flooding in the past. Particular problems have occurred along the drainages through Lakeview from Deadman and Bullard Canyons. Rick noted that most of the mitigation that needs to occur will come in the form of clearing and dredging drainages throughout Lakeview. He noted that one problem the Roads Department encounters while maintaining ditches and drainages is that many of them run along privately owned lands. Rick also noted that in the Hart Mtn/Plush area there are culverts that need to be replaced with larger culverts for drainage flows off of Hart Mtn.during snowmelt and rain storms.

Bill Duke, Lake County Resource Initiative
Held 4.26.2007

Bill recommended that actions regarding Drews Gap, Lakeview and Christmas Valley fire breaks recommended by the CWPP be prioritized as action items for the Natural Hazard Mitigation Plan. Bill estimated that less than 10% of the county is a WUI

zone. Bill noted that the Lake County Fire Council will head up mitigation actions taken from the CWPP and that those serving on the LCFC are: Bill Duke (head), Greg Pittman with ODF, Dan SHoun with Lake County, Matt Webb with FS/BLM, Craig Foster with OFW, Sam Goss Lakeview Fire Chief, Bob Carlson with Lakeview Fire Department and Lee Fludderjohan representing private timber industry lands.

Phone Interview with Lynn Culp, Member Service Manager with Surprise Valley Electric Cooperative

Held 4.27.2007

Lynn informed me that SVEC serves the rural communities around Lakeview including New Pine Creek, New Idaho, the Warner Valley including Plush and Adel, and North including Paisley to Summer Lake and to the West of Lakeview about 15 miles. He noted that wind is the primary cause of power outages for the area SVEC serves, and that heavy snow and ice loads are the secondary causes. When asked if there were areas of chronic outage, Lynn noted that over just the last few years a section of line running through forest land over the Warner Range serving Adel has been downed. He also noted that over the 20 years that he has worked with SVEC the longest outages have been less than 12 hours. Lynn noted that the only underground lines they have are short lines that run to irrigation pumps or where an individual member requested that service to their house be underground.

Lynn was going to pass on a few questions to Jim Hayes, Operations Manager and have Jim call me.

Phone Interview with Jim Hayes, Operations Manager with Surprise Valley Electric Cooperative

Held 4.27.07

Jim informed me that SVEC has 685 miles of overhead distribution lines in Lake County and 1667 meters in the county. He also informed me that there are 79 miles of undergrounded lines. These lines are primarily to irrigation pumps, pivots and to individual members that requested the service lines to their meters be undergrounded. Jim informed me that SVEC doesn't prefer to underground lines because of the difficulty to service them and difficulty in locating damage or malfunction. Regarding tree trimming, Jim said SVEC has no inventory on hazardous trees, that they trim on a as-needed basis, a rotating basis and a priority basis. He noted that staffs are constantly noting trees in the county that may be problematic but that there is no formatted plan. Jim noted that SVEC is a small company and that maintenance is their number one priority. He explained that tree trimming is a large part of maintenance where a lot of the cooperative's time and money is spent. Jim explained that SVEC enjoys cooperating with Lake County and that they are willing to be of any help they are able but that he has no suggested action items at this time.

Stakeholder Interview with Darwin Thurston, Operations Manager with Midstate Electric Cooperative

Held 5.23.2007 (phone interview)

Darwin informed that Midstate has 1,038 miles of distribution lines in Lake County. He noted that the Sycan Marsh area lines are sometime affected by winter storms. Outages are caused primarily from trees falling on lines. He noted that the number of outages each winter is dependant on the severity of the winter. He also noted that there are few customers that are provided power by the Sycan lines. When asked if Midstate would be interested in undergrounding the lines in Sycan Marsh, Darwin suggested instead that trees with shallow root systems, such as the Jack Pines, be removed around the lines. He explained that Midsate had removed all the Jack Pines within 80 feet of both sides of the lines around Klamath Falls and it reduced outages by 98%. This was much less costly than undergrounding lines. It was agreed that the Project Coordinator would draft an action to remove Jack Pines around Power Lines in Sycan Marsh and Midstate would serve as coordinating organization for the action.

Stakeholder Interview with Darwin Thurston, Operations Manager with Midstate Electric Coop

Held 7.30.2007 via telephone

When following up on the proposed action item to remove shallow-rooted trees in the Sycan Marsh area of Lake County, Darwin reported what he had discussed with maintenance crews for the Sycan Marsh area. He reported that there were not a significant amount of trees to warrant the suggested action item of shallow-rooted tree removal. Katie Mader, Project Coordinator, told Darwin she would remove the proposed action item from the plan and that the opportunity for Midstate electric to participate in the plan stood at any time.

Public Meetings

Public meetings served as a medium for information dissemination. Information provided will cover both natural hazard mitigation planning in Lake County and mitigation strategies for individuals, groups and businesses. These meetings also functioned as an avenue for meeting possible partners and stakeholders for the project.

Lake County Planning Commission Meeting

On Tuesday, October 17th project coordinator presented to the Lake County Planning Commission in regards to the Lake County Natural Hazard Mitigation Plan. She presented an overview of what the plan will consist of, it's importance to the community and how the planning commission could potentially be involved in the creation of the plan.

Lake County Senior Citizens Association

A presentation on home hazard preparedness was made to a group of approximately 20 people from the Lake County Senior Citizens Association (LCSSA) on Wednesday February 7th, 2007 from 2:15 to 3:00 p.m. The presentation began by discussing which natural hazards Lake County has vulnerability to. It continued with discussing what should be in a home disaster kit. Following that were examples of emergency plans that an individual or family should make. After discussing risks and plans, time was spent discussing

how to prepare a home for a variety of hazards. The presentation had positive reaction and support. Information was collected from those who expressed interest in more information on disaster preparedness or help preparing their homes for natural hazards.

Lake County Disaster Preparedness Group

On Tuesday, April 3rd, project coordinator Katie Mader attended the Lake County Disaster Preparedness Group meeting. Katie was allotted a few minutes of the meeting to discuss with the group about the Lake County Natural Hazard Mitigation Plan, its importance to the community and its relevance to the LCDPG. Katie informed the group of the public outreach she had previously conducted and the outreach she has planned for the duration of her project.

Lakeview Business Association

On Thursday, May 24th project coordinator Katie Mader spoke at the Lakeview Business Association Meeting. She informed LBA about the Lake County Hazard Mitigation Plan and why it is important to the community. She then talked about the three layers to small business hazard planning; human resources, physical resources and business operations. She informed the committee that there will be an action item included in the plan that will enhance small business hazard planning in Lake County. She dispensed material to LBA members from IBHS so they could begin planning currently.

Lakeview Town Council Meeting

On Tuesday, June 26th project coordinator Katie Mader spoke at the Lakeview Town Council Meeting. She informed the council members of the planning process that has taken place over the past 10 months. She included why the plan is being created, the structure of the plan, about action items and the implementation process. She informed the council about the creation of jurisdictional addendums and the process by which the Town of Lakeview will adopt the addendum.

Lakeview Lion's Club

On Thursday, July 12th project coordinator Katie Mader spoke at Lakeview Lion's Club meeting to approximately twenty members. She spoke to the members about how and why a Natural Hazard Mitigation Plan is being created for Lake County. She discussed the benefits of adopting a plan and highlighted a few projects the plan hopes to accomplish. Katie also mentioned a few tips on mitigation activities that members could do on a personal level in their own homes to prepare for natural hazards.

Lakeview Ministerial Association

On Tuesday, July 17th project coordinator Katie Mader spoke to the Lakeview Ministerial Association. There were approximately twelve members present. She informed those present about the natural hazard mitigation planning that has been underway in Lake County for the past ten months. She highlighted the structure of the plan and what she hopes will be accomplished through the implementation of the plan. Katie talked about mitigation actions that

individuals can do in their homes and offices and encouraged the pastors to mention them to their congregations. She also mentioned that someone may be contacting churches over the next few months asking to display hazard mitigation materials for the community.

Publications

Many local business and organizations produce weekly, monthly or quarterly publications. Submitting articles to these established publications was an efficient way to convey mitigation planning updates and advertise mitigation activities to a broad and many times large audience that may be otherwise missed.

High Desert Headlines

An article on earthquake awareness and preparedness was published in the Oregon State University Extension quarterly publication *High Desert Headlines*. The article also describes the creation of the Lake County Natural Hazard Mitigation Plan.

The publication is distributed to approximately 540 private residences and 60 businesses in Lake County.

Lake County Chamber of Commerce Quarterly Mailing

A full-page article on the Lake County Natural Hazard Mitigation Plan with suggestions for home and business mitigation activities was published in the 3rd Quarterly Lake County Chamber of Commerce Mailing. The mailing is sent to the approximately 215 Lake County Chamber of Commerce Members.

Lake County Examiner

An article on earthquake awareness and preparedness was published in the Lake County Examiner on Thursday, April 19, 2007. The article also describes the creation of the Lake County Natural Hazard Mitigation Plan.

Desert Whispers

An article on the Lake County Natural Hazard Mitigation Plan with suggestions for home and business mitigation activities was published in the July 15th, 2007 edition of *Desert Whispers*. *Desert Whispers* is a bi-monthly mailing published by the North Lake County Chamber of Commerce. *Desert Whispers* publishes 1,300 copies that are distributed to Lake County Post Offices and various businesses in Christmas Valley, Fort Rock, Silver Lake, Paisley, Summer Lake, and a small distribution in Lakeview at the Senior Center and the Chamber. There are also 80 mail subscriptions from California, to various parts of Oregon, and one in Ohio.

Lake County Examiner

An article on the near completion of the Lake County Natural Hazard Mitigation Plan was published in the Lake County Examiner on Wednesday, August 1, 2007. The article describes the planning process over the past year and describes

suggested mitigation action items included in the plan that the county hopes to accomplish in the coming years.

Agenda

Lakeview Addendum Work Session

Thursday, June 28th 2-3 p.m.

Commissioner's Hearing Room

- I. Welcome**
- II. About Addendums**
- III. Risk Assessment**
- IV. Final Steps**

Agenda

Natural Hazard Mitigation Steering Committee- Mapping Assets

Friday, February 23rd 9-11:30 a.m.

Commissioner's Hearing Room

I) Introduction (20 minutes)

II) Community Resilience Factors (10 minutes)

III) Community Asset Identification Exercise (55 minutes)

BREAK (10 minutes)

IV) Mapping Assets (55 minutes)

V) Hazard Brainstorm (20 minutes)

VI) Action Items Reintroduction (5 minutes)

VII) Preparations for Departure (5 minutes)

Agenda: Natural Hazard Mitigation Steering Committee Meeting #3:

Mission, Goals and Action Items

Monday, May 21st 2007

Commissioner's Hearing Room

9 -11 am

- I. Welcome (5 minutes)
- II. Mission and Goals (15 minutes)
- III. About Action Items (15 minutes)
- IV. Review Proposed Action Items (80 minutes)
- V. Wrap Up (5 minutes)

Agenda

Risk Assessment for the City of Paisley

I. Introduction

II. About the Plan

III. Current Mitigation

IV. Identifying Community Characteristics

V. Mapping

VI. Hazard Identification

Agenda

Natural Hazard Mitigation Plan Steering Committee Meeting #4: Implementation and Maintenance

July 25th 9-11 a.m.

Commissioner's Hearing Room

- I. Intro
- II. Implementing the Plan
- III. Plan Maintenance
- IV. Moving Projects Forward
- V. Public Involvement
- VI. Wrap- up

Lake County Natural Hazards Mitigation Plan
Steering Committee Meeting Agenda
December 18, 2006 2 p.m.

1. Welcome and Introductions (10 minutes)
2. Role of Steering Committee Members (5 minutes)
3. Regional Planning Initiative with Andre LeDuc, Director of Oregon Natural Hazards Workgroup (10 minutes)
4. What is Mitigation? (20 minutes)
 - a. Project Outline
 - b. Planning Process
5. Stakeholders and Public Outreach (20 minutes)
6. Homework (10 minutes)

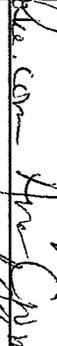
Lake County Natural Hazard Mitigation Steering Committee Meeting

December 18, 2006 2-3:30 p.m.

Name	Representing	Email	Roundtrip mileage (if applicable)	Hourly Rate
Gar Simms	Town of Lakeview	lakeviewtownmanager@xhew		45 -
Judy Graham	Lake Co SD 7, Lakeview	grahamj@lklv.k12.or.us		42.84
Hilary Zimmerman	Building Department			24.76
Luke B. Campbell, Sgt.	Lake County Sheriff LCRF	lucampbell@co.lake.or.us		26.37
BILL DUKE	Lake County Rescue Initiative LCRF	bdukeb@gaesslake.com		35-
Phil McDonald	Lake County Sheriff's Dept	pmcdonald@co.lake.or.us		31.74
Lisa D. Bowler	Lake County Planning Dept.	lbowler@colake.or.us		27.81
Fick Dumilia	" " Road Dept	lakeco@road.gaesslake.com		30.49
Ken Kestner	Co. Commissioner - Elect	kkestner@co.lake.or.us		19.61

* did not
complete
by 9:00 PM

**Natural Hazard Mitigation Steering Committee
Plan Implementation and Maintenance
Wednesday, July 25th 9-11 a.m. Commissioner's Hearing Room**

Name	Representing	Time In	Time Out	Email Address	Signature
Jim Knight	OWITW			jim.knight@owitw.com	
The Cropsey	Lake County Road	9:00	9:40	lakeroad@govalley.com	
Ken Gerscher	Lake Co. SD#s	9:00	9:40	gallagher@ku.edu	
Ken Gerscher	Lake County	9:00	9:40	kerscher@co.lake.or.us	
Tony Summers	Town of Glenview	9:00	9:40	kerscher@co.lake.or.us	

Paisley Addendum Work Session
June 11 7 pm

Name

Rosie Bagley

DALE ROBERTS

Lawrence A Duckworth

Signature

Rosie Bagley

Dale Roberts

Lawrence A Duckworth

Natural Hazard Mitigation Steering Committee Lakeview Addendum Work Session

Thursday, June 28th 2-3 p.m. Commissioner's Hearing Room

Name	Representing	Time In	Time Out	Email Address	Signature
Shy Simms	Lakeview	2:10	3:00		<i>Shy Simms</i>
Don Collopy	Lakeview S.D.	2:10	3:00		
Nelly Graham	Lakeview SD	2:05	3:00		
Pete Duke	LCRI	2:05	3:00		<i>Pete Duke</i>
Cory Jensen	Chamber	2:10	3:00		<i>Cory Jensen</i>



LAKE COUNTY PLANNING COMMISSION AGENDA

Tuesday, October 17, 2006 - 6:00 P.M.

- ITEM 1:** Approval of Minutes from the September 19, 2006 Planning Commission Meeting.
- ITEM 2:** A public hearing on Conditional Use Permit Application No. 1074 by Carolyn Carson-Graybill to establish one 8-unit apartment complex on property described as: Within Township 27 South, Range 17 EWM., Section 17B, Tax Lot 5400 in an R-1, Residential Use Zone. A decision will be based on Articles 3 and 24 of the amended Lake County Zoning Ordinance of 1980.
Cont. From
Sept. 19, 2006
- ITEM 3:** A public hearing on Conditional Use Permit Application No. 1077 by Carol Christenson establish a non-farm dwelling on property described as: Within Township 28 South, Range 16 EWM., Section 11, Tax Lot 1200 in an A-2, Agriculture Use Zone. A decision will be based on Articles 3 and 24 of the amended Lake County Zoning Ordinance of 1980.
Cont. From
Sept. 19, 2006
- ITEM 4:** A public hearing on Partition Application No. 1429 by Amy Blair to partition one 1± acre parcel from an existing 2.8± acre parcel on property described as: Within Township 39 South, Range 24 EWM., Tax Lot 138 in an A-1, Exclusive Farm Use Zone. A decision will be based on Articles 2 and 24 of the amended Lake County Zoning Ordinance of 1980 and Article 6 of the amended Lake County Land Development Ordinance of 1980.
- ITEM 5:** A public hearing on Conditional Use Permit Application No. 1080 by Lakeview Bowman's Sports Club to establish an Enclosed Archery Range on property described as: Within Township 39 South, Range 20 EWM., Section 22BA, Tax Lots 13400, 13500, and 13600 in an R-1, Residential Use Zone. A decision will be based on Articles 6 and 24 of the amended Lake County Zoning Ordinance of 1980.
- ITEM 6:** A public hearing on Conditional Use Permit Application No. 1082 by Doyle Bell to establish a non-farm dwelling on property described as: Within Township 28 South, Range 16 EWM., Section 11, Tax Lot 700 in an A-2, Agriculture Use Zone. A decision will be based on Articles 3 and 24 of the amended Lake County Zoning Ordinance of 1980.

COUNTY COURTHOUSE MEETING ROOM, 513 CENTER STREET, LAKEVIEW
Planning and Building Office (541) 947-6032

ITEM 14:

Presentation by Katie Madar, RARE Student, regarding Natural Hazard and Pre-Disaster Mitigation Planning for Lake County followed by discussion with the Planning Commission Members regarding their involvement in the process.



Lake District Hospital
Long Term Care
Home Health & Hospice

In Admin building
straight ahead from
parking lot, use left
door

**Lakeview Community
Disaster Preparedness Group**
Date: Tuesday, Apr 3, 2007
Time: 1:30 p.m.
Place: Warner Creek Correctional Facility

AGENDA

- | | |
|------------------------------------------------------|-------------|
| Old Business | 20 m |
| Drill, April 11 | |
| Come to the EOC with what now? | |
| talk to Phil, pass on to Patti | |
| start around 9 | |
| Katie Mader, Natural Hazard Mitigation | 10 m |
|
 | |
| EOC Committee update | 5 m |
| lack of information | |
|
 | |
| Special Populations meeting | 5 m |
| Bernie Burckholder - food pantry | |
|
 | |
| Other Discussion | 15 m |
| Kristen - CISM - critical Incident Stress Management | |
| CISM Team or Peer Support development | |
|
 | |
| Next Meeting date | 5 m |
| Drill results, Em. Alert System | |
| Tuesday May 1 | |

"To care for our community with respect and compassion through excellence and teamwork."

Mission Statement

Home Survey to Public Health - Mary & Beth



**Lakeview Disaster Preparedness
 Minutes**

Date: April 3, 2007

Present: Mary Wilke, Beth Hadley, Gordon Ensley, Patti Baker, Kristin Hill, Katie Mader, Bob Carlson, Brian Lee

ITEM	DISCUSSION	ACTION
Old Business	<p><u>Drill</u> Phill McDonald was not in attendance, so Katie Mader will contact him to make sure he will be participating in the community drill on April 11 or have the SAR available. If Phill does not perform the call-ins to the EOC, there will be some difficulty.</p> <p>Evaluators for the drill will be Brian Lee and Bob Carlson. Facilitator will be Matt Webb.</p> <p>Drill will run till ~1:30 with a hotwash immediately after for 1 hour. Testing ICS, documentation and call down lists.</p> <p>Lunch and morning snacks will be provided.</p>	<p>Katie to contact Patti to confirm Phill's participation.</p> <p>Brian, Bob and Matt to be at the SAR on April 11 between 8:30 and 9:00 a.m.</p>
Natural Hazard Mitigation	<p>Katie Mader's next outreach will be Examiner articles on Earthquake Awareness (April) and Wildfire Awareness (May). She will be talking to the service clubs on Business Continuity and the Ministerial Association. Public Health will team up with Katie and present information on home preparedness to the service clubs.</p>	
EOC Committee update	<p>Only one person showed up at the scheduled meeting last week. No new progress on the EOC issues.</p> <p>Mary and Patti attended a Commissioners work session and asked them to attend these meetings. There was interest from the Commissioners to prompt development on the County Emergency Plan.</p>	
Special Populations update	<p>The meeting with the Special Populations group yielded a lot of interest. See attached minutes from that sub committee. The idea is to meet a few times to see who needs assistance, get a clear picture of what the needs are in the community, and for all the partners to help one another get plans in place. Then perhaps meet once a year.</p>	

Agenda

Lakeview Business Assoc. Meeting 5/24/07

6:00pm Open Meeting

Guests: Kathy TVCC
Katie Mader - Natural Hazard Mitigation/
Small Business Hazard Planning

Reading of Minutes

Treasure Report

Old Business:

Maps

Flyers

Flags

New Business:

4th of July

Crazy Days

Sizzling Summer Savings

Next Meeting:

AGENDA
TOWN OF LAKEVIEW
TOWN COUNCIL
REGULAR SESSION
4:00 P.M.
June 26, 2007

- I. CALL TO ORDER- Rick Watson, Mayor
 - A. Pledge of Allegiance

- II. PUBLIC COMMENT

- III. COMMUNICATIONS/COMMENTS/INFORMATIONAL ITEM
 - A. Al Strain
 - B. Don Jordan-request for out of town utilities
 - C. Katie Mader-Disaster Mitigation Planning
 - D. Correspondence; Fremont Sawmill re: sidewalk improvement
 - E. Correspondence; ODOT re: street sweeper
 - F. Correspondence; Al & Barbara Strain re: alley vacation
 - G. Correspondence; Gretch-Ken Industries re: alley vacation
 - H. Correspondence; Jerry Cox re: public nuisance
 - I. Dept. of Corrections PAC 5/29/07 minutes
 - J. Correspondence; ODOT Hwy 395/140 improvements
 - K. Bullard Canyon Working Group 5/2/07 minutes
 - L. Correspondence; Oregon Emergency Management re: 911
 - M. News Release; Fremont-Winema National Forest noxious weed tour

- IV. CONSENT CALANDAR
 - A. Minutes: June 12, 2007 regular session

- V. MAYOR/COUNCIL UPDATE

- VI. OLD BUSINESS
 - A. 911

- VII. NEW BUSINESS
 - A. Resolution # 722 In the Matter of Transferring Funds from US Bank Checking to US Bank Time Certificate 06-07fy
 - B. Resolution # 723 In the Matter of Recognizing Funds from the Oregon Hunters Association for the Shooting Range 06-07fy

katie mader

From: Doug and Connie Dollarhide [dcd@hdo.net]
Sent: Wednesday, August 01, 2007 1:51 PM
To: Katie Mader
Subject: Thanks

Lions Clubs International, Multiple District 36 E

Lakeview Lions Club

PO Box 228

Lakeview, Oregon 97630

Katie Mader, Intern

Lake County Disaster Unit

Lakeview, OR 97630

Dear Katie,

Thank you very much for the program presented to the Lakeview Lions Club on Thursday, July 12, 2007. The program was very informative. I appreciate you taking time to keep us informed.

Sincerely,

Connie Dollarhide

Club Secretary

APRIL SHOWERS, FLOWERS AND EARTHQUAKES

Lake County is recognized for its striking landscape. Towering Abert Rim is a result of powerful seismic energies, and so are those relaxing geothermal hot springs. Geologic activity is what gives the landscape its rugged beauty, attracts rock hunters and keeps those hunters coming back for a soak after a cold, early morning. Anyone who's been in Lakeview since mid-June 2004 knows that this area is seismically active. A flurry of earthquakes, the largest with a magnitude of 4.4 made sure residents of Lakeview were aware of what's happening beneath the Earth's surface. Even before that, in April of 1999 there was another swarm of small earthquakes in Christmas Valley. Although geologic activity creates these enjoyable and aesthetically pleasing characteristics, living near fault lines comes with a set of hazards and responsibilities. If knowing is half the battle, being prepared is the other half.

Oregon recognizes April as Earthquake Awareness Month. Doing simple things to mitigate and prepare for a hazard; earthquake or otherwise, is a wise investment in your safety and recovery time if a hazardous event should occur. An easy way to summarize the term "mitigation" is "risk reduction". The Multihazard Mitigation Council produced a study concluding that a dollar spent on mitigation saves \$4 on response and recovery. An important thing to remember is that preparedness is everybody's business: individual citizens, businesses, organizations and local, state and federal government agencies.

Here are some easy ways to prepare your home for earthquake:

- Hang heavy items, such as mirrors or large picture frames away from beds and couches, or securely fasten them to the wall
- Brace overhead light fixtures
- Secure a water heater by strapping it to wall studs and bolting it to the floor
- Fasten shelves and bookcases to wall studs
- Place large or heavy objects on lower shelves
- Install latches on cupboards
- Know how to turn off water, gas and electricity at the main switches or valves and keep any tools necessary nearby
- Have fire extinguishers accessible at all times
- A 72-hour kit

What goes in a 72-hour kit?

- A variety of canned foods that don't need to be heated
 - If you have a pet, don't forget food for them!
- 1 gallon per day per person
 - Extra for cooking and sanitation
- First Aid Kit with manual
 - Any necessary prescription medicines
- Extra clothing and blankets
- Battery powered radio with extra batteries
- Flashlight with extra batteries
- Sanitation and hygiene items
 - Hand sanitizer
 - Moist towelettes
 - Toilet paper



(April Showers, con't)

- A variety of tools
- Items for infants and children
 - Formula
 - Diapers
 - Toys, coloring books

What to do if an earthquake strikes

- Take cover under a piece of heavy furniture or against an inside wall, away from windows and hold on
- If you are inside, stay there! Don't risk having objects fall on you by attempting to exit the building
- If you are outside, move into the open away from buildings, street lights and utility lines and stay there



Preparedness requires planning. Have a disaster plan that everyone in your family understands. Things to cover in a family disaster plan would be: where to meet in a hazardous event, who is your out-of-town contact, what are the escape routes from your home and where are the safe places, how to plan for anyone with special needs, how to prepare for different hazards and don't forget to plan for your pets.

Currently, a Natural Hazard Mitigation Plan is being prepared for Lake County. The plan will be approved by the Federal Emergency Management Agency (FEMA) and is being prepared by Katie Mader. Katie, a recent University of Oregon graduate is in Lakeview working with the AmeriCorps program through the University of Oregon. Resource Assistance for Rural Environments (RARE). As a RARE participant, Katie is working with Sheriff Phil McDonald and the University of Oregon's Oregon Natural Hazard Workgroup (ONHW) to create the plan. Once the plan has been adopted, it will open a variety of funding sources to start mitigation projects county-wide.

For more info on hazard preparedness see the FEMA (www.fema.gov) or the Red Cross (www.redcross.org) websites.

Submitted by: Katie Mader

OREGON FAMILIES & THEIR FORESTLANDS WHAT'S AT STAKE

April 27 – 28, 2007

Oregon State University, Lasells Stewart Center, Corvallis, OR

Sponsored by the Oregon Board of Forestry & Committee for Family Forestlands

Oregon's forestry environment is changing and so are the challenges facing private landowners. The forests we enjoy today aren't necessarily guaranteed to be here tomorrow. Join a collaborative effort to ensure they are.

To register for this symposium: www.oregonforests.org/conferences.ffl or call 541-737-9300

Natural Hazard Mitigation Planning in Lake County

Lake County is known for its rugged landscape and the mystic beauty that accompanies that ruggedness. This awesome landscape has been formed and altered by a myriad of natural processes; **earthquake, drought, fire, floods, wind and winter storms**. These natural processes still occur today, however they now have the potential not only to affect the natural landscape, but to affect human welfare and the built environment. Because of this there is new responsibility to be prepared for the risks these natural hazards pose.

A **Natural Hazard Mitigation Plan** is currently being created for Lake County by Katie Mader in collaboration with the Lake County Sheriff Department. Mader is an AmeriCorps volunteer also working with the University of Oregon program Resource Assistance for Rural Environments (RARE) and Oregon Natural Hazard Workgroup (ONHW).

Mitigation is a form of emergency management that focuses on **lessening the impacts of natural hazards before they hit**. It is not the same as preparedness or response. Preparedness is having a lantern in your home in case the power fails, mitigation is cutting down the tree before it falls on the power line to cause the power fail.

The Multi-Hazard Mitigation Council produced a study that showed that every \$1 spent on mitigation saves \$4 in response and recovery

The Lake County Natural Hazard Mitigation Plan will provide a comprehensive list of **Community Assets**, a community **Risk Assessment** and a list of proposed mitigation projects, referred to as **Action Items**. Once the plan is completed and adopted by the county, due to happen this fall, it will open a wide variety of funding sources to begin mitigation actions.

Mitigation is everyone's responsibility; the individual citizen, the business owner, the community organization and the government agency. There are many small steps that can be taken to make a big difference should a hazardous event occur. One easy project to mitigate wildland fire is to create a **defensible space** around buildings. Clear all brush, weeds and other flammable materials in a 30 foot radius around the building. This creates a fire break and also allows fire fighters space to maneuver safely around the structure. **Strapping water heaters** to wall studs can prevent a topple should an earthquake hit. **Plan for your small business** by creating a business continuity plan including key business functions and an employee emergency plan should an event occur during working hours.

For more ideas and information or to download materials on small business hazard planning, visit the Institute for Business and Home Safety at www.ibhs.org . For other mitigation and preparedness activities, visit the FEMA website at www.fema.gov, the Red Cross website at www.redcross.org or visit Lake County Public Health.



SUBMITTED PHOTO

ia Van Dreel, Asst. Prof. of Assoc. Prof. Emeritus of Prof. of Trombone Jeffrey of Tuba Michael Grose will Quintet at the First Presby- April 22.

Incil brings review April 22

ill bring a touch of the classi- April 22, with a concert at First

the Lake Arts Council's annual and the public is encouraged

ss quintet includes music from olyphony to modern composi-

orn player Lydia Van Dreel, pet players Brian McWhorter, bonist Jeffrey Williams. All of s are also professors or associ-

School of Music and Dance. available at The Golden Gem, Back Yard Floral. Individual rate admission is \$15.

tively scheduled for May 12, in ony Orchestra will perform at ints, located north of town off of

contact Stan Wonderley at 947-

the fourth Wednesday of each month. Light refresh-

April Earthquake Awareness Month

Lake County is recognized for its striking landscape. Towering Abert Rim is a result of powerful seismic energies, and so are those relaxing geothermal hot springs. Geologic activity is what gives the landscape its rugged beauty, attracts rock hunters and keeps those hunters coming back for a soak after a cold, early morning.

Anyone who's been in Lakeview since mid-June 2004 knows that this area is seismically active. A flurry of earthquakes, the largest with a magnitude of 4.4, made sure residents of Lakeview were aware of what's happening beneath the Earth's surface. Even before that, in April of 1999 there was another swarm of small earthquakes in Christmas Valley.

Although geologic activity creates these enjoyable and aesthetically pleasing characteristics, living near fault lines comes with a set of hazards and responsibilities. If knowing is half the battle, being prepared is the other half.

Oregon recognizes April as Earthquake Awareness Month. Doing simple things to mitigate and prepare for a hazard - earthquake or otherwise - is a wise investment in your safety and recovery time if a hazardous event should occur.

An easy way to summarize the term "mitigation" is "risk reduction". The Multihazard Mitigation Council produced a study concluding that one dollar spent on mitigation saves \$4 on response and recovery. An important thing to remember is that preparedness is everybody's business, including individual citizens, businesses, organizations and local, state and federal government agencies.

Currently, a Natural Hazard Mitigation Plan is being prepared for Lake County. The plan will be approved by the Federal Emergency Management Agency (FEMA) and is being prepared by Katie Mader. A recent University of Oregon graduate, Mader is in Lakeview working with the AmeriCorps program through the University of Oregon, Resource Assistance for Rural Environments (RARE). As a RARE participant, she is working with Sheriff Phil McDonald and the University of Oregon's Oregon Natural Hazard Workgroup (ONHW) to create the plan.

Once the plan has been adopted, it will open a variety of funding sources to start mitigation projects to help create a disaster resilient Lake County.

For more info on hazard preparedness see the FEMA ("http://www.fema.gov") or the Red Cross ("http://www.redcross.org") websites or visit Lake County Public Health for information packets.

— Submitted Article

Every week we meet to practice services. We sing at three services on cated to the successful creation of well-executed music. Peter and I h and not only enjoyed seeing each o spent a lot of our spare time togeth we were considered "a couple".

Christmas at the church is espe the-scenes work it takes to create a filled with joyous voices usually le second year in the choir found me trying to squeeze in shopping, bak all of the extra practices we were l all of the practicing would be wor know just how special it would tur

Christmas morning came and th dressing room decked out in crisp rushing around like a red blur as l and reminded everyone of their cu I smiled as I watched him and wo time to celebrate Christmas oursel

We filed solemnly into the c had arrived and began a beautiful lost myself in the wonderful Chri one song to the next. Peter stood satisfied smile on his face.

The church was nearly full, Fa choir, and we all began to sing Peter, but what happened next wa was expecting..

Peter leaned toward the r "Before we begin this celebration celebration of my own.". As he s at me. I felt butterflies in my stor

"On this special day, I wa woman I want to share my life down here for a moment, I'd like knees were shaking as I walked Peter at the front of the congre took my hand.

"Jean, in front of the peop you to be my wife," he said as h my finger. The whole congregat to hear my whispered "Yes" as P

I could barely walk back to voice was shaking so much I co rest of the service. What an incre

We have NEW and can Custo Or design

The Go

8 N. E St.

ty Calendar

WEDNESDAY, APRIL 19

ation Clinic, 8 a.m.-noon, 1 p.m.-5

.m.-3 p.m., Pool Room at Community

Job

10 N 4th St., Western Villa Rec Center,

1 p.m., Bowling Alley.

pen Discussion, 6:30 p.m.,

11 N. G St. call Pat P. 947-4728.

society, 6:30 p.m., Rec room at West-

SUNDAY, APRIL 22

Adult Competitive Volleyball, 4-6 p.m. Honker Court
JuJitsu - 6-8 p.m. at LHS gym. 947-2455 for more info.

MONDAY, APRIL 23

Domestic Violence Group. For information call 947-2449
Public Health Immunization Clinic, 8 a.m.-noon, 1- 5 p.m.,
100 N. D St.

Senior Citizens Pool, 9 a.m.-3 p.m., pool room at Community Senior Center.

Teen Advocate Women's & Children's Resource Center, 9 a.m.-4 p.m. North Lake County and Christmas Valley.

Blood Pressure Clinic, 11:30-Noon, Community Senior Cen-

Narcotics Anonymous, 7 p.m. dromat, Christmas Valley.

WEDNESDAY

Senior Citizens Pool, 9 a.m.-3 Senior Center.

Public Health Immunization 100 N. D St.

County Commissioners Meeti
Preschool Storytime, 10 a.m.

Narcotics Anonymous, 7 p.m. dromat, Christmas Valley.

Mental Health Advisory Board
Westside Parents Club, 7:30

THURSDAY

**Natural Hazard Mitigation Planning
in Lake County**

Lake County is known for its rugged landscape and the mystic beauty that accompanies that ruggedness. This awesome landscape has been formed and altered by a myriad of natural processes; earthquake, drought, fire, floods, wind and winter

storms. These natural processes still occur today, however they now have the potential not only to affect the natural landscape, but to affect human welfare and the built environment. Because of this there is new responsibility to be prepared for the risks these natural hazards pose.

A Natural Hazard Mitigation Plan is currently being created for Lake County by Katie Mader in collaboration with the Lake County Sheriff's Department. Mader is an AmeriCorps volunteer also working with the University of Oregon program Resource Assistance for Rural Environments (RARE) and Oregon Natural Hazard Workgroup (ONHW).

Mitigation is a form of emergency management that focuses on lessening the impacts of natural hazards before they hit. It is not the same as preparedness or response. Preparedness is having a lantern in your home in case the power fails, mitigation is cutting down the tree before it falls on the power line causing the power to fail.

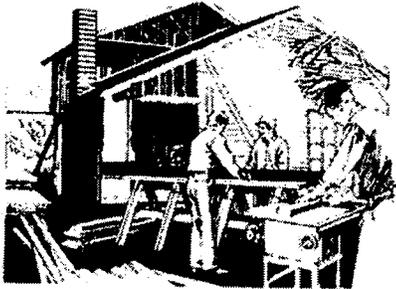
The Multi-Hazard Mitigation Council produced a study that showed that every \$1 spent on mitigation saves \$4 in response and recovery

The Lake County Natural Hazard Mitigation Plan will provide a comprehensive list of Community Assets, a community Risk Assessment and a list of proposed mitigation projects, referred to as Action Items. Once the plan is completed and adopted by the county, due to happen this fall, it will open a wide variety of funding sources to begin mitigation actions.

Mitigation is everyone's responsibility; the individual citizen, the business owner, the community organization and the government agency. There are many small steps that can be taken to make a big difference should a hazardous event occur. One easy project to mitigate wildland fire is to create a defensible space around buildings. Clear all brush, weeds and other flammable materials in a 30-foot radius around the building. This creates a fire break and also allows fire fighters space to maneuver safely around the structure. Strapping water heaters to wall studs can prevent a topple should an earthquake hit. Plan for your small business by creating a business continuity plan including key business functions and an employee emergency plan should an event occur during working hours.

For more ideas and information or to download materials on small business hazard planning, visit the Institute for Business and Home Safety at www.ibhs.org. For other mitigation and preparedness activities, visit the FEMA website at www.fema.gov, the Red Cross website at www.redcross.org or visit Lake County Public Health.

**Jared Smith Construction
(541) 815-0450 ~ (541) 576-2364**



**New Homes, Remodels, Concrete Work, Flat Work
Pole Barns, Backhoe Work**

PO Box 227
Christmas Valley, OR 97641

HIROCKCV@MSN.COM
ccb #144868

We Make Keys!



Zimmatic™
STRENGTH TO GROW ON

HANDDE PUMP & ELECTRIC, INC.

We carry a wide assortment of products: Wheeline Parts, Gearboxes
Genuine Zimmatic Parts, Plus Other Pivot Brand Parts
Schaffer's Oil, Gloves, Pumps, Pressure Tanks
Hillman: Bolts, Nuts, Screws
Abs pipe/fittings, PVC pipe/fitting, galvanized pipe/fittings,
Batteries, Flashlights, and Assorted Yard Supplies
Along with a ton of other products. Stop in and look around!



Now Stocking Chevron Products!
Now Selling Zipper Mowers.
Don't Forget UPS Ships Daily



Duane Hand ~ CCB#45220

PO Box 574 ~ 86908 Christmas Valley Highway ~ Christmas Valley, OR 97641

Shop: (541) 576-2206 ~ Fax: (541) 576-2702

Open Monday-Friday 8:00 am - 12:00 pm & 12:30 pm - 5:00 pm



Disaster planning, noise issues discussed by town

By Ryan Bonham
Lake County Examiner

Lake County emergency management project coordinator Kathie Mader provided Lakeview town councilors with a presentation on a disaster plan mandated by the Federal Emergency Management Agency (FEMA). According to Mader, the plan will open doors to additional funding opportunities through FEMA, once the county signs off on the plan. Following the signing, addendums will be prepared for Lake County's two lone incorporated communities, Lakeview and Paisley, which the councils would adopt by resolutions.

Funding received by the town could be implemented in a number of town-specific projects, Mader said. Mader provided a list of action items proposed throughout Lake County, which include fuels reduction for wildfire prevention in northern Lake County as well as flood control strategies such as culvert replacement at Crane Creek. Earthquake measures range from the installation of seismic monitoring devices at both Daly Middle School and Paisley School to the identification of historic, culturally significant structures known to be unreinforced in need of structural reinforcement for protection against earthquakes.

During the public comment period, Lakeview resident Eileen McLain voiced a complaint regarding repeated noise violations from a neighboring home on North K Street. Along with loud music, McLain reported lewd shouting and yelling as well as purported underage drinking and has had limited success in reporting the issue to the town police.

Both town attorney John Bogardus and Town Mgr. Ray Simms commented that updates are in the works for the town's nuisance ordinance in the way of enforcement policy. "Without being specific, it's not being ignored," Simms said, "and we're looking at putting more teeth into the ordinance." Simms also informed the council that efforts are in the works to repair the

flag on the eastern hillside near one of the town's water tanks. The search for proper equipment — namely an 85-foot man-lift unit — has slowed progress in repairing the flag pole, but repairs were reported likely to occur in time for the Fourth of July holiday.

The council also approved Resolution No. 727, regarding the annual operating budget for the 2007/08 fiscal year, as previously approved by the Town of Lakeview's budget advisory committee.

Following an executive session, Lakeview's town council reconvened in open session and voted unanimously to approve Simms' cover letter and proposal to be submitted to the Lake County Commissioners regarding a new design of managing the Lake County 9-1-1 system.

See related story elsewhere in this edition for additional details. Lakeview's town council will next meet on Tuesday, July 10, at 4 p.m. at Town Hall, located at 525 N. 1st St. For more information, call 947-2029.

Lakeview Police looking at new networking options

By Ryan Bonham
Lake County Examiner

Kamp said. "This is just another step forward in using what's available." Other benefits to the track people that have had contact with other agencies," Kamp said. Agencies on the OASIS

ness energy
geothermal
focusing and

Geothermal
See page 3

manager, recently said that
the new mill is "on
schedule".

DAVE GERRARD/Lake County Examiner

Geothermal mitigation plan near completion

Gerrard
Examiner

Natural disasters, whether they be fires, floods, earthquakes, windstorms or

drought, can and do happen, sometimes with little or no warning.

Lake County Sheriff Phil McDonald, who is also the county's emergency manager, decided to submit an application to the Resource Assistance for Rural Environments (RARE) program to develop a natural disaster mitigation plan for the county.

The application was approved, and the RARE program assigned Katie Mader to Lake County. Mader said that mitigation, in this case, means things that can be done before a disaster to lessen the impact.

Mader arrived in Lakeview last October and will have the work completed by mid-August. The final draft of the plan will then be sent to the Federal Emergency Management Agency (FEMA). FEMA will approve the plan and send a letter back to the county. Mader said approval should happen by the end of the year.

Once the county receives the letter of approval, it will be able to apply for funding for projects identified in the plan.

Mader, a native of Dundee, who graduated in 2006 from the University of Oregon, said she wanted to be placed in a southeast Oregon community because she had done a lot of backpacking in the Steens Mountains. While a student, she spent time volunteering in community development projects in the state and overseas. "This program (RARE) is a great opportunity to explore various aspects of community development," she said.

Mader's responsibilities included forming a steering committee, conducting community outreach, identifying and documenting relevant natural hazards, developing plan

goals and action steps, and presenting the final plan for adoption.

"It's been a very comprehensive planning process," Mader said, adding that there's been a lot of different groups involved. "The county has been very helpful."

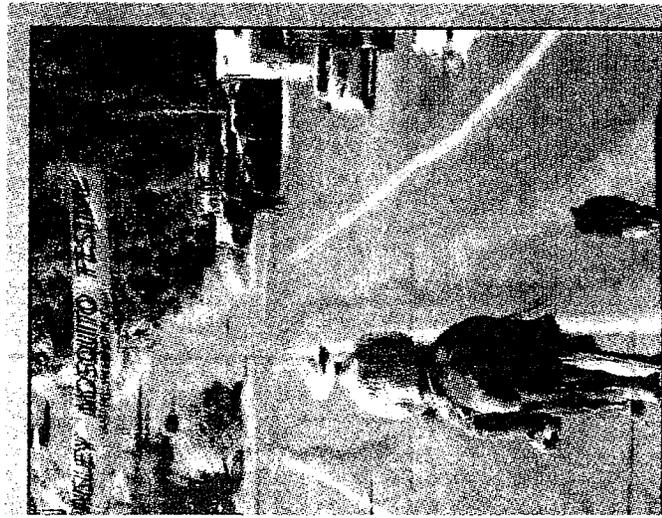
Mader said she has put together a list of 30 proposed "action items," covering fires, earthquakes, windstorms and drought. Some of the items include retrofitting Daly Middle School and Paisley School for earthquakes, a flood-prevention project and the construction of fire breaks.

Mader said that in case of an earthquake, the bricks on the outside walls of Daly Middle School would fall to the ground. The school is a stick-frame structure with brick on the outside. Along with the school, Mader said she would like to see retrofitting of the older brick buildings in Lakeview.

RARE is administered through the University of Oregon's Community Service Center and is currently supported through grants from the Corporation for National & Community Service (AmeriCorps), U.S. Department of Agriculture, Oregon Economic and Community Development and other agencies. In addition, each participating community provides \$17,000 of the approximately \$30,000 needed to place, train, and support a full-time RARE participant.



Katie Mader



Submitted photo

Festival welcomes many

Paisley and an unidentified canine had into town ahead of the pack, getting on this year's Mosquito Festival. Look for coverage from this year's 24th in the Lifestyles section, page 9, of this

A positive thought for the week

The indispensable first step to getting the things you want out of life is this: decide what you want.

- Ben Stein

Thought Sponsored by
Arrow Realty 947-4921

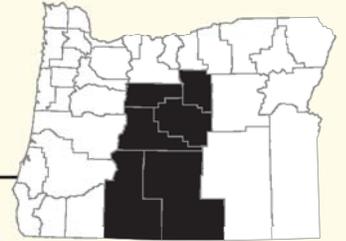
Appendix B: Regional Profile and Risk Assessment

The following contains the Regional Profile and Risk Assessment from the State of Oregon's Natural Hazard Mitigation Plan.



Region 6: Central Oregon Profile and Risk Assessment

Crook, Deschutes, Jefferson, Klamath, Lake, and Wheeler Counties



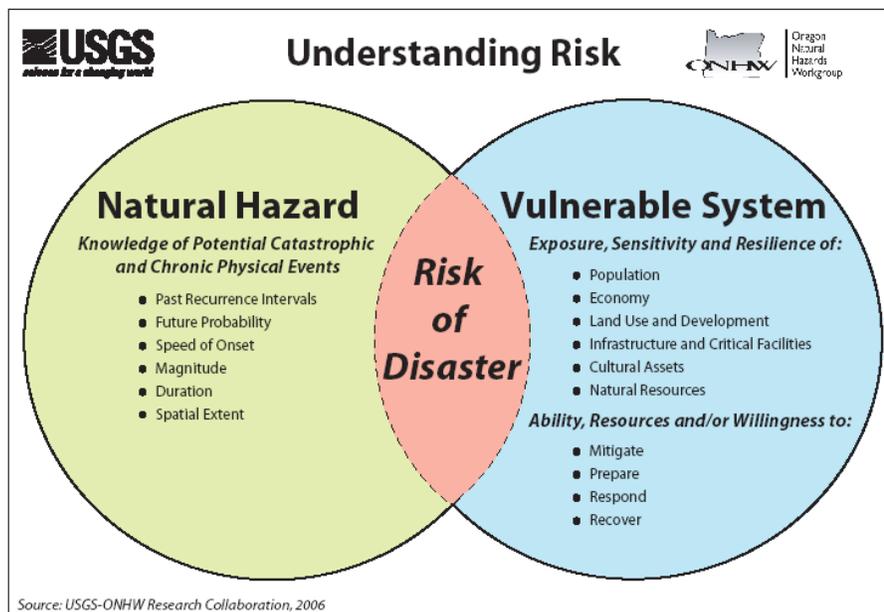
Region 6: Central Oregon Natural Hazard Risk Profile

Crook, Deschutes, Jefferson, Klamath, Lake, & Wheeler Counties

Introduction and Purpose

Oregon faces a number of natural hazards with the potential to cause loss of life, injuries and substantial property damage. A natural disaster occurs when a natural hazard event interacts with a vulnerable human system. The following quote and graphic summaries the difference between natural hazards and natural disasters:

Natural disasters occur as a predictable interaction among three broad systems: natural environment (e.g., climate, rivers systems, geology, forest ecosystems, etc.), the built environment (e.g., cities, buildings, roads, utilities, etc.), and societal systems (cultural institutions, community organization, business climate, service provision, etc.). A natural disaster occurs when a hazard impacts the built environment or societal systems and creates adverse conditions within a community. ¹



It is not always possible to predict exactly when a natural disaster will occur or the extent to which they may impact the community. However, communities can minimize losses from disaster events through deliberate planning and mitigation. 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 \$4.00²

How to use this Report

The Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon's Community Service Center developed this report as part of the regional planning initiative funded by the Pre-Disaster Mitigation Grant.^{*} In addition to serving as a regional resource for local planning initiatives, this also serves as the regional profile for the State's enhanced natural hazard mitigation plan. This report is intended to be used as a planning process document by communities developing local natural hazard mitigation plans. This regional report should be reviewed and updated by locals using the best available local data as the local plans serve as the foundation for the State Plan.

The information in this report should be paired with local data to identify issues for which mitigation action items can be developed. The report can be used in conjunction with the ONHW Sample Action Item Report to develop and document the community's action items. The Sample Action Item Report lists potential mitigation activities by category, such as population, economy, understanding of risk, and implementation. The report also provides state and national level rationale on why the sample action may be appropriate.

Regional Overview

The Central region (Region 6 as identified in the state's natural hazard mitigation plan) includes Crook, Deschutes, Jefferson, Klamath, Lake, and Wheeler Counties. This region is at relatively high risk from drought, wildfires, and winter storms. It also faces moderate to high risk from earthquakes, flood, and windstorms. The Central region is also at risk from landslides in steep sloped areas and volcanic eruptions.

Organization of Report

This report includes three main sections that work together to develop a comprehensive picture of the region and its sensitivity to natural hazards.

Regional Maps

Critical Infrastructure Map- Updated maps coming soon

Using 2003 data from Oregon Department of Transportation, this map shows the approximate location of critical infrastructure, including schools, hospitals, bridges, dams, and power stations. Knowing the location of critical infrastructure is important when determining the sensitivities of the region.

County Hazard Risk Analysis Maps- Updated maps coming soon

These maps depict the county's perceived risk for each natural hazard. Data for these maps comes from the County Hazard Risk Analysis in which each county

^{*} FEMA Pre-Disaster Mitigation Application Number - EMS-2005-PC-0004

develops risk scores for Oregon's major natural hazards. Scores are current as of March 2006.

Regional Profile and Sensitivity Analysis

Using the best available data, the regional profile includes a *Geographic Profile*, which provides a physical description of the region, a *Demographic Profile* that discusses the population in the Central region, an *Infrastructure Profile* that addresses the region's critical facilities and systems of transportation and power transmission, and an *Economic Profile* that discusses the scale and scope of the regional economy with a focus on key industries. In addition to describing characteristics and trends, each profile section identifies the traits that indicate the region's sensitivity to natural hazards.

The data sources used in this section are all publicly available. This report examines the Central region as a whole and by individual counties when possible. Much of the demographic data was sourced from the 2000 U.S. Census; the economic data came from the 2002 Economic Census, the Bureau of Economic Analysis and the Oregon Department of Agriculture. State agency reports and plans and websites for private companies were also important sources of information.

Regional Hazards Assessment

The regional natural hazard risk assessment section describes historical impacts, general location, extent, and severity of past natural hazard events as well as the probability for future events. This information is aggregated at the regional level and provides counties with a baseline understanding of past and potential natural hazards.

These assessments were based on best available data from various state agencies related to historical events, repetitive losses, county hazard analysis rankings, and general development trends. The risk assessment was written in 2003 as part of the State Natural Hazard Mitigation Plan.

ONHW Potential Action Item Report

This is a separate report produced by the Oregon Natural Hazards Workgroup at the University of Oregon. This report contains two main sections: (1) a series of explanations about what action items are, what purposes they serve, and how to create them; and (2) a series of potential actions addressing all the natural hazards Oregon communities face. The actions include a statewide and national rationale, based on research, for the action and ideas for implementation. The action items are designed to serve as a starting point for local communities as they discuss, develop and prioritize local risk reduction strategies. Communities will ultimately want to develop more detailed action items based on regional or locally specific data. This portion of the report will be available at the second plan development work session in January.

Central Region

The Central Oregon region has experienced a 34% percent increase in population since 1990. Deschutes County has become the fastest growing county in the state – increasing by more than two and a half times the state growth for the same period. The region’s population is almost equally divided between incorporated and unincorporated areas. Thirty-one percent of the region’s houses were built before 1960, 34% between 1960 and 1980, and 36% were built after 1980. The impact of a disaster can disrupt automobile traffic and shut down local transit systems across the region, making evacuation difficult. The average commute for workers in this region is 20 minutes each way. Seventy-five percent of the region’s workers drive alone to work. Thirteen percent carpool, six percent walk or use other means, and six percent work at home. Most bridges in the area have not been seismically retrofitted, creating significant risk to the commuting population in areas at risk from earthquakes.

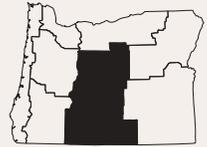
REGION FACTS

Population:

Total	226,302
Rural	120,344
Urban	105,968

Housing:

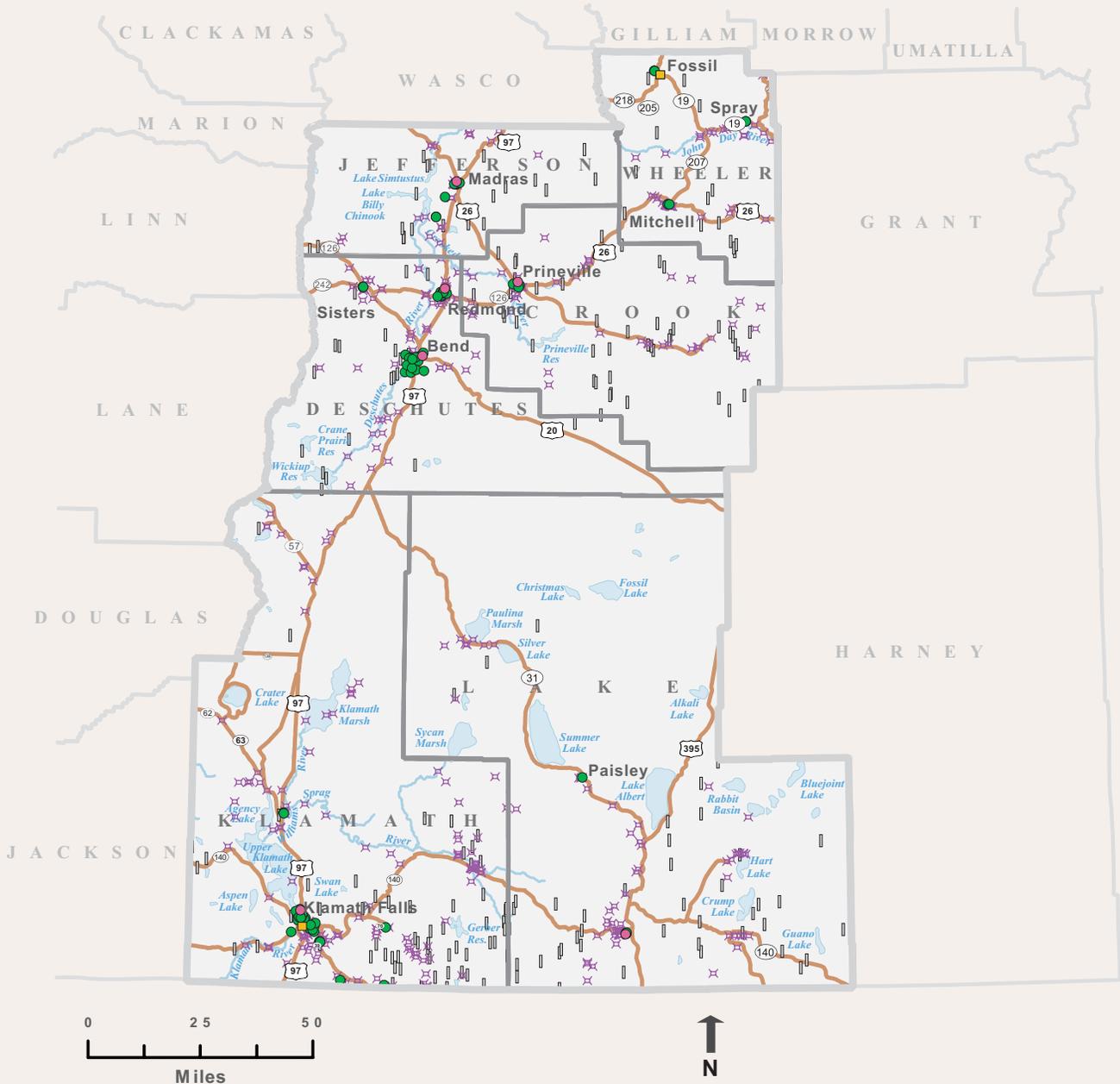
Single-Family	66%
Multi-Family	10%
Mobile Homes	23%
Boat, RV, Van, etc	3%



County	# of Hospitals	# of Hospital Beds	Police Stations	Fire & Rescue Stations	Power Plants	Dams	Bridges
Crook	1	35	2	1	0	36	87
Deschutes	2	220	4	10	0	14	143
Jefferson	1	100	3	3	0	12	62
Klamath	1	131	3	32	2	45	307
Lake	1	21	2	14	0	30	96
Wheeler	0	0	1	4	0	13	60

Critical Infrastructure

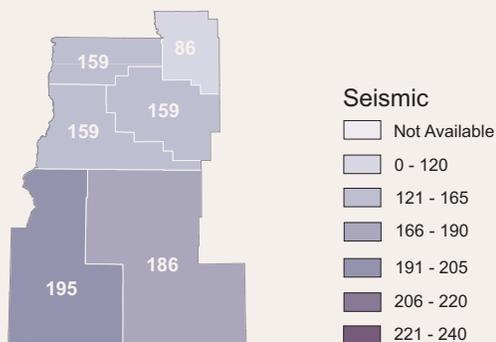
- School
- Hospital
- ✕ Bridge
- Power Substation
- Dam



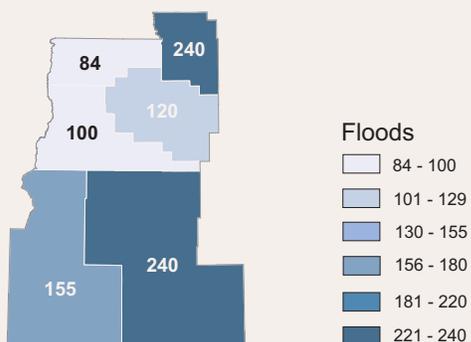
As part of the County Hazard Risk Analysis, each county develops risk scores for Oregon's major natural hazards. This score, ranging from 24 (low) to 240 (high), reflects the County's perceived risk for the particular hazard. Scores are current as of July 2003.

To obtain the most current scores, see <http://www.oregonshowcase.org> or contact Oregon State Police – Office of Emergency Management <http://www.osp.state.or.us/oem/>.

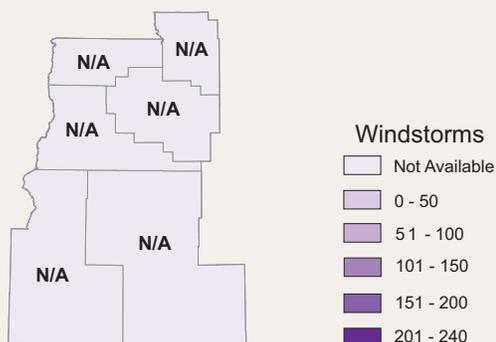
Seismic



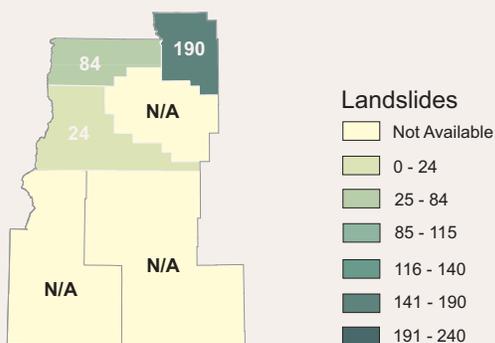
Floods



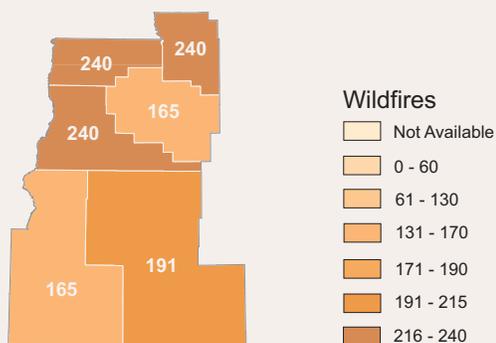
Windstorms



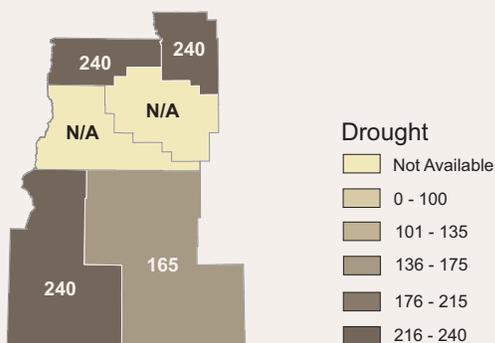
Landslides



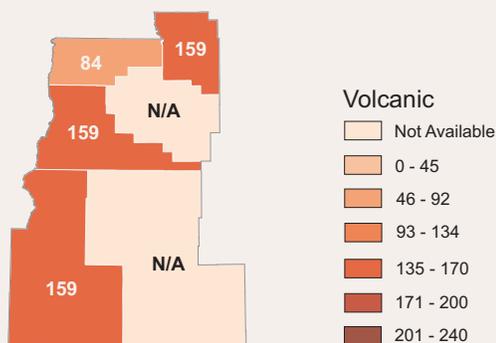
Wildfires



Drought



Volcanic



Regional Profile and Sensitivity Analysis

Section 1: Geography and Climate

The six-county area of the Central region is approximately 23,960 square miles. The Cascade Mountain range runs through the western part of the region and high desert comprises the eastern part of the region. The Ochoco Mountains also extends into the northeastern section of the region. The Cascades are volcanic in origin and are drained by hundreds of creeks, streams, rivers and lakes. Major rivers in the region include the Deschutes, John Day, Crooked, and Klamath. Average annual precipitation in the region ranges from up to 100 inches at the peak of the Cascades to 7 inches in the high desert. The Cascade Range forms a barrier to migrating air masses, keeping cold continental air masses in the region.³

Section 2: Demographic profile

This section describes the Central region in terms of its population, demographics and development trends. Data is followed by a discussion of characteristics that indicate community vulnerability to natural hazards. Identifying populations that are particularly vulnerable enables communities to design targeted strategies to reduce their risk. Reviewing development trends provides further guidance on how communities can accommodate growth in a manner that increases resilience to natural hazards.

Population and Demographics

In 2005, the estimated population of the Central region was 260,975, representing an increase of 9% since 2000. According to the Oregon Office of Economic Analysis, this growth pattern in the Central region is projected to continue at a moderate rate over the next 20 years. Table 1 displays the population change in each Central region county, along with their respective Average Annual Growth Rates (AAGR).

Table 1. Population Growth, Central Region, 2000-2005

County	2000 Population	2005 Population	2000-2005 Population Change	% Change 2000-2005	AAGR, 2000-2005
Crook	19,182	22,775	3,593	18.7%	3.7%
Deschutes	115,367	143,490	28,123	24.4%	4.9%
Jefferson	19,009	20,600	1,591	8.4%	1.7%
Klamath	63,775	65,055	1,280	2.0%	0.4%
Lake	7,422	7,505	83	1.1%	0.2%
Wheeler	1,547	1,550	3	0.2%	0.0%
Regional Total	226,302	260,975	34,673	9.0%	1.8%

Source: Portland State University, Population Estimates, 2005.

Median household income can be used to compare economic areas as a whole, but does not reflect how the income is divided among area residents. Table 2 displays

the median household income for the Central region, which was \$34,640 in 2003. This is below the national average of \$43,318 and the state's average of \$42,593. The less than one percent median household income growth between 2000 and 2003 in the region is smaller than the two percent State and three percent National growth over the same time period.

Table 2. Median Household Income, Central Region, 2000 and 2003

County	2000	2003	% Change 2000-2003
Crook	\$35,896	\$35,903	0.0%
Deschutes	\$42,712	\$44,111	3.3%
Jefferson	\$36,028	\$35,682	-1.0%
Klamath	\$33,044	\$32,357	-2.1%
Lake	\$30,496	\$30,499	0.0%
Wheeler	\$28,781	\$29,288	1.8%
Regional Average:	\$34,493	\$34,640	0.4%

Source: U.S. Census Bureau Small Area Income Poverty Estimates, 2000 and 2003

The impact in terms of loss and the ability to recover varies among population groups following a disaster. Historically, 80% of the disaster burden falls on the public.⁴ Of this number, a disproportionate burden is placed upon special needs groups, particularly minorities, and the poor.

In 2003, 13% of the nation's population was living in poverty, the same as the Central regional poverty level of 13%. Oregon's state poverty average was 12%, slightly less than the Central regional average. While the median household incomes are lower in the region than the state as a whole, the similar poverty rate may be due to a lower cost of living in the Central region. Table 3 details the county and regional poverty rates in 2003.

Table 3. Poverty Rates, Central Region, 2003

County	Total Population in Poverty		Children Under 18 in Poverty	
	Number	%	Number	%
Crook	2,496	12%	919	18%
Deschutes	13,761	10%	4,673	15%
Jefferson	2,845	14%	1,278	23%
Klamath	9,749	15%	3,525	23%
Lake	1,100	15%	374	23%
Wheeler	195	13%	59	23%
Regional Average		13%		21%

Source: U.S. Census Bureau Small Area Income Poverty Estimates, 2003

Low-income populations may require additional assistance following a disaster because they may not have the savings to withstand economic setbacks, and if work is interrupted, housing, food, and necessities become a greater burden. Additionally, low-income households are more reliant upon public transportation, public food assistance, public housing, and other public programs, all which can be impacted in the event of a natural disaster.

The age of the population is also an important consideration in hazard mitigation planning. In 2004, 36% of the regional population was under 14 or over 65 years of age.⁵ Table 4 provides a breakdown of the percentages of youth and elderly in the Central region counties.

Table 4. Central Region Youth and Senior Populations, 2004

County	0-14		65-74		75+	
	Number	%	Number	%	Number	%
Crook	4,589	20%	1,865	8%	1,510	7%
Deschutes	26,999	19%	10,288	7%	8,499	6%
Jefferson	4,815	23%	1,676	8%	1,093	5%
Klamath	13,164	20%	5,176	8%	4,510	7%
Lake	1,295	17%	739	10%	646	12%
Wheeler	214	14%	217	14%	190	9%
Regional Total and Average %:	51,076	19%	19,961	9%	16,448	8%

Source: Portland State University Population Estimates, 2005

The high percentage of elderly individuals, particularly in Lake and Wheeler Counties, require special consideration due to their sensitivities to heat and cold, their reliance upon transportation for medications, and their comparative difficulty in making home modifications that reduce risk to hazards.

Young people also represent a vulnerable segment of the population. In Crook, Jefferson and Klamath counties, at least 20% of the population is within the 0-14 year age range. Special considerations should be given to young populations and schools, where children spend much of their time, during the natural hazard mitigation process. Children are more vulnerable to heat and cold, have fewer transportation options, and require assistance to access medical facilities.

Special consideration should also be given to populations who do not speak English as their primary language. These populations can be harder to reach with preparedness and mitigation information materials. They are less likely to be prepared if special attention is not given to language and culturally appropriate outreach techniques. In the Central region, most citizens speak English as their primary language. However, in every county in Oregon, Spanish is the second most prominent language. Table 5 shows the percentage of the individuals in the Central region who do not speak English as their primary language. On average, 4% of the total population in the Central region speaks a language other than English as a primary language.

Table 5. Central Region Population over age 5 that Speaks English less than “Very Well”, 2000

County	%Population
Crook	3%
Deschutes	2%
Jefferson	9%
Klamath	3%
Lake	3%
Wheeler	2%
Regional Average:	4%

Source: US Census Bureau, 2000 Census Summary File 4

Housing and Development

To accommodate rapid growth, communities engaged in mitigation planning should consider the vulnerability of the community’s housing stock and development patterns. Eliminating or limiting development in hazard prone areas, such as floodplains, can reduce vulnerability to hazards, and the potential loss of life and injury and property damage. Oregon has been successful in developing land use goals that incorporate mitigation while preserving rural and protected lands within urban growth areas. If Measure 37 is upheld, it may impact the ability of communities to regulate land-use protection measures in communities. Communities in the process of developing land for housing and industry need to ensure that land-use and protection goals are being met to prevent future risks.

The urban and rural growth pattern impacts how agencies prepare for emergencies as changes in development can increase risks associated with hazards. The Central region is growing more urban, with two percent population growth in incorporated areas between 2000 and 2005, versus a two percent population loss in unincorporated areas during the same time period. Table 6 illustrates the trend in urban area population growth in the Central counties between 2000 and 2005.

Table 6. Urban/Rural Populations, Central Region, 2000-2005

County	% Incorporated Population		% Change
	2000	2005	2000-2005
Crook	38%	40%	1%
Deschutes	58%	64%	6%
Jefferson	34%	36%	2%
Klamath	35%	36%	1%
Lake	37%	38%	2%
Wheeler	50%	50%	-1%
Regional Average:	42%	44%	2%

Source: Portland State University Population Estimates, 2005

In addition to location, the character of the housing stock also affects the level of risk that communities face from natural hazards. Table 7 provides a breakdown by county of the various housing types available in 2000. Mobile homes and other non-permanent housing structures, which account for 30% of the housing in some Central counties, are particularly vulnerable to certain natural hazards, such as windstorms, and special attention should be given to securing these types of structures.

Table 7. County Housing Profile, Central Region, 2000

County	Single-Family	Multi-Family	Mobile Homes	Boat, RV, Van, etc.
Crook	64%	9%	24%	3%
Deschutes	70%	15%	14%	1%
Jefferson	56%	11%	29%	4%
Klamath	65%	15%	19%	1%
Lake	61%	5%	30%	4%
Wheeler	77%	2%	19%	2%

Source: U.S. Bureau of the Census, Profile of Housing Characteristics 2000.

Table 7 shows that the majority of the housing stock is in single-family homes and this trend is continuing with new construction. In 2002, an estimated 97% of new housing was single-family units⁶. This trend suggests that hazard mitigation efforts should provide outreach and information that specifically addresses preparedness in detached housing units.

Aside from location and type of housing, the year housing structures were built has implications for community vulnerability. The older a home is, the greater the risk of damage from natural disaster. This is because structures built after the late 1960s in the Northwest and California used earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that

required homes in the floodplain to be elevated to one foot over Base Flood Elevation. Knowing the age of a structure is helpful in targeting outreach regarding retrofitting and insurance for owners of older structures. Table 8 illustrates the percentage of homes built per county during certain periods of time.

Table 8. Housing, Year Built, Central Region

County	1939 or earlier - 1959	1960-1979	1980-2000
Crook	23%	35%	42%
Deschutes	11%	33%	56%
Jefferson	13%	35%	52%
Klamath	38%	38%	24%
Lake	41%	36%	23%
Wheeler	57%	24%	19%

Source: U.S. Bureau of the Census, Profile of Housing Characteristics 2000.

Section 3: Infrastructure Profile

This section of the report describes the infrastructure that supports Central region communities and economies. Transportation networks, systems for power transmission, and critical facilities such as hospitals and police stations are all vital to the functioning of the region. Due to the fundamental role that infrastructure plays both pre- and post-disaster it deserves special attention in the context of creating more resilient communities. The information that is provided in this section of the profile can provide the basis for informed decisions about how to reduce the vulnerability of Central region infrastructure to natural hazards.

Transportation

There are two primary modes of transportation in the region: highways and railroad. There are also many small airports scattered throughout the region that are used for passenger and freight service. The Central region combines two important freight corridors for the Pacific Northwest, State Highway 26 and U.S. 97. U.S. 97 connects to barge freight transportation along the Columbia River.

Roads and Bridges

There are two major highways that run through the Central region. State Highway 26 runs east-west through the Central region. U.S. 97 runs north-south through Klamath, Deschutes and Jefferson Counties. U.S. 97 is the most important north-south transportation corridor east of the Cascades as it provides a connection between I-84, the major east-west route in Oregon, and northern California.⁷

Many commercial entities make use of the highways in the Central region. Trucks on the section of U.S. 97 between Klamath Falls and Madras transported approximately 10 million tons of freight in 2002. Truck volume averaged between 500 and 1,499 trucks per day for most sections of U.S. 97, while averaging over 3,000 trucks per day outside the larger cities of Klamath Falls, Bend, and Madras.⁸ U.S. 97 also serves as an important alternative route to I-5.

Highways are also heavily utilized by local traffic. According to the 2000 Census, 75% of workers in the Central region commute by driving alone. The average commute for workers in the Central region is just over twenty minutes each way.⁹

Additionally, in 2003, 38% of employees living in counties in the Central region worked outside of their home county.¹⁰ A severe winter storm has the potential to disrupt the daily driving routine of thousands of people.

The recent population growth in the region has contributed to an increase of automobiles on the roads:

- Average daily traffic volume on U.S. 97 recorded 1.7 miles south of Redmond increased by 47% between 1996 and 2005. Farther north at the Highway 360 Madras-Prineville junction, the average daily traffic for the same time period increased by 15%. Judging from these trends, traffic levels will continue to increase.¹¹
- Average daily traffic counts also increased by 9% between 1996 and 2005 on U.S. 26, 10 miles southeast of Warm Springs in Jefferson County.¹²

A large increase of automobiles can place stress on roads, bridges and infrastructure within the cities, and also in rural areas where there are fewer transit roads. Natural hazards can disrupt automobile traffic and shut down local transit systems across the area or region and make evacuations difficult.

The condition of bridges in the region is also a factor that affects risk from natural hazards. Most bridges are not seismically retrofitted, which is a particularly important issue for the Central region because of its risk from earthquakes. Incapacitated bridges can disrupt traffic and exacerbate economic losses because of the inability of industries to transport services and products to clients. Table 9 shows the number of state, county, and city maintained bridges and culverts, and the number of historic covered bridges in the region. The bridges in the region are part of the state and interstate highway and maintained by the Oregon Department of Transportation.

Table 9. Bridges and Culverts

County	State Highway Bridges	State Highway Culverts	County Highway Bridges	County Highway Culverts	City/ Municipal Highway Bridges	City/ Municipal Highway Culverts	Historic Covered Bridges	2006 Total
Crook	27	26	26	3	6	0	0	88
Deschutes	41	17	46	3	31	2	1	141
Jefferson	14	12	34	0	3	0	0	63
Klamath	58	42	180	18	10	0	0	308
Lake	26	29	38	0	1	0	0	94
Wheeler	23	34	6	0	0	0	0	63

Source: Oregon Department of Transportation, 2006

Railroads

Railroads are major providers of regional and national cargo and trade flows. Railroads that run through the Central region provide vital transportation links from the Pacific to the rest of the country. The Burlington Northern Santa Fe Railroad (BNSF) and the Union Pacific Railroad (UP) are the two major railroads

in the region. The City of Prineville (COP) runs a line that connects with the BNSF between Bend and Madras, to provide service to Prineville.

BNSF owns the tracks that run north-south along the Deschutes River, running through Deschutes and Jefferson Counties. The tracks run through Oregon to Southern California where the tracks turn east and continue to Texas.¹³ COP connects to the BNSF line to run the railroad into Prineville.

UP's tracks in the region run further west of the BNSF tracks, connecting with the BNSF tracks going north-south in Klamath County.¹⁴

Sixteen million tons of goods produced in Oregon are shipped out of state by railroad per year. The goods include lumber and wood products, pulp and paper, and miscellaneous mixed shipments.¹⁵ Over 23 million tons of products originating in other states are annually shipped into Oregon by rail including wood, farm products, coal, and waste materials.¹⁶ More than 22 million tons of products are shipped through Oregon annually by rail. More than 6 million tons of these products include grains and soybeans transported from the Northern Midwest to Washington.¹⁷

Rails are sensitive to icing from the winter storms that are common in the Central region. For industries in the region that utilize rail transport, these disruptions in service can result in economic losses. As mentioned above, the potential for rail accidents caused by natural hazards can also have serious implications for the local communities if hazardous materials are involved.

Airports

The Central region has 5 small airports. Klamath Falls in Klamath County, which transported 200 tons of freight in 2003 and Redmond Municipal Roberts Field, in Deschutes County, which transported 300 tons of freight in 2000, are the two commercial airports in the region. Bend Municipal and Lake County airports provide general business air transportation.¹⁸

Flights face the potential for closure from a number of natural hazards that are common in the Central region, including windstorms and winter storms. Airports have strict guidelines regarding when conditions are safe for flight.

Critical Facilities

Critical facilities are those facilities that are essential to government response and recovery activities (e.g., police and fire stations, public hospitals, public schools). Critical facilities in the Central region are displayed in Table 10 by county.

Table 10. Central Region Critical Facilities by county

County	Hospitals		Police Station	Fire & Rescue Station	School Districts & Colleges
	# of Hospitals	# of Beds			
Crook	1	35	1	1	1 District
Deschutes	2	264	7	7	4 Districts, 1 Community College
Jefferson	1	36	4	3	4 Districts, 1 Community College
Klamath	1	176	5	17	2 Districts, 1 Community College, 1 State University
Lake	1	21	2	6	5 Districts
Wheeler	0	0	1	4	3 Districts

Sources: State Hospital Licensing Department, Local Sheriff Offices, Oregon State Fire Marshall, Oregon Department of Education. Table updated July 2006.

In addition to those listed in Table 10, there are other critical and essential facilities that are vital to the continued delivery of key governmental services or that may significantly impact the public's ability to recover from emergencies. Some of these facilities, such as correctional institutions, public services buildings, law enforcement centers, courthouses, juvenile services buildings, public works facilities, and other public facilities should be detailed in local and regional mitigation plans.

Power Generation and Transmission

The Central region is an important thoroughway for oil and gas pipelines and electricity transmission lines, connecting Oregon to California and Washington. The infrastructure associated with power generation and transmission plays a critical role in supporting the regional economy.

The John C. Boyle dam is the largest dam in the Central region. Positioned along the Klamath River, the John C. Boyle has a maximum generating capacity of 80 megawatts (mw.)¹⁹

Dam failures can occur at any time and are quite common. Fortunately, most failures result in minor damage and pose little or no risk to life safety. However, the potential for severe damage and fatalities does exist, and the National Inventory of Dams (NID) has developed a listing of High Threat Potential Hazard dams for the nation. The state has developed a complementary inventory of dams in Oregon. Table 11 lists the dams included in these inventories.

Table 11. Central Region Power Plants and Dams by County

County	Power Plants	Dams		Threat Potential
		Dams [†] (State)	Dams [‡] (National)	
Crook	0	57	40	3 High Threat
Deschutes	0	18	18	4 High Threat
Jefferson	0	17	15	5 High Threat
Klamath	2 plants, 570 MWs	66	54	4 High Threat
Lake	0	82	53	2 High Threat
Wheeler	0	18	13	0 High Threat

Sources: Oregon Department of Energy, National Inventory of Dams. Table updated July 2006.

The electric, oil, and gas lines that run through the Central region are privately owned. A network of electricity transmission lines running through the Central region allows Oregon utility companies to exchange electricity with other states and Canada.²⁰ Most of the natural gas Oregon uses originates in Alberta, Canada. One main natural gas transmission pipeline, owned by PG&E, runs through the Central region, with lines connecting to Madras, Prineville, Bend, and Klamath Falls.²¹ These lines may be vulnerable to severe, but infrequent natural hazards, such as earthquakes.

Section 4: Economic Profile

The following economic profile addresses the regional economy and its sensitivities to natural hazards. The sensitivities that are relevant to the Central region are a function of the types and diversity of industries and the composition of businesses that are present. To highlight key industries, this report will look at:

The largest revenue sectors, since interruptions to these industry sectors would result in significant revenue loss for the region.

The largest employment industries, since interruptions to these industry sectors would result in high unemployment in the region.

The industry sectors with the most businesses, since interruptions to these industry sectors would result in damage to the most businesses regionally.

[†] Note: The National Inventory of Dams includes all dams with either:

- a) a high or significant hazard rating
- b) a low hazard dam that exceeds 25 feet in height AND 15 acre-feet storage
- c) a low hazard dam that exceeds 6 feet in height AND 50 acre-feet storage

[‡] Note: The State Inventory of Dams includes all dams over 10 feet in height AND 9.2 acre-feet storage

By examining these key industry sensitivities and other economic sensitivities, such as industry diversity and the number of small businesses that exist in the Central region, informed decisions can be made about how to mitigate risk.

Economic Overview

The Central region enjoys some economic advantages due to its location. In addition, the region's close proximity to the Cascade Mountains and the high desert terrain provide year-round sporting and tourism activities.

According to the Oregon Employment Department, the Central region economy is experiencing an economic upturn. The rapid growth in Deschutes County has been accompanied by strong growth in the manufacturing and construction sectors. Unemployment has also gone down in Klamath and Lake Counties during the first five months of 2006. Government and recreation industries remain strong in the entire Central region.²² As of 2004, the region employed 142,828 people with a combined payroll of over three billion dollars. Table 12 displays the payroll and employee figures per county.

Table 12. Central Employment and Payroll by County, 2004

County	# of Employees	Annual Payroll
Crook	9,821	\$208,218,000
Deschutes	86,677	\$1,865,202,000
Jefferson	8,640	\$189,608
Klamath	32,626	\$714,851,000
Lake	4,272	\$69,897,000
Wheeler	792	\$7,049,000
Total	142,828	\$3,054,825,000

Source: Bureau of Economic Analysis

In 2004, there were 8,267 businesses in the Central region. Of these, 91%, or 7,489, were small businesses with less than 20 employees.²³ The prevalence of small businesses in the Central region is an indication of sensitivity to natural hazards because small businesses are more susceptible to financial uncertainty.²⁴ When a business is financially unstable before a natural disaster occurs, financial losses (resulting from both damage caused and the recovery process) may have a bigger impact than they would for larger and more financially stable businesses.²⁵

The economic diversity of the businesses in the Central region varies markedly between counties. Deschutes and Klamath Counties have relatively high economic diversity, while the other counties have fairly homogenous economies. Low economic diversity means that certain industries are dominating the economic structure of the community, and are therefore extremely important to the Central region. Table 13 displays the diversity ranking for each county with 1 being the most diverse economic county in Oregon, 36 being the least diverse economic county in Oregon.

Table 13. County Economic Diversity Ranking, 1999

County	Economic Diversity Index Ranking
Crook	27
Deschutes	5
Jefferson	29
Klamath	8
Lake	34
Wheeler	31

Source: Oregon Employment Department²⁶

An economy that is heavily dependent upon a few key industries may have a more difficult time recovering after a natural disaster than one with a more diverse economic base. While a community with a diverse economic base may suffer from an industry sector being damaged during a natural disaster, they have a broader base of operating industry sectors to continue to rely upon. However, a community that relies upon specific key industry sectors may have a harder time recovering their economic base if one of those key industry sectors is damaged. Recognizing that economic diversification is a long-term issue, more immediate strategies to reduce vulnerability should focus on risk management for the dominant industries.

Key Industries

Key industries are those that represent major employers, major revenue generators, and for the purposes of hazard mitigation planning, industries that are represented by a high number of businesses. Different industries face distinct vulnerabilities to natural hazards, as illustrated by the industry specific discussions below. Identifying key industries in the region enables communities to target mitigation activities towards those industries specific sensitivities.

It is important to recognize that the impact that a natural hazard event has on one industry can reverberate throughout the regional economy. The effect is especially great when the businesses concerned belong to a basic sector industry. Basic sector industries are those that are dependent on sales outside of the local community; they bring money into a local community via employment. The farm and ranch, information, and wholesale trade industries are all examples of basic industries. Non-basic sector industries are those that are dependent on local sales for their business, such as retail trade, construction, and health and social assistance.

Basic sector businesses have a multiplier effect on a local economy, whereby the jobs and income they bring to a community allow for the creation of new non-basic sector jobs. Their presence can therefore help speed the recovery process following a natural disaster. If, on the other hand, basic sector industry production is hampered by a natural hazard event, the multiplier effect could be experienced in reverse. In this case, a decrease in basic sector purchasing power results in lower profits (and potentially job losses) for the local non-basic businesses that are dependent on them.

High Revenue Sectors

The Central region's top revenue generating industries are a mix of basic and non-basic sectors. In 2002, the three sectors in the Central region with the highest revenue were Retail Trade (36%), Manufacturing (24%), and Wholesale Trade (14%).²⁷ §

Within individual counties in the Central region, however, the industries' relative contribution to revenue differs. For instance, in Lake and Wheeler counties, the Farm and Ranch sector garners either the highest, or second highest amount of revenue. Table 14 shows the percent of total county revenue that is contributed by various sectors.

Table 14. Percent of Revenue in Central Counties by Industry, 2002

County	Industry										
	Retail Trade	Wholesale Trade	Accommodation and Food Services	Health Care/ Social Assistance	Professional, Scientific and Technology	Other (except Public Admin)	Real Estate and Rental and Leasing	Arts/ Entertainment	Administrative/ Waste Services	Manufacturing	Farm and Ranch
Crook	19%	14%	4%	7%	n/a	2%	2%	n/a	1%	45%	7%
Deschutes	42%	16%	6%	12%	n/a	2%	3%	n/a	3%	16%	0%
Jefferson	24%	11%	6%	n/a	n/a	1%	1%	n/a	1%	49%	7%
Klamath	31%	11%	4%	10%	n/a	2%	2%	1%	1%	32%	7%
Lake	25%	15%	6%	12%	4%	1%	n/a	n/a	1%	n/a	36%
Wheeler	54%	n/a	3%	n/a	n/a	n/a	n/a	n/a	n/a	n.a	43%

Source: U.S. Census 2002, Oregon Department of Agriculture 2002

The *retail trade sector* in the Central region is primarily composed of small businesses (87%) that tend to be more sensitive to hazard induced costs due to prior financial instability. Retail trade is also largely dependent on wholesale trade and the transportation network for the delivery of goods for sale. Disruption of the transportation system could have severe consequences for retail businesses. Retail trade typically relies on local residents and tourists and their discretionary spending ability. Residents' discretionary spending diminishes after a natural disaster when they must pay to repair their homes and properties. In this situation, residents will likely concentrate their spending on essential items that would benefit some types of retail (e.g. grocery) but hurt others (e.g. gift shops). The potential income from tourists also diminishes after a natural disaster as people are

§ Note: US Census Total Sales figures were not available for all sectors and counties in Region 5. These figures represent the closest estimate.

deterred from visiting the impacted area. In summary, depending on the type and scale a disaster could affect specific segments of retail trade, or all segments.

In 2002, the *Manufacturing sector* generated 24% of all revenue in the Central region, making it the second-largest earning sector.²⁸ Manufacturers are highly dependent upon the transportation network in order to access supplies and send finished products to outside markets. As base industries, they are not dependent on local markets for sales, which contribute to the economic resilience of this sector.

Wholesale trade is closely linked with retail trade but it has a broader client base than retail trade, with local and non-local businesses as the typical clientele. Local business spending will be likely to diminish after a natural disaster, as businesses repair their properties and wait for their own retail trades to increase. Distanced clients may have difficulty reaching local wholesalers due to transportation disruptions from a natural disaster. Both would adversely impact the profitability of this sector.

The *farm and ranch sector* is a top revenue generator for Lake and Wheeler Counties. Agriculture is inherently dependent on the weather and is susceptible to a variety of natural hazards that afflict the Central region, including flood, drought, and summer and winter storms. These natural hazards have the capacity to devastate seasonal crops, representing a significant financial loss for the year. The southern portion of the region is a major producer of cattle and hay. The northern part of the region is a significant producer of mint.²⁹

In the Central region, a substantial ripple effect through the economy can be anticipated following agricultural loss. This is due both to the number of people who could lose employment in the wake of crop failure and the number of supporting industries (e.g. food processing manufacturers, wholesale trade, retail trade) that could be affected. Even if not directly impacted by a disaster, agricultural producers are also sensitive to the disruption of regional transportation networks from natural disasters; they need seasonal laborers to access the area and it is imperative that perishable products are moved to market in a timely manner.

Major employment sectors

Economic resilience to natural disasters is particularly important for the major employment sectors in the region. If these sectors are negatively impacted by a natural hazard, such that employment is affected, the impact will be felt throughout the regional economy. Thus, understanding and addressing the sensitivities of these sectors is a strategic way to increase the resiliency of the entire regional economy.

The five sectors in the Central region with the most employees in 2004 were Government (13%), Retail Trade (12%), Health Care and Social Assistance (9%), Construction (9%), and Manufacturing (9%).^{30**}

Within the six Central counties, the percent of county employment by various sectors differs. For example, in Wheeler and Lake Counties, Farm is a large

** Note: The Bureau of Economic Analysis did not disclose employment figures in some counties where an industry was represented by only a few businesses. These figures represent the closest estimate.

employer, though across the region, Farm accounts for a smaller percentage of total employment. Table 15 shows the distribution of each county's employees across the five largest regional employment sectors.

Table 15. Percent of County Employment by the Five Largest Regional Employment Sectors, Central Region, 2004

County	Industry					
	Government	Health Care and Social Services	Retail Trade	Farm	Manufacturing	Accommodation and Food Services
Crook	13%	7%	9%	8%	14%	3%
Deschutes	9%	9%	14%	2%	8%	9%
Jefferson	29%	n/a	8%	8%	20%	6%
Klamath	17%	10%	12%	6%	6%	8%
Lake	21%	n/a	9%	16%	8%	6%
Wheeler	18%	n/a	8%	32%	1%	n/a

Source: Bureau of Economic Analysis 2004

Sectors that are anticipated to be major employers in the future also warrant special attention in the hazard mitigation planning process. Between 2005 and 2014, the largest job growth in the Central region is expected to occur in state government, accommodation and food services, and professional and business services sectors.³¹

Government is the highest employment sector in the Central region, and is projected to grow more than any other economic sector by 2014. In the event of a natural disaster, the Government sector may not be as vulnerable as other sectors, since employees will be called upon to provide support and structure for their communities and will have outside funding sources.

The *accommodations* sector includes hotels, motels, recreational accommodation, and boarding houses. The *food services* sector includes places that prepare food and/or drink for immediate consumption. Accommodation businesses are predominantly dependant on people who come to the area as tourists, on business, or simply passing through, and many food service businesses also serve this clientele. The industry relies on an open transportation network both for customers and for supplies and is particularly sensitive to road closures (e.g. from wildfires) during the summer tourism season. The businesses that primarily cater to tourists and recreationalists are also dependant on an unimpaired physical environment. Restaurants and other food providers that rely on local customers may also suffer the same fate as other non-essential retail services; after a disaster, the local population may lack the funds to spend it on “luxury” services such as eating at restaurants.

The *professional and business services* sector is sensitive to a loss of power from a disaster and to disruptions of physical transmission cables (phone lines, etc.). There may also be a disruption of employees' ability to work as a result of damages/problems at home. If prepared and organized, however, this sector has the potential to have moderate resilience to many disasters. Some of the targeted consumers of this sector's services are located outside the region and their purchasing power would not be impacted by a localized natural disaster. The sector may also be more insulated from disruptions to the transportation network than others because there is a potential for many of the employees to work from home and because some services are offered via internet and phone.

Common Business Types

Identifying sectors that are represented by a large number of businesses can guide the development of targeted mitigation strategies for those sectors. Approximately 30% of all businesses in the Central region fall into two industry sectors. In the Central region, 17% (1,418) of all businesses are engaged in Construction and 15% (1,210) of all businesses are engaged in Retail Trade.³²

The retail trade and health care and social assistance sectors' sensitivities to natural hazards are addressed above. The large number of businesses engaged in the *construction* industry warrants attention to its specific vulnerabilities. First, it should be noted that 96% of construction businesses in the region have fewer than 20 employees; small businesses tend face more financial uncertainty than larger ones. These businesses may therefore be particularly sensitive to any temporary decreases in demand following a moderate natural hazard event.

However, in the event of wildfires, floods, earthquakes, or other types of destructive natural disasters, the demand for reconstruction services may be expected to increase. Business from local residents looking to re-build their homes and businesses may boost construction revenue. If transportation routes have been affected, construction businesses may have difficulty accessing necessary supplies from outside the impacted area. Protecting infrastructure and transportation will help to enable the construction sector to continue operating and re-building communities after a natural disaster.

Regional Profile and Sensitivity Conclusion

Information presented in the Demographic, Infrastructure, and Economic Profiles can be used to help communities identify areas of sensitivity and vulnerability to natural hazards. Once the areas of sensitivity are identified, communities should identify appropriate action items.

¹ LeDuc, A. "Establishing Mitigation as the Cornerstone for Community Resilience", 2006 Risk Management Yearbook, Public Entity Risk Institute. Fairfax, VA. 2006

² 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

³ Loy, William G., ed. Atlas of Oregon. 2001. University of Oregon Press.

⁴ Hazards Workshop. Session Summary #16. Disasters, Diversity, and Equity. Annual Hazards Workshop, (July 12, 2000). University of Colorado, Boulder. Peggy Stahl, FEMA Preparedness, Training and Exercise Directorate.

⁵ Portland State University, Population Estimates, 2005

⁶ US Census Bureau, County Building Permits, 2002

⁷ Oregon Transportation Plan Update, Freight Issues:

<http://www.oregon.gov/ODOT/TD/TP/docs/otpMobility/FreightIssues.pdf>

⁸ Ibid.

⁹ City-Data. www.city-data.com/counties.

¹⁰ US Census Bureau LEDmap, 2003

¹¹ Oregon Department of Transportation website. "Permanent Automatic Traffic Recorder Stations."
<http://www.oregon.gov/ODOT/TD/TDATA/tsm/atrtremds.shtml#2005>.

¹² Ibid.

¹³ BNSF Railway website. <http://www.bnsf.com/>.

¹⁴ Union Pacific Railroad website. <http://www.uprr.com>.

¹⁵ Oregon Rail Plan: An Element of the Oregon Transportation Plan, 2001. <http://www.oregon.gov/ODOT/RAIL/docs/railplan01.pdf>.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Oregon Department of Transportation, Department of Aviation, 2003
<http://www.oregon.gov/Aviation/docs/AirportsbyCategory.pdf>

¹⁹ Loy, W.G., ed. 2001. *Atlas of Oregon*, 2nd Edition. Eugene: University of Oregon Press.

²⁰ Ibid.

²¹ Ibid.

²² OLMIS, Region 10 and 11 trends, 2006

²³ US Census Bureau, Economic Census, 2002

²⁴ Alesch, Dan, et al. 2001. Organizations at Risk: What Happens When Small Businesses and Non-for-Profits Encounter Natural Disasters.
http://www.riskinstitute.org/uploads/ptrdocs/Organizations_at_Risk.pdf.

²⁵ Ibid.

²⁶ Oregon Employment Department, “Measuring Economic Development”, 2001
<http://www.qualityinfo.org/olmisj/ArticleReader?itemid=00002037&print=1>

²⁷ US Census Bureau Economic Census 2002, Oregon Agriculture Information Network, 2002.

²⁸ US Census Bureau, Economic Census 2002

²⁹ Loy, W.G., ed. 2001. *Atlas of Oregon*, 2nd Edition. Eugene: University of Oregon Press.

³⁰ Bureau of Economic Analysis, 2004

³¹ Oregon Employment Department, Workforce Analysis, 2005

³² U.S. Census Bureau. 2002 Economic Census. 2002.
http://factfinder.census.gov/servlet/IBQGeoSearchByListServlet?_lang=en&_ts=162143188835.

REGION 6 Central Oregon¹ Hazards Assessment

¹ Crook, Deschutes, Jefferson, Klamath, Lake, and Wheeler counties

DROUGHT	3
<i>Characteristics and Brief History</i>	3
<i>Recurrence</i>	3
<i>Vulnerability</i>	3
EARTHQUAKES	5
<i>Characteristics and Brief History</i>	5
<i>Probability</i>	7
<i>Vulnerability</i>	8
FIRES IN THE WILDLAND/URBAN INTERFACE	12
<i>Characteristics and Brief History</i>	12
<i>Probability</i>	14
<i>Vulnerability</i>	14
FLOOD	18
<i>Characteristics and Brief History</i>	18
<i>Probability</i>	20
<i>Vulnerability</i>	20
LANDSLIDES / DEBRIS FLOWS	21
<i>Characteristics and Brief History</i>	21
<i>Probability</i>	22
<i>Vulnerability</i>	22
VOLCANO-RELATED HAZARDS	24
<i>Characteristics and Brief History</i>	24
<i>Probability</i>	26
<i>Vulnerability</i>	28
WINDSTORMS	29
<i>Characteristics and Brief History</i>	29
<i>Probability</i>	30
<i>Vulnerability</i>	30
WINTERSTORMS	32
<i>Characteristics and Brief History</i>	32
<i>Probability</i>	33
<i>Vulnerability</i>	33

DROUGHT

Characteristics and Brief History

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, and in both summer and winter. They appear to be cyclic and they can have a profound effect on the state’s economy, particularly the hydro-power and agricultural sectors. The environmental consequences also are far-reaching, including insect infestations in Oregon forests and the insufficient stream flows to support endangered fish species. Severe drought conditions preceded the four disastrous Tillamook fires (1933, 1939, 1945, 1951) and pitted farmers against fish propagation groups during the Klamath Basin drought of 2001. The minimum drought loss included about 1200 jobs and \$150 million dollars in goods and services. Local farmers maintain that the cost was considerably more. Water allocation continues to be controversial. In recent years, the State has addressed drought emergencies through the Oregon Drought Council. This interagency (state / federal) council meets to discuss forecasts and advise the Governor as the need arises. Significant Oregon droughts are listed in Table 1.

Recurrence

Oregon’s drought history reveals many short-term and a few long-term events. The average recurrence interval for severe droughts in Oregon is somewhere between 8 and 12 years. Table 1 provides an overview of some severe droughts in Oregon.

TABLE 1. SIGNIFICANT DROUGHTS

DATE	DESCRIPTION
1904-1905	A statewide drought period of about 18 months
1917-1931	A very dry period throughout Oregon, punctuated by brief wet spells in 1920-21 and 1927
1939-1941	A three-year intense drought in Oregon
1959-1964	Primarily affected eastern Oregon
1985-1997	Generally a dry period, capped by statewide droughts in 1992 and 1994
2000-2001	Klamath drought intensifies; Low snow pack in mountains worsens conditions Draw down at Detroit Lake, Oregon, all but curtails lake recreation

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

Vulnerability

The probability that Region 6 will experience drought and the region’s vulnerability to their effects are depicted in Table 2 below. These scores

are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

TABLE 2. Vulnerability and Probability Assessment of Drought

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	H	H	H	H	M	H
Probability	H	H	H	H	H	H

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

EARTHQUAKES

Characteristics and Brief History

The geographical position of this region makes it susceptible to earthquakes from four sources, though expert opinions vary regarding the degree of susceptibility from each. These four sources are: (1) the off-shore Cascadia Fault Zone, (2) deep intra-plate events within the subducting Juan de Fuca plate, (3) shallow crustal events within the North America Plate, and (4) earthquakes associated with renewed volcanic activity. All have some tie to the subducting or diving of the dense, oceanic Juan de Fuca Plate under the lighter, continental North America Plate. In the “Basin and Range” area in the southern part of the region (Klamath and Lake counties) earthquakes are also associated with extension (pulling apart of the crust). Stresses occur because of these movements. There also appears to be a link between the subducting plate and the formation of volcanoes some distance inland from the off-shore fault zone

When crustal faults slip, they can produce earthquakes with magnitudes (M) up to 7.0 and can cause extensive damage, which tends to be localized in the vicinity of the area of slippage. Deep intraplate earthquakes occur at depths between 30 and 100 kilometers below the earth’s surface. They occur in the subducting oceanic plate and can approach M7.5. Subduction zone earthquakes pose the greatest hazard. They occur at the boundary between the descending oceanic Juan de Fuca Plate and the overriding North American Plate. This area of contact, which starts off the Oregon coast, is known as the Cascadia Subduction Zone (CSZ). The CSZ could produce a local earthquake up to 9.0 or greater.

Central Oregon includes portions of five physiographic provinces (High Cascades, Blue Mountains, Basin and Range, High Lava Plains, and Deschutes-Columbia Plateau). Consequently, its geology and earthquake susceptibility varies considerably. There have been several significant earthquakes that have been centered in the region, all in Klamath and Lake counties: 1906 north of Lakeview, 1920 Crater Lake, 1923 Lakeview area, 1958 Adel (M4.5), 1968 Adel swarm (4.7-5.1) and the 1993 Klamath County earthquakes (M5.9 and 6). There are also numerous identified faults in the region (mostly Lake and Klamath counties) that have been active in the last 20,000 years. The region has also been shaken historically by crustal and intraplate earthquakes and prehistorically by subduction zone earthquakes centered outside the area (Table 3). All considered, there is good reason to believe that the most devastating future earthquakes would probably originate along shallow crustal faults in the region.

Earthquake associated hazards include severe ground shaking, liquefaction of fine-grained soils, and landslides. The severity of these effects depend on several factors, including the distance from the

earthquake source, the ability of soil and rock to conduct seismic energy and the degree (angle) and composition of slope materials.

Earthquakes produced through volcanic activity could reach magnitudes of M5.2. However the Cascade volcanoes are some distance away from populated centers, which tends to lessen the concern.

Earthquake risk in Region 6 is reflected in the Uniform Building Code's (UBC) earthquake hazard maps (i.e., seismic zones 1-4). The higher the numerical designation, the more stringent the building standards become. Region 6 is within UBC Seismic Zone 2b, except for Klamath County, which is in Zone 3.

TABLE 3. SIGNIFICANT EARTHQUAKES

DATE	LOCATION	MAGNITUDE (M)	REMARKS
Approximate Years 1400 BCE* 1050 BCE 600 BCE 400 CE 750 CE 900 CE	Offshore, Cascadia Subduction Zone	Probably 8-9	Based on studies of earthquake and tsunamis at Willapa Bay, Washington. These are the mid-points of the age ranges for these six events. * BCE: Before the Common Era
January, 1700	Offshore, Cascadia Subduction Zone	Approximately 9.0	Generated a tsunami that struck Oregon, Washington, and Japan; destroyed Native American villages along the coast
April, 1906	N of Lakeview	V	Three felt aftershocks
April, 1920	Crater Lake	V	One of three shocks
January, 1923	Lakeview	VI	
March, 1958	SE of Adel	4.5	
May-June, 1968	Adel	4.7-5.1	Damage to homes. Twenty earthquakes of M4.0 or greater were recorded between 05/28/68 and 06/24/68. Shallow crustal
September, 1993	Klamath Falls	5.9 and 6.0	Series of earthquakes, the largest being M 6.0. Considerable damage in and around Klamath Falls. Two earthquake-related fatalities (rock fall on highway and heart attack).

Source: Wong, Ivan and Bolt, Jacqueline, November 1995, A Look Back at Oregon's Earthquake History, 1841-1994, *Oregon Geology*, p.125-139.

Probability

The Cascadia Subduction Zone generates an earthquake on average every 500-600 years. However, as with any natural process, the average time between events can be misleading. Some of the earthquakes may have been 150 years apart with some closer to 1,000 years apart.² Establishing a probability for crustal earthquakes is difficult given the small number of historic events in the region. Earthquakes generated by volcanic activity in Oregon's Cascade Range are possible, but likewise unpredictable.

² DOGAMI Special Paper 29: Earthquake Damage in Oregon, p.3.

Vulnerability

Region 5 is vulnerable to earthquake-induced landslides and strong ground shaking, specifically in Lake and Klamath counties.

The Oregon Department of Geology and Mineral Industries (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 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. Results are found in table 4-6.

TABLE 4. PROJECTED DOLLAR LOSSES BASED ON A M8.5 SUBDUCTION EVENT AND A 500-YEAR MODEL

REGION 6 COUNTIES	ECONOMIC BASE IN THOUSANDS (1999)	GREATEST ABSOLUTE LOSS IN THOUSANDS (1999) FROM A M 8.5 CSZ EVENT	GREATEST ABSOLUTE LOSS IN THOUSANDS (1999) FROM A 500-YEAR EVENT
CROOK	\$733,000	Less than \$1,000	\$6,000
DESCHUTES	\$4,673,000	\$5,000	\$71,000
JEFFERSON	\$707,000	Less than \$1,000	\$14,000
KLAMATH	\$3,134,000	\$41,000	\$939,000
LAKE	\$393,000	Less than \$1,000	\$40,000
WHEELER	\$82,000	Less than \$1,000	\$1,000

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

TABLE 5. ESTIMATED LOSSES ASSOCIATED WITH A M 8.5 SUBDUCTION EVENT

REGION 6 COUNTIES	CROOK	DESCHUTES	JEFFERSON	KLAMATH	LAKE	WHEELER
INJURIES	0	1	0	14	0	0
DEATHS	0	0	0	0	0	0
DISPLACED HOUSEHOLDS	0	0	0	37	0	0
ECONOMIC LOSSES FOR BUILDINGD	\$156,000	\$5 million	\$764,000	\$41 million	\$231,000	\$11,000
OPERATIONAL THE DAY AFTER THE EVENT	96%	100%	100%	99%	100%	No data
Fire stations	96%	99%	100%	99%	100%	No data
Police stations	97%	99%	99%	97%	99%	100%
Schools	100%	100%	100%	98%	100%	100%
Bridges						
ECONOMIC LOSSES TO INFRASTRUCTURE	\$6,000	\$17,000	\$9,000	\$339,000	\$32,000	\$5 million
Highways	0	\$40,000	0	\$642,000	\$96,000	\$8 million
Airports	\$8,000	\$2,000	0	\$141,000	\$10,000	\$946,000
Communications						
DEBRIS GENERATED (thousands of tons)	0	3	1	28	0	247

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

TABLE 6. ESTIMATED LOSSES ASSOCIATED WITH A 500-YEAR MODEL¹

REGION 6 COUNTIES	CROOK	DESCHUTES	JEFFERSON	KLAMATH	LAKE	WHEELER
INJURIES	1	17	7	630	19	0
DEATHS	0	0	0	12	0	0
DISPLACED HOUSEHOLDS	0	5	12	1,409	18	0
ECONOMIC LOSSES FOR BUILDINGS ²	5.5 million	\$71 million	\$14 million	\$939 million	\$40 million	\$708,000
OPERATIONAL THE DAY AFTER THE EVENT	N/A ³	N/A	N/A	N/A	N/A	N/A
Fire stations	N/A	N/A	N/A	N/A	N/A	N/A
Police stations	N/A	N/A	N/A	N/A	N/A	N/A
Schools	N/a	N/A	N/A	N/A	N/A	N/A
Bridges	N/a	N/A	N/A	N/A	N/A	N/A
ECONOMIC LOSSES TO INFRASTRUCTURE	\$879,000	\$572,000	\$698,000	\$28 million	\$20 million	\$338,000
Highways	\$316,000	\$2 million	\$395,000	\$15 million	\$8 million	\$688,000
Airports	\$18 million	\$1 million	\$104,000	\$14 million	\$4 million	\$123,000
Communications						
DEBRIS GENERATED (thousands of tons)	0	47	10	610	30	0

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

Table 6 Notes:

¹Every part of Oregon is subject to earthquakes. The 500-year model is an attempt to quantify the risk across the state. The estimate does not represent a single earthquake. Instead, the 500-year model includes 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. More and higher magnitude earthquakes than used in this model may occur (DOGAMI, 1999).

² “...there are numerous un-reinforced masonry structures (URMs) in Oregon, the currently available default building data does not include any URMs. Thus, the reported damage and loss estimates may seriously under-represent the actual threat” (page 126 – 1998, DOGAMI)

³NA - Because the 500-year model includes several earthquakes, the number of facilities operational the “day after” cannot be calculated

The probability that Region 6 will experience earthquakes and the region's vulnerability to their effects are depicted in Table 7 below. These scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

TABLE 7. Vulnerability and Probability Assessment of Earthquakes

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	H	H	H	H	H	M
Probability	M	L	L	M	M	L

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

FIRES IN THE WILDLAND/URBAN INTERFACE

Characteristics and Brief History

Oregon has a very lengthy history of fire in undeveloped wildland and in the developing urban/wildland interface. In recent years, the cost of fire suppression has risen dramatically, a large number of homes have been threatened or burned, more fire fighters have been placed at risk, and fire protection in wildland areas has been reduced. These things prompted the passage of Oregon Senate Bill (SB) 360 (Forestland / Urban Interface Protection Act, 1997). SB 360: (1) establishes legislative policy for fire protection, (2) defines urban/wildland interface areas for regulatory purposes, (3) establishes standards for locating homes in the urban/wildland interface, and (4) provides a means for establishing an integrated fire protection system. Table 8 describes some of the significant wildfires that have occurred in Region 6.

TABLE 8. Significant Wildfires

Year	Name of Fire	Location	Acres Burned	Remarks
1981	Redmond			State Conflagration Act Fire
1984	Crooked River Ranch			State Conflagration Act Fire
1985	Crooked River Ranch			State Conflagration Act Fire
1990	Delicious	Deschutes	1704	
1990	Awbrey Hall	Deschutes	3,400	This fire was an act of arson that affected the western fringe of Bend.
1992	Hanes Butte	Deschutes	348	
1992	Sage Flat	Deschutes	995	
1992	Round Lake	Klamath	490	
1992	Lone Pine	Klamath	30,320	
1994	LaClair	Jefferson		
1995	Day Road	Deschutes		
1996	Little Cabin	Jefferson	2,438	
1996	Smith Rock	Deschutes	500	1 structure was destroyed in this fire.
1996	Simnasho	Jefferson		
1996	Wheeler Point	Wheeler	21,980	
1996	Skeleton	Deschutes	17,700	19 structures were destroyed in this fire impacting the eastern fringe of Bend.
1996	Ashwood/Donnybrook	Central Oregon	118,000	This fire burned in areas of the state not protected from fire.
1999	McCoin Road	Deschutes	99	Prineville
2002	Eyerly	Jefferson	23,573	37 structures destroyed.
2002	Winter	Lake	35,779	
2002	Cache Mountain	Deschutes	4,200	2 structures destroyed.

Source: Oregon Emergency Management, State Natural Hazard Mitigation Plan, 2003, Wildland/Urban Interface chapter.

Note: This list is representative of a lengthy wildfire history. There have been many fires, named and unnamed. Statistics differ, depending on the source.

Probability

The natural ignition of forest fires is largely a function of weather and fuel; human-caused fires add another dimension to probability. Dry and diseased forests can be mapped accurately and some statement can be made about the probability of lightning strikes. Each forest is different and consequently has different probability/recurrence estimates.

This document defines wildfire as an uncontrolled burning of forest, brush, or grassland. Wildfire always has been a part of these ecosystems and sometimes with devastating effects. Wildfires result from natural causes (e.g., lightning strikes), a mechanical failure (Oxbow Fire), or human-caused (unattended campfire, debris burning, or arson). The severe fire season of 1987 resulted in a record setting mobilization of the state. Most wildfires can be linked to human carelessness.

Vulnerability

An understanding of risk begins with the knowledge that wildfire is a natural part of forest and grassland ecosystems. Past forest practices included the suppression of all forest and grassland fires. This practice, coupled with hundreds of acres of dry brush or trees weakened or killed through insect infestation, has fostered a dangerous situation. Present state and national forest practices include the reduction of understory vegetation through thinning and prescribed (controlled) burning.

Each year a significant number of people build homes within or on the edge of the forest (urban/wildland interface), thereby increasing wildfire hazards. In Many Oregon communities (incorporated and unincorporated) are within or abut areas subject to serious wildfire hazards. Oregon, there are about 240,000 homes worth around \$6.5 billion within the urban/wildland interface. Such development has greatly complicated firefighting efforts and significantly increased the cost of fire suppression. These communities have been designated "Interface Communities" and include those in Table 9.

A detailed community inventory of factors that affect vulnerability is important in assessing risk and is beyond the scope of the statewide assessment.

When assessing the risks from natural hazards, established mitigation practices already provide benefits in reduced disaster losses. It is important for communities to understand the benefits of past mitigation practices when assessing their risks, being mindful of opportunities to further reduce losses.

Possible mitigation practices include:

- Identify and map current hazardous forest conditions such as fuel, topography, etc.;
- Identify forest / urban interface communities - List of interface communities, Federal Register, 08/17/01. V. 66, N. 160;

- Identify and map Forest Protection Districts;
- Identify and map water sources;
- Implement effective addressing system in rural forested areas;
- Clearly mark evacuation routes;
- Identify and locate seasonal forest users. Initiate information program through schools, summer camps, forest camping grounds, lodges, etc;
- Identify and map bridges that can (and can not) support the weight of emergency vehicles. This is a basic requirement for fire suppression;
- Form committees to implement Oregon Senate Bill 360. This is required in Oregon Senate Bill 360; and
- Create road standards in interface areas to reflect fire suppression needs. Roads must be wide enough for fire suppression vehicles to turn around. Road grades cannot be too steep for large, heavy vehicles.

TABLE 9. WILDLAND/URBAN INTERFACE COMMUNITIES

CROOK	DESCHUTES	JEFFERSON	KLAMATH	LAKE	WHEELER
Jasper Point Resort	Bend	Ashwood	Beaty	Adel	Fossil
Paulina	Black Butte	Camp Sherman	Beaver Marsh	Christmas Valley	Mitchell
Post	Brothers	Crooked River Ranch	Bly	Drew's Gap	Richmond
Prineville	Elk Lake	Culver	Bly Mountain	Lakeview Basin	Spray
	Hampton	Gateway	Bonanza	New Pine Creek	Twickenham
	LaPine	Madras	Chemult	Paisley	Winlock
	Redmond	Metolius	Chiloquin	Plush	
	Sisters-Cloverdale	Warm Springs	Crater Lake	Silver Lake	
	Sunriver		Crescent	South Drews	
	Terrebonne		Crescent Lake	Summer Lake	
	Tumalo		Dairy	Valley Falls / Chandler	
			Diamond Lake Junction		
			Gilchrist		
			Harriman		
			Keno		
			Klamath Falls		
			Little River		
			Malin		
			Merrill		
			Odell Lake		
			Rocky Point		
			Rosedale		
			Running Y		
			Sand Creek		
			Klamath		
			Sprague River Valley		
			Sycan Estates		

Source: Federal Register

The probability that Region 6 will experience interface fires and the region’s vulnerability to their effects are depicted in Table 10 below. These scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

TABLE 10. Vulnerability and Probability Assessment of Fires in Interface Areas

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	M	H	H	M	M	H
Probability	H	H	H	H	H	H

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

FLOOD

Characteristics and Brief History

Central Oregon is subject to a variety of flood conditions, including (1) spring run-off from melting snow, (2) intense warm rain during the winter months, (3) ice-jam flooding, (4) local flash flooding, (5) lake flooding associated with high winds (e.g., Klamath Lake), (6) closed basin playa flooding (e.g., N. Goose Lake Basin, Lake County) and (6) flooding associated with the breaching of natural debris dams. Although not as notable as flash floods, the most common flood condition in Central Oregon is associated with warm winter rain on snow.

Rain-on-snow floods, so common in western Oregon, also occur east of the Cascades. The weather pattern that produces these floods occurs during the winter months and has come to be associated with La Nina events, a three to seven year cycle of cool, wet weather. In brief, cool, moist weather conditions are followed by a system of warm, moist air from tropical latitudes. The intense warm rain associated with this system quickly melts foothill and mountain snow. Above-freezing temperatures may occur well above pass levels in the Cascade Mountains (4,000-5,000 feet). Some of Oregon's most devastating floods are associated with these events.³

Although flooding occurs throughout central Oregon, local geology and the relatively low population of the six-county area lessen its effects. Volcanic rocks, some of which have a large capacity for water storage, underlie much of the region. Consequently, the discharge rates for some streams (e.g., Deschutes River) are very low considering the size of their basins⁴. In addition, there are some large reservoirs in the upper watersheds that can contain considerable quantities of runoff. Potential flood losses also are mitigated through land-use standards; all Region 6 communities participate in the National Flood Insurance Program.

The Flood Insurance Studies (FIS) for each of the Region 6 counties provide some insights associated with ice jam flooding (Deschutes County), basin lakes that receive run-off from all directions (e.g., Goose Lake Basin, Lake County), lake level differentials produced by local wind conditions (Klamath County), and possible flooding caused by the failure of natural debris dams (Deschutes County). Although these phenomena have not and would not produce devastation like historical flash floods in Jefferson and Wheeler counties, they certainly warrant the consideration of local emergency managers.

Table 11 describes significant floods in the region; Table 12 describes principal flood sources.

³ George Taylor, 1999.

⁴ June 8, 1998, Deschutes County Flood Insurance Study.

TABLE 11. SIGNIFICANT FLOODS

DATE	LOCATION	DESCRIPTION	TYPE OF FLOOD
June, 1884	Wheeler County (Painted Hills)	Mother and 3 children perished	Flash flood
June, 1900	Wheeler County (Mitchell)	Large area of county devastated	Flash flood
July, 1956	Wheeler County (Mitchell)	Much of town destroyed (20 buildings)	Flash flood
December, 1964	Entire state	Severe flooding in central Oregon	Rain on snow
August, 1976	Jefferson County (Ashwood)	Severe flooding. Damaged buildings	Flash flood
February, 1986	Entire state	Severe flooding	Rain on snow
August, 1991	Crook County (Aspen Valley)	Severe flooding. 1 fatality	Flash flood
March, 1993	Wheeler County	Severe flooding. Damage	Rain on snow
May, 1998	Crook County (Prineville)	Federal disaster declaration (FEMA-DR-1221-OR); Ochoco Dam threatened	Rain on snow

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

TABLE 12. PRINCIPAL RIVERINE FLOOD SOURCES

CROOK COUNTY	DESCHUTES COUNTY	JEFFERSON COUNTY	KLAMATH COUNTY	LAKE COUNTY	WHEELER COUNTY
Crooked River	Deschutes River	Willow Creek	Sprague River	Chewaucan River	Bridge Creek
Ochoco River	Little Deschutes River	Unnamed stream north of Culver	Williamson River	N. Goose Lake Basin	Keyes Creek
	Squaw Creek	Muddy Creek	Klamath River		
	Paulina Creek		Williamson River		
	Spring River		Link River		
			Four Mile Creek		
			Varney Creek		
			Upper Klamath Lake		

Sources: FEMA, Crook County Flood Insurance Study (FIS) 07/17/89; FEMA, Deschutes County FIS, 06/08/98; FEMA, Jefferson County FIS, 07/17/89; FEMA, Klamath County FIS, 06/18/84; FEMA, Lake County FIS, 12/05/89; FEMA, Wheeler County FIS, 07/17/89.

Probability

The Federal Emergency Management Agency (FEMA) has mapped the 10, 50, 100, and 500-year floodplains in the Region 6 counties. This corresponds to a 10%, 2%, 1% and 0.2% chance of a certain magnitude flood in any given year. In addition, FEMA has mapped the 100-year floodplain (i.e., 1% flood) in the incorporated cities. The 100-year flood is the benchmark upon which the National Flood Insurance Program (NFIP) is based.

Vulnerability

The probability that Region 6 will experience floods and the region's vulnerability to their effects are depicted in Table 13 below. These scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

TABLE 13. Vulnerability and Probability Assessment of Floods

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	M	L	M	M	M	H
Probability	M	M	L	H	H	H

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

LANDSLIDES / DEBRIS FLOWS

Characteristics and Brief History

Landslides and debris flows always have and always will shape Oregon's landscape. Landslides become problematic, however, when people place buildings and infrastructure in harm's way. Additionally, development practices can cause or contribute to the severity of landslides.

There are several categories of landslides, based on configuration (slide mechanism), slide materials, and rate of movement. Some slides are ancient, deep-seated, and slow moving. Others move rapidly as a mass of rock, mud, and large woody debris. All can be problematic when in the vicinity of buildings and infrastructure. Fast-moving landslides, or debris flows, occur throughout Oregon, but are especially noteworthy in the Cascade and Coast Ranges.

Debris flows (mudslides, mudflows, debris avalanches) are a common type of rapidly moving landslide that generally occur during intense rainfall on previously saturated ground. They usually begin on steep hillsides as slumps or slides that liquefy, accelerate to speeds as great as 35 mph or more, and flow down slopes and channels onto gently sloping ground. Their consistency ranges from watery mud to thick, rocky, mud-like wet cement, dense enough to carry boulders, trees, and automobiles. Debris flows from different sources can combine in canyons and channels, where their destructive power is greatly increased. In general, slopes that are over 25% or have a history of landslides might signal a landslide problem.

In recent events, particularly noteworthy landslides accompanied storms in 1964, 1982, 1966, and 1996. 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. 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.

Oregon's landslide / debris flow warning system primarily involves three state and one federal agency: the Oregon Department of Forestry (ODF), the Oregon Department of Geology and Mineral Industries (DOGAMI), the Oregon Department of Transportation (ODOT), and the National Oceanic and Atmospheric Administration (NOAA). The warning system is triggered by rainfall and monitored in areas that have been determined to be hazardous.

As the lead agency, ODF is responsible for forecasting and measuring rainfall from storms that may trigger debris flows. Advisories and

warnings are issued as appropriate. Information is broadcast over NOAA weather radio and on the Law Enforcement Data System. DOGAMI provides additional information on debris flows to the media; ODOT provides information concerning the location of landslides / debris flows, alternate transportation routes, etc.

Most landslides in Region 6 occur within the US Highway 26 corridor (Prineville-Mitchell). U.S. Highway 97 just north of Klamath Falls has a history of rock falls. One person was killed by a rockslide in this area during the 1993 Klamath Falls earthquake.

Probability

The probability of rapidly moving landslide 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); consequently, the Oregon Department of Forestry tracks storms during the rainy season, monitors rain gages and snow melt, and issues warnings as conditions warrant. Given the correlation between precipitation or snowmelt and the onset of 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.

Geo-engineers with the Oregon Department of Forestry estimate widespread landslide activity about every 20 years; In western Oregon, landslides at a local level can be expected every 2 or 3 years.⁵ It is reasonable to expect a longer recurrence interval within Region 6.

Vulnerability

The probability that Region 6 will experience landslides and the region's vulnerability to their effects are depicted in Table 14 below. These scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

⁵ Mills, 2002.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

In some cases, counties either did not rank the hazard or did not find it to be a significant concern. These cases are noted with a dash (-) in the table below.

TABLE 14. Vulnerability and Probability Assessment of Landslides

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	-	L	M	-	L	H
Probability	-	L	L	-	L	H

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

VOLCANO-RELATED HAZARDS

Characteristics and Brief History

The western boundaries of Jefferson, Deschutes and Klamath counties coincide with the Cascade Mountains. Volcanic activity in the Cascades will continue, but questions regarding how, to what extent, and when, remain. Most volcano-associated hazards are local (e.g., explosions, debris, lava, and pyroclastic flows). However, lahars can travel considerable distances down stream valleys and wind-borne tephra (ash) can blanket areas many miles from the source.

There is virtually no risk from lahars, debris or pyroclastic flows in Wheeler and Crook counties, although normal prevailing winds could carry ash into those areas. Jefferson, Deschutes, and Klamath counties are at risk, however, and should consider the impact of volcano-related activity on small mountain communities, natural debris dams (e.g., South Sister, Broken Top), dams creating reservoirs, tourist destinations (e.g., Crater Lake), highways and railroads. These counties also should consider probable impacts on the local economy (e.g., wood products and recreation) should a volcano-related hazard occur.

The history of volcanic activity in the Cascade Range is contained in its geologic record, and the age of the volcanoes vary considerably. Some lava flows on Washington's Mt. Rainier are thought to be older than 840,000 years; Mt. Saint Helens erupted in May 1980, and continues to be active. In short, all of the Cascade volcanoes are characterized by long periods of quiescence and intermittent activity. And these characteristics make predictions, recurrence intervals, or probability very difficult to attain.

Several Region 6 communities are within a few miles of prominent volcanoes. Mt. Jefferson, the Three Sisters, Broken Top, and Mt. Bachelor dominate the skyline between Redmond and Bend (Deschutes County). A less imposing, but none-the-less important volcano, Newberry Crater, is within 15 miles of La Pine (Deschutes County) and less than 25 miles from the City of Bend. The string of volcanoes continue south with Mt. Thielsen, Mt. Scott (Crater Lake), and Mt. McLaughlin dominating the horizon. The composition, eruptive behavior and history of these volcanoes are not the same, which probably has a bearing on any future activity.

A brief overview of the prominent Region 6 volcanoes is contained in Table 15.

TABLE 15. PROMINENT VOLCANOES

NAME	ELEVATION	TYPE	REMARKS
Mt. Jefferson	10,495 ft.	Composite	Capable of large explosive eruptions. Not extinct. Partly on Warm Springs Reservation. Lahar inundation zones on Shitike Creek; Warm Springs settlement endangered. Lahars could enter Lake Billy Chinook via the White River, overtop dam and create damage below. (USGS OFR 99-24)
Mt. Washington	7,796 ft.	Mafic volcano	Popular recreation area. Information on Mt. Washington is very limited. Best source: USGS Cascade Volcano Observatory (CVO) web sites. No report on potential hazards. Mafic volcanoes are less explosive than composite volcanoes.
North Sister	10,085 ft.	Mafic volcano	
Middle Sister	10,047 ft.	Composite volcano	May erupt explosively in the future (USGS OFR 99-437)
South Sister	10,358 ft.	Composite volcano	May erupt explosively in the future. Carver Lake on mountain is formed by a natural debris dam. Dam failure, for any reason, could send flood water down Squaw Creek toward City of Sisters (Ref. USGS OFR 87-41 and Deschutes Co. Flood Insurance Study) City of Sisters (pop. 900 plus many tourists) also subject to possible lahars (USGS OFR 99-437, Plate 1). Recent uplift detected near the South Sister (about 1 in./yr), but no indication of pending eruption.
Broken Top	9,152 ft.	Composite volcano	Popular hiking destination; Source of Bend water supply
Mt. Bachelor	9,065 ft.	Mafic volcano	All-season recreation area. Mt. Bachelor ski resort.
Newberry Crater	7,984 ft.	Composite volcano	Popular recreation area. Less than 25 miles from Bend. Violent eruptions in past. Will erupt in future. Lahars could reach residential areas in the vicinity of Sun River via Little Deschutes River (USGS OFR 99-437)
Mt. Thielsen	9,187 ft.	Basalt/andesite Shield volcano	Popular hiking / climbing destination
Crater Lake (Mt. Mazama)	8,926 ft. (Mt. Scott)	Overlapping shield and composite volcanoes	Popular destination.
Mt. McLaughlin	9,496 ft.	Mafic volcano	Less explosive than composite volcanoes

Source: USGS/Cascades Volcano Observatory, web site information

Probability

The probability of volcanic activity can be very difficult to predict, unless there are obvious precursors. The precursors might include increased seismic activity, temperature and chemical changes in groundwater, etc. Probability is especially difficult when the volcano has been inactive for many thousands of years and lacks a clear geologic record of past events. Also, the knowledge of volcanoes is too limited to know how long a dormant period at any volcano can last⁶, and this probably is the case for most Cascade volcanoes. Eruption probabilities generated by the USGS for the Oregon Cascades are largely based on the position of volcanic rocks in the geologic record. There is a considerable opportunity for error. Table 16 describes the probability of volcano-related hazards in Region 6.

⁶ USGS OFR 99-24, p. 6.

TABLE 16. PROBABILITY OF VOLCANO-RELATED HAZARDS

VOLCANO-RELATED HAZARDS	AFFECTED AREA						REMARKS
	Jefferson	Deschutes	Klamath	Wheeler	Crook	Lake	
Tephra (volcanic ash) (annual probability of 1cm or more accumulation from eruptions throughout the Cascade Range)	1 in 5,000	1 in 5,000	1 in 5,000	1 in 1,000 to 1 in 5,000	1 in 5,000	1 in 5,000	USGS Open File Report (OFR 97-513) p.9)
Lahar	Source: Mt. Jefferson	Source: Newberry Crater and Three Sisters	Source: Crater Lake	No Risk	No Risk	No Risk	If the Detroit Lake dam is breached, lahars could reach Mill City, Lyons, and Stayton in Marion County. OFR 99-24 (Maps) Lane County: OFR 99-437 (Map)
Lava flow	Source: Mt. Jefferson	Source: Newberry Crater and Three Sisters	Source: Crater Lake	No Risk	No Risk	No Risk	Mt. Jefferson: OFR 99-24 (Maps) Three Sisters: OFR 99-437 (Maps)
Debris flow / avalanche	Source: Mt. Jefferson	Source: Three Sisters	Source: Crater Lake	No Risk	No Risk	No Risk	Mt. Jefferson: OFR 99-24 (Maps) Three Sisters: OFR 99-437 (Maps)
Pyroclastic flow	Source: Mt. Jefferson	Source: Newberry Crater and Three Sisters	Source: Crater Lake and Newberry Crater	No Risk	No Risk	Source: Newberry Crater	Mt. Jefferson: OFR 99-24 (Maps) Three Sisters: OFR 99-437 (Maps)

Source: USGS Open File Reports 99-24, 99-437, 97-513

Vulnerability

The probability that Region 6 will experience volcano-related hazards and the region's vulnerability to their effects are depicted in Table 17 below. These scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

In some cases, counties either did not rank the hazard or did not find it to be a significant concern. These cases are noted with a dash (-) in the table below.

TABLE 17. Vulnerability and Probability Assessment of Volcano-Related Hazards

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	-	H	M	H	L	H
Probability	-	L	L	L	L	L

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

WINDSTORMS

Characteristics and Brief History

Extreme winds (other than tornadoes) are experienced in all of Oregon's eight regions. The most persistent high winds occur along the Oregon Coast and the Columbia River Gorge, so much so that these areas have special building code standards. This is not the case in Central Oregon, although high winds in inter-mountain valleys are not uncommon. For example, stiff winds from the Ochoco Mountains often occur in the City of Prineville (Crook County).

The majority of the destructive surface winds in Oregon are from the southwest. Under certain conditions, very strong east winds may occur, but these usually are limited to small areas in the vicinity of the Columbia River Gorge or other low mountain passes. The much more frequent and widespread strong winds from the southwest are associated with storms moving onto the coast from the Pacific Ocean. A historic overview of high winds affecting Region 6 may be found in Table 18.

TABLE 18. SIGNIFICANT WINDSTORMS

DATE	AFFECTED AREA	CHARACTERISTICS
Apr., 1931	N. Central Oregon	Unofficial wind speeds reported at 78 mph. Damage to fruit orchards and timber.
Nov. 10-11, 1951	Statewide	Widespread damage; transmission and utility lines; Wind speed 40-60 mph; Gusts 75-80 mph
Dec., 1951	Statewide	Wind speed 60 mph in Willamette Valley. 75 mph gusts. Damage to buildings and utility lines.
Dec., 1955	Statewide	Wind speeds 55-65 mph with 69 mph gusts. Considerable damage to buildings and utility lines
Nov., 1958	Statewide	Wind speeds at 51 mph with 71 mph gusts. Every major highway blocked by fallen trees
Oct., 1962	Statewide	Columbus Day Storm; Oregon's most destructive storm to date. 116 mph winds in Willamette Valley. Estimated 84 houses destroyed, with 5,000 severely damaged. Total damage estimated at \$170 million
Mar., 1971	Most of Oregon	Greatest damage in Willamette Valley. Homes and power lines destroyed by falling trees. Destruction to timber in Lane Co.
Nov., 1981	Statewide	Severe wind storm
Dec., 1991	N. Central Oregon	Severe wind storm; Blowing dust. Damage reported in Bend (Deschutes County)
Dec., 1995	Statewide	Severe wind storm

Source: Taylor, George H., and Ray Hatton. (1999), *The Oregon Weather Book*. p.151-157; and FEMA-1405-DR-OR, February 7, 2002, Hazard Mitigation Team Survey Report, Severe Windstorm in Western Oregon.

Probability

Generally, windstorms occur yearly even east of the Cascades. More destructive storms occur once or twice per decade. High wind events on the order of the 1962 Columbus Day storm are thought to have a 100-year recurrence interval.

Vulnerability

Many buildings, utilities, and transportation systems within Region 6 are vulnerable to wind damage. This is especially true in open areas, such as natural grasslands or farmlands. 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 include insufficiently anchored manufactured homes and older buildings in need of roof repair. 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 of time, impacting emergency operations. In addition, up-rooted or shattered trees can down power and/or utility lines and effectively bring local economic activity and other essential facilities 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 trees felled by high winds. 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 and removal program.

The probability that Region 6 will experience windstorms and the region's vulnerability to their effects are depicted in Table 19 below. These scores are based on the perceptions of area emergency managers.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

TABLE 19. Vulnerability and Probability Assessment of Windstorms

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	M	M	M	M	M	M
Probability	H	H	H	H	H	H

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

WINTERSTORMS

Characteristics and Brief History

Within the State of Oregon, Region 6 communities are known for cold, snowy winters. This is advantageous in at least one respect: in general, the region is prepared, and those visiting the region during the winter, usually come prepared. However, there are occasions when preparation cannot meet the challenge. Drifting, blowing snow has often brought highway traffic to a standstill. Also, windy, icy conditions have often closed mountain passes and canyons to certain classes of truck traffic. In these situations, travelers must seek accommodations, sometimes in communities where lodging is very limited. And local residents also experience problems. During the winter, heating, food, and the care of livestock and farm animals are everyday concerns. Access to farms and ranches can be extremely difficult and present a serious challenge to local emergency managers. Table 20 provides an historic overview of severe winter conditions within Region 6.

TABLE 20. SIGNIFICANT WINTERSTORMS

DATE	LOCATION	REMARKS
Dec., 1861	Entire state	Storm produced between 1 and 3 feet of snow
Dec., 1892	Northern counties	Between 15 and 30 inches of snow fell throughout the northern counties
Jan., 1916	Entire state	Two storms. Heavy snowfall, especially in mt. areas
Jan., Feb., 1937	Entire state	Deep snow drifts
Jan., 1950	Entire state	Record snow falls; Property damage throughout state.
Mar., 1960	Entire state	Many automobile accidents; Two fatalities
Jan., 1969	Entire state	Heavy snow throughout state
Jan., 1980	Entire state	Series of string storms across state. Many injuries and power outages.
Feb., 1985	Entire state	Two feet of snow in northeast mountains; Downed power lines. Fatalities
Feb., 1986	Central / Eastern Oregon	Heavy snow in Deschutes Basin. Traffic accidents; Broken power lines
Mar., 1988	Entire state	Strong winds; Heavy snow
Feb., 1990	Entire state	Heavy snow throughout state
Nov., 1993	Cascade Mountains	Heavy snow throughout region
Mar., 1994	Cascade Mountains	Heavy snow throughout region
Winter 1998-99	Entire state	One of the snowiest winters in Oregon history (Snowfall at Crater Lake: 586 inches)

Source: Taylor, George and Ray Hatton, 1999, *The Oregon Weather Book* p.118-122.

Probability

The recurrence interval for severe winter storms throughout Oregon is about every 13 years, however, there can be many localized storms between these periods.

Vulnerability

The probability that Region 6 will experience winterstorms and the region's vulnerability to their effects are depicted in Table 21 below. These scores are based on an analysis of risk conducted by county emergency program managers, usually with the assistance of a team of local public safety officials.

The probability scores below address the likelihood of a future major emergency or disaster within a specific period of time, as follows:

High = One incident likely within a 10 to 35 year period.

Moderate = One incident likely within a 35 to 75 year period.

Low = One incident likely within a 75 to 100 year period.

The vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

TABLE 21. Vulnerability and Probability Assessment of Winterstorms

	Crook	Deschutes	Jefferson	Klamath	Lake	Wheeler
Vulnerability	H	H	H	H	H	H
Probability	H	M	H	H	H	H

Source: Oregon Emergency Management, July 2003, County Hazard Analysis Scores.

Appendix C

Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon. 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 provide the details of economic analysis methods that can be used 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, avoided 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 of 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 purchasers. 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

Conducting detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practicable. 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 these methods is the STAPLE/E Approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a systematic 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?

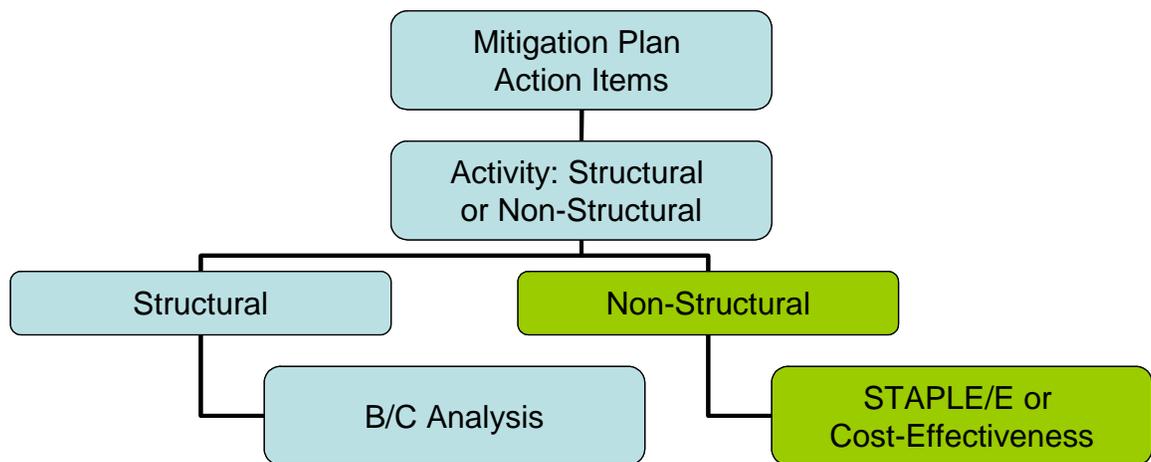
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

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: Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon, 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 expected future cost expressed in today's dollars. If the net present value is greater than the project 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. Many communities are looking towards developing multi-objective 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. Eiding, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997.

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics Inc., 1996.

Federal Emergency Management Agency *Report on 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 Olson Associates, Prepared for Oregon State Police, Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000).

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.

Appendix D: Regional Household Survey

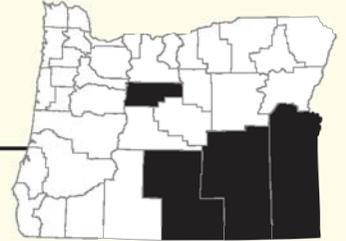
The following appendix includes the regional household survey report completed by the Oregon Natural Hazards Workgroup at the University of Oregon's Community Service Center.

PARTNERS *for*
**DISASTER RESISTANCE
RESILIENCE**



Household Preparedness Survey

Jefferson, Harney, Lake and Malheur Counties



Household Natural Hazards Preparedness Survey

Survey Report for:

Jefferson County, Oregon
Harney County, Oregon
Lake County, Oregon
Malheur County, Oregon

Prepared by:

Oregon Natural Hazards Workgroup

Community Service Center
1209 University of Oregon
Eugene, OR 97403-1209
Phone: 541.346.3889
Fax: 541.346.2040
Email: onhw@uoregon.edu
<http://www.oregonshowcase.org>

January 2007



Special Thanks & Acknowledgements

The Community Service Center would like to thank the following individuals for their assistance on this project:

Rena Thompson, Jefferson County

Andy Seebert, Harney County

Phil McDonald, Lake County

Craig Smith, Malheur County

Project Manager:

Bethany Johnson, Oregon Natural Hazards Workgroup

Project Advisors:

Krista Mitchell, Project Coordinator, Oregon Natural Hazards Workgroup

André LeDuc, Director, Oregon Natural Hazards Workgroup

Robert Parker, Managing Director, Community Service Center

Natural Hazard Household Preparedness Survey

Background

The *Partners for Disaster Resistance and Resilience: Oregon Showcase State Program* was established in 2000 to provide a more coordinated approach to addressing risks from natural hazards in Oregon.

Establishing disaster safety as a public value is a shared objective among the partners involved with the Program. This Program strives to reduce deaths, injuries, property damage, economic losses and human suffering caused by natural disasters. The next flood, earthquake or wildfire cannot be avoided. However, we can make a comprehensive and concentrated effort to reduce the effects of these natural forces on our economic, social and environmental stability. The Program provides a comprehensive framework for government and the private sector to prepare for and minimize risk and impact of natural hazards.

The Federal Emergency Management Agency (FEMA) published Interim Rule 44 CFR Part 201 in February 2002, requiring all states and communities to develop natural hazard mitigation plans by November 2003. These planning and mitigation requirements for states and communities are being accomplished through the Pre-Disaster Mitigation Program (PDM). Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon, as the coordinator of the *Partners for Disaster Resistance and Resilience: Oregon Showcase State Program*, is working with Oregon Emergency Management (OEM) and the PDM Program to assist local governments with their natural hazard mitigation planning efforts.

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

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.

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 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.

The survey helps the counties of the Southeastern region, made up of Jefferson, Harney, Lake and Malheur Counties, realize Bierle's five benefits of citizen involvement in the natural hazard mitigation planning process. As part of the PDM Program, ONHW is assisting the Southeastern region of Oregon with the citizen involvement components of the natural hazard mitigation planning process.

Methodology

To conduct the household survey, ONHW modified the eight page survey administered statewide in 2002 to a five page survey. The purpose of the survey is 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. (See Appendix A) The primary goal of the survey was to gauge the overall perception of natural disasters and determine a baseline level of loss reduction activity for residents in the community. ONHW 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.

The survey was sent to 1200 households in the Southeastern region, which includes: Jefferson, Harney, Lake and Malheur Counties. The households were randomly selected and population weighted based on registered voter lists provided to ONHW by each of the counties.

² Bierle, T. 1999. "Using social goals to evaluate public participation in environmental decisions." *Policy Studies Review*. 16(3/4) ,75-103.

The mailing contained a cover letter, the survey instrument, an entry raffle form for a gift certificate to a local hardware store, and a postage-paid return envelope. Completed surveys were returned to ONHW. A second mailing was sent to households who did not respond to the first mailing, approximately three weeks later. ONHW received 277 valid responses, for a 23% response rate.

Limitations

The study identifies key issues about how members of the Southeastern 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.

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 277 people who responded to the survey, giving the survey a 23% response rate. Of the four counties the survey was mailed to, the majority of surveys returned came from residents of Jefferson and Malheur Counties (Table 1). This is not surprising as Jefferson and

Malheur have the greatest number of residents in the region with 50,339 of the 65,370 total residents (2000 U.S. Census). Zip codes provide a more specific location of the survey respondents than the county level data. Of the 30 different zip codes indicated, the most respondents live in the 97914 zip code (City of Ontario) followed by 97741 (City of Madras) (Table 2).

Table 1. Percent of Surveys Received Per County

County	Percent of Surveys Received
Harney	14%
Lake	15%
Jefferson	33%
Malheur	38%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006).

Table 2. Percent of Surveys Per Zipcode

Zip code	Percent of Surveys
97914	21%
97741	15%
97630	10%
97760	9%
97918	8%
97913	6%
97738	6%
97720	6%
97734	4%
Other	16%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006).

Gender and Age

Women accounted for 57% of survey respondents even though they represented just less than 50% of the population in the Southeastern region according to the 2000 Census. The mean age of survey respondents was 58 years. This is considerably higher than the average median age, 40 years, of residents in Southeastern Oregon according to the U.S. Census 2000. Table 3 compares the ages of survey respondents to the 2000 U.S. Census. This shows that younger people were underrepresented while older people were overrepresented.

Table 3. Percentage of Southeastern Oregon Population and Survey Respondents by Age Category (persons 20 and over)

Age Category	Mid & Southeastern Oregon³	Survey Respondents
20 - 24	6.0%	1.1%
25 - 34	12.3%	6.2%
35 - 44	14.4%	11.8%
45 - 54	13.3%	23.2%
55 - 59	5.2%	14.1%
60 - 64	4.6%	9.9%
65 - 74	7.5%	18.1%
75 - 84	4.7%	13.1%
85+	1.7%	1.1%

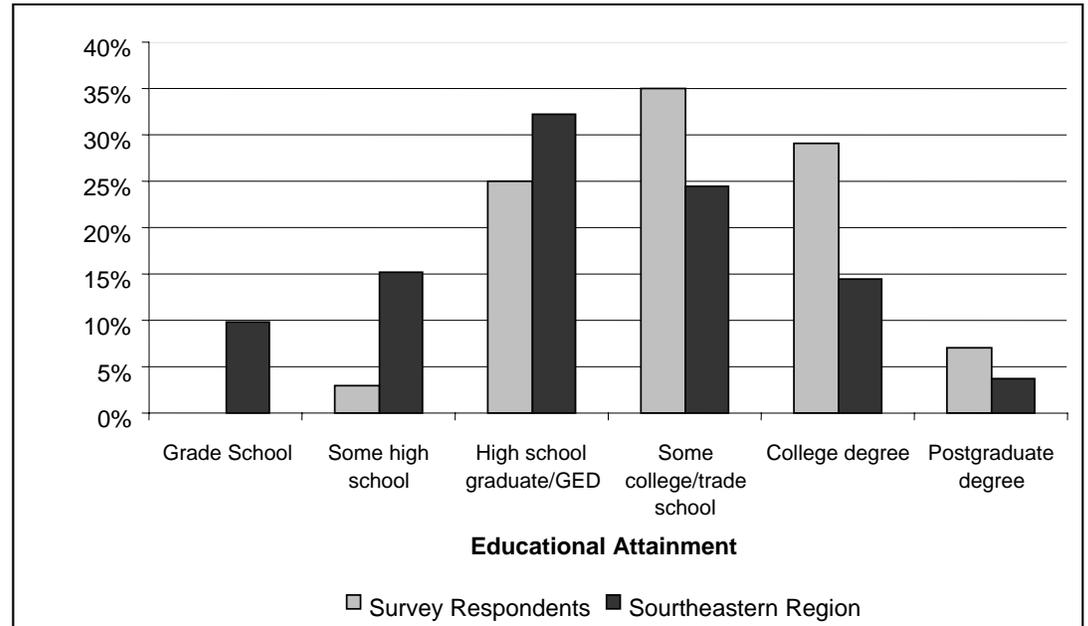
Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006).

Level of Education

In general, survey respondents were relatively well educated. Figure 1 compares the level of education of survey respondents with the 2000 U.S. Census. About 71% 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 an average of 43% of Southeastern 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 Southwestern region.

³ The age categories are percentages of the total number of people in each age group for all four counties as reported by the US Census 2000

Figure 1. Level of Education of Southeastern Oregon Population and Survey Respondents

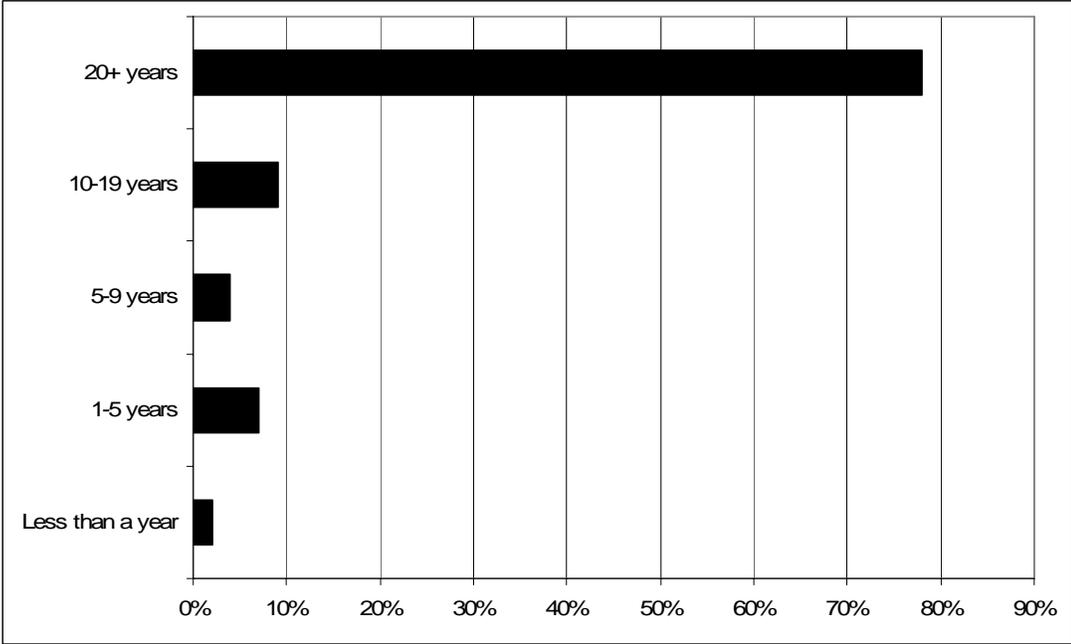


Source: U.S. Census Bureau: www.census.gov (2000) and Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

Oregon Residency

Approximately 78% percent of survey respondents have lived in Oregon for 20 years or more (see Figure 2). Respondents who have lived in Oregon for fewer than 20 years have most commonly moved from California (13%) and Idaho (13%).

Figure 2. Length of Time Survey Respondents Have Lived in Oregon



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

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 and homeowners might be more willing to invest time and money in making their homes more disaster resistance. Due to a data collection error, homeownership rates of survey respondents can not be reported. However, the US Census 2000 reports an average of 67% of Southeastern Oregon residents are homeowners.

Almost 66% of survey respondents live in single-family homes, 24% live in manufactured homes, 2% in apartments, and 3% live in duplexes. In addition, 76% said they have access to the internet.

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 Southeastern region. The primary objective of this question was to create a "natural hazard profile" of respondents to better understand how Southeastern residents perceive natural hazards.

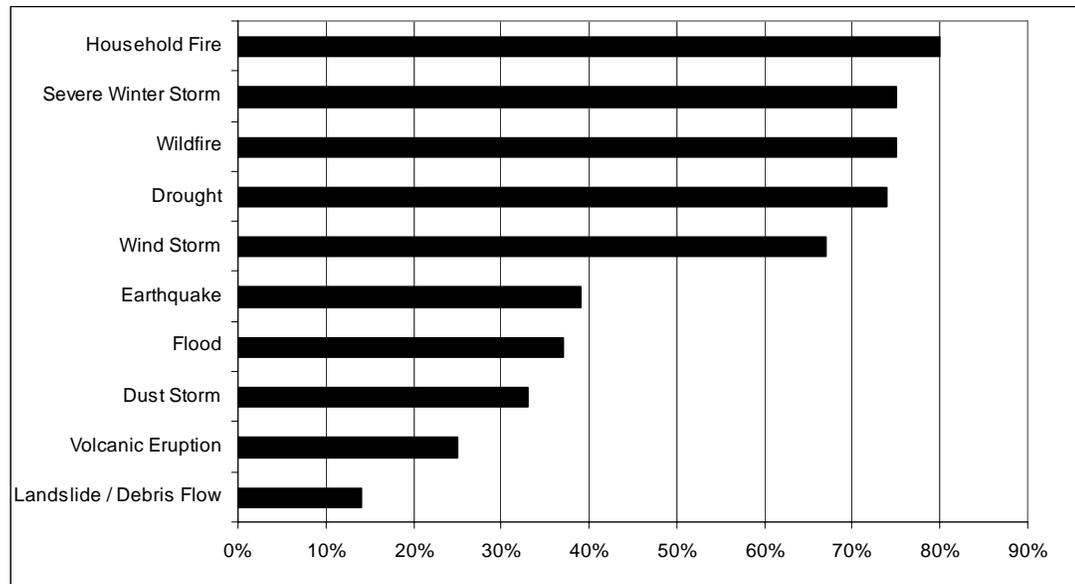
The survey asked respondents to rank their personal level of concern for specific natural disasters affecting their community. The results show that respondents were most concerned about household fire, wildfire, severe winter storm, drought and windstorm. The respondents are least concerned about landslide/debris flows. Figure 3 shows the percent of respondents that identified their level of concern as either "Very Concerned" or "Somewhat Concerned".

Table 4. Survey Respondents' Level of Concern Regarding Natural Hazards in the Southeastern Region

	Very Concerned	Somewhat Concerned	Neither Concerned nor Unconcerned	Not Very Concerned	Not Concerned
Drought	22%	52%	12%	9%	6%
Dust Storm	7%	26%	27%	22%	19%
Earthquake	11%	28%	21%	26%	14%
Flood	8%	29%	17%	23%	23%
Landslide / Debris Flow	4%	10%	23%	29%	34%
Wildfire	40%	35%	11%	8%	6%
Household Fire	31%	49%	11%	7%	2%
Volcanic Eruption	5%	20%	18%	20%	37%
Wind Storm	13%	54%	15%	11%	7%
Severe Winter Storm	23%	52%	14%	7%	4%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

Figure 3. Percentage of Survey Respondents' Who Are "Very Concerned" or "Somewhat Concerned" about Natural Hazards



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

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

Only 37% 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. Fourteen percent of the respondents indicated they have flood insurance leaving 86% without it. However, 53% of those who don't have flood insurance indicated the reason is because their home is not located in the floodplain and 17% felt it was not necessary. Approximately the same amount of respondents (15%) indicated they have earthquake insurance. The top two reasons given by those who don't have earthquake insurance were that it is not necessary (37%) or that they never considered it (32%).

Table 5. Survey Respondents' Reasons For Not Having Flood and/or Earthquake Insurance

Flood Insurance		Earthquake Insurance	
Not located in the floodplain	53%	Not necessary	37%
Not necessary	17%	Not familiar with it/don't know	32%
Not familiar with it/don't know	9%	Not available	11%
Too Expensive	8%	Too Expensive	11%
Not available	6%	Deductible too high/not worth it	5%
Other	4%	Other	5%
Deductible too high/not worth it	3%		

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

Sixty percent of respondents have used fire-resistant building or roofing materials and have secured their homes to its foundation. Fifty-six percent of respondents talked with members of their households about what to do in the case of a natural disaster or emergency. Table 6 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 6. Survey Respondents' Household Disaster Preparedness Activities

	Have Done	Plan To Do	Not Done	Unable To Do	Does Not Apply
Attended meetings or received written information on natural disasters or emergency preparedness?	27%	7%	61%	5%	
Talked with members in your household about what to do in case of a natural disaster or emergency?	56%	14%	27%	2%	
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	39%	19%	40%	2%	
Prepared a "Disaster Supply Kit" (Stored extra food, water, batteries, or other emergency supplies)?	41%	23%	36%	1%	
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	38%	6%	55%	1%	
Have you secured your water heaters, cabinets and bookcases to the wall?	26%	5%	62%	5%	4%
Have you fit your gas appliances with flexible connections?	24%	1%	14%	3%	58%
Used fire-resistant building or roofing materials?	60%	5%	22%	6%	7%
Secured your home to its foundation?	60%	3%	18%	9%	10%
Braced unreinforced masonry, concrete walls, and chimney?	22%	3%	27%	7%	41%
Elevated your home in preparation for floods?	19%	0%	20%	11%	50%

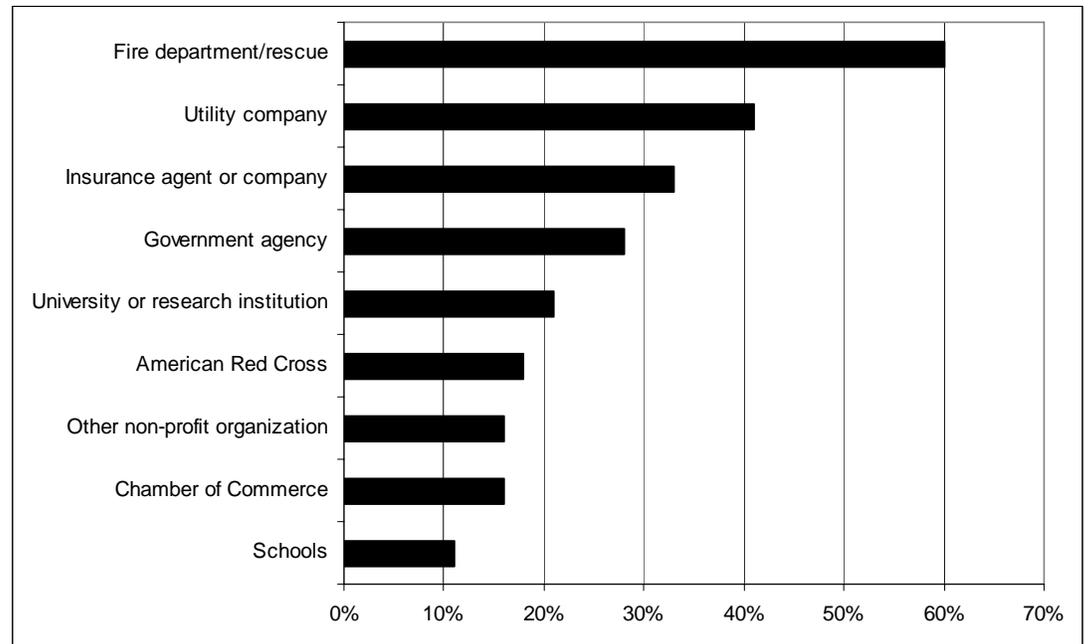
Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (June 2006)

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 4 shows that schools were the least preferred organization to be the primary information source.

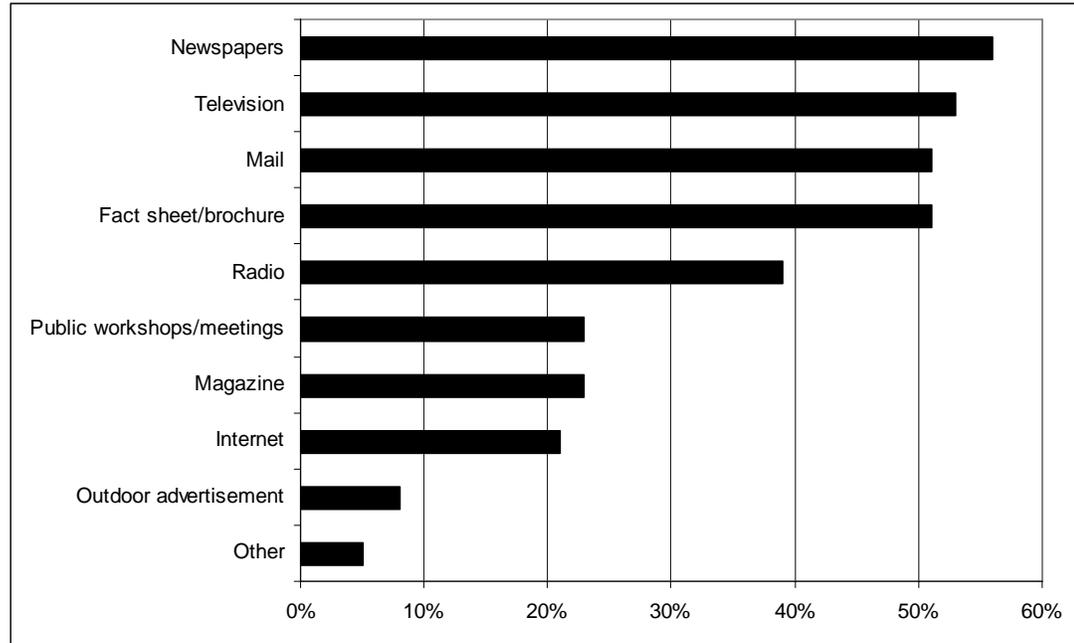
Figure 4. Survey Respondents' Preferred Sources of Information Regarding Household Preparedness



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

When asked what the most effective way was to receive information, respondents indicated that the local newspaper (56%), television news (53%), fact sheet/brochure (51%), and mail (51%) were the most effective. Figure 5 shows how survey respondents rated the effectiveness of dissemination methods presented in the survey.

Figure 5. Survey Respondents' Ranking of Effectiveness of Selected Preparedness Outreach Methods



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (September 2006)

Community Natural Hazard Preparedness

To assist those preparing the communities' 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 Southeastern communities determine their citizens' priorities when planning for natural hazards. They also provide an idea of which types of strategies to reduce the communities' risk the citizens would be willing support. Table 7 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, protect and reduce damage to utilities, strengthen emergency services. The statement with the lowest priority (78%) is to protect historical and cultural landmarks.

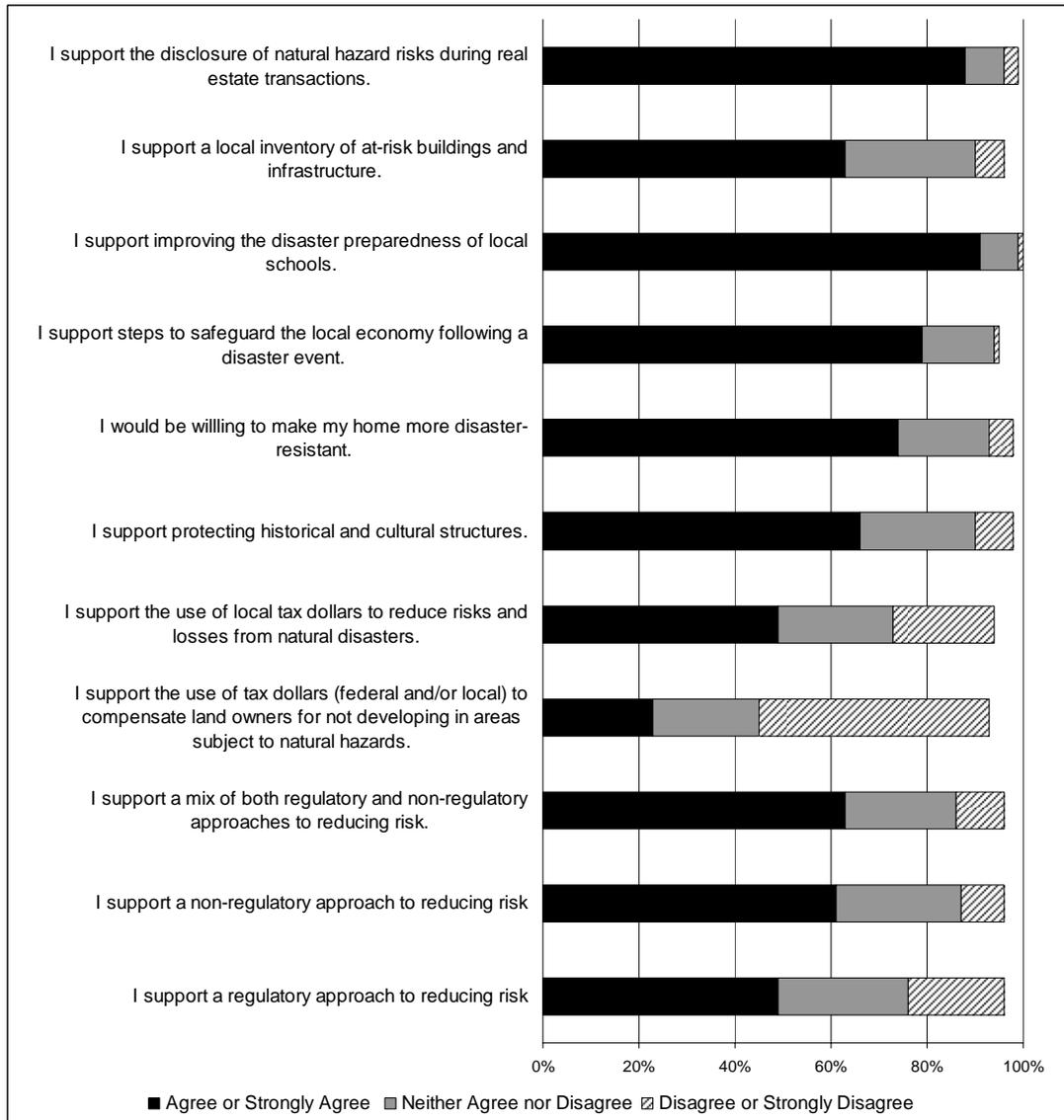
Table 7. Survey Respondents' Goal Prioritization

	Very Important	Somewhat Important	Neither Important nor Unimportant	Not Very Important	Not Important
Protecting private property	71%	24%	3%	1%	1%
Protecting critical facilities (e.g., transportation networks, hospitals, fire stations)	86%	12%	1%	0%	1%
Preventing development in hazard areas	46%	39%	10%	3%	2%
Enhancing the function of natural features (e.g., streams, wetlands)	37%	41%	14%	4%	4%
Protecting historical and cultural landmarks	31%	43%	19%	5%	2%
Protecting and reducing damage to utilities	70%	27%	3%	1%	0%
Strengthening emergency services (e.g., police, fire, ambulance)	68%	28%	3%	1%	1%
Disclosing natural hazard risks during real estate transactions	62%	29%	6%	2%	2%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

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. Figure 6 and Table 8 shows respondents' general level of agreement regarding the community-wide strategies included in the survey.

Figure 6. Survey Respondents' General Level of Agreement Regarding Community-wide Strategies



Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

Table 8. Survey Respondents' General Level of Agreement by Percentage Regarding Community-wide Strategies

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Not Sure
I support a regulatory approach to reducing risk	13%	36%	27%	16%	4%	4%
I support a non-regulatory approach to reducing risk	18%	43%	26%	8%	1%	5%
I support a mix of both regulatory and non-regulatory approaches to reducing risk.	23%	40%	23%	8%	2%	4%
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%	17%	22%	32%	16%	6%
I support the use of local tax dollars to reduce risks and losses from natural disasters.	6%	43%	24%	16%	5%	6%
I support protecting historical and cultural structures.	13%	53%	24%	6%	2%	1%
I would be willing to make my home more disaster-resistant.	16%	58%	19%	4%	1%	3%
I support steps to safeguard the local economy following a disaster event.	17%	62%	15%	0%	1%	4%
I support improving the disaster preparedness of local schools.	34%	57%	8%	0%	1%	0%
I support a local inventory of at-risk buildings and infrastructure.	15%	48%	27%	4%	2%	4%
I support the disclosure of natural hazard risks during real estate transactions.	45%	43%	8%	2%	1%	1%

Source: Household Natural Hazards Preparedness Survey, Oregon Natural Hazards Workgroup, (Nov. 2006)

As shown in Figure 6 and Table 8, 91% of respondents indicated that it is very important or somewhat important for the community to improve the disaster preparedness of local schools. In addition, over 91% indicated that it is very important or somewhat important to disclosure natural hazard risks during real estate transactions.

Open-ended Survey Responses

Q3.1 If “NO” for flood, what is the main reason your household does not have insurance for flood events?

- Only through government agencies
- Haven't looked into it
- Not in flood zone
- We live on a hill (2)
- Refused by insurance company
- We rent
- House flood, not natural flood
- High desert
- No one will pay out even if you have flood insurance
- Told I didn't need it
- Wasn't suggested by agent

Q4.1 If “NO” for earthquake, what is the main reason your household does not have insurance for earthquake events?

Other

- Not offered in this area
- Didn't think there were earthquakes here
- Not sure, will find out. I think we do.
- Not in high risk area
- We rent
- Didn't think of it
- Probably not
- Looking into it/will consider
- Small chance of earthquake
- Not my home

Q6. Who is your preferred information source and what is the preferred way for you to receive information about how to make your household and home safer from natural disasters?

Other

- Want to talk to
- We called Andy Seebart and was told there was nothing available
- Our church has an excellent program to help w/preparedness
- Public service announcements over media: radio, TV
- Church
- Search & rescue meetings
- Church organization's meetings
- Landlord responsible
- Common sense
- Training in disaster
- Going to insurance agency & asking about coverage

Q 12. County

- Harney (37)
- Jefferson (84)
- Lake (38)
- Malheur (98)

Q16. Please indicate your level of education

- Lifetime of experience
- "5th" term college sr.
- Navy

Q17 Do you rent/own

- Mobile home 12' wide
- Acreage & shop
- Commercial bldg w/apartment
- Mobile home (2)
- Log home
- Apt. over store

Q18. If you have lived in Oregon for less than 20 years, in what state did you live before you moved to Oregon?

- Alaska (2)
- Arkansas
- Colorado (3)
- Illinois (2)
- Michigan
- Tennessee
- Wyoming (2)
- Arizona, Florida, Montana, Wyoming, Michigan, & Kansas
- North Carolina & Pennsylvania
- So. Dakota & Arizona

Please feel free to provide any additional comments.

- Some questions don't apply to me as I rent rather than own my residence!
- We always have extra food – in case of emergency. We have generator to keep refrigeration units & well operating, Lanterns & portable stove. The more information available will be good for everyone to get together to help in event of disaster.
- All is well – thank you.
- I think our rivers should be dredged so the high waters have a place to flow.
- Make the “Community Emergency Response Training” available to all residents in the state. It is an excellent program. It educates people in how to prepare themselves, family, & friends for disasters. It provides emergency response personnel with backup help.
- Of course because of global warming, the destruction of habitats, pollution, oil dependency, and people who either don't care or can't grasp what the consequences are of destroying all our resources, I am deeply concerned about eminent world-wide disasters.
- I am probably not a very good example to be completing this form – I'm a widow & live alone & was very unsure about how to answer most of these questions. I've only lived in this house about 2.5 years & it was new when I moved in, although it had a previous owner for a few months.

- Thank you for the time spent preparing, distributing, & utilizing citizens' input.
- 1) I would very much enjoy a final copy of survey results. 2) Civil servants are more & more forgetting who/whom. They work for why, they are on the personal list.
- I think we need less regulation.
- Home is located about 50 feet above 100 year flood plain and I am unaware of any history of earthquake history. It does concern me when I see construction (building) on steep slopes, or in areas prone to heavy runoffs.
- Tax dollars should not be used to restore homes/bldg built in known flood zones – flood zones should be clearly identified and public disclosure should be required. Give public information so they can make common sense discussion – regulations are too costly!
- We live on the rim of the Crooked River Gorge. The river is 100 feet out and 350 feet down.
- The more non-profit organizations (Red Cross) and churches are used the better. These have shown a great history of being closer to their communities, more compassionate, more sincere, and non-threatening. And they will be right there when a disaster occurs.
- Whatever approaches are used to assist us in making wiser choices regarding preparation for any emergencies, I believe they must be balanced – both regulatory & non-regulatory. One size does not fit all! For example, fire is a very real and present danger where we live, but flooding is not. So efforts need to be focused on what the most likely natural hazard(s) by area. Thank you for asking. Blessings on your work!
- My area is not subject to much by way of hazard – the Silvies River has flooded in the past, but I can't imagine it was more than 6-8 inches of water. Since this area is electric dependent, I have considered a small generator – not much else.
- In disaster preparedness I much prefer a non-regulated approach. But, to also have some regulations in place so that there is at least some disaster readiness in place should a disaster occur.
- Good luck. Most folks don't like being told what to do until there is an emergency & even then not! Compensating land owners to "not develop" seems an open unknown for a bottomless drain on the economy. Anyone can say "I want to build a huge [money-making] something" and you need to compensate them for their pipe dreams.
- It is hard for me to do these things, but family can do them. And I live with family. On Crooked River Ranch, over 4600 residents

reside. We have only one exit/access road. The BLM & State of Oregon have offered no solutions or help.

- Here in Summer Lake, we survived the winter fire, which became a firestorm due to inept state & federal performance. There was no common sense during the 1st 3 days of the fire, and the very agencies who should have been helping were exacerbating the situation. The best help came from local volunteers, friends, & neighbors. WE are now prepared & no longer count on state or federal help!!!
- People should depend on themselves and not expect the government to bail them out.
- Education is the main key to preparedness, not regulations. Some questions misleading, i.e. 8G, 7E. Historical & cultural protection is not necessarily the job of gov't, however, private & non-profit organizations can do this. *f – how would tax \$ be used?
- I am 89 years old and live in a rented duplex so some of my answers are left blank or I don't know correct answer! I believe this is a very important project. Good luck!
- I live alone, so not all apply directly.
- I believe it is each person's responsibility to determine what hazards are likely to happen in an area and then act accordingly.
- Everyone should have an emergency plan. My plan I keep my camp trailer ready and cleaned up to use for an emergency.
- I never vote for more taxes.
- I'm never in support of more taxes. And I'm reluctant for allowing government to interfere in our private lives. More rules always means less freedom.
- Encourage people to use common sense.



September 20, 2006

Dear Resident:

We need your help! The Counties of Jefferson, Harney, Lake, and Malheur are currently engaged in a cooperative planning process to reduce the risks and losses associated with natural disasters. As a part of this process, the *Partners for Disaster Resistance and Resilience* and the Oregon Natural Hazards Workgroup at the University of Oregon are conducting a household survey. This survey provides an opportunity for you to share your opinions about preparing for and reducing your household's and your community's risks from natural disasters. The information you provide about your household's needs for disaster preparedness could help the Mid and Southeast Region improve local disaster preparedness and risk reduction activities.

Your opinions are important to us! Please complete the enclosed survey and return it in the postage-paid envelope. The survey will take 15-20 minutes to complete. Please complete and return this survey by **Thursday, October 12, 2006**.

We will also enter your name in a drawing to win a gift certificate at Stunz Lumber Company, True Value Hardware, Big R Ranch Farm Home Supply, or Parr Lumber Company. Please fill out the enclosed form and return with your survey, or mail the gift certificate preference form in a separate envelope to be entered into the drawing.

Your returned survey indicates your willingness to take part in the study. Your participation in this study is voluntary. If you have questions regarding your rights as a research participant, please contact the Office of Human Subjects Compliance, Riverfront Research Park, Suite 106, University of Oregon, Eugene, OR 97403-5219, or call (541) 346-2510. All individual survey responses are strictly confidential and are for research purposes only.

If you have questions regarding the survey, please contact the Oregon Natural Hazards Workgroup at the University of Oregon at (541) 346-3588.

If you have questions about the regional planning process, please contact:

Jefferson County: Rena Thompson, 541-475-4462

Harney County: Andy Seebart, 541-573-5961

Lake County: Phil McDonald, 541-947-6027

Malheur County: Craig Smith, 541-473-5120

For information on *Partners for Disaster Resistance: Oregon Showcase State*, please visit <http://www.OregonShowcase.org>.

Thank you for your participation! We look forward to hearing your opinions!

Andre LeDuc, State Coordinator
Partners for Disaster Resistance & Resilience

Household Natural Hazards Preparedness Questionnaire

This questionnaire is designed to help gauge household preparedness for disasters, and knowledge of tools and techniques that assist in reducing risk and loss from natural hazards. The questionnaire should be completed by an adult, preferably the homeowner or head of household. The information you provide about your needs for disaster preparedness could help improve public/private coordination of preparedness and risk reduction activities within your community. We ask that you please take a few minutes to complete this questionnaire.

Natural Hazard Household Risk Reduction

Households can do many things to prepare for a natural disaster or emergency. What you have on hand or are trained to do when a disaster strikes can make a big difference in your comfort and safety in the hours and days following a natural disaster or emergency. In addition, modifications to your home, including retrofits to strengthen your home's structure, can protect your home and its contents. The following questions focus on your household's preparedness for disaster events.

1. How concerned are you about the following natural disasters affecting your community?

(Check the corresponding box for each hazard)

Natural Disaster	Very Concerned	Somewhat Concerned	Neither Concerned nor Unconcerned	Not Very Concerned	Not Concerned
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dust Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide / Debris Flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Household Fire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcanic Eruption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wind Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Did you consider the possible occurrence of a natural hazard when you bought/moved into your current home?

Yes No

3. Does your household have insurance coverage for flood events?

- Yes No

If you answered Yes, please skip to Question 4.

3.1 If “NO” for flood, what is the main reason your household does not have insurance for flood events?

(Please check one)

- Not available Deductibles too high/not worth it Not necessary
 Not located in the floodplain Not familiar with it/don’t know Too expensive
 Other: _____

4. Does your household have insurance coverage for earthquake events?

- Yes No

If you answered Yes, please skip to Question 5.

4.1 If “NO” for earthquake, what is the main reason your household does not have insurance for earthquake events? *(Please check one)*

- Not available Deductibles too high/not worth it Too expensive
 Not necessary Not familiar with it/don’t know Other: _____

5. In the following list, please check those activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. For Questions F-K, there is also the option to check does not apply, if the preparation action does not apply to a feature of your home. *(Please check one answer for each preparedness activity)*

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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
B. Talked with members in your household about what to do in case of a natural disaster or emergency?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
C. Developed a “Household/Family Emergency Plan” in order to decide what everyone would do in the event of a disaster?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
D. Prepared a “Disaster Supply Kit” (Stored extra food, water, batteries, or other emergency supplies)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
E. In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F. Have you secured your water heater, cabinets and bookcases to the wall?	<input type="checkbox"/>				
G. Have you fit your gas appliances with flexible connections?	<input type="checkbox"/>				
H. Used fire-resistant building or roofing materials?	<input type="checkbox"/>				
I. Secured your home to its foundation?	<input type="checkbox"/>				
J. Braced unreinforced masonry, concrete walls, and chimney?	<input type="checkbox"/>				
K. Elevated your home in preparation for floods?	<input type="checkbox"/>				

Household Risk Reduction

6. Who is your preferred information source and what is the preferred way for you to receive information about how to make your household and home safer from natural disasters? (*Please check all that apply*)

Information Sources:

- Chamber of Commerce
- University or research institution
- Schools
- Fire Department/Rescue
- Utility company
- Insurance agent or company
- University or research institution
- Government agency
- American Red Cross
- Other non-profit organization

Methods:

- Fact Sheet/brochure
- Internet
- Mail
- Outdoor advertisements (signs, etc.)
- Radio
- Television
- Magazine
- Public workshops/meetings
- Newspapers
- Other (please explain):

Community Risk Reduction

7. Natural hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities for planning for natural hazards. Please tell us how important each one is to you.

Statements	Very Important	Somewhat Important	Neither Important nor Unimportant	Not Very Important	Not Important
A. Protecting private property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Protecting critical facilities (e.g., transportation networks, hospitals, fire stations)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Preventing development in hazard areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Enhancing the function of natural features (e.g., streams, wetlands)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Protecting historical and cultural landmarks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Protecting and reducing damage to utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Strengthening emergency services (e.g.,- police, fire, ambulance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I. Disclosing natural hazard risks during real estate transactions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General Household Information

9. Please indicate your age: _____

10. Gender: Male Female

11. Zip Code: _____

12. County: _____

13. Do you have access to the internet?

- Yes
- No

14. Do you rent or own your home?

- Yes
- No

15. Please indicate your level of education:

- Grade School/No Schooling
- Some high school
- High school graduate/GED
- Some college/trade school

- College degree
- Postgraduate degree
- Other, please specify: _____

16. How long have you lived in Oregon?

- Less than a year
- 1-5 years
- 5-9 years
- 10-19 years
- 20 years or more

17. Do you rent/own

- Single-family home
- Duplex
- Apartment (3-4 units in structure)
- Apartment (5 or more unit structures)
- Condominium / townhouse
- Manufactured home
- Other: _____

18. If you have lived in Oregon for less than 20 years, in what state did you live before you moved to Oregon?

- Not Applicable
- Washington
- California
- Other _____
- Idaho

Please feel free to provide any additional comments in the space provided below:

THANK YOU VERY MUCH FOR PROVIDING THIS INFORMATION

The Oregon Natural Hazards Workgroup at the University of Oregon's Community Service Center prepared this survey. Implementation of this survey is made possible by funding from the Federal Emergency Management Agency, Oregon Emergency Management and the Public Entity Risk Institute.

*For more information, please contact Oregon Natural Hazards Workgroup
at 1209 University of Oregon, Eugene, OR 97403-1209,
call (541) 346-3889, or visit www.OregonShowcase.org*

Appendix E: Resource Directory

The following appendix includes local, regional, state and federal resources for some of the hazards addressed in the plan. The directory also includes key publications and additional resources. This appendix was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon for use by Pre-Disaster Mitigation Communities.

Multi-Hazard Mitigation Resources

County Resources

Lake County Sheriff Department

The Emergency Management Team of the Lake County Sheriff Department coordinates emergency response planning along with natural hazard mitigation planning and implements measures to accomplish long-term prevention of the adverse impacts of natural hazards.

Contact: Lake County Emergency Manager
Address: 513 Center Street Lakeview, OR 97630
Phone: (541) 947-6027
Fax: (541) 947-6029

State Resources

Department of Land Conservation and Development (DLCD)

DLCD administers the state's Land Use Planning Program. The program is based on 19 Statewide Planning Goals, including Goal 7, related to natural hazards, with flood as its major focus. DLCD serves as the federally designated agency to coordinate floodplain management in Oregon. They also conduct various landslide related mitigation activities. In order to help local governments address natural hazards effectively, DLCD provides technical assistance such as conducting workshops, reviewing local land use plan amendments, and working interactively with other agencies.

Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: <http://www.oregon.gov/LCD/HAZ/index.shtml>
Oregon Floodplain Coordinator: (503) 373-0050 ext. 250

Oregon State Police (OSP)-Office of Emergency Management (OEM)

OEM administers FEMA's Hazard Mitigation Grant Program, which provides post-disaster monies for acquisition, elevation, relocation, and demolition of structures located in the floodplain. OEM also administers FEMA's Flood Mitigation Assistance Program. This program provides assistance for NFIP insured structures only. OEM also helps local jurisdictions to develop hazard

mitigation plans. OEM is heavily involved in flood damage assessment and works mainly with disaster recovery and hazard mitigation programs. OEM provides training for local governments through workshops on recovery and mitigation. OEM also helps implement and manage federal disaster recovery programs.

Contact: Office of Emergency Management
Address: PO Box 14370, Salem, OR 97309-5062
Phone: (503) 378-2911
Fax: (503) 373-7833
Website: <http://www.oregon.gov/OOHS/OEM/index.shtml>
OEM Hazard Mitigation Officer: (503) 378-2911 xt. 22247
Recovery and Mitigation Specialist: (503) 378-2911 xt. 22240

Oregon Department of Geology and Mineral Industries (DOGAMI)

The mission of the Department of Geology and Mineral Industries is to serve a broad public by providing a cost-effective source of geologic information for Oregonians and to use that information in partnership to reduce the future loss of life and property due to potentially devastating earthquakes, tsunamis, landslides, floods, and other geologic hazards. The Department has mapped earthquake hazards in most of western Oregon.

Contact: Deputy State Geologist, Seismic, Tsunami, and Coastal Hazards Team Leaders
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: <http://www.oregongeology.com>

Federal Resources

Federal Emergency Management Agency (FEMA)

FEMA provides maps of flood hazard areas, various publications related to flood mitigation, funding for flood mitigation projects, and technical assistance. FEMA also operates the National Flood Insurance Program. FEMA's mission is "to reduce loss of life and property and protect the nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response and recovery." FEMA Region X serves the northwestern states of Alaska, Idaho, Oregon, and Washington.

Contact: FEMA, Federal Regional Center, Region 10
Address: 228th St. SW, Bothell, WA 98021-9796
Phone: (425) 487-4678
Website: <http://www.fema.gov>

United States Geological Survey (USGS)

The USGS website provides current stream flow conditions at USGS gauging stations in Oregon and throughout the Pacific Northwest. The Oregon USGS office is responsible for water-resources investigations for Oregon and part of southern Washington. Their office cooperates with more than 40 local, state, and federal agencies in Oregon. Cooperative activities include water-resources data collection and interpretive water-availability and water-quality studies.

Contact: USGS Oregon District Office
Address: 10615 S.E. Cherry Blossom Dr., Portland, OR
97216
Phone: (503) 251-3200
Fax: (503) 251-3470
Website: <http://oregon.usgs.gov>
Email: dc_or@usgs.gov

National Oceanic and Atmospheric Administration (NOAA)

NOAA's historical role has been to predict environmental changes, protect life and property, provide decision makers with reliable scientific information, and foster global environmental stewardship.

Contact: National Oceanic and Atmospheric Administration
Address: 14th Street & Constitution Avenue, NW, Room
6013, Washington, DC 20230
Phone: (202) 482-6090
Fax: (202) 482-3154
Website: <http://www.noaa.gov>
Email: answers@noaa.gov

**National Weather Service, Insert appropriate bureau location here
(Portland, Medford, Pendleton, Boise)**

**The National Weather Service provides flood watches, warnings, and informational statements for rivers in *Insert Community Name Here*.
*Determine and identify which NWS Bureau serves your community.***

Contact: National Weather Service, Portland Bureau
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 261-9246 or (503) 261-9247
Fax: (503) 808-4875
Website: <http://www.wrh.noaa.gov/pqr/>

Contact: National Weather Service, Medford Bureau
Address: 4003 Cirrus Drive, Medford, OR 97504-4198
Phone: (541) 776-4303
Website: <http://www.wrh.noaa.gov/mfr/>

Contact: National Weather Service, Pendleton Bureau
Address: 2001 NW 56th Drive, Pendleton, OR 97801
Phone: (541) 276-7832
Website: <http://www.wrh.noaa.gov/pdt/>

Contact: National Weather Service, Boise Bureau
Address: NIFC Building 3807, Boise, ID 83705-5354
Phone: (208) 334-9860
Website: <http://www.wrh.noaa.gov/>

Additional Resources

American Red Cross

The American Red Cross is a humanitarian organization, led by volunteers, that provides relief to victims of disasters and helps people prevent, prepare for, and respond to emergencies. The Oregon Trail Chapter was chartered as a Red Cross unit in 1917. The chapter serves the residents of Clackamas, Columbia, Multnomah, Washington, Yamhill, and Tillamook counties. The Oregon Trail Chapter provides a variety of community services which are consistent with the Red Cross mission and meet the specific needs of this area, including disaster planning, preparedness, and education.

Contact: Southern Oregon Chapter
Address: 60 Hawthorne Street Medford, OR 97504
Phone: (541) 779-3773
Fax: (541) 772- 7212
Website: www.soredcross.org
Email: info@soredcross.org

Institute for Business & Home Safety (IBHS)

IBHS was created as an initiative of the insurance industry to reduce damage and losses caused by natural disasters. This website provides educational resources and on-line publications for insurers, businesses, and homeowners who are interested in taking the initiative to minimize future damages and losses.

Contact: Institute for Business and Home Safety
Address: 4775 E. Fowler Avenue, Tampa, FL 33617
Phone: (813) 286-3400
Fax: (813) 286-9960
E-mail: info@ibhs.org
Website: <http://www.ibhs.org/>

Flood Mitigation Resources

County Resources

Lake County Planning Department

The Lake County Planning Department manages the physical growth of Lake County. Flood plain management is a critical aspect of healthy growth. As a participant in FEMA's NFIP, Lake County Planning will have information on flood insurance, flood hazard mapping and flood plain management.

Contact: Lake County Planner
Address: 513 Center Street Lakeview, OR 97630
Phone: (541) 947- 6032
Website: www.lakecountyor.org/
Email: kgerschler@co.lake.or.us

State Resources

Oregon Department of Fish and Wildlife (ODFW)

ODFW's mission is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations. ODFW regulates stream activity and engages in stream enhancement activities.

Contact: ODFW
Address: 3406 Cherry Avenue N.E., Salem, OR 97303
Phone: (503) 947-6000
Website: <http://www.dfw.state.or.us/>
Email: Odfw.Info@state.or.us

Oregon Department of State Lands (DSL)

DSL is a regulatory agency, responsible for administration of Oregon's Removal-Fill Law. This law is intended to protect, conserve, and make the best use of the state's water resources. It generally requires a permit from DSL to remove, fill, or alter more than 50 cubic yards of material within the bed or banks of waters of the state. Exceptions are in state scenic

waterways and areas designated essential salmon habitat, where a permit is required for all in-stream activity, regardless of size. DSL and the US Army Corps of Engineers may issue these permits jointly.

Contact: Department of State Lands
Address: 775 Summer Street NE, Suite 100, Salem, OR 97301-1279
Phone: (503) 378-3805
Fax: (503) 378-4844
Website: <http://statelands.dsl.state.or.us/>
Assistant Director: (503) 378-3805, ext. 279
Western Region Manager: (503) 378-3805, ext. 246

Oregon Water Resources Department (WRD)

The WRD's mission is to serve the public by practicing and promoting wise long-term water management. The WRD provides services through 19 watermaster offices throughout the state. In addition, five regional offices provide services based on geographic regions. The Department's main administration is performed from the central office in Salem.

Contact: WRD
Address: 725 Summer Street NE, Suite A, Salem, OR 97301-1271
Phone: (503) 986-0900
Website: <http://www.wrd.state.or.us/OWRD/index.shtml>

Federal Resources

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The Bureau of Reclamation owns Scoggins Dam in Washington County and prepares emergency action plans for events at the dam.

Contact: Bureau of Reclamation, Pacific Northwest Region
Address: 1150 N. Curtis Road, Boise, ID 83706
Phone: (208) 378-5012
Website: <http://137.77.133.1/pn/index.html>

Army Corps of Engineers

The Corps of Engineers administers a permit program to ensure that the nation's waterways are used in the public interest. Any person, firm, or agency planning to work in waters of the United States must first obtain a permit from the Army Corps of Engineers. In Oregon, joint permits may be issued with the Division of State Lands. The Corps is responsible for the protection and development of the nation's water resources, including navigation, flood control, energy production through hydropower management, water supply storage and recreation.

Contact: US Army Corps of Engineers-Portland District,
Floodplain Information Branch
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 808-5150
Website: <http://www.nwp.usace.army.mil/>

Lakeview Soil and Water Conservation District (SWCD)

The SWCD works in partnership with the Natural Resource Conservation Service to promote soil and water conservation in *Insert Community Name Here*. SWCD works with agricultural interests and landowners to provide information on natural resource conservation practices. The partnership blends individual member resources to offer technical and financial assistance in planning and applying natural resource conservation practices and systems. Areas of focus include: erosion management, wetlands preservation and restoration, resource inventories, watershed assessments, and conservation education.

Contact: Lakeview SWCD
Address: 17612 Hwy 395 Lakeview, OR 97630
Phone: (541) 947-5855
Fax: (541) 947 -5854
Website: N/A

Lakeview Service Center National Resources Conservation Service (NRCS), US Department of Agriculture (USDA)

NRCS provides a suite of federal programs designed to assist state and local governments, and landowners in mitigating the impacts of flood events. The Watershed Surveys and Planning Program and the Small Watershed Program provide technical and financial assistance to help participants solve natural resource and related economic problems on a watershed basis. The Wetlands Reserve Program and the Flood Risk Reduction Program provide financial incentives to landowners to put aside land that is either a wetland resource or experiences frequent flooding. The Emergency Watershed Protection Program (EWP) provides technical and financial assistance for clearing debris from clogged waterways, restoring vegetation, and stabilizing riverbanks. The measures taken under the EWP must be environmentally and economically sound and generally benefit more than one property.

Contact: Lakeview Service Center USDA-NRCS
Address: 17612 Hwy 395 Lakeview, OR 97630
Phone: (541) 947-2367
Fax: (541) 947-2070
Website: N/A

Additional Resources

The National Flood Insurance Program

The National Flood Insurance Program (NFIP) Website is a subsection of the Federal Emergency Management Agency (FEMA) site (<http://www.fema.gov>). The NFIP information is intended for both the general public and the many organizations and agencies participating in the program. It includes information about the NFIP and other flood disaster assistance available from the Federal Government. It also provides access to the newly revised NFIP booklet: *Answers to Questions about the National Flood Insurance Program*.

Contact: The National Flood Insurance Program
Phone: (888) FLOOD29 or (800) 427-5593
Website: <http://www.fema.gov/business/nfip/index.shtm>

The Association of State Floodplain Managers

The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery. ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and encourages flood hazard research, education, and training. The ASFPM Web site includes information on how to become a member, the organization's constitution and bylaws, directories of officers and committees, a publications list, information on upcoming conferences, a history of the association, and other useful information and Internet links.

Contact: The Association of State Floodplain Managers

Address: 2809 Fish Hatchery Road, Madison, WI 53713
Phone: (608) 274-0123
Website: <http://www.floods.org>

USGS Water Resources

This web page offers current US water news; extensive current (including real-time) and historical water data; numerous fact sheets and other publications; various technical resources; descriptions of ongoing water survey programs; local water information; and connections to other sources of water information.

Contact: USGS Water Resources
Phone: (503) 251-3200
Website: <http://or.water.usgs.gov/>
Email: info-or@usgs.gov

Office of Hydrologic Development, National Weather Service

The National Weather Service's Office of Hydrologic Development (OHD) and its Hydrological Information Center offer information on floods and other aquatic disasters. This site offers current and historical data including an archive of past flood summaries, information on current hydrologic conditions, water supply outlooks, an Automated Local Flood Warning Systems Handbook, Natural Disaster Survey Reports, and other scientific publications on hydrology and flooding.

Contact: Office of Hydrologic Development, National Weather Service
Website: <http://www.nws.noaa.gov/oh/>

The Floodplain Management Association

The Floodplain Management website was established by the Floodplain Management Association (FMA) to serve the entire floodplain management community. It includes full-text articles, a calendar of upcoming events, a list of positions available, an index of publications available free or at nominal cost, a list of associations, a list of firms and consultants in floodplain management, an index of newsletters dealing with flood issues (with hypertext links if available), a section on the basics of floodplain management, a list of frequently asked questions (FAQs) about the Website, and, of course, a copious catalog of Web links.

Contact: Floodplain Managers Association
Website: <http://www.floodplain.org>
Email: admin@floodplain.org

Northwest Regional Floodplain Managers Association (NORFMA)

This site is a resource for floodplains, fisheries, and river engineering information for the Northwest. This site provides technical information,

articles, and Internet links in the field of floodplain and fisheries management

Contact: Northwest Regional Floodplain Managers Association
Website: <http://www.norfma.org/>

Publications

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:

Contact: Natural Hazards Program Manager, Department of Land Conservation and Development
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: <http://www.oregon.gov/LCD/HAZ/publications.shtml>

NFIP Community Rating System Coordinator's Manual. FEMA/NFIP. Indianapolis, IN.

This informative brochure explains how the Community Rating System works and what the benefits are to communities. It explains in detail the CRS point system, and what activities communities can pursue to earn points. These points then add up to the "rating" for the community, and flood insurance premium discounts are calculated based upon that "rating." The brochure also provides a table on the percent discount realized for each rating (1-10). Instructions on how to apply to be a CRS community are also included.

Contact: NFIP Community Rating System
Phone: (800) 480-2520 or (317) 848-2898
Website: <http://training.fema.gov/EMIWeb/CRS/> (select resources)

Floodplain Management: A Local Floodplain Administrator's Guide to the NFIP. FEMA-Region 10. Bothell, WA.

This document discusses floodplain processes and terminology. It contains floodplain management and mitigation strategies, as well as information on the NFIP, CRS, Community Assistance Visits, and floodplain development standards.

Contact: National Flood Insurance Program
Phone: (800) 480-2520
Website: http://www.oregon.gov/LCD/HAZ/docs/floods/localofficial_4th.pdf

Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials, (February 1987), FEMA-116.

This guidebook offers a table on actions that communities can take to reduce flood losses. It also offers a table with sources for floodplain mapping assistance for the various types of flooding hazards. There is information on various types of flood hazards with regard to existing mitigation efforts and options for action (policy and programs, mapping, regulatory, non-regulatory). Types of flooding which are covered include alluvial fan, areas behind levees, areas below unsafe dams, coastal flooding, flash floods, fluctuating lake level floods, ground failure triggered by earthquakes, ice jam flooding, and mudslides.

Contact: Federal Emergency Management Agency
Phone: (800) 480-2520
Website: <http://www.fema.gov/hazard/flood/pubs/lib116.shtm>

Oregon Model Flood Damage Prevention Ordinance, (January 1999), FEMA/DLCD.

This is an example of how to write an ordinance that complies with NFIP/FEMA standards. Communities can simply adopt this ordinance, word for word, filling in the blanks specific to their community or jurisdiction.

Contact: Department of Land Conservation and Development
Phone: (503) 373-0050
Website: <http://www.oregon.gov/LCD/HAZ/docs/floods/floodord.pdf>

Wildfire Resource Directory

State Resources

Oregon Department of Consumer and Business Services

The Building Codes Division of Oregon's Department of Consumer and Business Services is responsible for administering statewide building codes. Its responsibilities include adoption of statewide construction standards that help create disaster-resistant buildings, particularly for flood,

wildfire, wind, foundation stability, and seismic hazards. Information about wildfire-related building codes is found through this department.

Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, OR 97309
Phone: (503) 373-4133
Fax: (503) 378-2322
Website: <http://www.cbs.state.or.us/external/bcd>

Oregon Department of Forestry (ODF)

ODF's Fire Prevention Unit is involved in interface wildfire mitigation and provides information about Oregon's Wildfire Hazard Zones. The Protection From Fire section of the ODF website includes Oregon-specific fire protection resources. Wildfire condition reports can be accessed on the website as well. ODF's Protection from Fire Program works to do the following:

- Clarify roles of ODF, landowners, and other agencies in relation to wildland fire protection in Oregon;
- Strengthen the role of forest landowners and the forest industry in the protection system;
- Understand and respond to needs for improving forest health conditions and the role/use of prescribed fire in relation to mixed ownerships, forest fuels and insects and disease; and
- Understand and respond to needs for improving the wildland/urban interface situation.

Contact: Oregon Department of Forestry, Fire Prevention Unit
Address: 2600 State Street, Salem, Oregon 97310
Phone: (503) 945-7440
Website: http://www.oregon.gov/ODF/FIRE/fire_protection.shtml

Office of the State Fire Marshal (OSFM)

The Prevention Unit of Oregon's Office of the State Fire Marshal contains 19 Deputy State Fire Marshals located in various regions. The responsibilities of these deputies include public education for local fire districts and inspection of businesses, public assemblies, schools, daycare centers, and adult foster homes. The State Fire Marshal's Community Education Services unit works to keep Oregonians safe from fires and injury by providing them with the knowledge to protect themselves and their property.

Contact: Oregon State Fire Marshal
Address: 4760 Portland Road NE, Salem, Oregon 97305-1760

Phone: (503) 378-3473
Fax: (503) 373-1825
Website: <http://159.121.82.250/> Oregon Laws on Fire Protection:
http://159.121.82.250/SFM_Admin/firelaws.htm
Email: Oregon.sfm@state.or.us

Federal Resources and Programs

Federal Wildland Fire Policy, Wildland/Urban Interface Protection

This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions.

Website: <http://www.fs.fed.us/fire/management/policy.html>

National Fire Protection Association (NFPA)

This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiative's programs and documents. Other members of the initiative include: the National Association of State Foresters, the US Department of Agriculture Forest Service, the US Department of the Interior, and the United States Fire Administration.

Contact: Public Fire Protection Division
Address: 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101
Phone: (617) 770-3000
Website: www.nfpa.org

National Interagency Fire Center (NIFC)

The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service, National Weather Service, and Office of Aircraft Services.

Contact: National Interagency Fire Center
Address: 3833 S. Development Avenue, Boise, Idaho 83705-5354
Phone: (208) 387-5512
Website: <http://www.nifc.gov/>

United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)

As an entity of the Federal Emergency Management Agency, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination, and support.

Contact: USFA, Planning Branch, Mitigation Directorate
Address: 16825 S. Seton Ave., Emmitsburg, MD 21727

Phone: (301) 447-1000
Website: <http://www.fema.gov/hazard/wildfire/index.shtm> - Wildfire Mitigation Planning
<http://www.usfa.fema.gov/index.htm> - USFA Homepage
<http://www.usfa.fema.gov/wildfire/> - USFA Resources on Wildfire

United States Forest Service (USFS)

The USFS is a federal land management organization established to manage the nation's federally owned forests. As part of the Department of Agriculture, it provides timber for people, forage for cattle and wildlife, habitat for fish, plants, and animals, and recreation lands throughout the country.

The USFS offers a possible link from local jurisdictions to federal grant programs.

Contact: USDA Forest Service - Pacific Northwest Region
Address: 333 SW First Avenue, Portland, Oregon 97204-3440;
P.O. Box 3623, Portland, OR 97208-3623
Phone: 503-808-2468
Website: <http://www.fs.fed.us/r6/welcome.htm>

Additional Resources

FireFree Program to Promote Home Safety

In a pioneering effort to address wildfire danger in Bend, Oregon, four local agencies and a Fortune 500 corporation joined together to create "FireFree! Get In The Zone," a public education campaign designed to increase resident participation in wildfire safety and mitigate losses. Spearheaded by SAFECO Corporation, the partnership includes the Bend Fire Department, Deschutes County Rural Fire Protection District #2, Bend City Planning, and The Deschutes National Forest. The Oregon Department of Forestry and a number of local government agencies and businesses have joined the program.

Contact: FireFree
Address: 63377 Jamison St., Bend, OR 97701
Phone: (541) 318-0459
E-mail: dcrfpd2@dcrfpd2.com
Website: <http://www.firefree.org>

Firewise – The National Wildland/Urban Interface Fire program

Firewise maintains a Website designed for people who live in wildfire-prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences.

Contact: Firewise
Address: PO Box 9101, Quincy, MA 02269-9101
Phone: (617) 984-7056

E-mail: firewise@firewise.org
Website: <http://www.firewise.org/>

Publications

National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire. National Wildland/Urban Interface Fire Protection Program, (1991). National Fire Protection Association, Washington, D.C.

This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers, and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:

Contact: National Fire Protection Association Publications
Phone: (800) 344-3555
Website: <http://www.nfpa.org> or <http://www.firewise.org>

An International Collection of Wildland-Urban Interface Resource Materials (Information Report NOR-X-344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.

This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles, and public education materials. The citation format allows the reader to obtain most items through a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form. To obtain this resource:

Contact: Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
Website: http://www.pfc.cfs.nrcan.gc.ca/cgi-bin/bstore/catalog_e.pl?catalog=11794

Wildland/Urban Interface Fire Hazard Assessment Methodology. National Wildland/Urban Interface Fire Protection Program, (1998), NFPA, Washington, D.C. To obtain this resource:

Contact: Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
Website: <http://www.firewise.org>

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility. National Wildland/Urban Interface Fire Protection Program. (1998). Washington, D.C.: Author. To obtain this resource:

Contact: Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
Website: <http://www.firewise.org>

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local staffs and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:

Contact: Natural Hazards Program Manager
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: <http://www.oregon.gov/LCD/HAZ/index.shtml>

Burning Questions. A Social Science Research Plan for Federal Wildland Fire Management, Machlis, G., Kaplan, A., Tuler, S., Bagby, K., and McKendry, J. (2002) National Wildfire Coordinating Group.

The plan covers a wide range of topics and questions related to the human dimensions of federal wildland fire management. Both the beneficial and harmful affects of wildland fire are considered. The plan includes research in the social sciences or anthropology, economics, geography, psychology, political science, and sociology, as well as interdisciplinary fields of research. The plan is national in scale but recognizes the importance of regional variation in wildland fire issues.

Contact: Cooperative Park Studies Unit
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (208) 885-7054
Fax: (503) 378-6033
Website: <http://www.psu.uidaho.edu/>

Severe Weather Event Resource Directory

State Resources

Oregon Climate Service

The Oregon Climate Service collects, manages, and maintains Oregon weather and climate data. OCS provides weather and climate information to those within and outside the state of Oregon and educates the citizens of Oregon on current and emerging climate issues. OCS also performs independent research related to weather and climate issues.

Contact: Oregon Climate Service
Address: Oregon Climate Service, Oregon State University
Strand Ag Hall Room 316, Corvallis, OR 97331-2209
Phone: (541) 737-5705
Website: <http://www.ocs.orst.edu>

Email: oregon@oce.orst.edu

Additional Resources

Public Assistance Debris Management Guide, Federal Emergency Management Agency (July 2000).

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The *Public Assistance Debris Management Guide* is available in hard copy or on the FEMA website.

Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Fax: (425) 487-4622
Website: <http://www.fema.gov/government/grant/pa/dmgtoc.shtm>

Earthquake

State Resources

Oregon Department of Consumer & Business Services-Building

Codes Division

The Building Codes Division (BCD) sets statewide standards for design, construction, and alteration of buildings that include resistance to seismic forces. BCD is active on several earthquake committees and funds construction related continuing education programs. BCD registers persons qualified to inspect buildings as safe or unsafe to occupy following an earthquake and works with OEM to assign inspection teams where they are needed.

Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, Oregon 97309
Phone: (503) 378-4133
Fax: (503) 378-2322
Website: <http://www.cbs.state.or.us/external/bcd/>

The Nature of the Northwest Information Center

The Nature of the Northwest Information Center is operated jointly by the Oregon Department of Geology and Mineral Industries and the USDA

Forest Service. It offers selections of maps and publications from state, federal, and private agencies. DOGAMI's earthquake hazard maps can be ordered from this site.

Address: Suite 177, 800 NE Oregon Street # 5, Portland, Oregon 97232
Phone: (503) 872-2750
Fax: (503) 731-4066
Email: Nature.of.NW@state.or.us
Website: <http://www.naturenw.org/geo-earthquakes.htm>

Federal Resources

US Geological Survey (USGS)

The USGS is an active seismic research organization that also provides funding for research. (For an example of such research, see Recommended Seismic Publications below).

Contact: USGS, National Earthquake Information Center
Address: Box 25046; DFC, MS 967; Denver, Colorado 80225
Phone: (303) 273-8500
Fax: (303) 273-8450
Website: <http://neic.usgs.gov>

Building Seismic Safety Council (BSSC)

The Building Seismic Safety Council (BSSC), established by the National Institute of Building Sciences (NIBS), deals with complex regulatory, technical, social, and economic issues and develops and promotes building earthquake risk mitigation regulatory provisions for the nation.

Address: 1090 Vermont Avenue, NW, Suite 700, Washington, DC 20005
Phone: (202) 289-7800
Fax: (202) 289-1092
Website: <http://www.bssconline.org/>

Western States Seismic Policy Council (WSSPC)

The WSSPC is a regional organization that includes representatives of the earthquake programs of thirteen states (Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon Utah, Washington, and Wyoming), three U.S. territories (American Samoa, Commonwealth of the Northern Mariana Islands and Guam), one Canadian Province (British Columbia), and one Canadian Territory (Yukon). The primary aims of the organization have been: to improve public understanding of seismic risk; to improve earthquake preparedness; and, to provide a cooperative forum to enhance transfer of mitigation technologies at the local, state, interstate, and national levels.

The mission of the Council is to provide a forum to advance earthquake hazard reduction programs throughout the western region and to develop, recommend, and present seismic policies and programs through information exchange, research and education.

Contact: WSSPC, Executive Director
Address: 121 Second Street, 4th Floor, San Francisco, CA 94105
Phone: (415) 974-6435
Fax: (415) 974-1747
Email: wsspc@wsspc.com
Website: <http://www.wsspc.org/>

Cascadia Region Earthquake Workgroup (CREW)

CREW provides information on regional earthquake hazards, facts and mitigation strategies for the home and business office. CREW is a coalition of private and public representatives working together to improve the ability of Cascadia Region communities to reduce the effects of earthquake events. Members are from Oregon, Washington, California, and British Columbia. Goals are to:

- Promote efforts to reduce the loss of life and property.
- Conduct education efforts to motivate key decision makers to reduce risks associated with earthquakes.
- Foster productive linkages between scientists, critical infrastructure providers, businesses and governmental agencies in order to improve the viability of communities after an earthquake.

Contact: CREW, Executive Director
Address: 1330A S. 2nd Street, #105, Mount Vernon, WA 97273
Phone: (360) 336-5494
Fax: (360) 336-2837
Website: <http://www.crewsite.org/>

Additional Resources

Publications

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. You can write, call, fax, or go on-line to obtain this document.

Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: <http://www.oregon.gov/LCD/HAZ/index.shtml>

Environmental, Groundwater and Engineering Geology: Applications for Oregon – Earthquake Risks and Mitigation in Oregon, Yumei Wang, (1998) Oregon Department of Geology and Mineral Industries, Star Publishing.

This paper deals with earthquake risks in Oregon, what is being done today, and what policies and programs are in action to help prevent loss and damage from seismic events. This article also gives a good list of organizations that are doing work in this field within the state. This article is somewhat technical but provides vital information to communities around the state.

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Special Paper 29: Earthquake damage in Oregon: Preliminary estimates of future earthquake losses, Yumei Wang, Oregon Department Of Geology And Mineral Industries.

Wang, a geotechnical engineer, analyzed all faults with a 10% chance of causing an earthquake in the next 50 years and projected potential damage. Wang stresses that these are preliminary figures. "There are two things we could not incorporate into this study that would significantly increase these figures. One is a tsunami. The other is an inventory of unreinforced brick or masonry buildings."

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Land Use Planning for Earthquake Hazard Mitigation: A Handbook for Planners, Wolfe, Myer R. et. al., (1986) University of Colorado, Institute of Behavioral Science, National Science Foundation.

This handbook provides techniques that planners and others can utilize to help mitigate for seismic hazards. It provides information on the effects of earthquakes, sources on risk assessment, and effects of earthquakes on the built environment. The handbook also gives examples on application

and implementation of planning techniques to be used by local communities.

Contact: Natural Hazards Research and Applications
Information Center
Address: University of Colorado, 482 UCB, Boulder, CO
80309-0482
Phone: (303) 492-6818
Fax: (303) 492-2151
Website: <http://www.colorado.edu/UCB/Research/IBS/hazards>

Using Earthquake Hazard Maps: A Guide for Local Governments in the Portland Metropolitan Region; Evaluation of Earthquake Hazard Maps for the Portland Metropolitan Region Spangle Associates, (1998/1999) Urban Planning and Research, Portola Valley, California.

These two publications are useful for local governments concerned with land use in earthquake hazard areas. The proximity of Washington County to Portland and their interactive communities make these guides applicable to the County. The publications are written in clear and simplistic language and address issues such as how to apply earthquake hazard maps for land use decisions.

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon
97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Public Assistance Debris Management Guide, Federal Emergency Management Agency (July 2000).

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The *Public Assistance Debris Management Guide* is available in hard copy or on the FEMA website.

Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Fax: (425) 487-4622
Website: <http://www.fema.gov/government/grant/pa/dmgtoc.shtm>

Appendix F: Mitigation Successes

The following appendix includes success stories on mitigation projects completed as a result of this mitigation plan.

Appendix G: City Addendums

This appendix includes the addendums for the City of Paisley, Town of Lakeview, and the Harney Electric Cooperative.

City of Paisley Addendum

Participation in the Lake County Natural Hazard Mitigation Planning Process:

Participation in the Lake County Natural Hazard Mitigation Plan Steering Committee

Dale Roberts, Mayor of the City of Paisley was invited to sit on the Lake County Natural Hazards Mitigation Plan Steering Committee as a representative of the City of Paisley. Dale attended the third and fourth meetings.

Stakeholder Interviews for the Lake County Natural Hazard Mitigation Plan

Stakeholder Interviews were held with the following individuals representing the City of Paisley for the Lake County Natural Hazard Mitigation Plan.

- Dale Roberts, Mayor, City of Paisley
Held 3.5.2007

Risk Assessment Work Session

A work session at the Paisley Community Center was held on March 9, 2007 from 6-7:15pm; there, attendees conducted a risk assessment for their city. The following persons attended the work session:

- Rosie Bagley, City of Paisley Council Member
- Lawrence Duckworth, City of Paisley Council Member
- Ken Hamlington, City of Paisley Council Member
- Dale Roberts, City of Paisley Mayor
- Duane Young, City of Paisley Roads and Sewers

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments
Participant (RARE) Project Coordinator

The meeting was called to undergo the Risk Assessment portion of the Lake County Natural Hazard Mitigation Plan for the City of Paisley

After introductions, Katie Mader began to inform the council members about what mitigation is, why it is important to mitigate and why it is important to create a Natural Hazard Mitigation Plan. Next, Katie gave an overview of the plan's structure, describing each section and its timeline for completion. Katie then described to the members the requirements that Paisley must meet to become eligible for federal mitigation grant funding.

Katie led the members in a discussion to identify what mitigation activities have already been undertaken in the City of Paisley. They also discussed what organizations exist in Paisley that could be used as avenues for outreach and education on mitigation activities to the community. Next the group was asked to identify assets in the Paisley community under the headings of Population, Economy, Critical Facilities, Natural Resources and Cultural and Historic Assets. A Map was then laid on the table and the members were asked to locate natural hazards within

their community, as well as their city's assets and vulnerabilities. Lastly, Katie introduced the Action Item worksheet to the council and encouraged them to begin thinking about future mitigation activities for the City of Paisley.

Action Item Identification Work Session

A work session on brainstorming action items for the City of Paisley was held on Monday, April 16th from 6 -6:30 p.m. at the Paisley Community Center. Those present included:

- Dale Roberts, Mayor, City of Paisley
- Rosie Bagely, Paisley City Council Member
- Lawrence Duckworth, Paisley City Council Member

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments (RARE) Participant, Project Coordinator

Project manager Katie Mader reviewed issues identified at the previous Risk Assessment meeting for the city of Paisley. The issues presented were confirmed to be accurate by the council members. Katie then described what actions items are and what role they will play in the plan and in the implementation of the plan. Katie proposed action items that she thought were relevant to the City of Paisley. The council members gave their local input on each action item proposed resulting in a proposed list of action items for the City of Paisley.

Addendum-Creation Work Session

For the creation of the City of Paisley Addendum, a work session was held on Monday, June 11, 2007 from 7 to 8 p.m. at the Paisley Community Center. The following persons were present:

- Dale Roberts, Mayor City of Paisley
- Rosie Bagley, City of Paisley Council Member
- Lawrence Duckworth, City of Paisley Council Member

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments (RARE) Participant, Project Coordinator

The meeting was called to gather information for the City of Paisley Addendum for the Lake County Natural Hazard Mitigation Plan.

In order to assess the city's risks to natural hazards, Katie presented a summary of each hazard taken from the Region 6: Central Oregon Profile and Risk Assessment. Katie explained the Probability and Vulnerability ratings to the City Council and asked the members to agree or amend the ratings as pertaining specifically to the City of Paisley. Each hazard was discussed individually and the impacts of each hazard specific to the City of Paisley were recorded.

Action Items specific to the City of Paisley were briefly discussed and reviewed. A brief overview regarding the final steps for implementing the plan was presented to the Council members to finish the work session.

Hazards:

Wildfire

The Paisley City Council Members agreed that the County's 'high' probability rating for wildfire is also accurate for Paisley; however, Council members felt that the vulnerability rating of 'moderate' should be moved to high for their community. It was noted by a member that when there is a fire near town the whole town shuts down and the fire takes precedence in city activities. Even though the city may not be in immediate danger, all efforts go toward fire suppression. The forest land around the city is primarily owned by the U.S. Forest Service with some private ranch and timber lands interspersed. Paisley operates a volunteer fire department and has a working agreement with the Forest Service if back-up is required.

Earthquake

Lake County's probability of experiencing earthquakes is 'moderate.' Paisley council members felt that the City's probability is 'low.' The County's vulnerability to earthquake is 'high,' and council members agreed that a 'high' vulnerability rating was accurate for Paisley as well.

Flood

Lake County has a 'high' probability of experiencing a future flood event. Paisley council members agreed this is an accurate assessment for the City as well. Lake County has a 'moderate' vulnerability to future flood events. Council members agreed that this rating should be moved to 'high' for the City of Paisley. Members noted that although flooding is generally localized, the community is so small that the impacts are felt throughout.

The Chewaucan River is the largest river flowing through Lake County, although it is relatively small. The Chewaucan's source is in the mountains of the Fremont-Winema National Forest southeast of Paisley. The river arches north to flow through Paisley and then curves southwest to eventually drain into Lake Abert. The Chewaucan's waters are greatly depended upon by the farmers and ranchers that are near its banks. There are multiple diversions located in the vicinity of Paisley along the Chewaucan that divert river water for irrigation and for stock watering. Each of these diversions is privately owned.

The Chewaucan River has a history of flooding the City of Paisley. Heavy rains and snow melt are the primary culprits for flow increases. An earthen levee was created by the Army Corps of Engineers in the early 1900's as a means of channeling the river for irrigation uses, as the river naturally overflowed its banks creating seasonal marshes. The levee exists today on the south bank of the river through the City of Paisley. Efforts by local citizens have been made throughout the years to maintain the levee and protect the city from further flood issues. In 2006, a weir located on the river and upstream from City of Paisley that was owned by the city was removed. The removal of the city weir lowered the standard flow of the river by approximately five

feet. This has created a generous buffer for river flow increase and in protecting the city from further flooding on regular flood years.

Drought

Lake County's probability of experiencing drought is 'high,' and Paisley agrees that its probability is the same. Lake County's vulnerability to drought is 'moderate,' but Paisley felt that its vulnerability would be 'high.' Council members noted that the agriculture and ranching are essential to Paisley's economy – and thus, droughts can have major economic impacts for this City. A drought will produce less natural forage on grazeland and restrict water for irrigation purposes. It was suggested by one member that a severe drought could affect up to 60% of the population of Paisley, and that the impacts of drought are quickly felt in this community.

Wind

Members of the Paisley City Council felt that Lake County's Risk Assessment was accurate in predicting 'high' probability for windstorms but they felt that Paisley's vulnerability should be moved from a 'moderate' to 'high' rating. Members noted that the city annually experiences storms with winds of over 60 miles per hour. These storms fall trees which, historically, have toppled bars and damaged properties. Fallen trees can additionally block transportation routes and fall and/or create outages.

Winter Storm

The Paisley City Council members agreed that Lake County's vulnerability and probability rankings for winter storms were also true for Paisley (both are 'high'). The members noted that Paisley experiences annual winter storms that typically close state Highway 31 for a few hours to a few days due to white-out conditions and/or drifts. Often ODOT will escort cars through particularly dangerous sections during storms. The members also noted that storms come on quick and sometimes without warning.

Action Items:

The City of Paisley has an approximate population of 220; due to staffing limitations, the City of Paisley has chosen to partner with Lake County on six mitigation actions (below); actions will either directly benefit the city, or may be expanded upon to do so. Paisley will be included at all of Lake County's future hazard mitigation planning meetings. Full text of actions can be viewed in Section 4 of the plan.

- M1: Enhance small business hazard planning within Lake County
- M2: Establish and maintain a public awareness campaign on hazard awareness and mitigation, maintaining awareness as seasonally appropriate to each hazard and aiming mitigation activities at households, businesses and special needs populations.
- F4: Organizing tree planting along banks of Chewaucan upriver from the City of Paisley to reduce soil erosion and river sediment load during flood stages
- F5: Replace to enlarge and properly construct storm drain at Hwy 31 and Mill Street in Paisley

- EQ2: Seismically retrofit Paisley School to reduce the building's vulnerability to seismic hazards
- F5: Replace to enlarge and properly construct storm drain at Hwy 31 and Mill Street in Paisley

Local Adoption:

The City of Paisley Addendum will be adopted by City Council via resolution once the Lake County Natural Hazard Mitigation Plan has been pre-approved by the Federal Emergency Management Agency (FEMA).

Lakeview Addendum

Participation in the Lake County Natural Hazard Mitigation Planning Process:

Participation in the Lake County Natural Hazard Mitigation Plan Steering Committee

Ray Simms, Lakeview Manager was invited to be a member of the Lake County Natural Hazard Steering Committee. He attended the first and second meetings. Ron Wilke, Lakeview Public Works Manager was invited to be a member of the Steering Committee and attended the second meeting. Jeff Kamp, Chief of Police for the Lakeview Police Department was invited to be a member of the Steering Committee and also attended the second meeting.

Stakeholder Interviews for the Lake County Natural Hazard Mitigation Plan

Stakeholder Interviews were held with the following individuals representing the Town of Lakeview for the Lake County Natural Hazard Mitigation Plan.

- Sam Goss, Lakeview Fire Chief
Held 11.15.2006
- Caro Johnson, Lakeview Chamber of Commerce Director
Held 11.16.2006
- Ray Simms, Lakeview City Manager
Held 3.2.2007
- Ron Wilke, Lakeview Public Works Manager
Held 4.17.2007

Work Sessions with the Town of Lakeview

For the creation of the Lakeview Addendum, a work session was held on Thursday, June 28th 2007 from 2-3 p.m. in the Commissioner's Hearing Room of the Lake County Courthouse. The following persons were present:

- Bill Duke, Lake County Resource Initiative
- Ray Simms, Town of Lakeview
- Caro Johnson, Lake County Chamber of Commerce
- Judy Graham, Lakeview School District #7
- Sean Gallagher, Lakeview School District #7

Facilitated by:

- Katie Mader, Resource Assistance for Rural Environments Participant (RARE) Project Coordinator

The meeting was called to gather information for the Lakeview City Addendum to the Lake County Natural Hazard Mitigation Plan

Katie began by welcoming members and reviewing the agenda. She then began to explain the role of the addendum in the county's plan and what will be included in the addendum. She also explained the advantages of Lakeview completing and adopting the addendum.

Next Katie led the group in a discussion on the impacts of hazards on the Town of Lakeview. The group reviewed the State hazard rating and either agreed that the rating was accurate for the City, or amended the rating based on local knowledge. Lastly, Katie gave an overview of the County's planning progress.

Hazards:

Wildfire

It was agreed by the members of the Lakeview Addendum work session that the County's ratings for probability and vulnerability - both set as high - are accurate for the Town of Lakeview. Members noted that weed abatement within Lakeview would lower the town's vulnerability to wildfire. They noted that Lakeview is a wildland-urban interface community with forestland east of town. Members also noted that dry agriculture fields just outside of town are vulnerable to the effects of wildfire.

Earthquake

The County's probability of experiencing an earthquake is 'moderate.' The members of the Lakeview Addendum work session agreed that this was accurate for the Town of Lakeview. The members also agreed that the County's vulnerability rating of 'high' was also accurate within the town. There are historic buildings in Lakeview - particularly in its downtown - that are at high risk of collapse during extreme levels of seismic activity. Building instabilities pose risks not only to human welfare and property, but to the local economy as well.

Flood

Lake County's probability of experiencing a flood is high. The members of the Lakeview Addendum work session agreed that this rating was accurate for the Town of Lakeview. The members decided, however, that the County's 'moderate' vulnerability to flood should be elevated to 'high' within the Town's boundaries. They noted that major flooding events have historically - and could still - affect the businesses of downtown Lakeview. The two primary snow-melt drainages from the mountains east of town are Bullard and Deadman canyons. These canyons run parallel to each other and drain directly into Lakeview. There have been no flooding events from Bullard Canyon since the construction of its water retention structure in 2002. However, members noted that in the winter of 2005, water was within 3 feet of capping the structure. They also noted that the drainage from Deadman Canyon runs along side A.D. Hay Elementary School and the Lake District Hospital. Deadman canyon has rock diversion structures to help slow water flow but no retention structure is currently in place.

Drought

Members of the Lakeview Addendum work session felt that the probability of drought should be lowered from the County's rating of 'high' to 'moderate.' They also felt that the vulnerability rating should be elevated from the County's rating of 'moderate' to 'high.' They amended the vulnerability rating because of the agricultural and ranching economic ties to the Town of Lakeview. Drought affects the agricultural industry the hardest, and if ranchers and farmers are financially hit by the onset of a drought, that in turn affects the retail economy in Lakeview. Drought can also exacerbate fire risk which can sometimes lead to forest land closure. This affects

timber companies that are reliant upon forest access for the livelihood of their businesses.

Windstorm

Members of the Lakeview Addendum work session felt that the County's rating for windstorm probability ("high") was accurate for the Town. They also agreed that the vulnerability rating of 'high' was accurate.

Winter Storm

Members of the Lakeview Addendum work session agreed that the state rating for probability set at high was accurate. They also agreed that the vulnerability rating set at high was accurate. Members noted that the primary impacts of winter storms are power failures and transportation routes being blocked or closed.

Action Items:

The Town of Lakeview has an approximate population of over 2,600; due to staffing limitations, the Town of Lakeview has chosen to partner with Lake County on eight mitigation actions (below); actions will either directly benefit the city, or may be expanded upon to do so. Lakeview will be included at all of Lake County's future hazard mitigation planning meetings. Full text of actions can be viewed in Section 4 of the plan.

- WF3: Establish fuel breaks east of Lakeview along Deadman and Bullard Canyons as recommended by the South-Central Lake County Community Wildfire Protection Plan
- F2: Prioritize replacement of culverts in determined areas and develop implementation strategy
- F3: Establish maintenance program for drainage channels from Deadman and Bullard Canyon through Lakeview
- EQ1: Seismically retrofit Daly Middle School to reduce the building's vulnerability to seismic hazards
- EQ3: Identify historic structures that represent a significant cultural resource for the community, focusing especially on unreinforced masonry buildings, and identify mitigation measures (i.e. structural retrofit) to protect them from seismic natural hazards.
- EQ4: Prioritize critical facilities and public buildings in Lake County base on seismic vulnerability assessments provided in the Department of Geologic and Mineral Industries (DOGAMI) seismic study
- M1: Enhance small business hazard planning within Lake County
- M2: Establish and maintain a public awareness campaign on hazard awareness and mitigation, maintaining awareness as seasonally appropriate to each hazard and aiming mitigation activities at households, businesses and special needs populations.

Local Adoption:

The Lakeview Addendum will be adopted by Town Council via resolution once the Lake County Natural Hazard Mitigation Plan has been pre-approved by the Federal Emergency Management Agency (FEMA).

Harney Electric Cooperative Hazard Mitigation Addendum

Risk Assessment and Action Items

Introduction

The Harney Electric Cooperative addendum to the Harney County Natural Hazards Mitigation Plan provides hazard information specific to the Harney Electric Cooperative as well as two action items the Electric Cooperative has submitted to mitigate against natural hazard events. The Harney Electric Cooperative has been closely involved in the process of developing the Harney County Natural Hazards Mitigation Plan and has been identified as the convener for the Mitigation Plan. This addendum is part of the multi-jurisdictional Harney County Natural Hazards Mitigation Plan which also includes addendums for the City of Burns and the City of Hines. While the Harney County Mitigation Plan provides a comprehensive range of actions for all communities in the county, action items written for the Harney Electric Cooperative are necessary to address hazards specific to the company.

Methodology

The Oregon Natural Hazards Workgroup (ONHW) gathered information from a variety of sources to identify natural hazards affecting the Electric Cooperative. The asset identification meeting held on March 28, 2007, and the Hazard Identification meeting held on March 29, 2007 provided ONHW with the primary source natural hazard information for the Electric Cooperative. In addition, conversations with Office Manager for the Harney Electric Cooperative provided important information regarding how natural hazards affect the Electric Cooperative.

The Electric Cooperative submitted two action items addressing severe weather events, which are attached at the end of this addendum.

Company Profile

The Harney County Electric Cooperative is non-profit cooperative that provides electric power to an area covering 20,000 square miles. Their service area includes most of rural Harney County and extends into Malheur and Lake counties as well as Nevada. The cooperative is headquartered in Burns and has provided power to the area since the 1950s.

Hazard Identification

Although the cooperative provides reliable service to its customers, there are issues with older infrastructure that make the company more susceptible to natural hazard events.

Severe Weather: Ice and Wind Storms

One of the recurring problems the cooperative faces are ice and wind storms that often disrupt service. Areas of concern include older power lines that have long spans between poles and which have the tendency to sag when ice accumulates on the lines. When the ice melts, the lines snap up quickly, wrapping themselves around other lines and causing a power outage. Wind storms also have the capacity to knock down power lines, causing further power outages. The areas more susceptible to ice and wind storms are hilltops where ice tends to accumulate. A winter storm that lasted from December

2003 to January 2004 caused \$33,769 in damage to lines, however the Cooperative was able to obtain \$172,877 in mitigation funding to put the lines that were damaged underground.

Wildfire

Conversations with the Harney Electric Cooperative indicate that wildfire also poses a significant threat to the Electric Cooperative's power lines. Many of the older wooden power poles are highly vulnerable to wildfire because they are dry timber that burns very easily. Should a wildfire pass through an area with wooden power poles, then the Electric Cooperative can sustain significant damage. A wildfire that passed through Fields in August 2006 caused approximately \$150,000 in damage. In the 1980s fires caused approximately \$50,000 in damage. The Electric Cooperative has mitigated for wildfires by putting some of the lines underground.

Flood

Flooding also remains a significant natural hazard that has damaged power lines owned by the cooperative. A flood in 1987 caused approximately \$600,000 in damages. To mitigate against flood hazards, the Electric Cooperative has reinforced the base of powerlines to prevent future damage to them.

Mission, Goals, and Action Items

The mission and goals for the Harney Electric Cooperative Addendum are the same as the mission and goals written in the Harney County Natural Hazard Mitigation Plan. The mission for the Plan and the Electric Cooperative addendum is the following:

- To develop a disaster-resilient Harney County

The goals are the following:

- Save lives and reduce injuries.
- Minimize and prevent damage to public and private buildings and infrastructure.
- Increase cooperation and coordination among local, state, and federal agencies.
- Reduce economic loss.
- Protect natural resources.
- Protect cultural resources.

The Electric Cooperative wrote the following two action items to be included in the mitigation plan. These actions are also included in Section 3 of the Harney County Natural Hazard Mitigation Plan.

Severe Weather Action # 1

Proposed Action Item:		Alignment with Plan Goals:	
Replace primary electrical overhead lines to mountaintop communication services with underground lines.		<ul style="list-style-type: none"> • <i>Minimize and prevent damage to public and private buildings and infrastructure.</i> • <i>Reduce economic loss.</i> 	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • 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. Most of the services at the top are communication sites. The communication sites are used by ODOT, State Police, county sheriff, emergency services, telephone utilities and cell phone companies. During a disaster the sites are vital for communication. During winter storm access to the line by the utility is difficult and this difficulty delays the time for restoration of power to the services. The utility company has experienced costs each year to repair and maintain the lines. Changing the lines to underground would remove the risk of damage from wind and winter storm. • The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards, with an emphasis on new and existing buildings and infrastructure.[201.6(c)(3)(ii)] Replacing primary electrical overhead lines to mountaintop communication services with underground lines will reduce the impact of severe weather on power lines, and will continue power service to rural customers as well as ODOT, State Police, county sheriff, emergency services, telephone utilities, and cell phone companies. • The two incorporated cities in Harney County –Burns and Hines- rely on the county for certain services and public facilities. Because the cities rely on the County for services, this action is considered to be a multi-jurisdictional action since it benefits both the County and all the participating cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • The utility company would be responsible to identify all the mountaintops and apply for grants to put the lines underground. 			
Coordinating Organization:		Harney Electric Cooperative, Inc.	
Internal Partners:		External Partners:	
Oregon Trail Electric Cooperative		Companies which are served by the utility and the utility company, Malheur County, Lake County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	n/a	
	3-4 years		
Form Submitted by:		Fred Flippence	

Severe Weather Action # 2

Proposed Action Item:		Alignment with Plan Goals:	
Shorten spans and anchor poles on utility lines in high wind or heavy icing areas.		<ul style="list-style-type: none"> • <i>Minimize and prevent damage to public and private buildings and infrastructure.</i> 	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • High wind storms or winter icing storms can cause damage to long spans between power poles and create power outages during storms. If poles are inserted between spans this reduces the risk of outages. Also by anchoring certain poles this can reduce the amount of line which would go down in a storm. Both items reduce the cost of repair and replacement. • Winter storms have a significant impact on the Harney County Electric Cooperative, causing power outages when ice forms on the power lines. This is especially a problem with older power lines constructed in the 1950s that have a larger line span between poles. Placing intermediary poles between these spans cuts the span in half and reduces the likelihood of a power line breaking. • The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards, with an emphasis on new and existing buildings and infrastructure.[201.6(c)(3)(ii)] Shortening the spans between long lines and anchoring poles will reduce the likelihood of lines breaking during wind and winter icing storms. • The two incorporated cities in Harney County –Burns and Hines- rely on the county for certain services and public facilities. Because the cities rely on the County for services, this action is considered to be a multi-jurisdictional action since it benefits both the County and all the participating cities. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • The utility company would be responsible to identify high wind and icing areas from previous outages and apply for grants to strengthen the areas by pole inserts and anchoring. 			
Coordinating Organization:		Harney Electric Cooperative, Inc.	
Internal Partners:		External Partners:	
Oregon Trail Electric		Malheur County, Lake County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	N/A	
	<u>2-4 years</u>		
Form Submitted by:		Fred Flippence	

Appendix H: Hazard Analysis Score Methodology

The following appendix includes Oregon Emergency Management's methodology for completing County level Hazard Analysis Scores.

Oregon Emergency Management (OEM) HAZARD ANALYSIS METHODOLOGY

Table of Contents

Background and Overview	page 1
Possible Hazards to Consider	page 2
Completing the Hazard Analysis Matrix	page 3
Completing the Narrative	page 4
Other Methodologies	page 4
Hazard Analysis Matrix Worksheet	page 5
(This blank form is for your team to complete.)	
Sample Hazard Analysis Matrix	page 6
Sample Narrative	page 7

BACKGROUND AND OVERVIEW

This hazard analysis methodology was first developed by FEMA circa 1983, and gradually refined by OEM over the years. During 1984, the predecessor agency to OEM (Emergency Management Division) conducted workshops around the State of Oregon that resulted in all of Oregon's 36 counties producing an analysis using this methodology. Since then, several cities have also conducted an analysis using this method.

The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible), one order of magnitude from lowest to highest. Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

For local governments, conducting the hazard analysis described in this document is a useful early step in planning for hazard mitigation, response, and recovery. This method provides the jurisdiction with a sense of hazard priorities, or relative risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest.

Among other things, this hazard analysis can:

- ▶ help establish priorities for planning, capability development, and hazard mitigation;
- ▶ serve as a tool in the identification of hazard mitigation measures;
- ▶ be one tool in conducting a hazard-based needs analysis;
- ▶ serve to educate the public and public officials about hazards and vulnerabilities; and
- ▶ help communities make objective judgments about acceptable risk.

For OEM and other state and regional organizations, this analysis allows comparison of the same hazard across various local jurisdictions; for example, the score for the flood hazard in each county in a four-county region. The best place to view and think about the hazard analysis in this way is at the following website:

http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsviewer_content.html

Each local hazard analysis produced using this methodology is ultimately comprised of two main pieces: a hazard analysis matrix (table) and a narrative. A sample matrix is on page 6; sample narrative is provided on pages 7 and 8.

In connection with Emergency Management Performance Grant funding administered by OEM, there is a requirement that hazard analyses must be current and updated within the past ten years, and include a written synopsis (narrative) of the most credible events possible to occur within a jurisdiction. Having a current local hazard analysis is also one element in meeting Oregon Progress Board Benchmark #67, "Emergency Preparedness."

OEM is in the process of integrating this analysis with the three-phase risk assessment used in guidance and taught by the Oregon Natural Hazards Workgroup (ONHW) with respect to the development of local natural hazards mitigation plans.

POSSIBLE HAZARDS TO CONSIDER

NATURAL HAZARDS

Most jurisdictions should examine (score) earthquakes, fires (especially wildland-urban interface or "WUI" fires), floods, landslides and debris flows, snow/ice/extreme cold, and windstorms.

Where it applies, jurisdictions should also develop scores for coastal erosion, drought, tsunamis, and also possibly dust storms, El Niño – La Niña, tornadoes, and volcanic hazards.

With respect to volcanic hazards, score direct hazards such as blast and lahar separately from secondary hazards such as ashfall.¹

Please do not create a "catchall" category for "severe weather," but rather score floods, windstorms, and snow/ice/extreme cold separately. Even the term "winter storm," though used frequently around the state, means different things in different places. For example, a winter storm on the South Coast is typically very different from a winter storm in the Columbia River Gorge.

TECHNOLOGICAL/PERSON-CAUSED HAZARDS

Jurisdictions should develop scores for the dam failure hazard and hazardous materials. You may score fixed site and transportation hazards separately; some jurisdictions score radiological hazards separately.

Though not required as part of this analysis, at your option, you may want to score riots and acts terrorism.

¹ Examples from the past that demonstrate the need to do this include:

- ▶ Clatsop Co. scored volcanic hazards at 159, but this score reflects the hazard posed by ashfall only.
- ▶ Clackamas Co. reported only 131, but is clearly at much greater risk to volcanic hazards than Clatsop Co.
- ▶ Lincoln Co. scored 114, but is concerned about underwater volcanoes.

COMPLETING THE HAZARD ANALYSIS MATRIX

The Hazard Analysis Matrix Worksheet on page 5 is provided for you and your team to complete. You would probably benefit by transferring this worksheet onto a large format, such as a flipchart, dry erase board, etc., to assist in facilitating your meeting.

In this analysis, *severity ratings* are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario), and probability based as follows:

- LOW = choose the most appropriate number between 1 to 3 points
- MEDIUM = choose the most appropriate number between 4 to 7 points
- HIGH = choose the most appropriate number between 8 to 10 points

Weight factors also apply to each of the four categories as shown below.

HISTORY (weight factor for category = 2)

History is the record of previous occurrences. Events to include in assessing history of a hazard in your jurisdiction are events for which the following types of activities were required:

- < The EOC or alternate EOC was activated;
- < Three or more EOP functions were implemented, e.g., alert & warning, evacuation, shelter, etc.;
- < An extraordinary multi-jurisdictional response was required; and/or
- < A "Local Emergency" was declared.

LOW – score at 1 to 3 points based on...	0 - 1 event past 100 years
MEDIUM – score at 4 to 7 points based on...	2 - 3 events past 100 years
HIGH – score at 8 to 10 points based on...	4 + events past 100 years

VULNERABILITY (weight factor for category = 5)

Vulnerability is the percentage of population and property likely to be affected under an "average" occurrence of the hazard.

LOW – score at 1 to 3 points based on...	< 1% affected
MEDIUM – score at 4 to 7 points based on...	1 - 10% affected
HIGH – score at 8 to 10 points based on...	> 10% affected

MAXIMUM THREAT (weight factor for category = 10)

Maximum threat is the highest percentage of population and property that could be impacted under a worst-case scenario.

LOW – score at 1 to 3 points based on...	< 5% affected
MEDIUM – score at 4 to 7 points based on...	5 - 25% affected
HIGH – score at 8 to 10 points based on...	> 25% affected

PROBABILITY (weight factor for category = 7)

Probability is the likelihood of future occurrence within a specified period of time.

LOW – score at 1 to 3 points based on...	one incident likely within 75 to 100 years
MEDIUM – score at 4 to 7 points based on...	one incident likely within 35 to 75 years

HIGH – score at 8 to 10 points based on...

one incident likely within 10 to 35 years

By multiplying the *weight factors* associated with the categories by the *severity ratings*, we can arrive at a subscore for history, vulnerability, maximum threat, and probability for each hazard. Adding the subscores will produce a total score for each hazard.

For example, look at "landslide" on the "Sample Hazard Analysis Matrix" shown on page 6. The history of landslides is high in the sample jurisdiction. History has a weight factor of two (2), and in this case, high is scored with ten (10) points for the severity rating. $2 \times 10 =$ subscore of 20. The vulnerability of the sample jurisdiction is medium. However, a landslide normally would not affect much more than 1% of the people and property in the jurisdiction. Vulnerability has a factor weight of five (5) and this team decided on four (4) points for the severity rating. $5 \times 4 =$ subscore of 20. After figuring maximum threat and probability, the total score for landslides is 133.

The total score isn't as important as how it compares with the total scores for other hazards the jurisdiction faces. By comparing scores, the jurisdiction can determine priorities: Which hazards should the jurisdiction be most concerned about? Which ones less so?

COMPLETING THE NARRATIVE

Your hazard analysis should begin with a description of the local jurisdiction (sometimes called a community profile). These often include an overview of key demographic information, and sometimes include climate data or a climate summary.

In addition to the matrix used to score the hazards, each local hazard analysis should include a narrative that describes how these hazards affect that particular local jurisdiction, especially critical facilities, key infrastructure, and the most important facilities of the jurisdiction's economic base.

One should provide this narrative minimally on those hazards receiving the highest total scores in the jurisdiction; for example, you may include history, areas of vulnerability, areas of planned or current mitigation measures, maps and displays, or any other facts or data that may be relevant.

Some jurisdictions include a brief section on hazards that were considered, but not scored (or scored, but not included in the written hazard analysis), offering the rationale for not scoring or not writing narrative about certain minor hazards.

See pages 7 and 8 for sample narrative.

OTHER METHODOLOGIES

There are many other ways of assessing risk. The OEM Hazard Analysis Methodology should be considered simply one tool in the risk assessment "tool bag." This methodology, in fact, is a "big picture" tool that will often lead to more detailed vulnerability assessments and risk analyses. Among the other prominent tools are various Geographic Information Systems (GIS), FEMA's Hazards U.S. (HAZUS), and Oregon Department of Forestry's (wildfire) "Communities at Risk Assessment." This is only a partial list of the many ways of evaluating risk.

The OEM Hazard Analysis Methodology can and should be one tool used in the development or revision of risk assessments required as part of the local natural hazard mitigation planning process under 44 CFR 201.6(c)(2), which have as their bottom line using best available data.

More information on this topic can be found in the *Oregon Pre-Disaster Mitigation Program*

HAZARD ANALYSIS MATRIX WORKSHEET

JURISDICTION:

Hazards		History WF = 2	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	
	WF X SR	2 X ____	5 X ____	10 X ____	7 X ____	
	Subscore	=	=	=	=	

DATE: _____
factor

WF = weight

SR = severity rating

PREPARED BY:

² http://csc.uoregon.edu/PDR_website/resources/print/pdm/ppt_pdf/2004/fall_2004/PDM04_Final_Manual_09-16-04.pdf

AGENCY:

SAMPLE HAZARD ANALYSIS MATRIX

Hazards		History WF = 2	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score
FLOOD	WF X SR Subscore	2 X 10 = 20	5 X 9 = 45	10 X 7 = 70	7 X 10 = 70	205
WILDFIRE	WF X SR Subscore	2 X 10 = 20	5 X 8 = 40	10 X 5 = 50	7 X 10 = 70	180
EARTHQUAKE	WF X SR Subscore	2 X 2 = 4	5 X 10 = 50	10 X 10 = 100	7 X 3 = 21	175
WINDSTORM	WF X SR Subscore	2 X 8 = 16	5 X 6 = 30	10 X 6 = 60	7 X 8 = 56	162
HAZMAT	WF X SR Subscore	2 X 7 = 14	5 X 5 = 25	10 X 6 = 60	7 X 6 = 42	141
LANDSLIDE	WF X SR Subscore	2 X 10 = 20	5 X 4 = 20	10 X 3 = 30	7 X 9 = 63	133
DAM FAILURE	WF X SR Subscore	2 X 1 = 2	5 X 5 = 25	10 X 2 = 20	7 X 2 = 14	61

SEVERITY RATINGS (to be applied to the four categories)

LOW = 1 - 3 points
 MEDIUM = 4 - 7 points
 HIGH = 8 - 10 points

WF = weight factor
SR = severity rating

The following categories are used in developing the scores for this analysis:

HISTORY (record of previous occurrences)

LOW 0 - 1 event per 100 years
 MEDIUM 2 - 3 events per 100 years
 HIGH 4 + events per 100 years

VULNERABILITY (percentage of population and property likely to be affected)

LOW < 1% affected
 MEDIUM 1 - 10% affected
 HIGH > 10% affected

MAX. THREAT (percentage of population and property that could be impacted under a worst-case scenario)

LOW < 5% affected
 MEDIUM 5 - 25% affected
 HIGH > 25% affected

PROBABILITY (the likelihood of occurrence within a specified period of time)

LOW one incident likely within a 75 to 100 year period
 MODERATE one incident likely within a 35 to 75 year period
 HIGH one incident likely within a 10 to 35 year period

SAMPLE NARRATIVE

The following are samples of narrative copied from various hazard analysis documents from around the state. They are in order alphabetically by jurisdiction name (date of analysis).

Benton County (June 2002)

Earthquake (195 points)

An earthquake is the result of tectonic movement within the earth's crust. These changes are manifested as localized ground shaking and/or soil liquefaction. After the initial seismic event, tremors and aftershocks can occur for an extended period of time resulting in additional structural damage to buildings and public facilities. The largest earthquake in Oregon occurred in 1872 in the North Cascades. This earthquake had an estimated magnitude of 7.4 and was followed by many aftershocks. More recently, in 1993, a magnitude 5.7 earthquake caused significant damage to a bridge and numerous unreinforced masonry structures in Clackamas, Marion, and Yamhill counties. There is limited recorded data of earthquake activity in Benton County. However, a major fault line (the Corvallis Fault) runs through the northeast corner of the county near the major concentrations of population. While there has been no recorded activity on the fault, recent seismic events in Scott's Mills (March 1993) and Klamath County (September 1993) seem to indicate an increase in seismic activity in the state. Subduction zone earthquakes must also be considered a threat to Benton County residents. In the Pacific Northwest, oceanic crust is being pushed beneath the North American continent along a major boundary parallel to the coast of Washington and Oregon. This boundary, called the "Cascadia Subduction Zone," lies about 50 miles offshore and extends from the middle of Vancouver Island in British Columbia past Washington and Oregon to Northern California. Geologic evidence shows that the Cascadia Subduction Zone has generated great earthquakes (magnitude 8 or greater), and the most recent was about 300 years ago. If a major earthquake were to occur, there would be no warning and the region-wide impact is likely to be quite severe. Extensive damage to private and public facilities could be expected along with mass casualties and disruption of transportation routes, communications, and public utilities. In addition, an earthquake may cause other hazards such as fires, floods associated with dam failures, and hazardous materials spills.

Clatsop County (December 2002)

Hazardous Materials Incident (215 points – fixed site, 165 points – transportation)

This hazard involves an accidental release or spillage of materials that have a detrimental impact on life, the environment, and/or property. This occurrence may be associated with long-term contamination or toxicity to the affected area. A hazardous material incident is most commonly associated with a transportation accident (highway, rail, or waterway), but an incident may also be associated with a fixed facility. Clatsop County has, in addition to some locations where hazardous materials are manufactured or used, areas where those materials are stored, such as distributor petroleum product tank farms. The seafood processing industry uses large quantities of anhydrous ammonia that could become a hazard in the event of a fire or a seismic event. Cargo ship traffic represents a potential incident of horrific proportions.

Deschutes County (February 2001)

Winter Storm (snow/ice/extreme cold - 205 points)

History: With the Cascade Mountain range bordering the western half of Deschutes County, inclement weather is always a possibility, especially during the winter months. While annual snowstorms rarely pose more than an inconvenience, there are occasionally severe storms, which can cause area-wide power disruptions. In addition, heavy snowfall can curtail transportation not only within the county, but also on routes leading into and out of the county.

Deschutes County often goes through a drought cycle, which can last three to four years, resulting in lower than average snowpacks. Following these, several years of above average precipitation during the winter months usually occurs. Such was the case during the winters of 1995-96 and 1996-97. Numerous large storms passed through the area, and snowfall at higher elevations was significant. Fortunately, existing services were able to cope with weather related problems in lower, more densely populated areas.

Vulnerability: Because of the diverse terrain within the county, it is difficult to estimate the impact on the population. However, if a major storm, with snow levels down to 2000 feet materialized, it is possible that up to 60% of the county's population could be affected. That same type storm could affect up to 50% of the county itself.

Maximum threat: Based on a worst-case scenario, up to 90% of the county's population could experience some difficulty in the form of power outages, inability to drive, etc. Up to 70% of the county itself could be affected.

Probability: There have been a number of major winter storms over the past ten years, and there is no reason to believe that the possibility will decrease in the future. Since weather in Central Oregon can be quite diverse, accurate forecasting and early warning of impending storms remain a high priority.

Josephine County (June 2003)

Wildfire (201 points)

A considerable threat in the county is presented by the large amount of public and private forestland managed by state, federal and private entities. More than half of the county contains woodlands, much of which is used for recreation, agriculture, and timber industries. In addition, the county faces the threat of urban interface fires as communities continue their expansion into the wildland.

Umatilla County (December 2003)

Geographic Description³

Umatilla County is located along the Columbia River in northeastern Oregon. It has an area of 3,231 square miles with a population of 70,548, according to the U.S. Census 2000 nighttime population data. Twelve incorporated cities lie within the county, in which about two-thirds of the total county population resides. Approximately 12% of the county land area is under state or federal ownership. From an elevation of 296 feet at Umatilla, the county rises to an elevation greater than 5,800 feet in the Blue Mountains on its eastern boundary. Umatilla County is bordered by the Columbia River and Walla Walla County, Washington, to the north, Morrow County to the west, Grant County to the south, and Union and Wallowa counties to the east. Umatilla County is bisected by Interstate 84, west to east, and by U.S. Highway 395, north to south, Interstate 82 passes through the county near Umatilla and Hermiston. The Union Pacific Railroad travels east and west the length of the county.

³ This is usually the lead piece of local hazard analyses.