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AGENDA COVER MEMO

AGENDA DATE: September 20, 2006

TO: Board of County Commissioners

DEPARTMENT: Lane County Sheriff's Office, Emergency Management Section

PRESENTED BY: Linda L. Cook

AGENDA TITLE: In the Matter of Adopting a Natural Hazards Mitigation Plan for Lane County.

I. MOTION

MOVE APPROVAL OF THE ORDER ADOPTING A NATURAL HAZARDS MITIGATION PLAN FOR LANE COUNTY

II. DISCUSSION

A. Background

On July 21, 2006, Lane County Emergency Management was notified by Oregon Emergency Management (OEM) that the Federal Emergency Management Agency (FEMA) had pre-approved Lane County's Natural Hazards Mitigation Plan, making it ready for local adoption.

This non-regulatory plan is the culmination of several mitigation planning efforts undertaken by Lane County Emergency Management. The first, in 1996, resulted in a Regional All Hazard Mitigation Master Plan and was a joint effort among Benton, Lincoln, and Linn Counties. The second was the completion of a county-specific hazard assessment, completed in 2003 by Kenneth Goettel and Associates. The third effort took place in 2005 and resulted in the development of a countywide Community Wildfire Protection Plan or CWPP that would serve as the Wildfire Annex of the Lane County Natural Hazards Mitigation Plan. The County contracted with the University of Oregon to update, coalesce and build upon prior planning efforts to create a FEMA-approved Natural Hazards Mitigation Plan for Lane County. To accomplish this, Lane County convened a steering committee to guide the development of the Plan. The steering committee was responsible for making decisions and agreeing upon the final contents of the plan. Members of the steering committee included representatives from the following agencies:

- Lane County Emergency Management
- Lane County Land Management Division
- Oregon Department of Forestry – East Lane and South Cascade Districts
- Lane County Public Works, GIS and Roads Units
- United States Forest Service
- Bureau of Land Management
- Eugene Water and Electric Board
- Springfield Utility Board

More specifically, Lane County's mitigation planning efforts can be broken down into four phases:

Phase One: In 1996, the County partnered with Benton, Lincoln, and Linn Counties to complete a Regional All Hazard Mitigation Master Plan. The counties contracted with a consultant who completed the plan in December 1998. The finished plan identifies and assesses the counties' risk and vulnerability to the following hazards: floods, winter storms, landslides, and the disruption of utility and transportation systems. The plan additionally provides recommended mitigation projects to reduce the counties' risk to each hazard.

Phase Two: Recognizing a need to update the County's risk assessment information specific to Lane County, the County contracted with Kenneth Goettel and Associates in 2003 to complete county-specific hazard assessments for floods, winter storms, landslides, wildland-urban interface fires, earthquakes, volcanic events, utility-transportation disruption, hazardous materials, terrorism, and dam safety.

Phase Three: In fall 2004, the County completed a county-wide, multi-jurisdictional Community Wildfire Protection Planning process. The County contracted with the Community Service Center's Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon to develop a plan. The finalized Community Wildfire Protection Plan recognizes the need for shared responsibility in protecting the county from wildland-urban interface fire, recommends collaborative actions to mitigate the county's risk, and serves as the Wildfire Annex of the Lane County Natural Hazards Mitigation Plan.

Phase Four: In November 2005 a final draft of the Lane County Natural Hazards Mitigation Plan was completed. The final draft of the plan includes action items that Lane County agencies and citizens can implement to reduce risk in the community. Some action items have community-wide application, whereas others can be implemented on a one-by-one basis by residents and business owners. Each action item includes an estimate of the time line for implementation. Short-term action items are activities that the County's agencies may implement with existing resources and authorities within one to two years. Long-term action items may require new or additional resources or authorities, and may take between one and five years (or more) to implement.

It is noted that constraints may apply to some of the action items. These constraints may be a lack of County staff and/or lack of funds.

The Plan was submitted in December 2005 to FEMA for pre-approval (a step required by FEMA prior to local adoption). After receiving and responding to feedback from FEMA, formal pre-approval by FEMA was received in July 2006. Upon local adoption of this Plan, it will be resubmitted to Oregon Emergency Management and FEMA for final approval.

III ATTACHMENT

Draft of the Lane County Natural Hazards Mitigation Plan
Copy of letter from FEMA indicating pre-approval of Plan
Copy of FEMA plan review worksheet

IN THE BOARD OF COUNTY COMMISSIONERS OF LANE COUNTY, OREGON

RESOLUTION & ORDER NO.	)	IN THE MATTER OF ADOPTING A NATURAL HAZARDS MITIGATION PLAN FOR LANE COUNTY

WHEREAS, Lane County recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, Lane County is subject to earthquake/tsunami, floods, wildfires, severe winter storms and other natural hazards that can damage properties, close businesses, disrupt traffic and present a public health and safety hazard; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, Lane County fully participated in the FEMA-prescribed mitigation planning process to prepare this Natural Hazards Mitigation Plan; and

WHEREAS, the Oregon Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the Lane County Natural Hazards Mitigation Plan (dated September 2005) and pre-approved it (dated July 2006) contingent upon this official adoption of the participating governments and entities;

WHEREAS, the Board of County Commissioners has reviewed the draft of Lane County's Natural Hazards Mitigation Plan and found that the Plan reflects the intent of the Disaster Mitigation Act of 2000, NOW THEREFORE BE IT

RESOLVED AND ORDERED that the Board of County Commissioners hereby concurs with and adopts the Lane County Natural Hazards Mitigation Plan attached hereto and incorporated by this reference

BE IT FURTHER RESOLVED AND ORDERED, Lane County Emergency Management will submit this Adoption Resolution to the Oregon Office of Emergency Management and Federal Emergency Management Agency, Region X officials to enable the Plan's final approval.

Adopted this 20th day of September, 2006.

APPROVED AS TO FORM
Date 9/19/06 lane county
OFFICE OF LEGAL COUNSEL

Chair, Lane County Board of Commissioners

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U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

July 20, 2006

Mr. Dennis Sigrist
State of Oregon
Office of Homeland Security
Oregon Emergency Management
P.O. Box 14370
Salem, Oregon 97309-5062

Dear Mr. Sigrist:

As requested, I have completed a pre-adoption review of the **Lane County Natural Hazard Mitigation Plan**. The plan contains the required criteria, excluding the adoption, as outlined in 44 CFR Part 201 for approval by the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA). The plan review worksheet is enclosed.

Please advise Lane County to adopt the plan at their earliest convenience and submit the documentation through your office to FEMA for approval of the plan. Lane County is not eligible for mitigation project grants until the plan is approved by FEMA.

Please contact me at 425.487.4700 with any questions.

Sincerely,

Sharon Loper

Sharon Loper
Hazard Mitigation Plans Manager

Enclosure

SL:gb

			N	S
14	**Multi-jurisdictional Mitigation Strategy** ***Requirement §201.6(c)(3) (iv):*** *For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*			
A.	Does the plan include separate, identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	NA.		

			N	S
15	**Monitoring, Evaluating, and Updating the Plan** ***Requirement §201.6(c)(4)(i):*** *[The plan maintenance process shall include a section describing the] method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*			X
A.	Does the plan describe the **method for monitoring** the plan? (i.e. both staff position responsible for monitoring and the department overseeing the monitoring)	**Section 5: Plan Implementation and Maintenance, See page 5-2.** Lane County Emergency Management and Lane County Land Management Division will oversee the plan's implementation and maintenance.		X
B.	Does the plan describe a **schedule** for monitoring, evaluating, and updating the plan within the five-year cycle?	**Section 5: Table 5-1: Plan Maintenance Meeting Schedule.**		X

			N	S
16	**Implementation Through Existing Programs** *Requirement §201.6(c)(4) (ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate...*			X
A.	Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?	**Section 5: Implementing Through Existing Programs.**		X
B.	Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?	See above comment.		X

LOCAL HAZARD MITIGATION PLAN DETERMINATION — FEMA Region 10

Jurisdiction(s): Lane County, Oregon

Title of Plan: Lane County Natural Hazards Mitigation Plan
Lane County Community Wildfire Protection Plan (CWPP)

Date of Plan: October & June, 2005
Received 12/2005
Received 06-16-2006

Determination: (Check one)

- [ ] **Approved** – Criteria Met & Plan Adopted
- [ ] **Not Approved** – Criteria Met / Plan Not Adopted
- [ ] **Not Approved** – Criteria Not Met / Plan Adopted or Not Adopted

The plan determination was based upon the review of each of the following plan criteria, excluding the shaded criteria, as required in 44 CFR Part 201. For a local plan to receive FEMA approval all plan criteria must receive a Satisfactory (S) rating and the plan must be adopted by the local governing body. The Needs Improvement (N) rating indicates the criteria was not addressed or additional information is needed to met the criteria.

	44 CFR Part 201	N	S
1.	Adoption by the Local Governing Body	*§201.6(c)(5)*	X	
2.	Multi-Jurisdictional Plan Adoption	*§201.6(c)(5)*		
3.	Multi-Jurisdictional Planning Participation	*§201.6(a)(3)*		
4.	Documentation of Planning Process	*§201.6(c)(1)*		X
5.	Identifying Hazards	*§201.6(c)(2)(i)*		X
6.	Profiling Hazard Events	*§201.6(c)(2)(i)*		X
7.	Assessing Vulnerability: Identifying Assets	*§201.6(c)(2)(ii)(A)*		X
8.	Assessing Vulnerability: Estimating Potential Losses	*§201.6(c)(2)(ii)(B)*		
9.	Assessing Vulnerability: Analyzing Development Trends	*§201.6(c)(2)(ii)(c)*		X
10.	Multi-Jurisdictional Risk Assessment	*§201.6(c)(2)(iii)*		
11.	Local Hazard Mitigation Goals	*§201.6(c)(3)(i)*		X
12.	Identification and Analysis of Mitigation Measures	*§201.6(c)(3)(ii)*		X
13.	Implementation of Mitigation Measures	*§201.6(c)(3)(iii)*		X
14.	Multi-Jurisdictional Mitigation Strategy	*§201.6(c)(3)(iv)*		
15.	Monitoring, Evaluating, and Updating the Plan	*§201.6(c)(4)(i)*		X
16.	Implementation through Existing Programs	*§201.6(c)(4)(ii)*		X
17.	Continued Public Involvement	*§201.6(c)(4)(iii)*		X

Comments:

djs/OEM 7/20/2006 (transmitted to Lane Co. on 7/21)

Please refer to the attached Local Hazard Mitigation Plan Review Worksheet for additional information and comments on each criteria.

FEMA Reviewer: Jerry Probst, Mitigation Specialist — **Date:** July 21, 2006

FEMA Mitigation Plans Manager: Sharon Loper — **Date:** July 21, 2006

			NOT MET	MET
1	**Adoption by the Local Governing Body** *Requirement §201.6(c)(5) [The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council)...*		X	
A.	Is the local plan approved by the local governing body of the jurisdiction?	Mitigation Plan will be adopted by the Lane County Board of Commissioners after State and FEMA review and approval. Wildfire Protection Plan adopted by the Lane County Board of Commissioners by Resolution 05-7-12-1, July 12, 2005 as a stand alone document.	X	
B.	Is supporting documentation, such as a resolution, included?	See above comment.	X	

			NOT MET	MET
2	**Multi-jurisdictional Plan Adoption** *Requirement §201.6(c)(5) For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*			
A.	Does the plan indicate the specific jurisdictions represented in the plan?	See Section 1, Introduction, Page 1-2. This is a stand alone plan. Lane County participated with Linn, Lincoln, Benton, Polk, Marion and Yamhill Counties on a regional *All Hazards Mitigation Master Plan* via the Mid/Southern Willamette Valley Region partnership from 1996 to 1998. The plan integrated four phases Input from this plan was used as the template for developing Lane County's HMP.		
B.	For each jurisdiction, has the local governing body approved the plan?	See above comment.		
C.	Are supporting documentations, such as resolutions, included?	See above comment.		

			NOT MET	MET
3	**Multi-jurisdictional Participation** *Requirement §201.6(a)(3) Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process... Statewide plans will not be accepted as multi-jurisdictional plans.*			
A.	Does the plan identify **how** each jurisdiction participated in the plan's development?	NA. See **Section 3.2, Previous Mitigation Planning Activities**, page not numbered. This HMP is a single jurisdiction plan for the county's unincorporated area outside incorporated boundaries. The plan includes rural communities.		

4	**Documentation of the Planning Process** *Requirement §201.6(c)(1): [The plan **must** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*		N	S
A.	Does the plan **provide a narrative description** that explains the plan's development process, including who led the development at the staff level and any external contributors such as contractors?	**Page 1-2, Brief Mitigation History for Lane County.** Excellent summary of the four phase process used to develop the HMP for Lane County. The planning process was created by the Oregon Natural Hazard Workgroup at the University of Oregon via contract with Lane County.		X
B.	Does the plan list who was involved and how they contributed to the planning process? (e.g., participated on plan committee, provided information, reviewed drafts)	A steering committee was formed (see **Page 1-4, Steering Committee Members**) composed of key community stakeholders such as the Lane County Land Management Division, Lane County Emergency Management, Oregon Department of Forestry, Eugene Water and Electric Board.		X
C.	Does the plan indicate how the public was involved?	**Page 5-4 Public Involvement.** Opportunity to comment provided through website availability of plan and feedback mechanism. County utilized public forums on wildfire to also garner public involvement. The county is encouraged to utilize a multi-hazard approach in the future when possible. (djs/OEM)		X

5	**Identifying Hazards** **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...*		N	S
A.	Does the plan include **a description** of the types of **all natural hazards** that affect the jurisdiction? **DESCRIPTION** – explain the characteristics of each hazard (e.g. for flooding hazard, is it coastal, riverine, stormwater) **ALL NATURAL HAZARDS** – all probable hazards. For northwest communities, hazards include flood, earthquake, wind, and fire, and, possibly, tsunami, volcano, winter storms. Human-caused hazards (HAZMAT, Terrorism) may also be identified in the plan, but are not required.	Natural hazards described in the attached **Hazard Annex's** – *Primary Hazards* are **Winter Storms, Wildfire, Earthquakes, Landslide, Flood , And Volcanic Event. Wildfire Protection** is included as a separate stand alone document. *Secondary Hazards* are **Utility Disruption, Dam Safety, and Hazardous Materials.** Difficult to interpret the geographical boundaries of the identified hazards in relation to settlement patterns, roads, and utilities, without maps. For example, **Flood Annex -3**, describes FEMA Flood Insurance Rate Maps showing communities at risk and critical facilities.		X

6	**Profiling Hazard Events**		N	S
	*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.*			X
A.	Does the risk assessment identify the **location** of each hazard being addressed in the plan?	**Hazard Annexes.** Each identified natural hazard has a narrative description of the hazard location. All reference to maps included are not included in this plan making it difficult to interpret communities and infrastructure at risk.		X
B.	Does the risk assessment identify the **extent** of each hazard being addressed in the plan?	**Hazard Annexes.** Each natural hazard section has discussion of the magnitude or severity of historical events. For example, see **Flood Annex-1**.		X
C.	Does the plan provide information on the **previous occurrences** of each natural hazard?	**Hazard Annexes.** For example, see **Flood Annex-1, Historical Floods in Lane County.**		X
D.	Does the plan include the probability of future hazard events?	**Hazard Annexes.** For example, See **Flood Annex-14, Summary of Flood Risk for Lane County.**		X

7	**Assessing Vulnerability: Identifying Assets**		N	S
	*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...*			X
A.	Does the plan include an overall summary description of the jurisdiction's **vulnerability** to the hazards?	**Hazard Annexes.** For example see **Flood Annex-14, Summary of Flood Risk for Lane County** and **Page 7-11, and Winter Storm Annex-10, Probable Impacts of Winter Storms on Lane County.**		X
B.	Does the plan address the **Impacts** of the hazards on the jurisdiction?	**Hazard Annexes.** See above comments.		X
C.	**Recommended:** Does the plan identify the types and numbers of buildings, infrastructure, and critical facilities in hazard areas?	**Hazard Annexes.** For example, see **Flood Annex 10, Estimated Number of buildings in Mapped Floodplains.**		

			N	S
8	**Assessing Vulnerability: Estimating Potential Losses** *Requirement §201.6(c)(2) (ii)(B): [The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate...*		X	
A.	Does the plan estimate potential dollar losses to vulnerable structures?	CRITERIA NOT REQUIRED Flood Annex-11, Estimated building Damages in Mapped Floodplains.	X	

			N	S
9	**Assessing Vulnerability: Analyzing Development Trends** ***Requirement §201.6(c)(2) (ii)(c):*** *[The plan **should** describe vulnerability in terms of providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*			X
A.	Does the plan describe future land use and development trends?	See page 2-7 and 2-8, Community Profile. The *Lane County Rural Comprehensive Plan* directs the majority of future land use within established Urban Growth Boundaries (UBG) or rural communities in order to conserve the dominate forest and farm land use base.		X

			N	S
10	**Multi-Jurisdictional Risk Assessment** ***Requirement §201.6(c)(2) (iii):*** *For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area..*			
A.	Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	NA		

11	**Local Hazard Mitigation Goals**		N	S
	Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include: a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*			X
A.	Does the plan include a description of mitigation **goals**? **GOALS** – usually long-term and represent what the community want to achieve, such as "eliminate flood damage."	See **Page 4-2, Mitigation Plan Goals**. Six main goals are listed with a goal statement.		X

12	**Identification and Analysis of Mitigation Measures**		N	S
	Requirement §201.6(c)(3) (ii): *[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure*			X
A.	Does the plan identify a **comprehensive range** of specific mitigation actions and projects for each hazard?	**Section 4, Lane County Action Plan, Action Plan Matrix.** Comprehensive table showing how the action items relate to the plan goals with timeline and agency responsible for implementation. Each action is followed by a detailed form outlining the rationale, and ideas to implement.		X
B.	Does the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	**Section 4, Lane County Action Plan.** For example, Landslide #3 – consider adoption of hillside development ordinance.		X
C.	Does the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	**Section 4, Lane County Action Plan.** For example, see Flood Mitigation Action #2 - Consult with 20 Lane County Property Owners within repetitive flood loss areas to explore potential mitigation tools currently available.		X

13	**Implementation of Mitigation Measures** ***Requirement: §201.6(c)(3) (iii):*** *[The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization 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.*		N	S
A.	Does the mitigation strategy include how the actions will be **prioritized?**	**Executive Summary, iv. Project prioritization** describes a four step process. **Page 5-6 to 5-8** describes the "Project Prioritization Process" in detail. **Recommend**: On page 5-6, the Disaster Policy Council is identified as meeting on a semi-annual basis to, among other things, "prioritize potential mitigation projects." It would be beneficial to identify their role and the entity that makes final determination, if Council's prioritization is not the final determination, in the Executive Summary's description of the prioritization process.		X
B.	Does the mitigation strategy address how the actions will be **implemented?** (i.e. existing resources and potential future resources)	**Action Plan Matrix described above 12.A.**		X
C.	Does the mitigation strategy address how the actions will be **administered?**	See above		X
D.	Does the priotitization process include an emphasis on the use of **cost-benefit review?**	**Project Prioritization, page IV.** Indicates the project prioritization process will involve a four step process that includes a cost-benefit review. Additionally, Appendix A, Economic Analysis of Natural Hazard Mitigation Projects, provides information to support the county in completing their cost-benefit review process.		X

			N	S
17	**Continued Public Involvement** ***Requirement §201.6(c)(4) (iii):*** *[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.*			X
	A. Does the plan explain how **continued public participation** will be obtained? (e.g., public notices, an on-going mitigation plan committee, annual review meeting with stakeholders).	**Section 5, Page 5-11, Continued Public Involvement.**		X

– END REVIEW CHECKLIST –

Lane County Natural Hazard Mitigation Plan

Draft Report for:

Lane County, OR

125 E. 8th Ave., Eugene, OR 97401

Prepared by:

Oregon Natural Hazards Workgroup

Community Service Center
1209 University of Oregon
Eugene, OR 97403-1209
Email: onhw@uoregon.edu
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October 2005

Special Thanks & Acknowledgements

Project Steering Committee:

Linda Cook – Lane County Emergency Management

Mark McKay – Lane County Emergency Management

Steve Hopkins – Lane County Land Management Division

Keir Miller – Lane County Land Management Division

Cress Bates – Lane County Land Management Division - GIS

Adam Vellutini – Lane County Land Management Division - GIS

John Petsch – Lane County Land Management Division - Roads

Randy Wood – Lane County Fire Defense Board

Karl Morgenstern – Eugene Water and Electric Board

Kevin Kinney – Oregon Department of Transportation

Ron Barber – USDA Forest Service

Community Service Center Staff:

Andre LeDuc, Program Director, Oregon Natural Hazards Workgroup

Krista Mitchell, Project Coordinator, Oregon Natural Hazards Workgroup

Kate Lenzser, Research Assistant, Oregon Natural Hazards Workgroup

Executive Summary

Lane County developed this Natural Hazards Mitigation Plan in an effort to limit future loss of life and property resulting 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 planning, policy changes, programs, projects, and other activities.

The plan provides: (1) a foundation for coordination and collaboration among agencies and the public in the County; (2) identification and prioritization of future mitigation activities; and (3) support in meeting federal planning requirements to qualify for assistance programs. Additionally, the plan recommends 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 implementation of preventive activities such as land use or watershed management programs.

How is the Plan Organized?

The Mitigation Plan contains five main sections, hazard annexes, and resource appendices. The main plan document includes the following sections: Introduction, Community Profile, Risk Assessment Summary, Mitigation Plan Goals and Action Items, and Plan Implementation. It also contains a series of 10 hazard-specific annexes covering the following hazards: Winter and Windstorms; Wildfire; Earthquake; Landslide; Flood; Volcanic Event; Dam Safety; Hazardous Materials; Terrorism; and Utility and Transportation, as well as three resource appendices covering benefit cost analysis; existing plans, policies, and programs; and common acronyms.

Who Participated in Developing the Plan?

This plan is the culmination of several mitigation planning efforts undertaken by Lane County. . The first, in 1996, resulted in a Regional All Hazard Mitigation Master Plan and was a joint effort among Benton, Lincoln, and Linn Counties. The second was the completion of a county-specific hazard assessment, completed in 2003 by Kenneth Goettel and Associates. The third effort took place in 2005 and resulted in the development of a countywide Community Wildfire Protection Plan or CWPP. The County contracted with the Community Service Center's Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon to develop this plan. Building upon these initial efforts, Lane County convened a steering committee to guide the development of the natural hazards mitigation plan. The steering committee was responsible for making decisions and agreeing upon the final contents of the plan. Members of the steering committee included representatives from the following agencies:

- Lane County Emergency Management
- Lane County Land Management Division
- Oregon Department of Forestry – East Lane and South Cascade Districts
- Lane County Public Works, GIS and Roads Units
- United States Forest Service
- Bureau of Land Management
- Eugene Water and Electric Board
- Springfield Utility Board

What are the Plan Goals?

The plan goals help to guide the direction of future activities aimed at reducing risk and preventing losses from natural hazards. The goals listed here serve as the guiding principles for agencies and organizations as they begin implementing action items. Each goal includes a goal statement, which serves to further explain how each of the plan's goals will assist in mitigating the effects of natural hazards within Lane County. The goals of the Lane County Natural Hazard Mitigation Plan are to:

1. Save lives and reduce injuries
2. Minimize and prevent damage to buildings and infrastructure
3. Reduce economic loss
4. Decrease disruption to services
5. Protect natural and cultural resources
6. Increase awareness and understanding of the hazards and risks in Lane County

How are the Action Items Organized?

The plan identifies action items developed through various plan inputs, data collection and research. The action items identified by the plan are intended to move the County towards achieving the plan's goals. Action items address both multi-hazard (MH) and hazard-specific issues.

To facilitate implementation, each action item is described in a worksheet, which includes information on key issues addressed, ideas for implementation, coordinating and partner organizations, timeline, and plan goals addressed.

How Will the Plan be Implemented?

The Lane County Natural Hazards Mitigation Plan was developed and will be implemented through a collaborative process. The Plan will be adopted via resolution by the Lane County Board of Commissioners.

Upon approval by FEMA and local adoption, Lane County will gain eligibility for the Pre-Disaster Mitigation Grant Program, as well as Hazard Mitigation Grant Program and Flood Mitigation Assistance program funds. The effectiveness of Lane County's non-regulatory Natural Hazards Mitigation Plan will be contingent upon implementation of the plan and incorporation of the identified action items into existing Lane County plans, policies, and programs.

Coordinating Body

The Disaster Policy Council will act as the coordinating body and serve as a centralized resource for natural hazard issues and risk reduction in Lane County. Additional roles and responsibilities of the committee include:

- Serving as the local evaluation committee for funding programs such as Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds;
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Documenting successes and lessons learned;
- Evaluating and updating the Natural Hazards Mitigation Plan in accordance with the prescribed maintenance schedule, (See Table 5.1); and
- Developing and coordinating ad hoc and/or standing subcommittees as needed.

Co-Conveners

Lane County Emergency Management and the Lane County Land Management Division will serve as co-conveners to oversee the plan's implementation and maintenance. These two entities will be responsible for calling meetings to order at scheduled times or when issues arise, (e.g., when funding becomes available or following a major natural hazard event).

Emergency Management roles:

- Coordinate Disaster Policy Council meeting dates, times, locations, agendas, and member notification;
- Document outcomes of Committee meetings;
- Serve as a communication conduit between the Disaster Policy Council and key plan stakeholders; and
- Identify emergency management-related funding sources for natural hazard mitigation projects.

Land Management roles:

- Incorporate, maintain, and update Lane County's natural hazards risk GIS data elements; and

- Utilize the Lane County Natural Hazards Risk Assessment as a tool for prioritizing proposed natural hazard risk reduction projects.

Project Prioritization

The Disaster Mitigation Act of 2000 requires that the plan identify a process for prioritizing potential actions. Such actions often come from a variety of sources; therefore, the project prioritization process needs to be flexible. The prioritization process outlined in the plan utilizes a four-step process to help ensure that limited mitigation funding is used in a cost-effective manner. The four steps include:

1. Examining funding requirements;
2. Completing a risk assessment evaluation;
3. Completing quantitative or qualitative assessments and economic analysis; and
4. Providing a recommendation.

Plan Maintenance and Update

The plan includes a schedule and recommended tasks to assist the County in maintaining and updating the plan. The schedule includes annual meetings as well as a five-year update.

Section 1
Introduction

Lane County developed this Natural Hazards Mitigation Plan in an effort to limit future loss of life and property resulting from natural disasters. It is impossible to predict exactly when these disasters might occur, or the extent to which they could 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.

A natural disaster occurs when a natural hazard impacts people or property and creates adverse conditions within a community. Natural hazards include: floods, earthquakes, extreme weather, and wildfire, and each has the potential to harm people or property.[1] This plan focuses on the primary natural hazards that could affect Lane County, Oregon, which include earthquake, flood, landslide, wildfire, windstorm, and winter storm.

Why Update the County's Mitigation Plan?

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. This Natural Hazards Mitigation Plan is intended to assist the County in reducing its risk of damage from natural hazards by identifying resources, information, and strategies for risk reduction. It will also help to guide and coordinate mitigation activities throughout the County.

The plan is non-regulatory in nature, meaning that it does not 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; and (3) support in meeting federal planning requirements to qualify for assistance programs. The mitigation plan works in conjunction with other County plans and programs, including the Comprehensive Land Use Plan, Emergency Response and Recovery Plans, Economic Development Strategic Plan, Capital Improvement 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 implementation of preventive activities such as land use or watershed management programs. The actions described in the plan are intended to be implemented through existing plans and programs within the County.

Brief Mitigation Planning History for Lane County

This plan is not the first effort the County has undertaken toward natural hazard mitigation. Its previous efforts can be categorized into the following four phases:

Phase One: In 1996, the County partnered with Benton, Lincoln, and Linn Counties to complete a Regional All Hazard Mitigation Master Plan. The counties contracted with a consultant who completed the plan in December 1998. The finished plan identifies and assesses the counties' risk and vulnerability to the following hazards: floods, winter storms, landslides, and the disruption of utility and transportation systems. The plan additionally provides recommended mitigation projects to reduce the counties' risk to each hazard.

Phase Two: Recognizing a need to update the County's risk assessment information specific to Lane County, the County contracted with Kenneth Goettel and Associates in 2003 to complete county-specific hazard assessments for floods, winter storms, landslides, wildland-urban interface fires, earthquakes, volcanic events, utility-transportation disruption, hazardous materials, terrorism, and dam safety.

Phase Three: In fall 2004, the County completed a county-wide, multi-jurisdictional Community Wildfire Protection Planning process. The County contracted with the Community Service Center's Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon to develop a plan. The finalized Community Wildfire Protection Plan is a proactive document that recognizes the need for shared responsibility in protecting the county from wildland-urban interface fire, recommends collaborative actions to mitigate the county's risk, and serves as the Wildfire Annex of the Lane County All-Hazards Plan.

Phase Four: The Disaster Mitigation Act of 2000 (DMA 2000) is the latest federal legislation addressing mitigation planning. This legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. The Act established a Pre-Disaster Mitigation program to address this issue. In fall 2004, the ONHW at the University of Oregon partnered with the Department of Geology and Mineral Industries (DOGAMI) and Mid/Southern Willamette Valley Region (Benton, Lane, Linn, Marion, Polk, and Yamhill counties) to develop a Pre-Disaster Mitigation grant proposal for the Mid/Southern Willamette Valley Region. Each county joined the Partners for Disaster Resistance & Resilience (*The Partnership*) by signing (through their county commissions) a Memorandum of Understanding for this project.

The Mid/Southern Willamette Valley Region grant was awarded to support the development of natural hazard mitigation plans for the six counties in the region. The region's planning process utilized a

seven-step procedure and technical resources developed by ONHW and *The Partnership*.

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 planning, policy changes, programs, projects, and other activities. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.[2] The action items in this plan are assigned to a number of these stakeholders, reflecting the diversity of mitigation responsibility.

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.

Who Will the Plan Affect?

Lane County's size and diversity of geography, population, and land management practices mean that the threat of natural hazards is not uniform across the County. The plan identifies general areas at high risk to earthquakes, floods, landslides, winter storms, windstorms and wildfires, and recommends actions the County can take to reduce its risk. The plan affects the County and a portion of its urban service area, and addresses the ways in which the County can mitigate the threat to life, property, and resources caused by the natural hazards present throughout the County. Through risk identification and the recommendation of risk-reduction actions, the plan aligns with the goals of the County's Strategic and Rural Comprehensive Plans, and helps the County meet the requirements of statewide land use planning Goal 7: Areas Subject to Natural Hazards.

While this plan does not establish mandates for the County, it does provide a viable framework for planning for natural hazards. The resources and background information in the plan are applicable countywide, and the goals and recommendations can lay groundwork for the development and implementation of mitigation activities and partnerships.

Policy Framework for Natural Hazards in Oregon

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which was instituted in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with 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 hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, some resources exist at the state and federal levels. 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).

Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funding available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and local communities must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds.

Plan Methodology

Phase four of the Lane County Natural Hazards Mitigation Plan was developed using a planning process created by the Community Service Center's Oregon Natural Hazard Workgroup at the University of Oregon.[3] The planning process was designed to (1) result in a plan that is DMA 2000 compliant, (2) coordinate this plan with the State's plan and activities of the Partners for Disaster Resistance & Resilience: Oregon Showcase State Program, and (3) build a network of jurisdictions and organizations that can play an active role in plan implementation. Following is a summary of major activities included in the planning process.

Steering Committee:

Building upon phases two and three, the steering committee was convened 4 times between July and September 2005 to guide the development of the natural hazard mitigation plan. The committee played a vital role in developing the mission and goals of the mitigation plan and served as the coordinating body to implement and maintain the plan upon adoption and FEMA approval. The committee comprised representatives of public and private agencies and organizations in the County, including:

- Lane County Emergency Management
- Lane County Land Management Division

- Oregon Department of Forestry – East Lane and South Cascade Districts
- Lane County Public Works, GIS and Roads Units
- United States Forest Service
- Bureau of Land Management
- Eugene Water and Electric Board
- Springfield Utility Board

Hazard-specific Information:

The County recognized the importance of establishing a collaborative planning process to develop both short-term and long-term risk reduction strategies with strong ties to the County's existing programs and divisions of governance. Therefore, the County worked with stakeholders, individuals and specialists, with natural hazard mitigation understanding and responsibilities from County departments, state agencies, and community organizations in and around Lane County. These stakeholders were able to provide insight on community issues, policies, and programs related to specific natural hazards and assist in identifying potential future action items.

Planning Resources

The County reviewed natural hazard mitigation plans from other jurisdictions, current FEMA planning requirements, the FEMA Pre-Disaster Mitigation Program requirements, and the National Flood Insurance Program's Community Rating System. Statewide reference materials consisted of community and county mitigation plans, including:

- Regional All Hazards Mitigation Master Plan for Benton, Lane, Lincoln and Linn Counties;
- Douglas County Natural Hazards Mitigation Plan;
- Clackamas County Natural Hazard Mitigation Plan;
- Metro's Regional Hazard Mitigation Policy and Planning Guide;
- Oregon Natural Hazards Workgroup, Plan Framework (ONHW);
- *Planning for Natural Hazards: Oregon Technical Resource Guide* (DLCD);
- *Natural Hazard Mitigation Plans: An Evaluation Process* (OEM)
- State of Oregon Natural Hazards Mitigation Plan (OEM); and
- Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments (OEM)
- Partners for Disaster Resistance & Resilience: Oregon Showcase State Initiative's Community Planning Resources

The County plan builds upon the resources listed above and is based upon the University of Oregon's Oregon Natural Hazards Workgroup, plan framework and seven-step collaborative planning process.

Plan Organization

How is the plan to be used?

Each section of the mitigation plan provides specific information and resources to facilitate understanding of the hazard-specific issues facing Lane County citizens, businesses, and the environment. Combined, the sections work together to form a mitigation plan that guides the plan's mission to research, coordinate and implement risk reduction activities. This plan's structure enables stakeholders to use the section(s) of interest to them.

Mitigation Action Plan

Executive Summary

The executive summary provides an overview of the Lane County Natural Hazard Mitigation Plan.

Section 1: Introduction

The Introduction briefly describes why the plan was updated, what mitigation is, hazard policy framework in the state, and the methodology used to develop the plan. It also includes information about the steering committee's role, and how stakeholders provided input.

Section 2: Community Profile

The Community Profile briefly describes the County in terms of demographic, economic, and development trends as well as geography and environment, housing and transportation.

Section 3: Risk Assessment Summary

This section provides information on the five federal requirements for a risk assessment: hazard identification; profiling hazard events; vulnerability assessment/inventorying assets; risk analysis/estimating potential losses; and assessing vulnerability/analyzing development trends. It also includes summaries of the risk assessments for the primary hazards affecting Lane County.

Section 4: Mitigation Plan Goals, Action Items

This section provides information on the process used to develop the goals and action items in the plan. It also describes the plan's mission, goals and actions, which guide the implementation of mitigation strategies.

Section 5: Plan Maintenance

This section describes the roles, responsibilities and process associated with implementing, maintaining and updating the plan.

Hazard-specific Annexes

Hazard-specific annexes, developed in Phase II of the planning process, provide detailed background information on the hazards known to impact Lane County. Each of these annexes includes information about historical impacts, risk assessments, and specific community issues

related to that particular hazard. . Hazards are organized into two categories: primary and secondary. Primary hazards are naturally occurring events, such as floods and earthquakes; secondary hazards are those that are either man-made or those that might occur as a secondary effect of a natural hazard, such as utility or transportation disruption. The primary hazards addressed in the plan include:

- *Winter Storm*
- *Wildfire*
- *Earthquake*
- *Landslide*
- *Flood*
- *Volcanic Event*

The secondary hazards presented in the plan include:

- *Utility-Transportation Disruption*
- *Dam Safety*
- *Terrorism*
- *Hazardous Materials*

Resource Appendices

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

Economic Analysis of Natural Hazard 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 analyses of proposed mitigation activities.

Existing Plans, Policies, and Programs in Lane County

This appendix provides information on the existing plans, policies, and programs within Lane County, and describes how mitigation can be linked to existing efforts.

List of Acronyms

This appendix provides a list of acronyms for county, regional, state and federal agencies, organizations and programs that may be referred to within the Lane County Natural Hazards Mitigation Plan.

Section Endnotes

[1] Federal Emergency Management Agency. 2002. *How-To Guide #2: Understanding Your Community's Risks; Identifying Hazards; and Determining Risks.*

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

[3] More information on the Oregon Natural Hazards Workgroup can be found at http://darkwing.uoregon.edu/~onhw

Section 2
Community Profile

Why Plan for Natural Hazards in Lane County?

In 2000, Congress passed and the President signed the Disaster Mitigation Act of 2000, commonly known as DMA 2000. Under DMA 2000 and rules published in 44 CFR Part 201.6, communities, states, and tribal governments needed to have FEMA-approved natural hazard mitigation plans by November 1, 2004 to be eligible for certain federal assistance programs such as the Hazard Mitigation Grant Program (HMGP).[1]

Lane County's varied landscape ranges from the coast to the Cascades, and natural hazards such as coastal erosion, wildfire, and flooding pose a threat to the county's economy, built environment, and residents. As noted in the following section, heavy winter rainstorms and windstorms, along with occasional severe winter storms, have caused major problems in Lane County in recent history. The County's location near a major earthquake subduction zone places it in danger of experiencing significant earthquake damage, and its proximity to the Cascade mountain range raises the threat of volcanic eruption. Planning for the occurrence of such hazards helps strengthen vital components of the county's infrastructure and minimize the risk and incidence of personal injuries, fatalities, and property damage.

History of Natural Hazards in Lane County

Lane County is vulnerable to a number of different hazards, including flooding, winter and windstorms, earthquakes, wildfire, landslides, and volcanic eruptions. The following provides a brief history of the impact of these hazards in Lane County.

Flooding is a chronic hazard in Lane County. Significant flooding events impacted the County in 1861, 1890, 1945, 1956, 1964, and 1996. During the 1996 flood event, rising waters in the McKenzie River forced the evacuation of about 1,200 to 1,500 people in low-lying areas of Springfield. In the Springfield/ Thurston area along the McKenzie River, about 35-40 homes, approximately 20 private roads and bridges and 20 vehicles were damaged. A secondary effect of the 1996 flood event was flood-induced landslides. State geologists identified 75 individual landslide events in Mapleton and 51 in Vida.

There have been 14 major winter and windstorms in Lane County in the last 125 years; the most recent event was in 2002.

Over the past 30 years, Lane County has averaged 75 fires, burning 331 acres, per year. While Lane County has not had any significant wildfires in recent history, the conditions necessary to fuel an intense wildfire do exist within the County. On the right day, under the right conditions, Lane County could be a prime candidate for a major wildfire, severely impacting people and property.

No earthquakes in recent history have been centered in Lane County, but the County has felt the impacts of several historical quakes in the area including: the 1993 Scotts Mills and Klamath Falls events as well as the 2001 Seattle quake.

The Eugene/Springfield Metro Area is approximately 50 miles from the nearest volcano (Three Sisters). This distance is great enough that the Eugene/Springfield Metro Area is extremely unlikely to have major impacts from eruptions of any nearby volcanoes.

Geography and Climate

Lane County covers about 4,620 square miles, from the Pacific Coast to the crest of the Cascades. Its size and diverse geography, topography, climate, and other natural attributes such as vegetation, are important factors to consider in planning for natural and manmade hazards.

For the purposes of hazard mitigation planning, Lane County is divided into five main physiographic regions, based on classifications by the National Weather Service:

- The Coast Region, in western Lane County, is characterized by sand dunes and bluffs. This region is the only portion of Lane County subject to coastal hazards such as storm surge flooding and tsunamis. Every winter the Coast Region is exposed to high-speed windstorms that cause significant damage to buildings and infrastructure.
- The Coast Range, in the western portion of Lane County, has a relatively low population, is a heavily forested mountainous area, and is characterized by heavy rainfall, making it susceptible to flooding and landslides.
- The Willamette Valley, in central Lane County, is the most heavily populated area and is characterized by flat or gently rolling topography where the Willamette and McKenzie rivers meet. This area is subject to floods, windstorms and occasional snow/ice storms.
- The Cascade Foothills include the lower elevation portions of the western slopes of the Cascades. This region is generally heavily forested and, in places, is moderately populated. Wildfires and severe winter storms are the most common natural hazards in this area.

- The Cascade Range, in eastern Lane County, is sparsely populated and is characterized by heavily forested slopes, with elevations up to or exceeding 10,000 feet. This includes the western slopes of the Three Sisters Peaks. Moderately heavy rainfalls and extreme winter conditions with heavy snowfalls characterize this area.

The climate in central Lane County is moderate. Mean daily temperatures range from highs of about 82 degrees and lows of about 51 degrees in July and August, to highs of about 46 degrees and lows of about 34- 35 degrees in December and January.[2] The climate for coastal Lane County is moderated by the Pacific Ocean. Summer temperatures are lower than in central Lane County, while winter temperatures are higher. For example, in Florence (data gathered at Honeyman State Park), mean daily temperatures range from highs of about 70 degrees and lows of about 50 degrees in July, August and September, to highs of about 50 degrees and lows of about 38 degrees in December and January.

The average annual rainfall in central Lane County is about 46 inches. Average monthly precipitation varies from about 7 to 8 inches in November through January, to about 0.4 inch in July. Average annual snowfall is only about 6.0 inches. The Coastal and Cascade Ranges receive more than 100 inches of precipitation annually, much of which is in the form of snow during the winter months.[3]

Population and Demographics

The first European settlers in the area arrived in Eugene and Springfield in 1846 and 1849, respectively, and the two were incorporated as cities in 1862 and 1885. Lane County is now the fourth most populous county in Oregon, with a population of 322,959.[4] In 2004, the population was about 4% higher than in 2000, or about 335,000.

Since 1950, the total population of Lane County has increased approximately 157% as shown in Table 2.1 below.

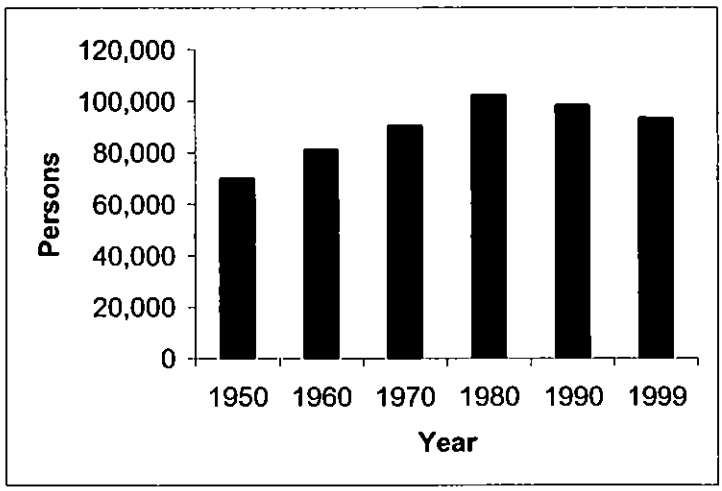
Table 2.1: Population Growth, Lane County, 1950-2000

Census	Population	Percent Change
1950	125,776	--
1960	162,890	29.5%
1970	215,401	32.2%
1980	275,226	27.8%
1990	282,912	2.8%
2000	322,959	14.2%

Source: 2000 US Census

Figure 2.1 shows that the unincorporated rural portions of Lane County have grown much more slowly than the county as a whole, with the population increasing by only about 30% between 1950 and 2000.

Figure 2.1: Rural Population Trends



Sources: US Census Bureau and Portland State University Center for Population Research and Census.

In 2000, 69% of Lane County residents were living in incorporated areas, while 31% lived in unincorporated areas.

For emergency planning purposes, children, the elderly,, the disabled, people living in poverty, and people whose primary language is not English are considered special needs populations. This is because these populations in the community struggle disproportionately in their ability to respond to a disaster. Lane County has a substantial number of residents in all of these special needs categories. Almost 8% of the population speaks a language other than English. Other special needs populations are represented in tables 2.2 – 2.4.

Table 2.2: Population by Age, Lane County, 2000

Age Distribution	Percent of Population
Under 5 years	5.8%
Under 18 years	22.9%
18 years and older	77.1%
65 years and older	13.3%

Source: 2000 US Census

Table 2.3: Disabled Population, Lane County, 2000

Disabled Residents by Age	Number	Percent of Population
5 to 20 years with a disability	5,973	8.3%
21 to 64 years with a disability	33,657	17.9%
65 years and over with a disability	17,952	42.7%

Source: 2000 US Census

Table 2.4: Poverty Rates by Age, Lane County, 2000

Poverty Rate by Age	Number	Percent
All Ages	45423	14.4
Under 5	3741	1.2
5 years	760	0.2
6 to 11 years	4067	1.3
12 to 17 years	3524	1.1
18 to 64 years	30182	9.6
65 to 74 years	1300	0.4
75 years and over	1849	0.6

Source: 2000 US Census

Employment and Economics

The economy of Lane County is largely agrarian in origin; wheat was the first commercial crop. Industrialization began in the 1850s, with the construction of the millrace in Eugene to provide water power for flour mills, lumber mills, and, later, for woolen mills. The Willamette River was the major transportation artery for the region. In the 1870s, development accelerated when the railroad from California reached Eugene. Through the mid-20th century, the lumber industry was a very important segment of the local economy. However, by the 1990s, the lumber industry had declined in importance, and economic growth moved to new sectors, including high-tech.

Education has been a major segment of the regional economy since the founding of the University of Oregon in 1872. Over the next century, the addition of several private colleges and Lane Community College increased the contribution of the education sector to Lane County's economy. The distribution of current employment is displayed in Table 2.5.

Table 2.5: Employment by Industry, Lane County, 2000

Industry	Percent
Education, health and social services	22.1%
Manufacturing	14.3%
Retail trade	13.7%
Professional, scientific, management, administrative, and waste management services	8.7%
Arts, entertainment, recreation, accommodation, and food services	8.0%
Construction	6.5%
Other services (except public administration)	5.5%
Finance, insurance, real estate, and rental	5.2%
Transportation and warehousing and utilities	4.2%
Wholesale trade	3.7%
Public administration	3.3%
Information	2.5%
Agriculture, forestry, fishing, hunting, and mining	2.3%

Source: 2000 US Census

Median household income can be used as an indicator of the strength of the region's economic stability. In Lane County, the median household income was $36,942 in 1999, somewhat below the national median income of $41,994. Although it can be used to compare economic areas as a whole, this figure does not reflect how income is divided among area residents.

Housing in Lane County

Housing development types and year-built dates are important factors in mitigation planning. Certain housing types tend to be less disaster-resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. In addition, generally the older the home is, the greater the risk of damage from natural disaster. This is because stricter building codes have been developed based on improved scientific understanding of plate tectonics and earthquake risk. For example, 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 one foot above Base Flood Elevation. Housing characteristics for Lane County are provided in the tables below.

Table 2.6: Housing Type, Lane County, 2000

Housing Type	Percent
Single-Family	61%
Multi-Family	27%
Mobile Homes	11%
Boat, RV, Van, etc.	Less than 1%

Source: 2000 US Census

Table 2.7: Housing Age Structure, Lane County, 2000

Year Built	Percent
Pre-1939–1959	28%
1960–1979	43%
1980–2000	29%

Source: 2000 US Census

Twenty-eight percent of homes in Lane County were built before recommendations for seismic design were even included as a mandatory design requirement in the Uniform Building Code. More than 71% of homes were built prior to 1984, when Lane County adopted a floodplain management ordinance that minimizes flood risk.

Land and Development

Development in Lane County radiates outward from the Eugene/Springfield Metropolitan Area, with the most heavily developed rural areas in the Willamette Valley, directly surrounding the metro area. A similar development pattern is evident near the City of Florence, with development extending along the coast and up the Siuslaw River. From these large urban areas, rural development follows a fairly distinct pattern along rivers and lakes and along Highway 101, following the coastline.

Most of the rural population of Lane County is clustered in rural communities. For the most part, these communities are settlements of long historical standing; several were founded more than 100 years ago. Many were developed to support the timber industry or as agricultural centers and therefore grew along major county roads and state highways, often following the river valleys. Thus, many of the rural communities in Lane County have significant portions of their developed areas within or near floodplains.

Other rural communities in Lane County, especially those located outside of the Willamette Valley, are located in or near heavily forested areas. Consequently, many rural communities are at significant risk for wildland or wildland-urban interface fires. By contrast, a relatively small fraction of rural development is in areas with high landslide potential because many of these areas are steep-sloped forestlands, where development is limited.

Portions of some rural communities are, however, within hazard zones for landslides or debris flows.

Local and state policies currently direct growth away from rural lands into Urban Growth Boundaries and, to a lesser extent, into rural communities. The *Lane County Rural Comprehensive Plan* policy calls for the vast majority of the land outside UGBs to continue to be used for farm and forest practices and directs future rural residents primarily to rural communities.

The policy further provides that future development outside existing developed or committed areas be an approved exception to Statewide Planning Goals or otherwise meet Statewide Planning Goal requirements. In accordance with this policy, Lane County may allow conversion of rural lands to non-resource use when it is shown that the lands do not meet state and local criteria for farm and forest designation.

There are about 29,500 addresses in rural Lane County (outside UGBs). More than 90% of these (about 28,000) are in residential use. An additional 1,000 addresses are in commercial/industrial use or categories including religious, educational, utilities, government, and recreation. The remaining 500 are in forest, farm, or parks land use. Potential new residential development in rural Lane County is expected to remain slow. Currently, there are only about 1,500 vacant tax lots designated as residential that are considered buildable and could potentially be developed in the future.

Another 1,136 tax lots are zoned for commercial or industrial use in rural Lane County. Of these, 730 are considered developed (assessed value equal to or greater than $50,000) and about 400 lots are either not developed or underdeveloped. These 400 lots represent the maximum number that could potentially be developed in the future.

Over the next 50 years, emerging telecommunications services may affect the rural economy, enhancing the capacity of residents in rural areas to access information and deliver services from remote locations. Pressure for rural development may come from people seeking a rural lifestyle, especially workers in the information economy, with remote service capacity, and retirees who do not have the need to commute..

If development follows historical trends, urban areas will expand their UGBs, rural unincorporated communities will continue to grow, and overall rural residential density will increase only slightly, with the bulk of rural lands kept in farm and forest use. The existing pattern of development in rural areas, radiating out

from the urban areas along rivers and streams, is likely to continue. Most of the easily developed land is already developed, leaving more constrained land, such as land in the floodplains or on steep slopes, to be developed in the future. Such development on constrained land could potentially increase the rate at which development occurs in natural hazard areas.

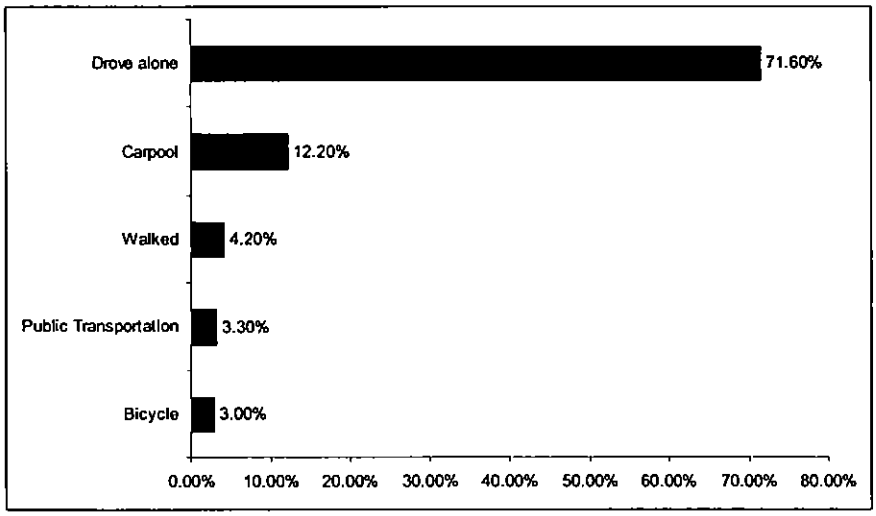
The County does evaluate emergency access when considering development. For the most part (with few exceptions), developers are required to build dwellings near the roadway, partly to provide easier access for emergency vehicles. Larger development proposals must include a storm water management plan for storm water discharge, and development is not allowed to alter an existing waterway. In conformance with National Flood Insurance Program regulations, the County requires that new development in mapped floodplains be at least one foot above the base flood elevation, to reduce the risk of flood damage.

Transportation and Commuting Patterns

The major arterials in Lane County include Interstate 5 and Highway 99, which run North/South through the Willamette Valley; Highway 126, which runs East/West from the Cascades to the Coast; and Highway 101, the Coastal Highway. Numerous state and county roads also crisscross the County. Localized flooding, landslides, and severe winter storm events have historically been sources of disruption to the transportation system in Lane County.

Growth in Lane County will put pressure on both major and minor roads, especially if the main mode of travel is by single occupancy vehicles. How people travel to work is an indicator of the prevalence of single occupancy vehicle travel and thus the amount of traffic congestion and the potential for accidents. Traffic is an important consideration when planning for emergency service provision. Figure 2.2 demonstrates that single occupancy vehicle travel is, by far, the most utilized mode of transit for Lane County residents.

Figure 2.2: Residents Mode of Travel to Work, Lane County, 2000



Source: 2000 US Census

Bridges warrant special attention in mitigating the impact of hazards on the transportation system. Most bridges are not seismically retrofitted, creating a significant risk for the commuting population, particularly in an area that may be at risk for earthquakes. Incapacitated bridges can disrupt traffic and exacerbate economic losses because of the inability of industries to transport services and products to clients. The bridges in the region, counted in Table 2.8, are part of the state and interstate highway and maintained by the Oregon Department of Transportation.

Table 2.8: Bridge Ownership, Lane County, 2004

Bridge Ownership	Number
State Highway Agency	404
County Highway Agency	432
City/Municipal Highway Agency	65
Historical Covered Bridges	19
Total	920

Critical Facilities and Infrastructure

Critical facilities are those that support government and first responders' ability to take action in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Individual communities in Lane County should inventory their critical facilities to include locally designated shelters and other essential assets, such as fire stations, and water and waste treatment facilities. Aggregate numbers of the most basic types of critical facilities in Lane County are based on county profiles developed for

the State of Oregon Natural Hazard Plan and are provided in Table 2.9.

Table 2.9: Critical Facilities and Infrastructure, Lane County, 2004

Critical Faclity Types	Number
Hospitals	
Number of Facilities	5
Number of Beds	671
Police Stations	10
Fire & Rescue Stations	19
School Districts & Colleges	9*
Power Plants	2-552 MW
Dams	
Number of Dams	34
Threat Potential	9 high threat

*7 districts, 1 community college, 1 state university

Dam failures are not uncommon. Fortunately, most failures result in minor damage and pose little or no life-threatening risk. However, the potential for severe damage and fatalities does exist, and the National Inventory of Dams (NID) has developed a listing of High Potential Hazard dams for the nation. There are nine dams within Lane County that warrant this designation.

Historic and Cultural Resources

According to the National Historic Register, there are 125 historic and cultural sites located in Lane County. These sites range from Native American archeological sites to historic homes, pioneer cemeteries and historic bridges.

[1] DMA 2000, State and Local Plan Criteria: Mitigation Planning Workshop for Local Governments, <http://www.fema.gov/fima/planning_toc4.shtm>

[2] Oregon State University. 2000. Oregon Climate Service Monthly Means and Extremes. Accessed 4 January 2005 on the world wide web at: < http://www.ocs.oregonstate.edu/index.html>

[3] University of Oregon. 1999. Atlas of Lane County. Accessed 4 January 2005 on the world wide web at: <http://geography.uoregon.edu/infographics/lcweb/preciptext.htm>

[4] United States Census Bureau. 2000. Lane County Population Data. http://www.census.gov

Section 3
Risk Assessment Summary

An important component of the Lane County Natural Hazards Mitigation Plan is the risk assessment. This section provides a summary of findings that include background information on the process used to develop the risk assessment, as well as overviews of Lane County's risk to only the primary natural hazards addressed by this plan: earthquakes, floods, landslides, wildfires, windstorms, and winter storms. Complete risk assessment information for all hazards can be found in hazard specific annexes at the end of the plan.

What is a Risk Assessment?

The risk assessment process is used to identify and evaluate the impact of natural hazards on the human-built environment, businesses, social structure and services, and the natural environment of a community. 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. Specifically, the following elements are present in a risk assessment:

1) ***Hazard Identification*** identifies the geographic extent of the hazard, the intensity of the hazard, and the probability of its occurrence. Maps are frequently used to display hazard identification data. Lane County identified six major hazard that consistently affect or threaten its geographic area. These hazards – earthquakes, floods, landslides, wildfires, windstorms, and winter storms – were identified through a process that utilized input from a project steering committee, subject mater experts, and historical records (as well as through the Lane County Risk Assessment completed in Phases Two and Three of the County's mitigation planning process).

2) ***Profiling Hazard Events*** describes the causes and characteristics of each hazard, how they have affected Lane County in the past, and what part of Lane County's population, infrastructure, and environment have historically been vulnerable to each specific hazard. A profile of each hazard addressed in this plan is provided in the plan's hazard annexes. For a full description of the history of hazard specific events, please see the hazard specific annex.

3) ***Vulnerability Assessment/Inventorying Assets*** combines the hazard identification with an inventory of existing (or planned) property and population that would be exposed to a hazard. Critical facilities are of particular concern because they provide essential products and services that are necessary to preserve the welfare and quality of life in Lane County and fulfill important

public safety, emergency response, and/or disaster recovery functions.

4) ***Risk Analysis/Estimating Potential Losses*** involves estimating the damage, injuries, and financial losses likely to be sustained from hazard events in a geographic area over a given period of time. This level of analysis typically involved using mathematical models, such as HAZUS. The two measurable components of risk analysis are magnitude of the impact that may result from the hazard event and the likelihood of the hazard occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. Where available, the best available data was used to determine the magnitude and likelihood of future natural hazard events. For each hazard where data was available, quantitative estimates for potential losses are included in the hazard assessment.

5) ***Assessing Vulnerability/Analyzing Development Trends*** provides a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions. This plan provides a comprehensive description of the characteristics of Lane County in Section 2: Community Profile. This general description includes the geography and climate, population and demographics, employment and economics, land use and development, housing and community development, employment and industry, transportation and commuting patterns, and historic and cultural resources. Analyzing these components of Lane County can help in identifying potential issues or concerns, and can serve as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

Risk Assessment Summary

This section provides an overview of the risk assessments for the primary hazards affecting Lane County. The risk assessments were developed during Phases Two and Three of the County's mitigation planning process.

Earthquake Risk Summary

Lane County has no occurrences of historic earthquakes centered within the county. However, the *State of Oregon's Natural Hazard Mitigation Plan's* Region 3 (which is comprised of Benton, Lane, Linn, Marion, Polk, and Yamhill counties) has had 5 historic earthquake events centered within the region with magnitudes of 4 or greater.[1] As part of a statewide effort to analyze county risk to various hazards, Lane County has developed an earthquake risk score for itself based on vulnerability and probability of a future earthquake event. Lane County rated itself as having an earthquake risk rating of 175 out of 240. This puts Lane County at an above average risk for earthquakes.[2] The State's hazard assessment identified Lane County's probability of

experiencing a future earthquake as low, that Lane County could expect to have one major earthquake event in the next 75 to 100 years. However, the State's hazard assessment evaluated the vulnerability of the county's population and assets to a future earthquake event as high.[3]

Flood Risk Summary

Lane County has a long history of historic flood occurrences. Historic flooding events have occurred within Lane County in 1945, 1956, 1964, and in 1996. Caused by snow melts and heavy rains, the 1996 floods resulted in the evacuation of residents and damage to buildings, homes, vehicles, roads, and bridges.[4] Lane County rated itself as having an above average flood risk rating of 165 out of 240.[5] This rating is comparable to the state's flood risk assessment of Lane County. The State's hazard assessment indicates that the County's vulnerability to a future flood event is moderate. However, the State's hazard assessment estimated that Lane County was likely to have one major flooding event in the next 10 to 35 years, a high probability for a future flooding event.[6]

Landslides

Landslide events have occurred recently in Lane County's history. The heavy rains that were responsible for the 1996 flood additionally caused landslides in Lane County. Heavy rains in 1998 and 2000 also resulted in landslides that caused road closures in the Deadwood area.[7] At this time neither the County nor the State have developed a rating for Lane County's risk to landslides. However, Lane County does have 24% of all reported landslides statewide. Additionally, the State's hazard assessment estimates that landslides on the local level can be expected every two to three years within Region 3.[8]

Wildfire

Nineteen-ten, 1917, 1922, and 1929 all mark years of historic wildfire events within Lane County. More recently, 44,000 acres of Lane County burned during the 1966 Oxbow Fire.[9] Lane County's self-reported risk rating for wildfire is 180 out of 240. This means that Lane County indicated its vulnerability to, and probability for, wildfire as an above average risk.[10] The State's hazard assessment estimated that Lane County is likely to have a major wildfire in the next 10 to 35 years, a high probability for a future wildfire event. The State's hazard assessment also estimated that Lane County has a high vulnerability to a future wildfire event.[11] The County completed a very thorough risk assessment in spring of 2005. Please refer Lane County's Community Wildfire Protection Plan.

Windstorm

Several historic windstorms, in 1971, 1990, 1995, and including the 1962 Columbus Day Storm, have affected the entire state of Oregon. Windstorms in 1997 and 2002 caused significant damage to western Oregon, including Lane County. Lane County has also experienced tornados in 1951, 1971, 1984, and 1989 that damaged buildings and uprooted trees.[12] The County has rated its own risk vulnerability and potential for windstorms as 190 out of 240, an above average risk to a future windstorm event.[13] The state's risk assessment estimated that Lane County is likely to have a major windstorm in the next 10 to 35 years, a high probability for a future windstorm event. The State's hazard assessment also estimated that Lane County has a high vulnerability to a future windstorm event.[14]

Winter Storm

Winter storms may include windstorms, heavy snowstorms, and ice storms. Historic winter storms have occurred in 1950, 1969, 1980, 1992, 1993, and 1998 and caused damage to buildings, power outages, various accidents, and road closures across the state. During the 1969 storm, Eugene received 47 inches of snow.[15] Lane County has not rated its own risk to winter storm vulnerability and probability. The state's risk assessment estimated that Lane County is likely to have a major winter storm in the next 10 to 35 years, a high probability for a future winter storm event. The State's hazard assessment also estimated that Lane County has a high vulnerability to a future winter storm event.[16]

Secondary Hazards

In addition to the primary hazards that affect Lane County, this plan also addresses the county's risk to secondary hazards: dam safety, hazmat incidents, terrorism, utility and transportation system disruptions, and volcanic hazards. Secondary hazards are those hazards that can affect Lane County, but have a lesser probably of occurrence than the primary hazards that affect the county. Complete risk assessment information on these secondary hazards can be found in hazard specific annexes.

[1] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

[2] http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsViewer_content.html

[3] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

[4] Goettel, Kenneth. 2003. *Lane County Risk Assessment.*

[5] http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsViewer_content.html

[6] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

[7] Goettel, Kenneth. 2003. *Lane County Risk Assessment.*

[8] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

[9] Ibid.

[10] http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsViewer_content.html

[11] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

[12] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

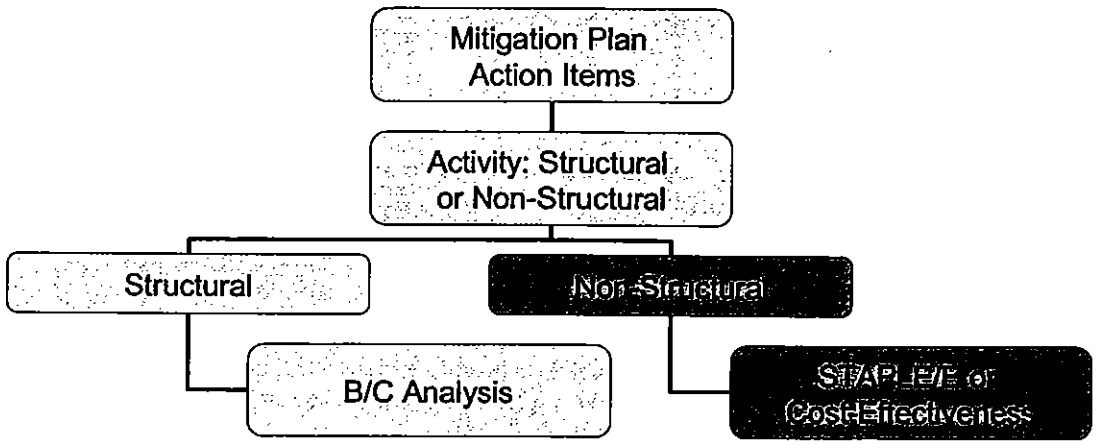
[13] http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsViewer_content.html

[14] State Interagency Hazard Mitigation Team. 2004. *State of Oregon Natural Hazard Mitigation Plan.*

[15] Ibid.

[16] Ibid.

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 project 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. Eidinger, 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 B
Existing Plans, Policies, and Programs In Lane County

The Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce loss from hazard events in Lane County. Many of the 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. 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] Implementing the natural hazards mitigation plan's action items through existing plans and policies maximizes the county's resources.

The following is a summary of existing Lane County plans, policies, and programs that can be used to implement action items identified in a mitigation plan.

Lane County Code

- Date of last revision: June, 2004
- Plan Owner: Lane County Board of Commissioners
- Plan Description: Several of the chapters of the Lane Code (including but not limited to 9, 10, 11, 12, 13, 15, and 16) establish how land within the county will be zoned, and how people may develop land based on the zoning regulations. Some of the code's goals include (but are not limited to): promoting and protecting the public safety, welfare, and health; providing for and encouraging a safe transportation system; protecting life and property in areas that are prone to flooding, landslides, and other natural hazards; protecting and planning for the responsible use of natural resources. Certain chapters of the code align with the county's Comprehensive Plan.
- Plan Cycle: The county codes are reviewed annually.
- Relation to hazard mitigation: County codes influence the where and what types of development are allowed within Lane County. Development in certain areas can exacerbate the impact of natural hazards on a community and may also inhibit residents' abilities to prepare for and respond to natural hazards. The county codes also influence the way the county can and does implement the requirements for Oregon Statewide

Planning Goal 7, which regulates areas affected by natural hazards. County codes influence the development and expansion of the roads within the county, an important components of the county's transportation network. The safety and efficiency of the county's roads impact residents' abilities to evacuate and emergency response personnel's abilities to respond in the event of natural hazards.

Lane County Strategic Plan

- Date of last revision: May, 2001
- Plan Owner: The Lane County Board of Commissioners
- Plan Description: The plan was created to help "guide current and future leaders about what public services the county should provide, at what level and how the services should be delivered."[2] The guidance provided by the Strategic Plan will improve the county government's ability to provide services and resources to help ensure the safety and health of citizens of Lane County
- Plan cycle: Plan revisions and updates can be made as community conditions and government requirements change.
- Relation to hazard mitigation: Specific plan goals include assisting communities in developing transportation and telecommunications infrastructure, housing, growth management, and land development; helping maintain a healthy environment throughout the county; and helping to maintain and protect the public's assets. The goals are to be implemented through specified strategies listed in the plan. The service improvement strategy, specifically, can be linked to Natural Hazard Mitigation Plan action items aimed at ways the county can implement Statewide Planning Goal 7 requirements, improve citizens' access to information, and ways the county government can assist its citizens regarding natural hazard mitigation.

Capital Improvement Program (CIP)

- Date of last revision: May 11, 2005
- Plan Owner: Lane County Board of Commissioners
- Plan Description: The purpose of the five-year CIP is to financially plan for capital improvements to Lane County's transportation systems that will improve efficiency, safety, utility and that will plan for future growth accommodation.
- Plan cycle: the Board of Commissioners updates the plan annually.
- Relations to hazard mitigation: Many of the capital improvement projects include improving the safety of roads, intersections, bridges, and utilities and bringing them up to

code. Having updated, safe roads and bridges will aid emergency response personnel in the event of a natural hazard. Recommendations for projects that consider or include natural hazard mitigation could be made to improve and update infrastructure to be more disaster resistant. Improving infrastructure to be more disaster resistant reduces the amount of potential infrastructure damage caused by natural hazards, reducing the cost of repairs.

Transportation System Plan (TSP)

- Date of last revision: June 4, 2004
- Plan Owner: Lane County Board of Commissioners.
- Plan Description: The TSP is a 20-year plan that complies with state requirements of OAR 660-012. It was adopted by the Lane County Board of Commissioners on May 5, 2004, and became effective on June 4, 2004. It serves to improve the planning and management of the county's transportation system by providing guidance for coordinating the existing transportation system with transportation agencies, land use requirements, and future needs and projects.
- Plan cycle: Plan revisions and updates can be made as community conditions and government requirements change.
- Relations to hazard mitigation: Infrastructure and public safety are priorities of the plan. Additionally, the plan is updated to reflect new county projects and needs. As previously mentioned, having safe and effective roads that are up to code assist residents and emergency response personnel in efficient evacuation and response in the event of a natural hazard. Recommendations for projects that consider or include natural hazard mitigation could be made to improve and update infrastructure to be more disaster resistant. Improving infrastructure to be more disaster resistant reduces the amount of potential damage caused to infrastructure by natural hazards, reducing the cost of repairs.

1980 Parks and Open Space Plan

- Date of last revision: January, 1981, but is in the process of being revised.
- Plan Owner: Lane County Parks Advisory Committee and the Lane County Planning Commission
- Plan Description: The plan helps the county meet Statewide Planning Goals 5 and 8, by planning for the current and future parks, open spaces, and recreational needs of the county.
- Plan cycle: There is no listed plan maintenance schedule, though the plan is currently in the process of being revised.

- Relation to hazard mitigation: Planning for current and future parks and open space needs affects land use and development, as well as where population growth occurs within the county. The location and types of human development within the county can affect the impact a natural hazard would have on the county. Additionally, the *Parks and Open Space Plan* is a part of the county's *Comprehensive Plan*, allowing the county to acquire property prone to floods. Using such property as parks and open spaces reduces the risk and potential for losses of life and property caused by future flood events.

Lane County Public Works Strategic Plan: 2005-2007

- Date of last revision: March 16, 2005
- Plan Owner: Lane County Public Works
- Plan Description: The plan is designed to help insure safe and cost-effective improvements to the county's infrastructure to promote the long-term viability of the county's built and natural environments.
- Plan cycle: The plan is to be reviewed regularly to address changing needs, conditions, and improved accuracy of assessments.
- Relation to hazard mitigation: County infrastructure is a critical community value to be protected against loss and damage from natural hazards. Promoting and encouraging infrastructure improvements that minimize or eliminate damage to county infrastructure in the event of a natural hazard aids the county's natural hazard mitigation efforts.

Regional Housing Rehabilitation Program

- Date of last revision: March 16, 2005
- Plan Owner: Lane County Community and Economic Development program in partnership with St. Vincent de Paul
- Plan Description: The program provides low-interest rate loans, of up to $25,000, to low to moderate-income homeowners. Homeowners can use the loans to complete safety and structural improvements to their homes. Loan recipients do not need to make monthly payments for the first 20 years of the loan, or until the home is sold.
- Plan cycle: Information on program reviews was not available.
- Relation to hazard mitigation: Homeowners who receive RHRP loans can use the money to improve their home's resistance to natural hazards. Assisting homeowners in reducing their risk to damage from natural hazards aids the county's natural hazard mitigation efforts.

Coastal Resources Development Plan

- Date of last revision: 1991
- Plan Owner: Lane County Land Management
- Plan Description: This plan addresses Statewide Planning Goals 16-19. It used inventories of Lane County's coastal areas to identify the different types of existing costal ecosystems. The plan's intent is to provide a "diverse mixture of use and preservation" to help ensure the protection of natural resources, and maintain economic, environmental, and social values.
- Plan cycle: Plan revisions and updates can be made as community conditions and government requirements change.
- Relation to hazard mitigation: The conditions of the coastal areas can influence the amount of damage and loss caused by a natural hazard event. Plan action items can be added or revised to include strategies or steps that incorporate natural hazard mitigation planning and ways to implement Statewide Planning Goal 7 requirements.

Lane County General Plan: County-Wide Policies

- Date of last revision: January 1975
- Plan Owner: Lane Council of Governments
- Plan Description: The General Plan intends to prepare for growth and development within the county while maintaining the quality of life for the county's residents and visitors. The plan attempts to do so by providing standards for land use development and activities.
- Plan cycle: Plan revisions and updates can be made as community conditions and government requirements change.
- Relation to hazard mitigation: The plan strives to protect the natural environment, and promote the responsible use of natural resources. Plan action items can be added or revised to influence the ways in which the county implements Statewide Planning Goal 7 requirements, and can include strategies or steps that incorporate natural hazard mitigation planning.

Rural Comprehensive Plan

- Date of last revision: Revisions to parts of the plan have been occurring since 1984.
- Plan Owner: Lane Council of Governments
- Plan Description: The plan "lays out approaches for interpretation of county planning needs and means of complying with State of Oregon planning law,"[3] regarding the development of rural areas within the county. This plan specifically addresses Statewide Planning Goals 1-15.

- Plan cycle: Plan revisions and updates can be made as community conditions and government requirements change.
- Relation to hazard mitigation: The plan addresses Statewide Planning Goals 1-15. How and where human development occurs within the county can affect the impact and damage done by natural hazard events. Plan action items can be added or revised to include strategies or steps that include natural hazard mitigation planning.

Air, Rail, Water, and Pipelines Map

- Date of last revision: April, 2003
- Plan Owner: Lane County Public Works.
- Plan Description: This map displays the locations of airport, rail lines, natural gas pipelines, and petroleum pipelines within Lane County.
- Plan cycle: No information on map maintenance was available.
- Relation to hazard mitigation: In planning for, or estimating areas within Lane County that could potentially be affected by certain natural hazards, these maps can be used to approximate potential impacts to airports, rail lines, and natural gas and petroleum pipelines within the county.

Lane Transit District Map

- Date of last revision: Unknown
- Plan Owner: Lane County Public Works.
- Plan Description: This map displays the boundaries of the Lane Transit District and the Amtrak Rail Lines within Lane County.
- Plan cycle: No information on map maintenance was available.
- Relation to hazard mitigation: In planning for, or estimating areas within Lane County that could potentially be affected by certain natural hazards, these maps can be used to approximate potential impacts to LTD and Amtrak.

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

[2] Lane County. 2005. "Strategic Plan: 2001-2005." <http://www.co.lane.or.us/CAO/documents/StrategicPlan.pdf>.

[3] Lane Council of Governments. 1984. "Rural Comprehensive Plan."

Appendix C
List of Acronyms

County and Regional

CIP	Capital Improvement Plan
CREW	Cascadia Region Earthquake Workgroup
CWPP	Community Wildfire Protection Plan
DPC	Disaster Policy Council
EWEB	Eugene Water and Electric Board
FD	Fire Department
LC	Lane County
LCEM	Lane County Emergency Management
LCLMD	Lane County Land Management Division
LCPH	Lane County Public Health
LCPW	Lane County Public Works
LCOG	Lane Council of Governments
LTD	Lane Transit District
MWMC	McKenzie Willamette Medical Center
PIO	Public Information Officer
RFD	Rural Fire District
RHRP	Regional Housing Rehabilitation Program
SHMC	Sacred Heart Medical Center
SUB	Springfield Utility Board
SWCD	Soil and Water Conservation District
TSP	Transportation System Plan

Oregon

AGC	Associated General Contractors
AOC	Association of Oregon Counties
BCD	Building Codes Division (Department of Consumer and Business Services)
BPA	Bonneville Power Administration
CPW	Community Planning Workshop (University of Oregon)
DAS	Department of Administrative Services
DCBS	Department of Consumer and Business Services

DEQ	Department of Environmental Quality
DHS	Department of Human Services
DLCD	Department of Land Conservation and Development
DOGAMI	Department of Geology and Mineral Industries
DSL	Division of State Lands
ESD	Education Service District
GNRO	Governor's Natural Resources Office (State of Oregon)
IHMT	Interagency Hazard Mitigation Team
LCDC	Land Conservation and Development Commission (State of Oregon)
LOC	League of Oregon Cities
OAR	Oregon Administrative Rules
OCS	Oregon Climate Service
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OEM	Office of Emergency Management (Oregon State Police)
OEMA	Oregon Emergency Management Association
OERS	Oregon Emergency Response System
OHIRA	Oregon Hazard Identification and Risk Assessment
ONHW	Oregon Natural Hazards Workshop (University of Oregon)
ORHUG	Oregon HAZUS User Group
ORS	Oregon Revised Statutes
ORVOAD	Oregon Voluntary Organizations Active in Disaster
OSFM	Office of State Fire Marshal (Oregon State Police)
OSP	Oregon State Police
OSSPAC	Oregon Seismic Safety Policy Advisory Commission
OSU	Oregon State University
OUS	Oregon University System
OWEB	Oregon Watershed Enhancement Board
PSU	Portland State University
PUC	Public Utility Commission

WRD	Water Resources Department

Federal

AASHTO	American Association of State Highway and Transportation Officials
AIA	American Institute of Architects
APA	American Planning Association
ARC	American Red Cross
ARES	Amateur Radio Emergency Services
ASCE	American Society of Civil Engineers
ATC	Applied Technology Council b/ca benefit/cost analysis
BFE	Base Flood Elevation
BLM	Bureau of Land Management
BSSC	Building Seismic Safety Council
CDBG	Community Development Block Grant
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
CRS	Community Rating System
CVO	Cascade Volcano Observatory (USGS)
DFIRM	Digital Flood Insurance Rate Map
DMA 2000	Disaster Mitigation Act of 2000
EDA	Economic Development Administration
EPA	Environmental Protection Agency
ER	Emergency Relief
EWP	Emergency Watershed Protection (NRCS Program)
FAA	Federal Aviation Administration
FAS	Federal Aid System
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance (FEMA Program)
FTE	Full Time Equivalent
GIS	Geographic Information System
GNS	Institute of Geological and Nuclear Sciences (International)
GSA	General Services Administration

HAZUS	Hazards U.S.
HBA	Home Builders Association
HMGP	Hazard Mitigation Grant Program
HMST	Hazard Mitigation Survey Team
HUD	Housing and Urban Development (United States, Department of)
IBHS	Institute for Business and Home Safety
ICC	Increased Cost of Compliance
IHMT	Interagency Hazard Mitigation Team
MH	Multi-hazard
NCDC	National Climate Data Center
NFIP	National Flood Insurance Program
NFP	National Fire Plan
NFPA	National Fire Protection Association
NHMP	Natural Hazard Mitigation Plan (also known as "409 Plan")
NIBS	National Institute of Building Sciences
NID	National Inventory of Dams
NIFC	National Interagency Fire Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
SBA	Small Business Administration
SEAO	Structural Engineers Association of Oregon
SHMO	State Hazard Mitigation Officer
TDR	Transfer of Development Rights
UGB	Urban Growth Boundary
URM	Unreinforced Masonry
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture

USFA	United States Fire Administration
USFS	United States Forest Service
USGS	United States Geological Survey
USGS-CVO	United States Geological Survey – Cascades Volcano Observatory
WSSPC	Western States Seismic Policy Council

Other

B/C	Benefit-Cost
GIS	Geographic Information System
MOU	Memorandum of Understanding
STAPLE/E	Social, Technical, Administrative, Political, Legal, Economic and Environmental