

Planning for Earthquakes and Other Geologic Events

Oregon Workshop Summary Report



Prepared by:

ONHW

Oregon Natural Hazards Workgroup

André LeDuc, Director

1209 University of Oregon

Eugene, OR 97403-1209

Phone: 541.346.2878

Fax: 541.346.2040

Email: onhw@uoregon.edu

<http://darkwing.uoregon.edu/~onhw>

Copyright © April 2004

Oregon Natural Hazards Workgroup –
Community Service Center, University of Oregon

Planning for Earthquakes & Other Geologic Events

FINAL DRAFT

Report for:

CREW Board of Directors

3110 Portage Bay Pl Slip G
Seattle, Washington 98102

Prepared by:

Oregon Natural Hazards Workgroup

1209 University of Oregon

Eugene, OR 97403-1209

Phone: 541.346.2878

Fax: 541.346.2040

Email: onhw@uoregon.edu

<http://darkwing.uoregon.edu/~onhw>

April 22, 2004

Special Thanks & Acknowledgements

Project Staff:

André LeDuc, Director

Lorelei Juntunen, Project Manager

Julie Baxter, Researcher

Roxana Hernandez, Researcher

Zach Phillips, Researcher

Nick Snead, Researcher

Other Special Thanks:

Bob Freitag

Gail Dreckman

Frank Westerlund

Scott Doyle

Bethany Johnson

Heidi Kandathil

Planning for Earthquakes & Other Geologic Events

Workshop Summary

Table of Contents

Section 1: Key Findings	3
Section 2: Workshop Summary	4
Section 3: Participants Evaluation Results	13
Section 4: Data	17

Section 1: Key Findings

The Workshop Design

The purpose of the Planning for Earthquakes and other Events workshop was to bring together planners, geologists, and engineers to discuss opportunities and barriers to implementing loss-reduction measures in local communities.

- 30 planners with at least 5 years of experience, representing county, city, tribal, university and private consulting organizations attended the workshop, along with Geologists and Engineers focusing on seismic risk.
- The workshop was replicated at the University of Washington in March.

Small Group Discussion Results

Overall, the major themes revolved around public awareness and political will for mitigation projects, the availability of technical resources, and funding issues. Groups discussed overall strengths and weaknesses, including:

- **Key strengths:** Regulation, techniques for mapping and GIS, training opportunities, increased coordination/sharing of resources within government agencies.
- **Key weaknesses:** Funding, maps/data, lack of awareness, politics
- The major obstacles to implementation included cost/funding, and lack of awareness of seismic issues. Education of the public and decision makers was a unanimously agreed-upon opportunity.
- Each group devised a strategy to address the obstacles in their group; most of them were very similar. They included the following elements:
 - Regional educational plan that could be adopted by local jurisdictions
 - Collaborative partnerships
 - Developing financial incentives within planning and development processes

Participant Evaluations of the Workshop

- Evaluations of the workshop were very positive overall.
- Participants listed the most beneficial parts of the workshop as the small group discussion and the case study of the landslide ordinance in Salem.

Section 2: Workshop Summary

Introduction

The Planning for Earthquakes and Other Geologic Events workshop brought together planners, geologists and engineers from throughout Oregon to discuss earthquake risk in the state. The purpose of the workshop was to identify the resources, opportunities, and obstacles to implementing loss reduction measures in local communities. The event took place on February 26, 2004 at the University of Oregon and was sponsored by the Cascadia Regional Earthquake Workgroup (CREW), the Oregon Natural Hazards Workgroup (ONHW), the Oregon Chapter of the American Planners Association and Partners for Disaster Resistance & Resilience (PDR). The Institute for Hazard Mitigation Planning and Research at the University of Washington replicated the workshop using the same methods on March 15, 2004 in Seattle.

This summary provides brief background information on the workshop, describes the facilitation processes used in the small group discussion, and summarizes the results of the discussion.

Workshop structure

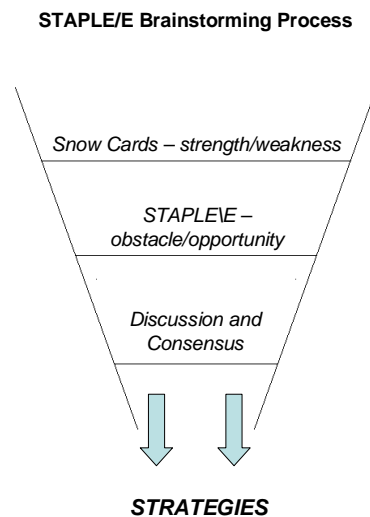
Those invited to participate in the Planning for Earthquakes and other Geologic Events workshop included planners with at least five years of experience and geologists and engineers focused on seismic issues. Approximately thirty people attended, representing a mix of county, city, tribal, university and private sectors.

The workshop opened with a welcome and introductions session followed by presentations. These were designed to improve participants' understanding of the earthquake hazard in Oregon and the resources available for implementing mitigation measures. A presentation on the recent adoption of a landslide ordinance in the City of Salem and Marion County provided a case study on a successful loss reduction program in a local planning department.

The second part of the workshop consisted of a small group discussion. The session aimed to identify the barriers and potential solutions to implementing land use changes based on recent scientific outputs. The participants were divided into three groups, each reflecting the mix of professions in the room. Graduate students from the Community and Regional Planning program at the University of Oregon facilitated the session.

The small group discussion began with a snow card process for identifying the strengths and weaknesses of Oregon's current programs for reducing losses resulting from seismic events. Next, the STAPLE/E method was used to further refine participants' ideas. Figure 1 graphically depicts the small group process; it was designed to focus the brainstorming of ideas with increasing structure, leading to consensus on a strategy for moving forward.

FIGURE 1: Small Group Process



Snow Card Process

The snow card process provides a method for organizing a brainstorming session. Snow cards generate many ideas in a short amount of time. This facilitation tool also provides an anonymous method for gathering an equal number of responses from all participants.

In the workshop the facilitators gave each participant three “snow” cards (blank pieces of white paper) and asked them to write one response per card to the question, “What are the strengths of the current programs and policies for reducing losses resulting from seismic events?” After they finished writing, each person received

three more cards and the process was repeated with the question, “What are the weaknesses of current programs and policies for reducing losses resulting from seismic events?” Once participants finished answering the question, facilitators collected the cards and displayed them in categories on the wall. The group then clarified and summarized the results.

Snow Card Results

The snow card process was effective as a brainstorming tool, generating over 142 separate responses. Forty-four percent of the responses generated in the snow card process identified the strengths of current programs and policies for reducing losses resulting from seismic events, and 56% of responses identified weaknesses.

Strengths of Current Programs and Policies

The greatest number of comments on the strengths of current programs, or one-third of the total, occurred in the regulation category. Most of the comments had to do with state level regulation, such as the upgraded seismic zones and corresponding design requirements in building codes and the integration of building, engineering, and planning throughout the site development process. For instance, in one snow card the participant wrote, “State Goals and laws help local government move forward with their own implementing ordinances. These state mandates help counter local political pressure.”

The second most common theme in the strength responses was the availability of maps and data and the expertise available through Oregon’s Department of Geology and Mineral Industries (DOGAMI). Maps and data made up one-quarter of the responses to the strengths question. Other major categories of strengths included awareness, coordination, and Statewide Planning Goal 7. Awareness refers to comments about the increasing awareness of the seismic risk on the part of the public, developers, and government. Participants also identified the increasing communication between disciplines, between government agencies, and between jurisdictions, as well as the support available from state and federal agencies as strengths of the current policies and programs. Goal 7 helps by establishing government interest and requiring jurisdictional discussion of mitigation issues.

Weaknesses of Current Programs and Policies

In response to the question about the weaknesses of current programs and policies for reducing losses resulting from seismic events, workshop participants identified funding and maps and/or data most often. Each category represented one-quarter of the responses. Snow cards about maps and data specified the need for more data, especially at the local level and for better information-

sharing. Several snow cards referred to the lack of funding for mitigation measures, education, and implementing state regulations. Mitigation measures are also costly for developers and landowners.

Other weaknesses were in awareness, regulation, and politics. There is a lack of awareness about seismic risk and vulnerability, especially due to the low frequency of events. Participants also identified regulation as a problem because of inadequate codes and enforcement. They felt there is a disconnect between the goals of developers, planners, and engineers. The lack of political will for addressing these issues, especially with the low frequency and unpredictability of events, also causes weakness.

STAPLE/E Process

Once participants brainstormed the strengths and weaknesses of the current programs and policies, the facilitators followed with a process to provide more structure to these ideas. The STAPLE/E approach to analysis was used to draw a more specific set of ideas and information from participants. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. These seven subject areas together can help define the reality in which planners and scientists must make decisions. Using a worksheet that outlined these categories, each participant was asked to apply STAPLE/E to the creation of local seismic risk reduction activities and new seismic hazard information by brainstorming the obstacles and opportunities presented by each STAPLE/E category. The process asked participants to consider the ways that the following characteristics of their communities might impact the creation and/or implementation of seismic loss reduction strategies:

- **Social:** Refers to the demographic and socio-economic characteristics of a community.
- **Technical:** Refers to the availability and quality of data and maps, as well as the necessary technical skills to interpret data such as hazard indices, risk assessments or loss estimates.
- **Administrative:** Relates to the human and financial resources required to administer a seismic loss reduction program.
- **Political:** Relates to the political environment surrounding the creation and implementation of programs and/or strategies.
- **Legal:** Relates to potential legal challenges, constraints and/or opportunities related to seismic loss reduction strategies.

- **Economic:** Consists of the economic and community development considerations of seismic risk reduction strategies.
- **Environmental:** This category relates to potential environmental impacts to seismic related mitigation projects.

The STAPLE/E process provided a large amount of information in an organized manner by allowing all participants time to think about the issues from several different angles. The participants also consider the obstacles and opportunities from their different professional perspectives.

STAPLE/E Results

Analysis of the results of the worksheets used in the STAPLE/E process showed that each category generated a similar number of responses. The exception was the environmental section, which had about one-third the amount of the others. This may be because this category was the last listed on the worksheet. Sixty-two percent of the total responses were obstacles and 38% were opportunities. For every category, participants listed more obstacles than opportunities. In the summary of results below, the main opportunities and obstacles identified in each category are listed.

Social

In the social category 59% of responses were obstacles and 41% were opportunities.

Opportunities

- Public education, awareness, and involvement.
- Technological tools may help with public education.
- Citizen involvement in the public process.
- Developers are increasingly aware of seismic hazards and incorporate standards in new developments.

Obstacles

- The difficulty in reaching and meeting the needs of diverse populations.
- Public perception of low risk in Oregon and apathy towards the subject.
- Costs of seismic upgrades or retrofitting of homes are expensive and often unaffordable for low or middle income populations.

Technical

In the technical category, 46% of comments were opportunities and 54% were obstacles. The gap between the percentages of opportunities and obstacles was smallest in this category.

Opportunities

- Increasing detail of data and maps.
- GIS and the Internet provide a platform that makes information easily available once it exists.
- Maps are providing an increasing ability to communicate technical matters to the non-technical community.
- Increased sharing and integrating of resources.
- Regional partnerships can help alleviate the financial burden on smaller jurisdictions.

Obstacles

- The expertise to interpret, analyze, and apply technical information is unavailable in many local jurisdictions.
- Cost of equipment and expertise.
- Uncertainty and conflicting information in data.

Administrative

Forty percent of administrative comments were opportunities and 60% were obstacles.

Opportunities

- The regulatory process in place, including the statewide planning goals and land use system in Oregon.
- Federal requirements for mitigation plans force the consolidation of information and greater inter- and intra-governmental discussion.
- Cooperative partnerships and the sharing of resources.
- A regional approach.

Obstacles

- Financial and budget limitations,
- Lack of staff resources and personnel to administer programs.
- The specialization of roles that exists in government can be problematic when integrating new policies.

- The separation of planning and building departments makes coordination difficult for projects that are outside of the usual process flow.

Political

In the political category, 27% of responses were opportunities and 73% were obstacles. This category had the largest gap between percentages of opportunities and obstacles.

Opportunities

- State and federal support to local jurisdictions
- Examples of progressive approaches, such as the landslide ordinance in Salem.
- Fear of inaction.

Obstacles

- Changing priorities with changing politicians and administrations.
- Lack of knowledge about seismic issues by many local politicians.
- Other priorities competing for funding.
- Opposition to further land use regulation.
- Fear of a follow-up to Ballot Measure 7.

Legal

One-third of the answers in the legal section were opportunities and two-thirds were obstacles.

Opportunities

- The government's obligation to protect public safety and welfare.
- The fear of liability and litigation may motivate the implementation of ordinances and development standards.

Obstacles

- Property rights and takings.
- Crafting ordinances that are defensible.
- Liability when appropriate ordinances and standards are in place and followed, but property is still lost in a natural disaster.

Economic

One-third of economic responses were opportunities and two-thirds were obstacles.

Opportunities

- Obtaining grants and assistance.
- Informing the public about the cost of mitigation versus the risk.
- Property owners desire to protect personal investment in property may provide motivation for implementing loss-reduction measures.

Obstacles

- Inadequate funding and the high costs to the public and government of policy-development, technical resources, education, and implementation.
- Infrequency of events prevents understanding that the mitigation costs are worth it.
- In a poor economy natural hazard programs are not a priority.
- Fear of hindering economic development.
- Short-term gains are more important than expensive long term preventative measures to developers, so they achieve only the minimum compliance.

Environmental

In the environmental category, 45% of responses were opportunities and 55% were obstacles.

Opportunities

- Hazard ordinances may help to protect environmentally sensitive areas that are subject to development pressures, such as hillsides and riparian areas.
- Hazard areas may be preserved as open-space, capturing multiple benefits for the community.

Obstacles

- Site review is only useful if hazards are known and mapped.
- Restrictions on building in certain areas may reduce buildable lands supply.

Discussion and Consensus

After completing the STAPLE/E worksheets, participants shared their top obstacle and top opportunity out of all the STAPLE/E categories. Facilitators recorded the opportunities and obstacles on a flipchart. Next, the group was asked to come to consensus on their key obstacle and opportunity.

Each of the three groups came to the same key opportunity in the current seismic hazard process: public education and awareness. The key obstacle identified by each group was either funding or lack of public awareness about the seismic hazard in Oregon.

Strategies

The final part of the small group process encouraged participants to incorporate the snow card and the STAPLE/E results into specific strategies and next steps to address they had identified. These strategies were reported back to the large group for a brief discussion.

One group did not have time to formulate a strategy, but came to consensus that more funding is required to better educate the public. The second group's strategy consisted of the following two parts:

1. Develop a regional education plan that can be built upon by local jurisdictions, and
2. Develop clear financial incentives for incorporating risk reduction, for instance FEMA's flood program.

The third group's strategy consisted of four steps and a catchy slogan. The four steps are:

1. Make available clear and consistent scientific information,
2. Create education and collaborative partnerships,
3. Build incentives into planning and development processes, such as from FEMA, to create local buy-in, and
4. Implement more rigorous oversight.

The final slogan is SLSD. Sort it through science, Learn it through education, Sell it through incentives, and Do it right.

Section 3: Participant Evaluation Summary

This section summarizes the results of an evaluation survey that was given to all workshop participants at the end of the workshop. The results are presented below in a format similar to the survey itself, and include all comments from participants.

SPECIFIC SESSIONS

Session 1: Workshop Purpose and Introductions

This session was *very beneficial* 6 *somewhat beneficial* 9 *not beneficial* _____ for me.

I think I *will* 10 *will not* 2 use the information from this session in my work.

Session 2: Existing Seismology and Resources

This session was *very beneficial* 6 *somewhat beneficial* 8 *not beneficial* _____ for me.

I think I *will* 11 *will not* _____ use the information from this session in my work.

Comments:

'too short- needed more time'

'very helpful to see changes in ord.'

'Was aware of most of this info.'

'geology is my field, so I am familiar with this info.'

'Existing probabilistic mapping of ground motion in Oregon. Would be good to show.'

Session 3: City of Salem Case Study

This session was *very beneficial* 11 *somewhat beneficial* 3 *not beneficial* _____ for me.

I think I *will* 8 *will not* _____ use the information from this session in my work.

Comments:

‘careful not to hold this up as the model without disclosing all of the external grant funding’

‘good information’

‘new info for me’

‘this was an excellent presentation- I’ll definitely use this example in hazards class discussion’

‘there was no sharing of the success or failure. Without evaluation we don’t know if the regulations are paying off.’

‘very good example. Pertains to only one kind of hazard. Are there case studies for other seismic issues?’

Session 4: Question and Answer Session

This session was *very beneficial* 9 *somewhat beneficial* 4 *not beneficial* _____ for me.

I think I *will* 11 *will not* _____ use the information from this session in my work.

Comments:

‘good’

‘very helpful to see changes in ord.’

‘could have been longer, very valuable expertise in the room.’

‘knowledgeable and articulate presenters’

Session 5: Facilitated Small Group Discussion

This session was *very beneficial* 13 *somewhat beneficial* 2 *not beneficial* _____ for me.

I think I *will* 11 *will not* 1 use the information from this session in my work.

Comments:

‘Good mix of professions’

‘Good ideas exchanged’

‘I really enjoyed hearing the planning side of all of these issues’

‘Great facilitator and note taker for “blue” group.’

‘Good give and take. Lots of different perspectives’

Session 6: Report Back

This session was *very beneficial* 11 *somewhat beneficial* 5 *not beneficial* _____ for me.

I think I *will* 9 *will not* 1 use the information from this session in my work.

Comments:

‘interesting’

‘not enough time to explore issues.’

Session 7: Next Steps and Wrap Up

This session was *very beneficial* 7 *somewhat beneficial* 4 *not beneficial* _____ for me.

I think I *will* 4 *will not* 1 use the information from this session in my work.

Comments:

‘helpful’

GENERAL

What were the most helpful components of the workshop?

‘questions and answers’

‘sharing’

‘hearing other views/perspectives’

‘group breakouts’

‘discussions with other planners about the issues.’

‘The recording of data and coordination of collective ideas in small group discussion. Could we make 2 lists on a chalkboard?’

‘developing strategies and acknowledging costs is where all the brainstorming comes together. Good.’

'Sharing of ideas, discussion of issues, learning about other's perspectives.'

What could be improved?

'time (more)'

'could be an all day session'

'it could actually be longer ~unusual!'

'questions and breakout worksheets (stapler) should have sent out before hand'

'mix of professionals/interest in strategizing'

'involve the development community soon. If not any proposals will be DOA. Oregon is in a streamlining mode, not a regulatory mode.'

'*please do this workshop at OPI in Sept! (Andre: Contact Kathi Wiederhold at LCOG)

Are there resources (human or otherwise) that would have been helpful?

'no'

'mapping levels'

I am a:

____ PDM Participant 4 State or Local official 10 State or Local Staff 1 Community Representative 1 Other

Section 4: Data

The following pages contain most of the comments that participants listed during the small group discussion, including the all snow card process comments and most STAPLE/E workshop process comments (described in Section 3).

Summary of Data

Snow Card Comments

During the snow card brainstorming process, participants listed a total of 63 strengths and 79 weaknesses. These strengths and weaknesses were broken down into categories as follows:

Table 1: Snow Card Comment Summary

<i>Category</i>	<i>Number of comments</i>
Awareness	12
Coordination	6
Funding	19
Goal 7	5
Legal	2
Maps/Data	20
Politics	7
Regulation	20
Technical Ability	2
Other	4

The comments suggest that participants are most concerned about the effects (both positive and negative) of regulation, maps and data, and funding.

Participants' actual comments are listed in the pages that follow.

STAPLE/E Comments

This portion of the small group discussion utilized the STAPLE/E method to structure a brainstorming process. Participants were asked to consider each of eight factors (**S**ocial, **T**echnical, **A**ministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental) and their connection to the successful implementation of loss reduction measures. Table 2 below summarizes the results:

Table 2: STAPLE/E Comment Summary

	<i>Total</i>	<i>Opportunities</i>	<i>Obstacles</i>
S=	75	31	44
T=	82	38	44
A=	65	26	39
P=	71	19	52
L=	55	18	37
E=	65	22	43
Envir=	22	10	12
Other=	5	1	4

The comments suggest that participants are most concerned about the social and technical aspects of implementing loss reduction.

A sampling of participant comments resulting from this process is provided in the pages that follow.

Snow Card Comments

Snow Card		
Category	Weaknesses	Strengths
Awareness	Lack of awareness of seismic response, mitigation and preparedness in departments within a jurisdiction	Raising awareness on part of developers on seismic hazards and geotechnical needs
Awareness	Lack of Consistent public awareness and education -- interest and events seem to coincide	Geared to public education of individuals to reduce loss at base level. Individual responsibility
Awareness	Frequency of events makes it difficult to generate public interest	Public interest in natural hazards
Awareness	Lack of feedback/interaction between scientists and planners	
Awareness	Seismic zone education – outreach. Bridging gap between public policy and private property rights.	Developers awareness might be increasing.
Awareness	Public awareness of where they can find more information about a particular area.	Increased public awareness
Awareness	Trend of resistance to additional regulation.	Increased awareness of the problem in the last 10 years. Rapidly increasing level of knowledge about seismic risks in our state/region.
Awareness		Increased awareness of need for more information sharing.
Awareness	Lack of information about the vulnerability of utilities and emergency facilities like hospitals.	
Awareness	Public and political misperception that earthquakes are not an Oregon problem.	
Coordination	Lack of local buy-in - not coordinated action between emergency management and planning.	Increased effort to collect and share information – workshops.
Coordination	Specialization of expertise and scope of influence creates communication gaps and lack of effective coordination.	We have people tasked specifically to look at seismic issues – DOGAMI, OEM, etc. Increased communication between science, planning, and design communities.
Coordination		Technical support available from Federal and State agencies - DLCDD, DOGAMI, DSL, FEMA.
Coordination		New lines of communication between various state agencies (DOGAMI, DLCDD, OEM,ODF...)
Coordination		Statewide planning requires inter-jurisdictional discussions on seismic issues.
Funding	Cost of compliance provides great incentive to dispute/argue/challenge regulations	
Funding	Mitigation Measures different from other hazards, require different resources; hard to develop land use measures	
Funding	Turning state-wide legislation into local ordinances takes money	
Funding	natural hazard mitigation plan requirement is an unfunded mandate and difficult for jurisdictions	
Funding	Lack of funding for education and research in natural hazards	Cost effective approach – example – don't have to hire consultant or engineer to make determination.
Funding	Lack of funding	
Funding	Lack of resources to implement mitigation measures.	

Funding	Lack of sufficient money to mitigate known hazards.	
Funding	Evaluating hazard mitigation is a costly process. Need to develop approaches that can be costly for community.	
Funding	Cost – private and public – to landowners, jurisdictions, developing agencies.	
Funding	High price (for jurisdictions)	
Funding	High price (for developers)	
Funding	Declining funding for planning function in general.	
Funding	Community and neighborhood specific geological data is either unavailable or very \$\$ to procure.	
Funding	Lack of funding for all phases of mitigation and response.	
Funding	Lack of \$ for planning, public involvement, and awareness.	
Funding	Local government mandate to do this type of planning management is recent, unfunded, and not yet legally tested in court to articulate local risk and vulnerabilities.	
Funding	Lack of resources, especially at local level, both money and staff.	
Funding	Limitation of staff and resources.	
Goal 7		Goal 7 establishes a good process to conduct hazard mitigation analysis.
Goal 7		Legitimate, established local government interest via goal 7 and other state planning and rule requirements.
Goal 7		Statewide planning "Goal 7" requires jurisdictional discussion of the issue.
Goal 7		Statewide Planning Goal 7 - natural hazards
Goal 7		30 years of statewide planning program - goal 7
Legal	These new procedures have not yet been "judged" in the courts re: 1. land use decision process, 2. local liability for flawed decision making, 3. adequacy of technical data.	
Legal	Uncertainties regarding liability issues (which can be enormous.)	
Maps/Data	Difficult to inventory	DOGAMI focus on providing maps on hazards for state
Maps/Data	There is no easy way to compare risks from different natural hazards: ie floods vs. seismic vs. volcanic	availability of this type of mapping for small jurisdictions
Maps/Data	Lack of information	Existence of scientific data in USGS, academia, and State
Maps/Data	Cost of producing adequate data and assessing data to develop risk assessment	Connections to other hazard losses
Maps/Data	Information is often not available for individual properties	
Maps/Data	public perception of risk is low	
Maps/Data	Lack of information to help community determine acceptable risk.	Graphic information availability – hazard maps.
Maps/Data	Perhaps it's available but not aware. Lack of geotechs throughout entire project. 1. preliminary 2. design 3. construction.	
Maps/Data	Need more data.	Expertise at DOGAMI available. Have abundant maps and resource documents.

Maps/Data	Lack of statewide mapping of hazards and risk evaluation	Data/maps appear to be at appropriate scale.
Maps/Data		Better identification of risk locations DOGAMI mapping, etc.
Maps/Data		Having some seismic related data that relates to my community.
Maps/Data	No consistency in data representation.	Requirement in Oregon's land use laws for hazard info. development of geologic hazard maps that incorporate previous disaster information, fault maps, surface geology, etc.
Maps/Data	Web sites and info sharing need additional work.	
Maps/Data	Lack of earthquake - seismic mapping	Local requirements for information have energized discussion between local vs. state agencies. Committed and knowledgeable staff at state (and some local) agencies.
Maps/Data	Poor mapping and other technical data available at the local level.	
Maps/Data	Integration of geologic information to development codes and maps.	
Maps/Data	Lack of specific data about faults	
Maps/Data	Environmental nexus - need really accurate data. What is really accurate data?	
Maps/Data	Data resources may not be accurate or sufficient	
Other	Definition of acceptable risk.	
Other	Implementation	Good follow-up process to make sure development is constructed as designed.
Other	Inconsistency in programs and policy between jurisdictions	A specific process to identify hazard risk.
Other		Periodic disasters (of various scales) have provided valuable training.
Politics	Lack of policy	regulatory process is in place and staffed (although not adequately funded for additional regs)
Politics	political will	
Politics	Resistance by development community	
Politics	Lack of predictability. Probability.	
Politics	Politics – prevents adoption where resistance is high.	
Politics	Overly politicized.	
Politics	Can be hard to politically motivate leaders to adopt standards when no hazard has recently occurred.	
Regulation	lack of regulation	Building code regulations related to building structures that will respond better from earthquakes
Regulation		Directed at structural measures to minimize loss.
Regulation		Recognition of issue and building ordinances to meet community needs
Regulation		State Goals and laws help local government move forward with their own implementing ordinances. These state mandates help counter local political pressure.
Regulation		We have building codes that are enforced
Regulation	Don't address pre-code development	UBC addresses seismic zone differences.
Regulation	No UBC for residential	Updating of seismic building codes.

Regulation	Very few on-the-ground ordinances	Building codes – upgraded seismic zones and corresponding design requirements (state level).
Regulation	Codes are not adequate.	Regulatory requirements to use specific professional for hazard studies.
Regulation		Retrofit focus on specific critical buildings (not too broad) i.e. schools, hospitals, fire stations, and etc.
Regulation		Mandatory inclusion of hazard mitigation strategies in the community planning process.
Regulation	There is often a disconnect between planning and building departments regarding requirements/enforcement	
Regulation	Lack of consistent development standards, including the roles of engineering geologists and geotechnical engineers.	
Regulation	Development code development in smaller jurisdictions.	Integration of building, planning, and engineering through the site development process.
Regulation		Statewide building code- leads to many qualified inspectors around the state.
Regulation	Data types / rating scales	Local planning ordinances (incl. Comprehensive plan.)
Regulation		Appendix (uniform building code) Chapter 33.
Regulation		Building code awareness of issues.
Regulation		Shift development pressures to less hazardous areas.
Regulation		New requirements for DLCDC to notify jurisdictions of new hazard info.
Regulation Technical Ability	Lack of expertise at local level – small localities.	
Regulation Technical Ability	Lack of public sector experience with geologic hazards.	

STAPLE/E Comments

No growth community (county)	Obstacle
Very high second homes	Obstacle
Very large county (1125 mi square)	Obstacle
Resource based economy	Obstacle
Political will	Obstacle
strong interest during and immediately after 'events'	Opportunity
Education	Opportunity
Money	Obstacle
Interest	Obstacle
Inter-agency dialogue, city and county	Obstacle
Inter-agency dialogue, city and county	Opportunity
GIS	Opportunity
Pre-disaster mitigation plan	Opportunity
Money	Obstacle
Political will	Obstacle
The event'	Opportunity
Education	Opportunity
Value	Opportunity
FEMA	Opportunity
Political will	Obstacle
cost	Obstacle
Impact/county-wide	Obstacle
Too many hazards	Obstacle
Support from state regarding natural hazards	Opportunity
FEMA	Opportunity
Takings	Obstacle
Regulations	Obstacle
Public involvement in process	Opportunity
Clear process	Opportunity
Education/Information	Opportunity
Recent memory event	Obstacle
Tax issues	Obstacle
Regulations	Obstacle
Overwhelming	Obstacle
Grants	Opportunity
State regs	Opportunity
Assistance	Opportunity
Appealing to 'green'	Obstacle
Resource based conflicts with urban areas	Obstacle
Better communication b/w jurisdictions	Opportunity
long-term benefits	Opportunity
Outsider/insiders local memory versus data	Obstacle
Outsider/insiders local memory versus data	Opportunity
Community apathy/disorganization --> lack of organization and interest given the infrequency of seismic events.	Obstacle
Seismic risk reduction (rg14) can increase the price of housing/development.	Obstacle
Earthquake insurance is available for all properties, given a certain premium.	Opportunity
Lack of \$ funding, seismic data, and reporting.	Obstacle
Scientific studies are never absolute; always some uncertainty.	Obstacle
Certain amount of credibility when state/federal government (specialists) release seismic hazard data.	Opportunity
The general community has an interest in knowing the general physiographic risks existing in their area.	Opportunity
Technical knowledge is generally consolidated to a select group of professionals.	Obstacle
What happens when those employees leave an organization?	Obstacle
Where is the institutions/knowledge?	Obstacle

Financial/Budget limitations affect government's ability to monitor, track, and update the public on new seismic data.	Obstacle
Government serves/protects public welfare.	Opportunity
Government is well suited to incorporate new data and make it available as outreach or regulations.	Opportunity
Government has systems in place (E.M.S., PW's, Zoning) to address Natural Hazard Events.	Opportunity
Seismic data is typically not well-received to those interests that represent private property rights, building industry association, and realtors.	Obstacle
"Change" is not readily embraced.	Obstacle
Since reg14 involve significant resources, \$ (or lack thereof) adds to the political statement	Obstacle
Anti-planning measures (Measure 7) create uncertainty and distrust of government.	Obstacle
Coalitions and collaborative opportunities exist between stakeholders. Progressive approaches exist (i.e. City of Salem/Marion County)	Opportunity
"Due diligence" - do new seismic strategies require local governments to implement new procedures?	Obstacle
What if a community is suffering from budget limitations?	Obstacle
Does it make sense to ignore new mapping.	Obstacle
"Due diligence" - Government has an obligation to protect public safety and welfare.	Opportunity
Any new req14 tool must meet legal scrutiny.	Opportunity
Seismic occurrences are infrequent.	Obstacle
Does Benefit/Cost Analysis justify implementing seismic risk reduction strategies? (Some would argue "no")	Obstacle
Understanding relative seismic risk can empower businesses/property owners to take the appropriate measures to protect their investment (insurance).	Opportunity
Seismic reduction strategies may motivate builders and developers to reallocate their energies to other areas (farm lands, wetlands, etc.)	Obstacle
Hillside development reg16 can benefit (wake quality, sedimentation).	Opportunity
Protect fish & wildlife.	Opportunity
Not a priority for Oregon Citizens because of economic woes in the state	Obstacle
Tie in to all hazards; bring in businesses to take lead	Opportunity
Maps are important educational tool	Opportunity
Lack of funding	Obstacle
Limited staff	Opportunity
Focus on economic woes that overshadow other concerns	Obstacle
State legislative lack of knowledge of seismic issues	Obstacle
Political will to move	Obstacle
Ballot measures 15 & 16	Opportunity
Liabilities	Obstacle
Senate Bills 14 & 15	Opportunity
Ballot measures 15 & 16	Opportunity
Economic (Priorities are low for Natural Hazards reduction) business loss if ordinances are passed	Obstacle
Senate Bills 14 & 15 - Critical structure	Opportunity