

# **Natural Hazard Mitigation in Oregon: A Case Study**

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## **Introduction**

Professional planners, hazard mitigation specialists, and emergency response officials have long recognized that better planning can significantly reduce the cost of coping with the aftermath of natural disasters. Effective disaster mitigation requires the coordination of a variety of agencies at different levels of government with many levels of responsibility. This can be achieved by establishing mechanisms for interagency communication with strong working relationships between the involved agencies. Effective interagency communication and partnerships, however, can rarely be established once a disaster occurs. Therefore, it is critical that partnerships be established before disasters happen if damage is to be minimized and response and recovery efforts are to be effective. A recent article published in *Planning*, the magazine of the American Planning Association, highlights research showing that communities making the greatest improvements in safety are located in states that require hazards elements in local plans (Steinberg and Burby, 2002).

The disaster of September 11, 2001, illustrated America's vulnerability to terrorist attacks. In response to September 11th, federal, state, and local

governments around the nation implemented their emergency response plans and communication processes which, in some cases, illustrated deficiencies and challenges facing interagency communication. Understanding the gravity of the terrorism threat, and reflecting on the many natural and technological hazards to which Oregon communities are vulnerable, the Oregon Emergency Management (OEM) Agency expressed an interest in evaluating how effective state agency communication is in responding in emergency response and disaster recovery situations. Working with OEM, the Oregon Natural Hazards Workgroup<sup>1</sup> (ONHW) at the University of Oregon received a Quick Response Grant through the Natural Hazards Research and Application Center at the University of Colorado at Boulder to conduct a survey of communication and coordination in the post-disaster environment through the Oregon Emergency Response System.

Oregon has worked to develop coordinated efforts and partnerships and is one of a few states that makes planning for natural hazards an integral element of a statewide land use planning program. Oregon's statewide planning program has required cities and counties to develop and adopt comprehensive land use plans since 1973. Moreover, land use plans must include an element that addresses development in areas of "known natural hazards" (State of Oregon, n.d.).

Well before September 11th, Oregon recognized the urgency of natural hazards planning after the damage and losses suffered statewide from severe winter storms that struck the state in February and November of 1996. These storms triggered heavy flooding and numerous landslides, resulting in property destruction and loss of life in several regions of the state. Immediately after these events, Oregon Governor John Kitzhaber requested that several state agencies review their programs and identify ways of reducing future risks from natural hazards.<sup>2</sup> The Governor specifically directed the Land Conservation and Development Commission to review Statewide Planning Goal 7, Areas Subject to Natural Disasters and Hazards (Community Planning Workshop, 1998). Goal 7 requires incorporated cities and counties to inventory natural hazards and to adopt "appropriate safeguards" to mitigate development in hazardous areas.

The evaluation of Statewide Planning Goal 7 in 1998 marked the beginning of a series of efforts between state agencies, Oregon communities, and the ONHW related to natural hazard planning and mitigation in Oregon. These efforts resulted in the development of resource materials and collaborative partnerships that have been sustained since that time. While the events of September 11th were tragic, they also provided an opportunity for government, businesses, and citizens alike to assess their readiness for natural disasters. Our research examines intergovernmental communication and coordination in this post-disaster environment.<sup>3</sup> We begin with a description of the development and organization of hazard mitigation activities in Oregon,

showing how these activities have promoted mitigation planning and coordination and greater communication among governmental agencies. We then present data from a survey of state agency representatives conducted by ONHW to assess the nature of coordination and planning in the post-disaster environment after September 11th. Finally, we discuss implications that Oregon's experience may have for other states that hope to build a framework for sustainable collaboration for mitigation.

### **Natural Hazard Mitigation in Oregon, 1996–2002**

Oregon communities are vulnerable to earthquakes, wildfires, floods, and other natural disasters with the potential to cause extensive loss of life and property and severe disruption to essential human services and the economy. Oregon is ranked third nationally for potential earthquake losses—projected to exceed \$12 billion given a major event in the Cascadia Region Subduction Zone. In the past decade, major floods, earthquakes, drought, and severe windstorms, as well as other events, have resulted in over ten statewide Presidential Disaster Declarations (Federal Emergency Management Agency, 2002). With the impacts communities have suffered from disasters there is growing recognition about the importance for and benefits of long-term planning strategies to reduce risk from natural disasters.

In 1996, Oregon began investigating ways in which the state could minimize losses from future hazard events. Raging floods and landslides brought the devastating consequences of natural disasters to public attention, and Oregon state government and communities began to engage in a wide range of activities intended to mitigate the impact of future disasters. Federal and state agencies as well as Oregon universities provided research and technical assistance to local governments, the Oregon Legislature passed key regulatory legislation, and perhaps most important, a strong partnership of government and private agencies dedicated to mitigating natural hazards emerged.

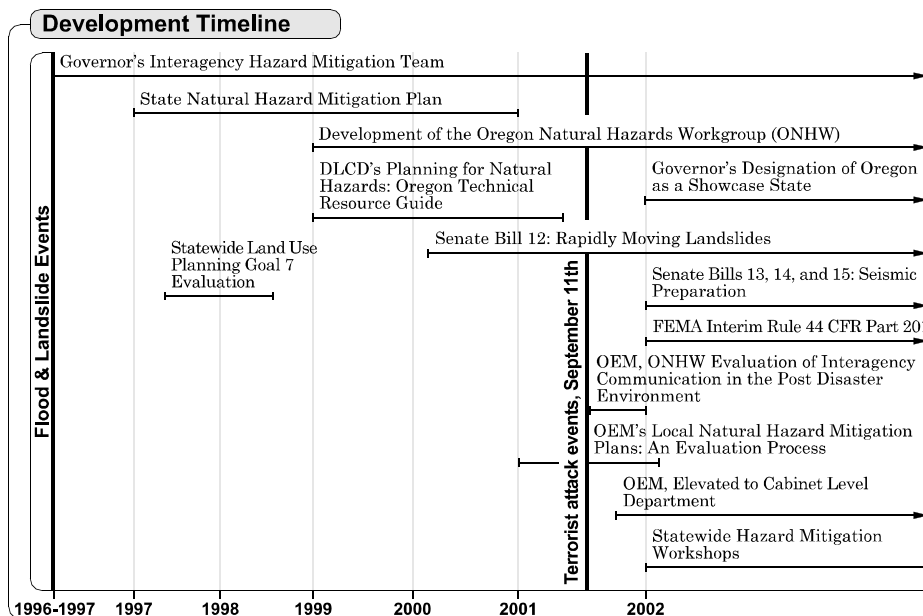
#### **The Catalyst for Mitigation Activities in Oregon: The 1996 Floods**

The floods of 1996 and 1997 marked a turning point in statewide hazard mitigation efforts. Between October 1995 and January 1996, northwest Oregon had rainfall that was about 125% above average, producing an unusually wet winter that saturated soils and raised reservoirs to abnormally high levels. Up to this point, little snow had fallen, but beginning in mid-January, both the Cascades and the Coast Range experienced high snowfall in middle and high elevations. In just two weeks by the end of January 1996, average snowpack had reached a level of 112% of average (Oregon Cascades West Council of Governments, 1996, p. 16).

A period of intense cold at the end of January followed by warm rain and air temperatures soon melted the snowpack in the Cascade and Coastal ranges, causing enormous amounts of water to be released into those watersheds—a classic, though unusually powerful “rain-on-snow event.” Consequently, stream levels rose, and many very quickly reached flood stage, creating vast amounts of flooding. The flood impacts were compounded by landslides throughout the flooded areas, caused by the overly saturated soils. Several people lost their lives and the region’s damage was estimated at more than \$280 million (Interagency Hazard Mitigation Team, 1996, p. 12).

The February flood of 1996 followed by flooding in November and December heightened the awareness of officials and the general public about the dangers of such natural disasters. The 1996 floods also suggested the need for cooperative planning within communities and across jurisdictional boundaries to prepare for future disasters. Since the floods of 1996 and 1997, Oregon has engaged in a series of coordinated activities around natural hazard preparedness and mitigation to address this need. Figure 1 provides a timeline of key events following the 1996–1997 floods. The events can be thought of as involving three interrelated lines of activity: (1) research and technical assistance, (2) legislation, and (3) coordination, all of which are described in detail in the following sections.

**Figure 1. Timeline of events.**



## Helping Local Governments: Research and Technical Assistance

As a result of the floods of 1996 and 1997, and at the direction of the Governor, the Oregon Department of Land Conservation and Development commissioned the University of Oregon's Community Planning Workshop to conduct an evaluation of Statewide Planning Goal 7, Natural Hazards and Disasters (Community Planning Workshop, 1998). This evaluation established strong evidence of need for a more coordinated and comprehensive approach to providing technical assistance to local governments in Oregon. Creating effective inventories, policies, and ordinances to guide development in areas where known natural hazards exist requires large amounts of time, energy, labor, resources, and technical expertise to a degree that many local governments simply do not have (Community Planning Workshop, 1998). As a result, communities often experience difficulties in the areas of communication, information access, technical assistance, and general resources available to conduct the large and intricate process of hazard mitigation. Our report concluded that

The wide range of hazards addressed in local jurisdictions, as well as the inherent complexity of the forces that cause hazardous conditions, stresses the ability of local jurisdictions to effectively plan for and evaluate development in hazardous areas and to ensure that appropriate safeguards are in place. . . . Incomplete or inadequate communication between Department of Land Conservation and Development, hazard specialists in other agencies and organizations, and local planners and decision-makers results in incomplete inventories and confusions concerning proper application of inventories and hazard ordinances. Planners are not always aware of the types of resources that are available to them, how they may access those materials, or whom they may contact for assistance in using the materials (Community Planning Workshop, 1998, p. 43).

Based on these findings we recommended that increased technical assistance be provided to local governments to enhance their (1) knowledge of agencies, specialists, organizations, communities, and other sources that could provide information and guidelines for working through the process; (2) ability to obtain these types of information and guidelines; (3) knowledge of agencies that could offer technical assistance in the process; and (4) ability to communicate with and gain technical assistance from agencies, specialists, organizations, communities and other resources that could assist in the process (Community Planning Workshop, 1998, pp. 11–50).

In response to these findings and recommendations, the state Department of Land Conservation and Development in partnership with ONHW produced the *Planning for Natural Hazards: Oregon Technical Resource Guide* (Oregon Natural Hazards Workgroup, 2001). ONHW developed as a sister program to Community Planning Workshop in 1999 and was founded

with a mission to assist communities in reducing their risk to natural disasters. *Planning for Natural Hazards: Oregon Technical Resource Guide* provides tools that Oregon communities can use to plan for, and limit the effects of, threats posed by natural hazards. It describes the requirements of the Statewide Planning Goal 7, methods and data sources for developing accurate inventories, and model policies and ordinances to implement the planning provisions of Goal 7. Development of this guide was a first step in addressing risk reduction and providing education to planners and policy makers in Oregon communities.

The Department of Land Conservation and Development is not the only state agency addressing technical assistance needs of local governments in Oregon. Following on the successful development of the *Planning for Natural Hazards: Oregon Technical Resource Guide*, and in anticipation of the federal rule (the Federal Emergency Management Agency's Interim Final Rule, 44 *CFR*, Part 201) requiring states and jurisdictions therein to develop natural hazard mitigation plans, OEM asked the ONHW to develop a guide to assist in the evaluation of local natural hazard mitigation plans. This document, *Local Natural Hazard Mitigation Plans: An Evaluation Process*, provides guidance on evaluating hazard mitigation plans and a synthesis of standards and approaches developed by state and federal agencies and organizations to assist communities in achieving risk reduction. The criteria outlined in this document address preliminary federal criteria from 44 *CFR* Part 201, as well as other Federal Emergency Management Agency (FEMA) programs, including the National Flood Insurance Program's Community Rating System, the Flood Mitigation Assistance Program, and the Hazard Mitigation Grant Program. While the *Technical Resource Guide* is a broader resource document, the *Evaluation Process* is a tool that can be used to help communities define the planning process and develop strategies for public participation and activity identification during the development of natural hazard mitigation plans.

In addition to development of technical resources, we recognized the need to test these resources by helping communities develop natural hazard mitigation plans, as well as to promote the tools and resources by providing training and outreach opportunities for local communities. Since 2000, ONHW has assisted four cities and three counties in developing natural hazard mitigation plans. These cities and counties requested assistance through their participation in the Flood Mitigation Assistance Program and Hazard Mitigation Grant Program.

In 2002, OEM, in partnership with ONHW and the Department of Geology and Mineral Industries, coordinated Hazard Mitigation and Public Assistance Workshops across the state. Materials presented at the workshop included mitigation resources, programmatic information about the "Partners for Disaster Resistance and Resilience: Oregon Showcase State program,"

and information on technical assistance for mitigation plan development and implementation.

Over the past several years, Oregon communities have benefitted from increased technical assistance, resources, and public education and outreach programs focused on mitigation. The coordinated partnership between state agencies and ONHW increased the availability and dissemination of these resources and programs to Oregon communities. The real values and opportunities for replication are best illustrated by the time and resources dedicated to developing these programs and the capacity building that occurs at the local level. An organization such as ONHW can assist in developing and maintaining an organizational structure that facilitates long-term planning and implementation of mitigation strategies.

### **Enhancing the Regulatory Framework: Key Legislation**

Since the flood and landslide events of 1996–1997, the Oregon State Legislature has enacted several key pieces of legislation addressing natural hazards. Two key bills have addressed risks from landslides. Senate Bill 1211, which was passed in 1997, addresses risks from rapidly moving landslides around steep forestlands. Senate Bill 12, which was passed in 1999, directs state and local governments to protect people from rapidly moving landslides. The bill has three major components affecting local governments: detailed mapping of areas potentially prone to debris flows, local government regulating authority, and funding for a model ordinance. The direction of these bills, developed through a collaborative process with the Governor's Interagency Hazard Mitigation Team, will result in planning resources such as maps and technical reports based on areas subject to rapidly moving landslides. Coordinating legislation with the development of technical resources can have a direct impact on education and development patterns among communities.

Three bills, all passed in the 2001 legislative session, relate to hazards from potential seismic activity. Senate Bill 13 requires each state and local agency and persons employing 250 or more full-time employees to develop seismic preparation procedures and inform their employees about the procedures and conduct drills in accordance with OEM guidelines. Senate Bill 14 requires the State Board of Higher Education to provide for seismic safety surveys of buildings that have a capacity of 250 or more persons and are routinely used for student activities by public institutions or departments under the control of the board. Finally, Senate Bill 15 requires the Health Division to provide for seismic safety surveys of hospital buildings that contain an acute inpatient care facility and seismic surveys be conducted on fire stations, police stations, sheriffs' offices, and similar facilities. Senate Bills 13, 14, and 15 again illustrate that coordination at the highest level of

government can lead to commitment of essential resources and facilitate risk reduction activities among state, regional, and local stakeholders.

The value of these bills derives from the coordination that resulted in their development, the broad-based collective support, and in their geographic reach. Statewide legislation for natural hazards also provide a baseline of activity across communities, even when local legislation fails to pass emergency management-related measures. For example, in the November 5, 2002, election, Oregon citizens passed two seismic rehabilitation Senate Bills for schools and critical facilities, while a local municipality failed to approve a public safety measure.

### **Leveraging Resources through Partnerships: Coordination**

One key outcome of the 1996 and 1997 disasters in Oregon was the development of strong partnerships that have become institutionalized and are involved in hazard mitigation and planning. These include the formation of the Governor's Interagency Hazard Mitigation Team, the development of the State Natural Hazards Mitigation Plan, and the development and implementation of Partners for Disaster Resistance: Oregon Showcase State program.

Governor Kitzhaber declared a State of Emergency for 18 counties in Oregon on February 8, 1996, due to disastrous flooding and landslides. The Governor then directed his administration to identify ways state and local government can minimize loss of life and damages to property from future events. The development of the Governor's Interagency Hazard Mitigation Team in 1997 was a direct outcome from that review. The Hazard Mitigation Team comprises 18 state agencies, including OEM, the Department of Geology and Mineral Industries, and other agencies representing natural resources and the environment, risk management, economic development, utilities, and transportation. The Hazard Mitigation Team's primary goal is to assist in guiding government action related to natural hazard mitigation activities in the state.

The Hazard Mitigation Team played an integral role in providing information and technical expertise during the development of the State Natural Hazard Mitigation Plan. Representatives from state agencies such as the departments of Geology and Mineral Industries, Forestry, Land Conservation and Development, among others, provided technical expertise and experience to participate in inventorying hazard-related issues and resources, and identifying appropriate action items.

On December 12, 2000, the Governor signed an Executive Order designating Oregon a "Showcase State for Natural Disaster Resistance and Resilience" (Executive Order No. 00-31). This Executive Order follows a model developed and tested in Rhode Island by the Institute for Business &



Home Safety (IBHS), an initiative of the insurance industry to reduce deaths, injuries, property damage, economic loss, and human suffering caused by natural disasters. The Executive Order builds upon the foundation established by the state's land use planning laws, building code requirements, emergency preparedness planning, hazards assessment, and other policies and programs. The Showcase State program provides a comprehensive framework for government and the private sector to prepare for and minimize risk and impact of natural hazards. Specifically, the mission of the Showcase State initiative is to prevent injuries and deaths, protect public and private property, and create a disaster-ready statewide economy through public and private partnerships.

The Showcase State program provides a unique opportunity to demonstrate how state and local governments, the insurance industry, and academia can work together to promote awareness of natural hazard risks and associated risk reduction strategies. ONHW is serving as the statewide coordinator and has taken a lead in further developing Oregon's Partners for Disaster Resistance program. The primary objective is to create and strengthen private/public partnerships to enhance disaster safety and preparedness statewide. In its coordinating role, ONHW facilitates and implements activities to motivate behavioral change among communities, individuals and businesses. Figure 2 illustrates the coordination and collaborative roles among communities, the private sector, public agencies, and academia, all partnering together to help realize program objectives. Partners for Disaster Resistance strives to create mutually beneficial

*Figure 2. Partners for Disaster Resistance stakeholders.*



relationships between the partners. One example of this kind of partnership is illustrated by the City of Tillamook, which experienced floods in 1996, 1997, and 2000. At the state level, OEM provided funds for the city to develop a flood mitigation plan. Making use of the state resources, the ONHW developed the plan with strong collaboration among federal, state, and local government, as well as local businesses and community members.

Organized around 14 interdependent elements (Figure 3), the Showcase State model provides an integrated, cost-effective and systematic approach for all levels of government and the private sector by bringing together resources—both human and financial—to prepare for and minimize natural disaster impacts. These elements, developed by IBHS, are measurable activities that serve both to institutionalize disaster protection into long-range policies, procedures, programs, designs, and plans and to take immediate action to begin to reduce costs associated with disasters. Figure 3 illustrates each of the fourteen elements, which range from building codes to incentive

<b>Showcase State Model – 14 Elements</b>	
<b>1 Formal commitment and strategic plan</b>	Obtain Governor-level executive order to formalize partnership. Create 5-year strategy with 1-year action plans.
<b>2 Statewide hazard and risk assessment</b>	Identify hazards and what's at risk statewide to help prioritize disaster-resistant actions.
<b>3 Business recovery alliances</b>	Develop partnerships with businesses for coordinated mitigation, preparedness, response and recovery.
<b>4 Enforceable building code</b>	Adopt and enforce a statewide model code that incorporates hazard-resistant design.
<b>5 Landuse plans</b>	Address relevant hazards in state-level landuse decisions. Encourage adoption of local plans that incorporate hazards and mitigation strategies.
<b>6 Response and recovery plans</b>	Maintain a state emergency response plan. Develop a state post-disaster recovery plan coordinated with local post-disaster plans.
<b>7 Rating and regulatory systems</b>	Improve compliance and participation in natural hazard-related rating and regulatory systems (e.g. the National Flood Insurance Program, Community Rating System, Fire Suppression Rating, Building Code Effectiveness Grading Schedule, etc.)
<b>8 Lifeline protection</b>	Incorporate disaster protection measures into public and private lifeline utilities, infrastructure and critical facilities.
<b>9 Community-level disaster resistance</b>	Encourage the development of disaster resistant communities within the state and coordinate at local and regional levels.
<b>10 Public awareness and outreach</b>	Develop programs to increase the public's awareness of natural hazards and how to reduce or prevent damage.
<b>11 School curricula</b>	Incorporate natural hazard awareness and reduction programs into grade-school and higher education curricula.
<b>12 Protection of childcare centers</b>	Support IBHS and its partners in the nonstructural retrofit of nonprofit childcare centers.
<b>13 Professional training</b>	Conduct mitigation training for building design and construction professionals and others to incorporate disaster resistance into policy and practice.
<b>14 Incentives and disincentives</b>	Identify existing incentives and disincentives for hazard loss reduction action. Develop and enact appropriate incentives or adjustments.

**Figure 3. Showcase State elements.**

programs, and a brief description of their relevance to the Oregon Partners for Disaster Resistance program.

Interest in the partnership emerged from both the public and private sectors after the Rhode Island's Showcase State program was announced in late 1998. The Oregon Department of Geology and Mineral Industries and OEM continue to lead state agency interest from their missions in identifying hazards and reducing public safety risks. SAFECO Insurance Companies, and the Insurance Information Service of Oregon and Idaho lead private-sector interest in minimizing property damage and economic losses and expediting economic recovery after a disaster. The initiative is bolstered by the ongoing work of ONHW. The Partners for Disaster Resistance: Oregon Showcase State program provides a unique opportunity to demonstrate how state and local governments, the insurance industry, and academia can work together to promote awareness of natural hazard risks and associated risk reduction strategies.

A key objective of the partnership is to provide an integrated, cost-effective and systematic approach to prepare for and minimize natural disaster impacts. The state has, for many years, however, had another formal structure to maintain communications between agencies when disasters actually happen. The importance of the ability to maintain these communications became very apparent after the September 11th disaster.

### **Interagency Communication in the Post-disaster Environment**

Interagency communication in Oregon during emergency response and post-disaster recovery is facilitated by the Oregon Emergency Response System (OERS), established by Governor Tom McCall of Oregon in 1972. Its mission is to improve communications and coordination between government agencies that respond to hazardous material incidents and to coordinate and manage state resources in response to natural and technological emergencies and civil unrest involving multi-jurisdictional cooperation between all levels of government and the private sector. OERS is the primary point of contact by which any public agency provides the state notification of an emergency or disaster, or requests access to state or federal resources (State of Oregon, 2002). The OERS is coordinated through the OERS Council, which is composed of staff from 21 state agencies and meets quarterly to discuss communications issues and conduct exercises.

Agencies participating on the OERS Council represent human resources, transportation, corrections, environment, building codes, utilities, and agriculture, among other areas. We distributed a survey designed to evaluate

interagency communication and coordination in the post-disaster environment to the directors of the 22 member agencies of the OERS Council in October 2001, and received 20 responses for an 87% response rate.<sup>4</sup> The survey results and findings are organized in three core areas:

- Agency roles and responsibilities and agency understanding of OEM's role in coordinating emergency response and recovery;
- Emergency Coordination Center and OERS coordination roles in emergency response and recovery; and
- Communication and informational needs.

### **Agency Roles and Responsibilities**

OERS is the primary point of contact for state notification of an emergency or disaster. Moreover, OERS coordinates 24-hour access to, and use of, personnel and equipment for all state agencies necessary to assess, alleviate, respond to, mitigate, or recover from conditions caused by an emergency or disaster. OERS provides service through OEM. Given the key role of OEM in directing and coordinating emergency activity, we were especially interested in the extent to which agency representatives understood and accepted this role.

The survey results suggest OEM is relatively effective in communicating its role in coordinating communication and assistance in emergency response and post-disaster recovery to other agencies. Consistent with its statutory mission, OEM is providing information and services to other state and local agencies during disasters and agencies are consulting OEM in post-disaster situations.

The survey findings, however, also suggest that not all agencies are clear on OEM's role in the OERS Council. For example, only 25% of respondents indicated that OEM is responsible for coordinating with FEMA during post-disaster recovery. Coordination with FEMA is one of the stated roles of OEM in disaster recovery. Survey results indicate that agency directors and their designees want to be kept apprised of the state's Emergency Communication Center's coordination and all agency-related emergency response plans and operations. Over 80% of respondents agreed that the nature of the emergency, potentially impacted areas of the state, activities being carried out by government officials to respond to the emergency or mitigate its effects, and actions the public should take for their protection should be included in information released from OEM during Emergency Communication Center activation.

### **Coordinating Roles in Emergency Response and Recovery**

We were also interested in the extent to which agencies perceived that OEM provided effective help with needed services and communication, especially in the coordination of roles during periods of emergency response and recovery. Survey results suggest that up-to-date and accurate information on disaster incidents, and specific needs for response and recovery coordinated and disseminated through OEM and the Emergency Communication Center help agencies provide appropriate services and communicate an accurate message to the public, media, and other agencies. Over 50% of respondents agreed that OERS is very effective and an important means of communication. Additionally, respondents said that the OERS Council helps facilitate communication between state agencies by collecting and disseminating information, providing direct lines of communication, and increasing agency awareness.

Only 30% of the agencies surveyed have an agency or division emergency operations center. Of those that do have a center, 67% use the telephone and e-mail/internet to communicate with the state Emergency Communication Center. About 50% of respondents use the Oregon Emergency Response System. Notably, some agencies or divisions that do not have an emergency operations center do not have a plan for communicating and coordinating with OERS and the Emergency Communication Center. This suggests that communication issues may emerge in post-disaster situations.

### **Communication and Information Needs**

Finally, we were interested in learning the extent to which agencies perceived that information had been effectively disseminated pre- and post-disaster. The distribution of timely and accurate information is a necessary function in emergency response and post-disaster recovery. OERS member agencies that understand OERS and Emergency Communication Center procedures can better facilitate the exchange of information and implementation of services during and after a disaster event. Responses concerning communication about pre-disaster planning, emergency response, and recovery information also suggest that improvements could be made. While 35% rated communication during the pre-disaster environment (in this instance, before September 11th) as somewhat or very effective, 40% of respondents rated such communication as average and 10% rated it as somewhat ineffective or not effective at all. When asked how effectively information has been disseminated among agencies during the post-disaster environment, however, 55% of respondents felt it had been somewhat or very effective in the past, 20% rated it as average, and 15% rated it as somewhat ineffective or not effective at all. While understanding of agency roles and responsibilities during post-disaster

response seems relatively high, there is some difference in perceptions among the agencies we surveyed about the effectiveness of communication and information dissemination during pre-disaster and post-disaster situations.

The survey found that many agencies prefer to use communication methods that are dependant on external communication systems (e.g., telephone, e-mail and internet, and cellular phone). Alternative methods of accessing information before, during, and after disaster situations will help communication processes. Respondents suggested the internet, satellite telephones, radio, and other technology. This could present a problem in the event that these external systems are overwhelmed or fail during emergency response and post-disaster recovery activities.

Written comments suggest that information delivered to agencies in a concise and readily available manner would improve effectiveness. Moreover, about 70% of respondents said that communication between and among agencies could be improved by having increased education on current policies and operations. Over 50% felt that frequent exercises and increased training opportunities would further improve communication.

The OERS is a state-level mechanism for communication and coordination in disaster situations. The statutory requirement for this system provides assurance of delegated action in the post-disaster environment, and can serve as a model for communication and coordination. Furthermore, in partnership with state agency activity, and specifically, with the Governor's Interagency Hazard Mitigation Team, OERS provides an opportunity for an integrated and coordinated approach for emergency management. In summary, the OERS Council and operations have proven to be effective communication resources, although clarifying the purpose and use of the system and sending clear and more concise information to OERS Council members would lead to better communication.

### **Working Towards a Sustainable Collaborative Mitigation Model**

The evidence of Oregon's efforts to minimize the impacts and potential loss from disasters is illustrated through a number of coordinated efforts among the public and private sector, policy and legislation, as well as the resources made available to communities statewide that help them to plan for disaster events. In the wake of September 11th, communities throughout the nation are struggling to build and maintain levels of preparedness for potential attacks against homeland security. Oregon is confronting this challenge by working to identify the gaps that exist between disaster response and mitigation, and focusing on long-term planning efforts that will build the capacity of community leaders to develop and implement programs that will reduce community risk from disasters.

Through its public policy framework, Oregon has made progress in natural hazard loss reduction. The state's land use planning laws, building code requirements, emergency management, hazard assessments, and other policies and programs provide a sound foundation on which to build. Engaging citizens and business owners in managing risk can be difficult, as it is challenging to change community and individual behavior. These efforts are not well coordinated or funded, and reduce the effectiveness of disaster safety messages. A recent statewide survey on household hazard preparedness indicated low levels of concern regarding natural hazards (Oregon Natural Hazards Workgroup, 2002). Even state agencies show a low level of preparedness activities, illustrated by the fact that only 30% of the agencies surveyed in the 2002 OERS Council survey indicated that they have emergency operations centers.

Building upon this understanding of the current level of preparedness among state agencies and Oregon citizens, we (ONHW) have continued to work with OEM to develop other resources and community mitigation plans and to coordinate the Partners for Disaster Resistance: Oregon Showcase State program to strengthen the state's risk and loss reduction efforts. OEM and ONHW are proposing to assist communities throughout Oregon to develop mitigation plans that will help them prepare for and reduce risk from natural hazards. The Partners for Disaster Resistance Program is a promising "next step" to bolster limited public resources and create partnerships that will generate activity that could not be accomplished by a single entity working independently.

Oregon's approach to natural hazard mitigation planning aims to build local capacity in developing and implementing risk reduction activities through technical assistance and training, partnership development, and resource sharing. To achieve this objective, the approach fosters partnerships among agencies, communities, and organizations to determine needs, identify issues and resources, and develop strategies for risk reduction. Below, we describe how our approach incorporates activities at state, regional, and local levels; how it builds on strategic partnerships between programs and, in summary, the opportunities and challenges that we see for the future.

### **Oregon's Tiered Mitigation Approach**

Natural hazard mitigation activities in Oregon are organized in three inter-related levels: statewide activities, regional activities, and local activities (Figure 4). Each level of activity makes use of resources provided at the other levels and leads to more coordinated mitigation strategies and plans.



*Figure 4: The Oregon mitigation approach.*

***Statewide Activities:***

***Planning Tools, Resources, and Training***

At the broadest level, Partners for Disaster Resistance provides a comprehensive framework for government and the private sector to work in coordination to reduce risk and prevent loss from natural hazards throughout the state. In 2002, Partners for Disaster Resistance developed a five-year strategic plan that provides a baseline of information on level of preparedness and types of mitigation activities among Oregon communities, organizations, and citizens, as well as recommended action items and strategies for implementation. Partners for Disaster Resistance is one example of how state agencies and organizations can come together to develop initiatives, and coordinate resources in a way that increases awareness and activities statewide.

***Regional Activities:***

***Planning, Partnerships, and Resources Sharing***

Regional activities offer a narrower geographic scope and focus on planning and mitigation activities at the regional level. These planning activities can set baseline vulnerability data and regional mitigation goals and objectives for multiple jurisdictions. This can be accomplished through a comprehensive regional planning process that fosters partnership



development, cooperation, and resource sharing among federal, state, and local governments and community and regional organizations. ONHW has found in prior projects that using a collaborative approach to mitigation planning promotes inter-governmental coordination, fosters public/private partnerships, and builds local capacity to develop risk reduction strategies. Since 2000, ONHW has been engaged in fostering regional activities through the development of several county natural hazard mitigation plans. These county plans included stakeholders from a broad range of sectors, and lay the foundation for jurisdictions in those areas to integrate local activities with those existing at the regional level.

One of the most recent examples of regional planning and partnerships is the Clackamas County Natural Hazards Mitigation Plan. Utilizing the collaborative planning process and framework developed by ONHW, Clackamas County, with assistance of ONHW and Showcase State partners, engaged in a year-long process to develop its natural hazard mitigation plan, which recently became the first plan in the nation to meet FEMA's new requirements for natural hazard mitigation plans. OEM also selected Clackamas County to be one of the Pre-Disaster Mitigation Communities for 2002–2003. In the next year, the county will assist its 14 cities in developing jurisdictional natural hazard mitigation strategies.

### ***Local Activities:***

#### ***Plan Development and Implementation***

Local activities focus on community-level activities and planning. Public participation processes are an important aspect of all planning and mitigation activities, as this participation feeds directly into action items and implementation strategies for the plans. Mitigation action and implementation strategies are the basis for local mitigation plan goals and objectives. At the local level, everyone involved in natural hazard planning and mitigation can draw on the resources and information at the regional and state levels. This cooperative aspect strengthens plans and leads to more disaster-resistant communities through an understanding of potential risk and methods for addressing the impacts. These plans are specific to a geographic area, yet they draw from statewide knowledge and strategies, and address vulnerability data and regional mitigation goals and objectives from regional plans where applicable.

This kind of coordination and resource sharing is illustrated by vulnerability assessments and other baseline information collected at a regional level that are then made available to local governments and organizations planning for natural hazards. Mitigation actions and implementation measures are most effective at the community level as local considerations drive the planning process. The tiered approach is best illustrated by the use of state resources to develop plans and activities at

regional and local levels. In 2001, Washington County partnered with ONHW to develop a natural hazards mitigation plan. The *Planning for Natural Hazards: Oregon Technical Resource Guide* served as a primary basis for technical information for this plan, making use of an important statewide resource. Representatives from state and regional government, the private sector, and community organizations participated in the plan's development. In 2002, the cities of Beaverton and Hillsboro, two of Washington County's largest jurisdictions, are embarking on development of their natural hazard mitigation plans and will make use of both the county plan and state resources.

### **Addressing Disaster Mitigation Act of 2000 through Strategic Program Partnerships**

In February 2002, FEMA published Interim Final Rule 44 *CFR* Part 201, part of the Disaster Mitigation Act of 2000 amendment to the Robert T. Stafford Disaster Assistance and Emergency Relief Act, which requires all states and communities to develop natural hazard mitigation plans by November 2004. These planning and mitigation requirements for states and communities will be accomplished through the Pre-Disaster Mitigation Program. We (ONHW) are working with Partners for Disaster Resistance partners, OEM, FEMA, and local governments statewide to coordinate Partners for Disaster Resistance activities in a manner consistent with the Pre-Disaster Mitigation Program and that will assist communities and the state in meeting the new requirements (Figure 5).

The program partnership between Partners for Disaster Resistance and the Pre-Disaster Mitigation Program is a step toward sustaining and institutionalizing Oregon's goals to reduce risk to natural disasters. Partnering the two programs will assist in achieving the broad goals of both programs, while assisting communities address the requirements of the new federal rule.

To accomplish these goals ONHW and Partners for Disaster Resistance are promoting a collaborative partnership approach to mitigation planning and activities that focuses on inter-governmental coordination, fosters public/private partnerships, and builds local capacity to develop risk reduction strategies and activities. The partnering of the Oregon Pre-Disaster Mitigation Program and Partners for Disaster Resistance is intended to result in an integrated, cost-effective, and systematic approach to prepare for and minimize natural disaster impacts.

The activities of both programs promise to provide measurable outcomes to institutionalize disaster protection into long-range policies, procedures, programs, designs, and plans and to take immediate action in reducing costs associated with disasters. Additionally, this planning process aims to

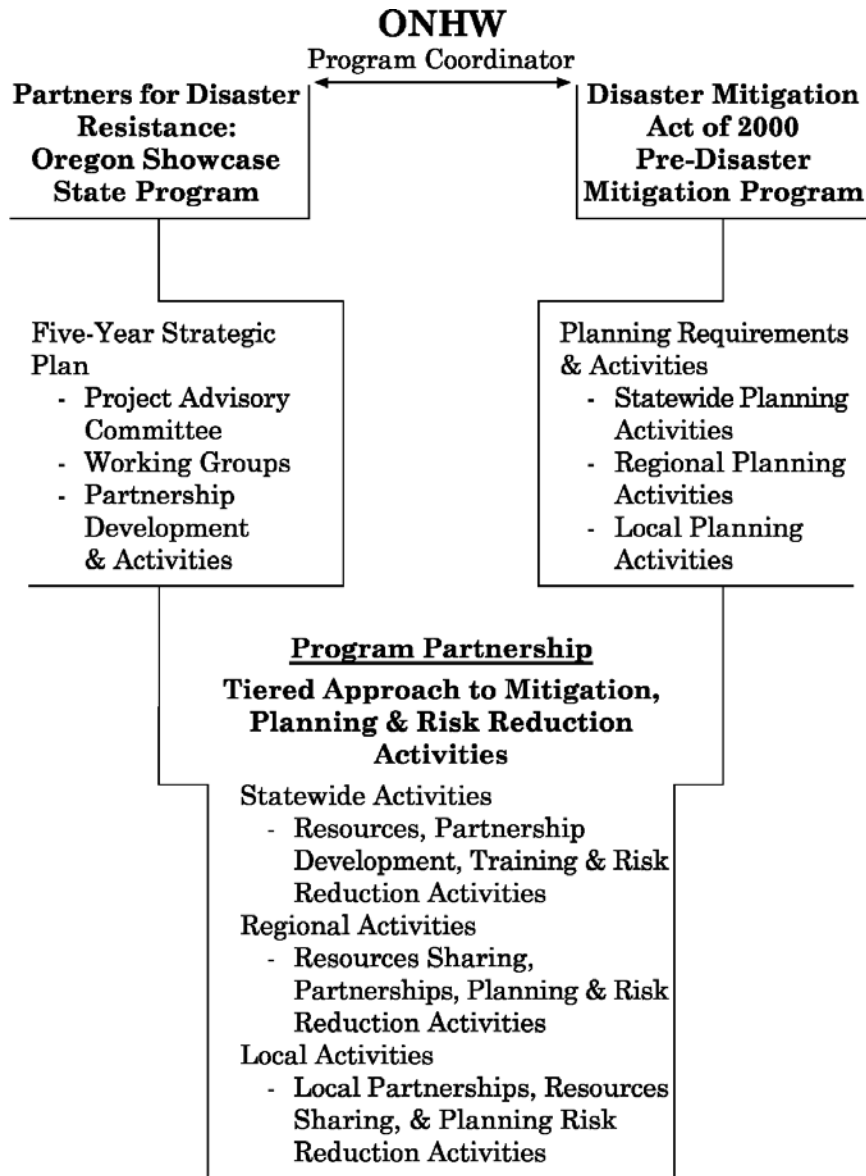


Figure 5: Pre-Disaster Mitigation Program partnerships.

incorporate economic, environmental, cultural, and historical considerations into natural hazard mitigation planning while adhering to state and federal requirements for community mitigation planning. These requirements include the Disaster Mitigation Act 2000, Oregon Statewide Land Use Planning Goal 7, and Senate Bill 360, among other federal and state requirements for mitigation planning.

### **Opportunities and Challenges**

Findings from the agency survey illustrate the complex nature of interagency communication and coordination during disasters. Moreover, current world events demonstrate the importance of pre-disaster planning, and the crucial connection between preparing for, responding to, and recovering from disasters. Interagency communication is essential to all phases of disaster: response, recovery, mitigation, and preparedness, along with state government continuity. Developing disaster management strategies between agencies will lead to improved communication and coordination during disaster events.

Oregon addresses hazards through the Oregon Emergency Response System and the state Natural Hazard Mitigation Plan (Oregon Emergency Management, 2000), as well as through public policy and Statewide Land Use Planning Goals. Through its public policy framework, Oregon has made progress in hazard preparedness and loss reduction. The state's land use planning laws, building code requirements, emergency preparedness planning, hazards assessment, and other policies and programs that establish the basis for loss reduction provide direction for reducing risk and responding to natural hazard events. Moreover, in Oregon, two state organizations play central roles in communication and coordination for disaster management: the Oregon Emergency Response System Council and the Governor's Interagency Hazard Mitigation Team.

As previously stated, the objective of OERS is to provide and implement a plan for coordinated state agency action in cases involving natural or technological hazards or civil disorder that threaten the citizens or resources of Oregon. The Hazard Mitigation Team's broad focus is to understand losses arising from natural and technological hazards, and recommend strategies to mitigate loss of life, property, and natural resources by developing for promulgation a State Hazard Mitigation Plan. Furthermore, there are many other agencies, organizations, and programs throughout the state that are engaging in disaster response, recovery, mitigation, and preparedness. The Hazard Mitigation Team is a strong first step in coordinating mitigation activities across state agencies. Yet, as an initiative of Governor Kitzhaber, the Hazard Mitigation Team has no assurance of permanency during the transition to the next state administration. Thus, it needs to be institutionalized if Oregon is to continue its successes around natural hazard mitigation.

The events of September 11th aggravated an already weak U.S. economy. By December 2001, Oregon had the highest unemployment rate in the nation and faced a \$1 billion state budget shortfall, which affected all state agencies, including OEM. All state agencies were asked to submit revised budgets as the Oregon legislature entered into a special session to address the problem. OEM, like many other state agencies, faces staff reductions as part of the budget balancing process. In short, OEM will need to find ways to meet the new demands of the Disaster Mitigation Act of 2000 with fewer state resources. Partnership and collaboration are logical ways to leverage limited resources.

A key challenge facing Oregon is how to integrate response and recovery with mitigation efforts. Our survey of state agencies that participate on the OERS Council suggests that Oregon is doing reasonably well in coordinating agency communications during response and recovery. This is due, in part, to a statutory mandate that agencies participate in the OERS. Mitigation has fared relatively well since the flood disasters of 1996. Discussions with representatives from the OERS and the Hazard Mitigation Team indicate that there is no communication between the two bodies. This disconnect between response and recovery and mitigation is an obvious area where partnerships could be developed that would result in long-term benefits.

Limited financial and human resources pose a challenge to the effective coordination in emergency situations during both the post-disaster recovery period and the pre-disaster mitigation environment. Agencies with direct missions to participate in hazard mitigation activities may be unable to do so, given budget constraints as well as a lack of accountability. One solution to dealing with limited authority would be the creation of a neutral statewide hazard mitigation coordinator who would work with both public and private interests and report to a governor-appointed body like Oregon's Hazard Mitigation Team (a role currently filled by the ONHW). This position would bring important recognition to the current threat of chronic and catastrophic natural disasters and the potential for technological or terrorist events, and bring about a level of coordination and activity among and between state agencies that does not currently exist. Based on the Oregon experience and the unique Showcase State partnership between the state agencies, the private sector, higher education, and communities, ONHW has proven that the coordination of limited resources can generate activity that could not be accomplished by any one group or organization working alone.

Collaboration among all levels of government and the private sector in natural hazards mitigation can result in better issue and resource identification, stronger political will, and more feasible strategies for implementing projects. Furthermore, the successes that ONHW has had as a neutral facilitator of hazard mitigation projects in Oregon has brought representatives from the business community, state agencies, and citizen

groups to the same table. ONHW's coordination role illustrates the importance of having a dedicated and impartial facilitator. ONHW has succeeded in this role by building local capacity, encouraging process and action, and fostering long-term, non-regulatory solutions to the challenges facing Oregon communities.

The success of Partners for Disaster Resistance and ONHW is transferable to other states. The natural divisions between different levels of government as well as businesses and communities makes the coordination role essential. Because these divisions exist in every state, the Partners for Disaster Resistance model can easily be implemented elsewhere. Success of the model, however, is not assured. It requires political and financial support. The political support in Oregon came from Governor John Kitzhaber's Executive Order declaring Oregon a Showcase State for Disaster Resistance and Resilience. Financial support has been more challenging. The coordination role provided by the ONHW has been funded through a grant from the Public Entity Risk Institute as well as state and local governments. Long-term, stable funding remains a barrier to the Partners for Disaster Resistance.

Our initial research focused on evaluating interagency communication in the post-disaster environment. Oregon's history of exposure to natural hazards, as well as the events of September 11th illustrate the essential role of public/private partnerships and demonstrate the successes of these partnerships. We should not lose sight, however, of the importance of planning for and reducing risks to natural hazards.

Further examination of communication and coordination in all phases of the disaster cycle, and among the various groups that engage in disaster management, can potentially lead to improved coordination and implementation of disaster management strategies for both natural and technological hazards. Activities to further understand and strengthen disaster-related interagency communication could include

- Examining the current state infrastructure for disaster management and how interagency communication is involved in coordinating disaster response, recovery, preparedness, and/or mitigation.
- Exploring the relationship between OERS and the Governor's Interagency Hazard Mitigation Team, and whether OERS's official state role makes it more efficient than the Hazard Mitigation Team, which is not a formal organization.
- Examine how the missions and composition of individual agencies affect their ability to communicate, coordinate, and respond during pre- and post-disaster periods.

- Examine the role that higher education programs such as the ONHW can play as a coordinating mechanism between federal, state, and local governments, business, and communities.

The public/private partnerships being established in Oregon are no better illustrated than by the coordination of the federal Pre-Disaster Mitigation Program and the Partners for Disaster Resistance: Oregon Showcase State program. This partnership will enable agencies and organizations to leverage resources for long-term planning and mitigation for natural hazards. Historically, there has been a focus on emergency response and recovery. Oregon's focus on mitigation is part of a paradigm shift highlighting risk reduction, thereby providing a cost-effective approach to reducing disaster loss. The coordination between the Pre-Disaster Mitigation Program and the Partners for Disaster Resistance Program, along with the proposed change in OEM's state agency status and the multitude of community mitigation activities statewide, has created a foundation for project implementation and future mitigation successes.

### **Notes**

1. The Oregon Natural Hazards Workgroup is a program within the Community Service Center (CSC) at the University of Oregon. The CSC is a consortium of programs assisting Oregon communities and providing service-learning opportunities to University of Oregon students. Additional programs within the CSC include the Community Planning Workshop and Resource Assistance for Rural Environments. The authors of this paper are all on the staff of the Community Service Center.
2. Oregon Emergency Management, Department of Land Conservation and Development, Forestry, and Geologic and Mineral Industries were the key state agencies involved in the review.
3. For the purpose of this paper, we use the term "intergovernmental" to mean state agencies.
4. Of the 22 surveys distributed, there were 20 responses and three non-responses. One agency submitted responses from two different divisions.

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