Resilience: A Holistic Approach

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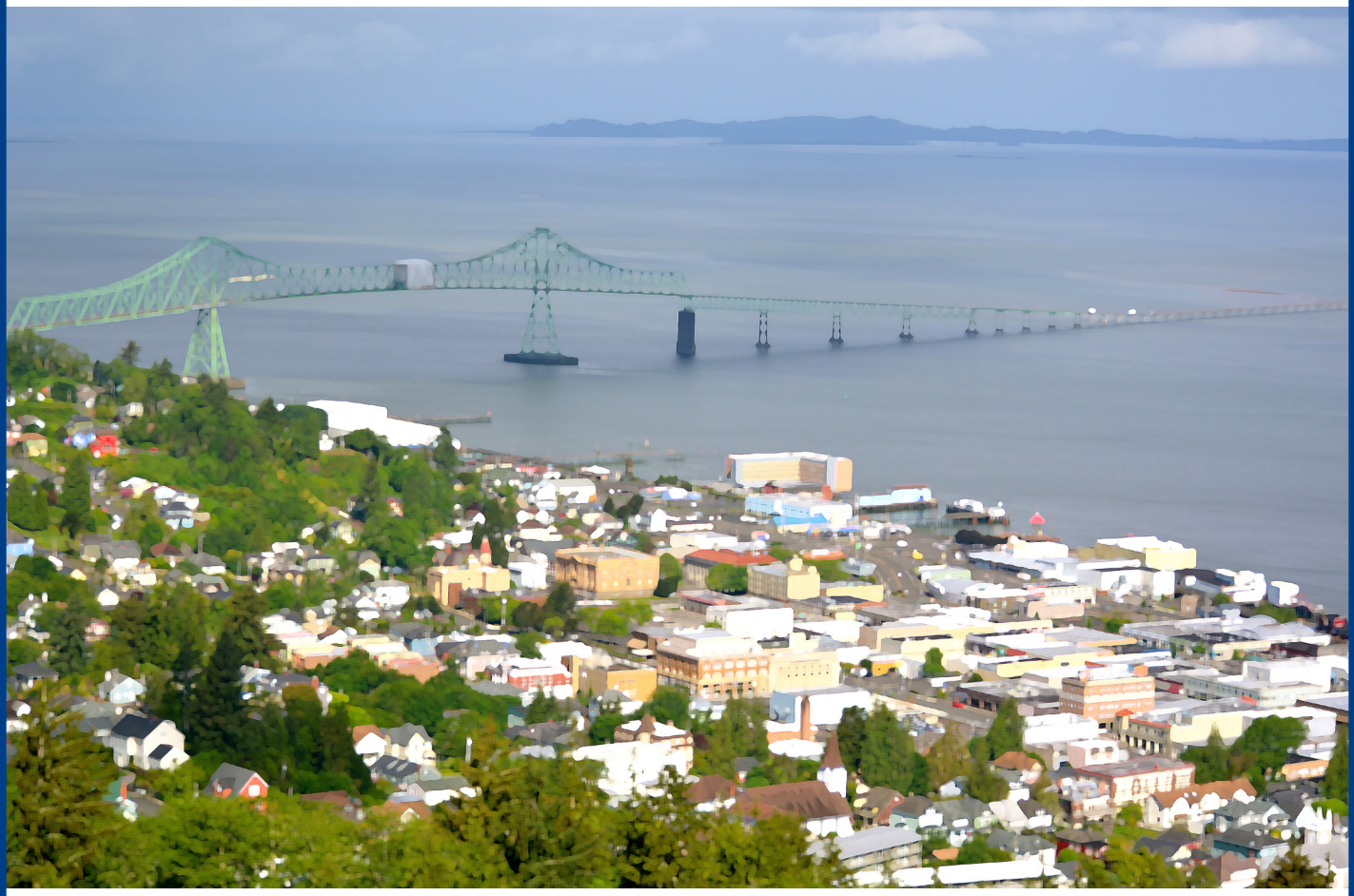

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SUMMARY

In October of 2014, the Oregon Resilience Task Force, a statewide task force created to provide guidance on natural hazard mitigation and resiliency policy for the state, is creating an implementation strategy for the Oregon Resilience Plan. Oregon has the opportunity to create a vision and roadmap that approaches resiliency from a more holistic approach—one that includes all hazards and impacted sectors.

This white paper puts the Oregon Resilience Plan into context by describing natural hazard planning in Oregon. The paper recommends and outlines a more holistic approach to thinking about hazard planning based on seven principles of resilience. This approach considers all hazards and sectors when planning for resiliency.

This white paper was written in partnership with the University of Oregon Community Service Center and the Oregon Partnership for Disaster Resilience. Many thanks to those who provided insight and feedback for this paper:

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The Community Service Center (CSC), a research center affiliated with the Department of Planning, Public Policy, and Management at the University of Oregon, is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of the CSC is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

The Oregon Partnership for Disaster Resilience (OPDR) is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by the Community Service Center at the University of Oregon, the OPDR employs a service-learning model to increase community capacity and enhance disaster safety and resilience statewide.

The Oregon Chapter of the American Planning Association is an independent, statewide, not-for-profit educational organization that provides leadership in the development of vital communities by advocating excellence in community planning, promoting education and citizen empowerment, and providing the tools and support necessary to meet the challenges of growth and change.

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HOW OREGON CURRENTLY PLANS FOR HAZARDS

Background

We live in an uncertain world. Both domestically and abroad, natural hazards are more destructive and are happening with increased frequency. There are a number of reasons for this including increased population locating in hazardous areas made vulnerable, in part, by climate change. Some of the factors we can attempt to control—for example relocating homes, businesses and other buildings from floodways and tsunami inundation areas and changes in the frequency, scale and impact of primarily weather related hazard events (wildfires, hurricanes, winter storms, floods, droughts, etc.). However, other factors are more challenging to influence – for example, global economics and supply chains, population growth, and international climate policy.

Natural Hazard Mitigation Planning

Natural hazard mitigation planning strives to reduce risk by decreasing the impact of a hazard events before they occur. The emergency management cycle in Figure 1 illustrates where hazard mitigation fits within an emergency management context.

Figure 1. Emergency Management Cycle

Source: http://mjcetenvsci.blogspot.com/2013/11/diasater-management-cycle.html

Most jurisdictions are familiar with the right half of this cycle, the preparedness and response stages. This is when people are asking and answering preparedness questions like, "What can we do before a disaster so we can be safe when it happens?" and response questions like "How will our first-responders coordinate when a disaster occurs?" Increasingly, jurisdictions are turning their focus to the mitigation and recovery stages. The questions being asked here include: "How can we reduce our vulnerability to hazards before they happen so the impacts aren't as bad?" and "How will we rebuild our community should something catastrophic happen?"

Natural hazard mitigation in Oregon takes place at the state and local levels. The DRAFT 2015 Oregon State Natural Hazards Mitigation Plan explains how Oregon has taken a leading role in the development of innovative and progressive strategies to address issues that impact its residents, economy and natural and built environments. The Oregon Beach Bill (1967), the Oregon Bottle Bill (1971) and the Oregon Land Use Program (1973) are but three historical examples of Oregon's visionary spirit. Oregon's Land Use Program established 19 statewide goals including Goal 7, "Areas Subject to Natural Hazard Disasters and Hazards." These goals are implemented through local Comprehensive Plans. The Land Conservation and Development Commission together with the Department of Land Conservation and Development (DLCD) oversee and regulate the statewide land use program. At the local (county/city) level, each community has varying levels of how they address natural hazards in their local Comprehensive Plan.

In addition, the federal Disaster Mitigation Act of 2000 (DMA2K) is a voluntary program that ties eligibility for certain types of hazard mitigation funding to the preparation and adoption of a natural hazard mitigation plan (NHMP). Because DMA2K requires many of the same things outlined in Goal 7, connecting and integrating local NHMPs into local Comprehensive Plans is one progressive solution many communities in Oregon are working towards.

Current Initiatives

Numerous statewide initiatives currently underway are designed to protect the state from hazards. For example, the Oregon Seismic Safety Policy Advisory Committee was directed by House Resolution 3 (April 18, 2011) to create the Oregon Resilience Plan that focuses on the ways Oregon can survive and recover from a 9.0 magnitude Cascadia earthquake and tsunami event.

Since the Oregon Resilience Plan was released in February 2013, the Legislature passed Oregon Senate Bill 33 on June 26, 2013. SB 33 established the Oregon Resilience Task Force and directed it to, "implement the strategic vision and roadmap of the Oregon Resilience Plan." The group presented their implementation plan and recommendations to the legislature in October 2014.[1] Other initiatives include a statewide recovery plan

1. Go to http://www.oregon.gov/OMD/OEM/Pages/Resilience-Task-force.aspx for more info.

currently being developed by the Oregon Military Department's Office of Emergency Management; local and regional risk assessment projects conducted through the Oregon Department of Geology and Mineral Industries, and; the Oregon Risk MAP (mapping, assessment and planning) program coordinated by the Department of Land Conservation and Development. Other initiatives are too numerous to list here.

WHY DOES RESILIENCE MATTER IN OREGON TODAY?

Resilience is the ability to anticipate, absorb, adapt to, and recover from disruptions. Resilience is important to Oregon because the more resilient Oregon is to hazards the more people will survive after a disaster and the stronger and more economically competitive Oregon will be locally, nationally, and globally. Consider Figure 2 which shows the time it will take for communities to recover from a disaster depending on their level of resilience.

Given the interrelated and interconnected nature of social-, economic-, environmental-, and built- systems, it is critical that Oregon policy makers, planners, emergency managers and citizens think about resiliency in broad terms. The state should work to become resilient to multiple hazards including earthquakes, wildfires, flooding, landslides, coastal erosion, and winter storms. This thinking should also extend to man-made, technologic and public health dangers.

By thinking more holistically about resilience, when a hazard event occurs, Oregon will have plans in place that can respond appropriately with all of the state's goals in mind.

HOW CAN OREGON INCREASE ITS RESILIENCE?

The following seven principles for building resilience across systems provides one approach to contextualize resilience. These principles are adapted from a social-ecological systems perspective published by the Cambridge University Press (2014) "Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems."[2] This book is an expansion on the comprehensive review "Towards principles for enhancing the resilience of ecosystem services" published in the journal Annual Review of Environment and Resources (2012). The following subsections provide short explanations of the principles with local examples.

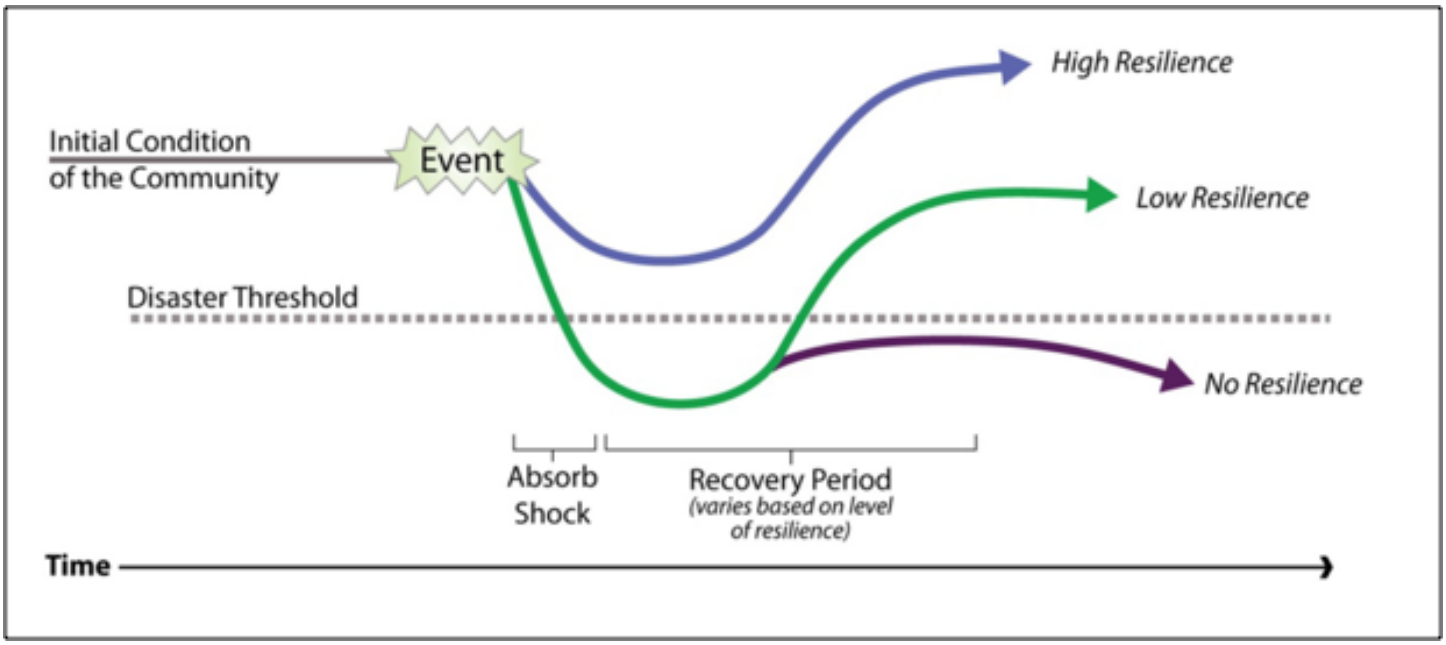
1. Maintain Diversity and Redundancy

Diversity and redundancy can be summed up with the phrase, "don't put all your eggs in one basket." Think of diversity and redundancy like an insurance policy making sure your all of your bases are covered in the event of a disaster or natural hazard. An important element is focusing less on maximum efficiency even if it costs more upfront. In the long run diversity and redundancy of systems will pay off when systems fail.

Example: Portland, OR has invested in a multi-modal transportation system with roads not only for

2. Simonsen, Sturle, et al. Applying Resilience Thinking Seven Principles for Building Resilience in Social-Ecological Systems.

Figure 2. Community Resilience Diagram



Source: Oregon Partnership for Disaster Resilience

vehicles but also public transit systems, bicycles, and pedestrians. Portland's transportation system is both diverse and redundant in order to accommodate the population growth of the city sustainably and to provide transportation options for residents and visitors. Every city should have a diverse and redundant system in place like Portland's multi-modal transportation system. This system helps by providing options and ease current issues but also is extremely important in a crisis or hazard event.

2. Manage Connectivity
Connected systems can overcome and recover from disturbances more quickly. The more and varied connections and networks that are made can help overcome a disaster.

Example: The Emergency Volunteer Corps of Nehalem Bay embodies a connected system. Formed in 2008 in response to a hazard event that isolated Manzanita, Nehalem, Wheeler, and the surrounding rural areas, the group has 300 volunteers trained to be self-sufficient and respond to disasters. Through their programs and community building efforts, the group has created a culture of emergency preparedness. This type of community effort is an effective way to survive a Cascadia event where citizens need to plan to be self-sufficient for much longer than the commonly advised 72-hour period. Even in the case of a winter storm or flood, knowing your neighbors and the resources in the community through a volunteer group effort and program like the Emergency Volunteer Corps of Nehalem Bay will create the resilient community that is better off in an adverse situation.

3. Manage Slow Variables and Feedback
The way society functions has changed over time. It is important to pay attention to these changes and do our best to not let them effect how resilient we are as a community.

Example: Our current food systems rely on a global food network where in the Willamette Valley 97% of the valley's food is imported. This is consistent with regions across the United States.[3] The Willamette Valley's dependence on an international food network today means the region is not nearly as resilient as it can be (or has been historically) in a hazard event. Willamette Valley's Crop Trend has gone from producing food to focusing almost solely on grass seed, a non-edible crop. The Willamette Valley has the potential to grow a number of edible crops as was done before the globalization of food system. The issue is that processing and storage has moved away from the valley due to their cost so the Willamette Valley no longer has a way to process and store enough food for the system to be self-sufficient anymore. Recognizing these types of changes in our society and working towards creating systems that are more resilient is essential.

4. Foster Complex Adaptive Systems Thinking
Building off of principles 2 and 3, this principle gets at the idea that connections and interdependencies matter. Interdependencies address the fact that all systems are connected in some way. Adopting a systems framework is important to expect and account for these interdependencies.

Example: Eugene and Springfield recently completed a vulnerability assessment project that highlights the principle of complex adaptive systems thinking. The purpose of the project was to develop and apply a method for assessing the vulnerability of community-wide sectors to climate change, rising energy prices, and the natural hazards (earthquake, flood, wildfire, etc.) contained in the Eugene/Springfield Natural Hazards Mitigation Plan. This vulnerability assessment was applied to multiple sectors including transportation, water, energy, health, housing, and food. The findings from the assessment will be used to inform the update of the Natural Hazards Mitigation Plan and to inform other planning, risk management, and investment decisions. The project produced rich and informative results about the vulnerabilities of individual sectors as well as the dependency and inter-connectedness of virtually all of the systems studied. This should lead to a more robust, comprehensive, and realistic assessment of needed hazard mitigation actions and one that reflects the inherent synergies between natural hazards, climate change, and energy insecurity.[4]

5. Encourage Learning
Continuous learning and experimentation is another key to resiliency. This is done through engaging a variety of participants, providing opportunities for interaction, and ensuring sufficient resources.

Example: The American Planning Association (APA) has been encouraging learning through their reports, memoranda, expert testimony, conference presentations, workshops, training sessions, blog postings, and other website material for years. The APA has recently been working to establish a Hazard Mitigation and Recovery Planning Division that would encourage greater learning by:

3. Armstrong, Dan. "Relocalizing Eden." Mud City Press. March 9, 2008. Accessed August 8, 2014. http://www.mudcitypress.com/mudeden.html.

4. "Hazard and Climate Vulnerability Assessment." March, 2014. Accessed August 5, 2014. http://www.livabilitylane.org/files/Vulnerability-Assessment.pdf.

- Increasing the understanding of hazard mitigation and disaster recovery planning as key elements of public policy formulation at all levels of government
- Promoting hazard mitigation and disaster recovery as critical elements of neighborhood, community, regional, state and national planning processes
- Disseminating materials and information about current hazard mitigation and disaster recovery practice and theory to members of the Division
- Promoting professional communication among members of the Division through a variety of member services, including but not limited to newsletters, conference sessions, workshops and other publications
- Identifying complementary issues/problems that serve as opportunities to collaborate with other APA Divisions.[5]

6. Broaden Participation
Broad participation builds trust and creates a greater understanding. Important things to consider include: clarifying goals and expectations; involving the right people; finding leaders that can mobilize a group; providing capacity building; dealing with power issues and potential conflicts, and; securing sufficient resources to enable effective participation.

Example: The 100 Resilient Cities is an initiative pioneered and funded by The Rockefeller Foundation. The goal is to build capacity for a global network of cities dealing with similar and challenging resiliency issues from natural hazards to unemployment and violence. Cities in the 100 Resilient Cities network are provided with the resources necessary to develop a roadmap to resilience along four main pathways:

- Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city's resilience efforts
- Expert support for development of a robust resilience strategy
- Access to solutions, service providers, and partners from the private, public, and NGO sectors who can help them develop and implement their resilience strategies
- Membership of a global network of member cities who can learn from and help each other[6]

Notably, this principle builds upon principle 5 and also is related to the local example of the capacity building work of the Emergency Volunteer Corps of Nehalem Bay as discussed in principle 2.

7. Promote Polycentric Governance Systems
Collaboration across institutions improves communication and efficiency. Well-connected governance structures can better deal with change and disturbance. Non-governmental organization (NGO) relationships are also important as a part of these polycentric governance systems.
Example: The Southeast Florida Regional Climate Change Compact is an example of how a local group has worked together on a coordinated response to climate change that has influenced the State of Florida. The compact is comprised of Broward, Miami-Dade, Monroe and Palm Beach Counties. With 5.6 million people and 109 individual municipalities, the four-county Compact region accounts for nearly one third of Florida's population and over one third of the state's economy. The Regional Compact is designed to pioneer a regional climate governance model designed to enable local governments to set the agenda for climate change solutions while providing an efficient means to coordinate the engagement of state and federal agency engagement. The scope and extent of regional engagement made possible by the Regional Compact has served to foster on-going bi-partisan support as the Compact continues to enjoy strong political leadership from each of the Compact Counties.[7]

TRENDS

National/Global
Trends show resilience is coming about through grassroots and educational efforts that are impacting the way government agencies have traditionally thought about natural hazards. The South Florida Regional Climate Change Compact is a great example of a local effort organizing to impact state decisions. The Rockefeller Foundation 100 Resilient Cities project shows the high level of interest in resilient communities from an influential NGO. Educational programs are happening through professional organizations including the APA, but are also happening on University campuses.

Regional
Western Washington University has a program called the Resilience institute. The Resilience Institute is part of Western Washington University's Huxley College of the Environment. It facilitates scholarship, education,

5. "Proposal to Establish a Division." American Planning Association. May 8, 2014. Accessed August 8, 2014. https://www.planning.org/divisions/proposed/hazardmitigation/.
6. 100 Resilient Cities. December 2013. Accessed August 8, 2014.
7. South Florida Regional Compact Climate Change. Accessed August 5, 2014. http://southeastfloridaclimatecompact.org.

and practice on reducing social and physical vulnerability to natural hazards through sustainable community development. The Institute promotes sustainable development strategies as a way to minimize loss and enhance recovery from disasters, and foster resilient communities in Washington State and its interdependent global communities. The Resilience Institute was established as a research and development component of Western Washington University's undergraduate minor in Disaster Reduction and Emergency Planning. Its efforts are aimed at developing a cutting-edge research agenda to:

- Facilitate greater disaster risk awareness and reduction, and
- Support participatory planning processes in emergency planning in Washington State, the Northwest region, and beyond as a strategy for building community resilience.[8]

Local

In Oregon, one recent trend is the Oregon Seismic Rehabilitation Grant Program, which is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public buildings, particularly public schools and emergency services facilities. There has also been more involvement by DLCD for hazards planning including incorporating Goal 7 into local comprehensive plans. Oregon Emergency Management is also developing a state level Recovery Framework. These initiatives will all help address natural hazards better and highlight Oregon's progressive planning and initiatives.

HOW FUNDING WORKS

The 2015 Oregon State Natural Hazards Mitigation Plan draft explains how funding for hazards in the state works. Oregon uses a number of local, state, and federal funding sources to support natural hazard mitigation projects and planning. In general, FEMA Hazard Mitigation Assistance (HMA) grants figure prominently in the state's funding strategy. Several of the grant programs are available "pre-disaster" while others are available only after a federally declared disaster has occurred.

State funding to support hazard mitigation and risk reduction remains extremely limited. However, Oregon has an excellent track record of leveraging limited local resources to successfully complete mitigation planning and projects throughout the state. State funding often consists of "General Fund" money that pays for the labor costs of state officials who are working to support local and statewide hazard mitigation activities. These labor costs are often used as non-federal cost-share for projects that are otherwise federally funded. For example, all of the Office of Emergency Management's (OEM) mitigation staff are funded in part by state dollars that are used to match other federal, homeland security based funding sources. Notably, the majority of state-level staff positions dedicated to hazard mitigation planning and implementation (and a growing number of those at the local level) are funding through federal programs or grants. While Oregon has successfully leveraged funds, a lack of staff resources and capacity contributed to the loss of Enhanced plan status for the Natural Hazard Mitigation Plan in 2012. Loss of Enhanced Plan status means less federal money coming in to the state when a Presidential Disaster Declaration is issued.

Chief among the federal funding sources used to support local mitigation planning in Oregon is FEMA's Pre-Disaster Mitigation Grant Program (PDM). PDM funds generally support one or more local mitigation projects each year as well. The Flood Mitigation Assistance Program (FMA) provides federal funds for flood hazard planning, flood mitigation projects or both. FMA priorities for funding are (1) mitigation plans, (2) projects that mitigate Severe Repetitive Loss (SRL) properties and (3) projects that mitigate Repetitive Loss (RL) properties. Because Oregon is so successful at developing and updating mitigation plans through the PDM program, FMA funds are used exclusively for SRL and RL flood mitigation project grants. Given the annual uncertainty regarding the availability of HMA Grants, Oregon is actively pursuing opportunities to expand local funding for mitigation planning and projects. Because the allocation of funds depends on statewide budget priorities and politics, future availability of additional local funds remains uncertain.

Post-disaster, the Hazard Mitigation Grant Program (HMGP), Public Assistance (PA) Program, and Small Business Association's (SBA) Physical Disaster Loan Program each support varying levels and types of mitigation planning and projects. Oregon has experienced nine presidentially declared disasters over the past 10-years. Each of these disaster declarations has opened up funds through HMGP that Oregon has used to support local and statewide hazard mitigation planning as well as numerous local mitigation projects.

In addition, cities, counties, and special districts use a variety of funding mechanisms to support local mitigation projects. Capital improvement funds, service fees, general funds, levies, and local grants are used to support mitigation projects across Oregon. For example, Lincoln County voters have approved several bond measures that

8. "Resilience Institute." Western Washington University. Accessed August 8, 2014. https://huxley.wwu.edu/resilience-institute.

specifically supported the relocation of schools outside the tsunami inundation zone. In one case, local bond funds leveraged the first FEMA supported (PDM) tsunami school buy-out in the nation. These examples reflect the creative, innovative, and pro-active methods communities in Oregon are using to support risk reduction.[9]

Future funding sources the state may need to explore include private foundations or other public-private funding agreements. Notably, the identification, generation, and allocation of new sources of state funding would be the best way to ensure that critical mitigation activities are implemented in Oregon. Given current economic and political realities at local, state, region, nation, and global levels, successful identification of new public funding sources remains a significant challenge. Consistent funding is essential to support program continuity; a robust, strategic mitigation program that allows for project development, implementation, close-out and validation requires significant, ongoing support. The recent loss of "enhanced status" for the State NHMP reflects these resource limitations. At present, Oregon lacks capacity across all levels of government to effectively support the full range of hazard mitigation efforts currently needed in Oregon.

CONCLUSION

Oregon is known across the United States and internationally for its progressive policies and planning principles. With the Oregon Resilience Task Force working towards an implementation strategy for the Oregon Resilience Plan, now is the perfect time to continue Oregon's progressive reputation and set the bar with a visionary resilience implementation plan that applies the Seven Principles of Resilience Framework. Hazard planning should not focus on one hazard but instead focus on all hazards while also working with other sectors to create a truly resilient Oregon.

Here is an overview of several key strengths, weaknesses, opportunities, and threats regarding natural hazard planning in Oregon:

Strengths

- Oregon's Land Use Statewide Goal 7 "Areas Subject to Natural Hazard Disasters and Hazards" and more involvement from DLCD to incorporate Goal 7 into local comprehensive plans.
- The Disaster Mitigation Act of 2000
    - o Most of the state's population is covered by a local NHMP
- Oregon Resilience Plan

Weaknesses

- Uncertainties associated with climate change
- Uncertainties associated with Cascadia earthquake/ tsunami and its ripple effects
- Insufficient resources to implement mitigation measures at local and state levels
- Insufficient collaboration across sectors
- Public education about hazards, risks and community vulnerabilities
- Lack of Administrative Rules to implement Statewide Planning Goal 7

Opportunities

- Develop and adopt Goal 7 Administrative Rules
- Continue to increase public awareness of natural hazards and the need to plan for and implement risk reduction strategies
- Regain enhanced plan status for the Oregon Natural Hazard Mitigation Plan
- Increase funding for implementation (e.g. Seismic Rehabilitation Grant Program)
- Increase funding for hazard risk and vulnerability assessment (e.g. general fund support for DOGAMI)
- Increase funding for local hazard planning technical assistance and capacity (e.g. general fund support for DLCD)

Threats

- Uncertain future (when will the Cascadia earthquake event happen? How will climate change impact Oregon?)
- Lack of legislative action
- Loss of Federal funding
- Lack of a coordinated, strategic, multi-objective strategy to achieve Oregon's economic, environmental and social goals

9. "PRELIMINARY DRAFT 2015 Oregon NHMP, v03." August 1, 2014. Accessed August 8, 2014. http://www.oregon.gov/LCD/HAZ/docs/4_Mitigation_Strategy.pdf.

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