South Clatsop County Resilience Guide

January, 2015

Volume II: Appendices A through D

Prepared for:

Clatsop County and the communities of Seaside, Cannon Beach, Gearhart and Arch Cape and the Department of Land Conservation and Development North Coast Resilience Network Project

Prepared by:

Oregon Partnership for Disaster Resilience

A Program of the
Community Service Center

UNIVERSITY OF OREGON

This guide is available online at

http://www.oregon.gov/LCD/Pages/publications.aspx

or

http://www.oregon.gov/LCD/OCMP/Pages/Publications.aspx

Oregon Department of Land Conservation and Development
Jim Rue, Director
635 Capitol Street NE #150
Salem, Oregon 97301-2540

SOUTHWEST CLATSOP COUNTY RESILIENCE GUIDE

Volume II

Appendices A through D

Appendix A: Mapping for Resilience A-1

Appendix B: Principles of Resilience B-1

Appendix C: Technical Memo #1: Resilience Assessment Methodology Literature Review and Recommendations C-1

Appendix D: Coastal Community Resilience Plans: A Summary of the USAID's Resilience Assessment Process D-1

Volume III (under separate cover)

Appendix E

Appendix E: Full Size* Resilience Resource Sheets E-1

**Material in Appendix E is exactly the same as pages 19-38 in Volume I, except for page size.*

Appendix A:
Mapping for Resilience

Mapping Community Vulnerability to Support Planning for Resilience

Oregon's Coastal Community Resilience Networks Pilot Project is ambitious. The project was designed to include several broad and complementary elements: actually planning for community resilience; establishing networks to build community resilience; and community-based mapping to support planning for community resilience. In implementing the project, a mapping element was assembled and made available for use by project partners. However, neither community-based mapping nor the actual use of mapping to support resilience planning has been fully tested. This appendix provides an overview of mapping for resilience and how community-based mapping might be used to improve community resilience, and a summary of what the project accomplished, which might be used to assemble similar capacity for use in another area.

The central challenge at the heart of community based mapping for resilience is how to access, organize and use community knowledge to improve the foundation for resilience planning. *Can community-based mapping be used to identify community vulnerabilities in support of planning for community resilience?* This challenge involves several assumptions or conclusions:

- Community vulnerability directly affects community resilience
- Citizens who are not directly involved in planning for hazards have knowledge that can supplement the community's planning capacity
- Community-based mapping is a viable mechanism to access and compile that knowledge

Of these three starting assumptions, the third clearly presents the greatest challenge. Community-based mapping is theoretically a robust way to compile local knowledge. However, its *availability* does not automatically lead to its *use*. Significantly more effort may be needed to help members of the general public get comfortable with the use of a digital map interface.

<u>Community Vulnerability and Community Resilience</u>

Planning for natural hazards is based in part on knowledge about natural hazard risks to a community or site. In the world of planning for hazards, *risk* is commonly described as the intersection, overlap or coincidence of *exposure* to a hazard and the *vulnerability* of a resource, site, person, or population to that hazard. In this way of thinking, vulnerability largely depends on the hazard: something is vulnerable because of the hazard.

Hazard mitigation planning typically seeks to reduce risk by reducing exposure to hazards. Reducing exposure is an effective way to reduce risk without needing to address vulnerability: If something is not in harm's way, it is not vulnerable to that hazard. For instance, a simple way for a community to reduce damage from flooding is to move infrastructure and investments out of flood-prone areas—or not to place them there in the first place. In simple terms, risk is reduced by reducing exposure.

Risk can also be reduced by reducing vulnerability. Aside from reducing *exposure*, reducing *vulnerability* is also a viable strategy to improve community resilience. In other words, measures to reduce vulnerability—in addition to measures to reduce or mitigate exposure--will reduce the potential for damage or harm from a hazard event, which in turn will better position a community to recover from such events.

There is a line of thinking that says that vulnerability is not necessarily tied to a particular hazard. Rather, an expanded approach says the vulnerability of people involves conditions or circumstances that exist prior to a hazard event or disaster, and that by their nature make it less likely that such people can respond to the event or access resources after an event to ensure full recovery to pre-event conditions. The term 'vulnerable' comes from a Latin term:

> *"Vulnerabilis* was the term used by the Romans to describe the state of a soldier lying wounded on the battlefield, i.e., already injured therefore at risk from further attack. The relevance to the present discussion is that vulnerability, in this classic sense, is defined primarily by the prior damage (the existing wound) and not by the future stress (any further attack). By analogy, then, the vulnerability of any individual or social grouping to some particular form of natural hazard is determined primarily by their existent state, that is, by their capacity to respond to that hazard, rather than by what may or may not happen in the future."[1]

In short, vulnerability is commonly a function of socioeconomic conditions that exist without respect to a particular hazard, such as poverty, disabilities of various kinds, communication challenges, and so on.

Reducing risk is the cornerstone of community resilience. Communities can reduce risk by (among other things) reducing exposure to hazards *and* addressing sources of vulnerability. In the end, measures to address vulnerability can be a distinct element in a community's approach to improving resilience.

Using Community-Based Mapping to Compile Local Knowledge

Location, geography, and the socioeconomic condition of a community and its members all affect community vulnerability—and, therefore, its fundamental level of resilience. So ultimately, a community may consider mapping both the physical vulnerability of infrastructure and property improvements and socioeconomic vulnerability of people and communities as a basis for ongoing planning for community resilience.

"Community Vulnerability Maps,"[2] can be developed at the neighborhood level to support local hazard or resilience planning. And neighborhood-level vulnerability mapping can involve community members:

> A community vulnerability inventory reflects where at-risk groups such as the following are concentrated:
>
> - Residents of group living facilities
> - Ethnic minorities (by language)
> - Elderly, particularly frail elderly
> - Recent residents/immigrants/migrants
> - Physically or mentally disabled
> - Large households
> - Renters
> - Large concentrations of children/youth
> - Poor households
> - Homeless
> - Women-headed households
> - Tourists and transients
>
> These vulnerability categories are not mutually exclusive. Indeed, they are likely to be compounded in ways that place certain geographical areas of the community especially at risk.[3]

A community may consider using 'community-based mapping' to refine and improve its inventory of vulnerable assets and people. 'Community-based mapping' refers to a system or process used to

---

[1] From "Theory And Practice in Assessing Vulnerability to Climate Change and Facilitating Adaptation." P. M. Kelly and W. N. Adger, *Climatic Change* 47: 325–352, 2000.
[2] From Betty Hearn Morrow. *Identifying and mapping community vulnerability* Disasters. 1999, 23(1):1-18.
[3] Ibid.

gather geospatially-specific local knowledge about conditions on the ground from distributed, multiple sources—typically informed non-professionals—for display in a map format. Certainly, knowledge about individuals and households is probably best generated at the neighborhood level. Community based mapping and community-based activities like "Map Your Neighborhood" can help identify areas of vulnerability for mitigation, evacuation, response, and recovery planning, *all of which have the potential to improve community resilience to natural disasters.*

Community members may have specific information about conditions that could feed into planning for hazards and community resilience. For example, someone might know about an undersized culvert that always exacerbates flooding; a levee may appear to be eroding or slumping; a designated evacuation route may rely on an unlit, unpaved pathway. Local knowledge can potentially be used to refine and improve local strategies to reduce exposure, reduce vulnerabilities, and convey information about risk.

Community-based mapping can be used to capture detailed local data to develop a full understanding of local vulnerability. A community may benefit in other ways by tapping into local knowledge about hazards or vulnerabilities. The most important benefit might be improving the general level of community knowledge about natural hazard risks. The idea is to establish a capacity for community members to identify and map known points or elements of vulnerability in the community. Presumably, local awareness of vulnerability to natural hazards will create the environment for robust local response and recovery from hazard events.

The resilience network project only began to test the practicality and value of community-based mapping (CBM) to tap into the knowledge of community members. Two approaches to CBM were used. In the first approach, local work group members were given a chance to identify on paper maps features that were thought to influence local vulnerability. This approach can be expanded and adapted for use in any workshop setting where community vulnerability is discussed and information is captured on paper maps. The second approach involves the use of an internet-based platform where users can independently add information on community vulnerability. In fact, information that was put on the maps in the workshop setting has been digitized and included in a prototype community hazard mapping portal on the internet.

Clatsop Hazard Information Portal

Department of Land Conservation and Development staff assembled an online mapping portal for the Coastal Community Resilience Networks Project. The Clatsop Hazard Information Portal (CHIP) is a prototype portal that provides access to a GIS tool for local use in hazard mitigation and community resilience planning, with no cost to the community. The portal (see Figure 1) provides users with access to county, state, and federal mapped data on natural hazards and community features. Such data, when combined with *locally managed data*, can be used to help land use planners, hazard mitigation planners, emergency managers, and other local decision makers identify the local natural hazard vulnerabilities.

CHIP has an additional benefit in that, in times of natural hazard events, the tool can be made accessible to state and federal officials who can use the local-specific information for emergency management purposes.

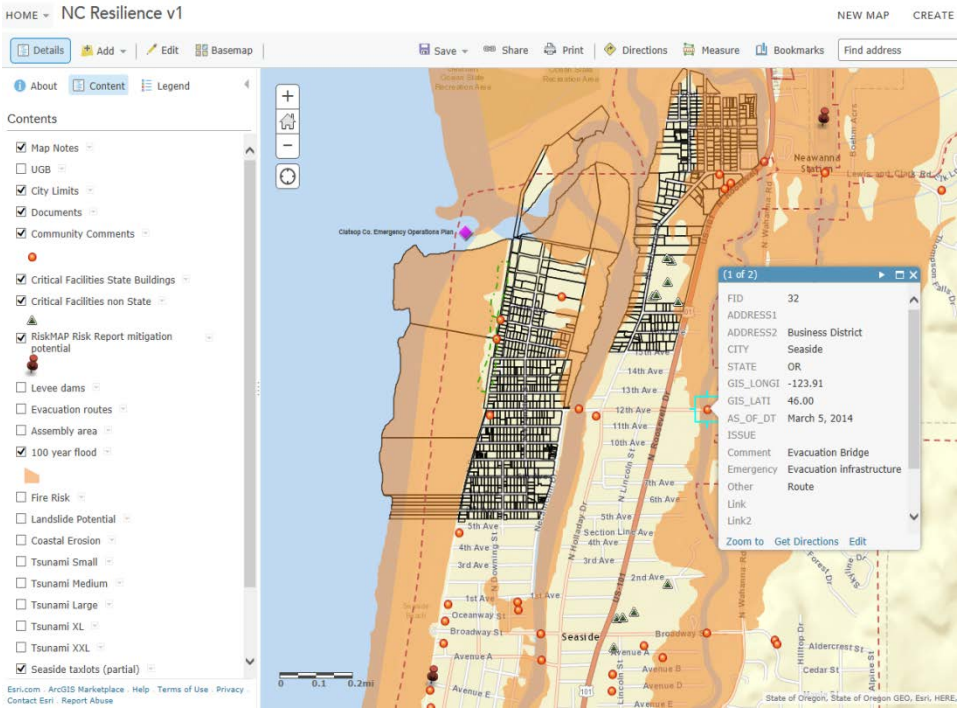


Figure 1. Sample page from the Clatsop Hazard Information Portal

The primary purpose of the portal is promote active participation of community stakeholders in viewing, generating, and managing data and information that is *important to the community* (and possibly not available anywhere else) in building resilience. Throughout the development of the portal and discussions with local partner work groups in the pilot project, discussions of mapping emphasized the value of identifying and mapping community vulnerabilities. As noted above, the underlying premise in mapping community vulnerabilities is that efforts to identify and reduce local vulnerabilities will reduce local hazard risks and consequently, improve community resilience.

Locally-generated data and information can help inform discussions about such topics that influence planning for hazards and community resilience as:

- What exists at a particular location?
- Where are the best or worst places to put something or someone?
- What changes have occurred in a specific period of time?
- Where are people who may need assistance during a hazard event located?
- Are infrastructure improvements or other community assets exposed to natural hazards?

The mapping tool provides access to the most detailed and current data available on hazards such as floods, landslides, and tsunamis. The tool itself allows such data to be viewed and manipulated in conjunction with data showing tax lots, critical facilities, and other important community features and assets. The tool basically replicates the longstanding practice in land use planning that involves the simultaneous use of transparent maps that show different components or aspects of a particular area. An online tool like CHIP becomes a community asset--and not just a GIS data viewer--when users enter and maintain their own data and information either to use it with available data (maps) so others can use it for community analyses. Data entered by users can be in the form of additions to existing datasets or notes about specific features, places, or conditions. With a fully-developed platform, users can enter and manage their own geographic content and the data are maintained in a secure, cloud-based environment at no cost to the communities. Finally, the ESRI ArcGIS Online platform provides a rich resource of additional layers and base maps that users or communities can incorporate into their viewer.

In assembling the prototype CHIP, the initial community dataset ("Community Comments") was compiled from over sixty annotations put on a set of paper maps by members of the local work groups. Work group members, including citizen planners and community officials, were asked to identify what they thought were important points of community vulnerability that might not be identified by any other process or inventory. The compiled dataset contains a range of observations about things like vulnerable bridges, care facilities, fuel tanks, and so on. The database for this preliminary community vulnerability inventory contains fields that identify the location and describe the feature. To demonstrate of the utility of linking to other Internet datasets, each community comment contains a URL to its location in Google Street View. To demonstrate how each community's data can be revised and customized, CHIP includes a locally unique dataset that contains the location of mitigation opportunities as identified through a FEMA Risk MAP project.

Current layers in CHIP include:

<u>Hazard Layers:</u>

- Special Flood Hazard Area (SFHA), or "100-year" flood
- Tsunami (five Cascadia Event scenarios)
- Landslides
- Fire risk
- Coastal erosion

<u>Additional Layers:</u>

- Administrative Boundaries (City limits and UGBs)
- Critical facilities
- Evacuation routes and evacuation assembly areas
- Levees and dams
- Tax lots with selected assessor data

The eventual goal for a fully-developed and community-maintained platform like CHIP is to structure it so the primary hazard and base layers are maintained by the Oregon Department of Land Conservation and Development in association with the Oregon Geospatial Enterprise Office (GEO), while datasets unique to the communities are maintained locally. Over time, local partners may choose to take on more of the maintenance and oversight role that DLCD and GEO now have.

Base Data Layers for Community-Based Mapping

One of the initial challenges in developing a platform for CBM is to identify what data and information to use for the foundation. Possible contents of a mapping system include:[4]

Base maps

- Community land use information (zoning, etc.)
- Structures: Year of construction

Hazards

- Natural hazard inventories that identify areas of risk
- FEMA's Discovery Reports for communities engaged in the RiskMAP process contain information about flood zones; Letters of Map Amendments; damage claims; repetitive loss sites; insured value; uninsured improvements; and extent of historic floods

Vulnerabilities

- People:
  - Census data at the block level; neighborhoods
  - Concentration of vulnerable populations like schools, medical offices and facilities, community centers and other congregation sites, day care facilities, foster facilities, long-term care facilities, nursing homes,
  - Jails
- Infrastructure:
  - Evacuation routes, safe areas
  - Domestic water supply
  - Wastewater systems
  - Solid waste facilities
  - Roads, bridges, airports;
  - Communications: cell towers, areas with coverage
  - Energy systems: electrical grid; fuel; emergency generators
  - Dikes, levees, bulkheads, seawalls
  - Stormwater management system
  - Dams
- Services and resources that affect community functioning:
  - Government
  - Banks
  - Critical businesses (food, fuel, communications, cash, transportation)
  - Emergency response and operations infrastructure: Police, fire, shelters, command facilities; emergency warning systems

Lastly, the guidance document used in this pilot project[5] contains clear suggestions about what might be mapped under the benchmarks that were used to develop the resilience elements:

---

[4] This list was generated in part by referring to the "Coastal Community Resilience Index: A Community Self-Assessment," 2010. NOAA, Sea Grant, and the Gulf of Mexico Alliance. (http://masgc.org/assets/uploads/publications/662/coastal_community_resilience_index.pdf)

[5] U.S. Indian Ocean Tsunami Warning System Program. 2007. How Resilient is Your Coastal Community? A Guide for Evaluating Coastal Community Resilience to Tsunamis and Other Coastal Hazards. U.S. Indian Ocean Tsunami Warning System Program supported by the United States Agency for International Development and partners, Bangkok, Thailand. 144 p. See Table 4-6 on page 4-14.

Community Features to Consider for Mapping by Resilience Element	
A. Governance	Basic services (roads, bridges, ports and harbors, electrical supply, potable water, etc.), critical facilities (hospitals, schools, etc.), government offices
B. Society and Economy	Religious institutions (churches, mosques, temples, etc.), cultural resources (shrines, historical landmarks, etc.), commercial centers (markets, malls, supply centers), livelihood resources (fishing grounds, cold storage)
C. Coastal Resource Management	Protected areas, conservation areas, management zones, critical habitat (coral reefs, wetlands, etc.), resources of special concern (endangered species, spawning grounds, etc.), protective resources (sand dunes, mangroves, etc.)
D. Land Use Management and Structural Design	Current and planned land uses (agricultural, residential, industrial, conservation, etc.)
E. Risk Knowledge	Hazard areas (tsunami zones, flooding zones, landslide zones, erosion zones), at-risk populations, individuals with special needs
F. Warning and Evacuation	Warning towers, warning flags, warning centers, evacuation zones, evacuation routes, evacuation towers, evacuation shelters, safe areas
G. Emergency Response	Emergency centers, police stations, community center
H. Disaster Recovery	Emergency supplies, redevelopment areas, coastal setbacks

Lessons from the Pilot

Mapping in general and community-based mapping in particular provide a rich and potentially very detailed foundation for improved understanding of community vulnerabilities. However, there are challenges in getting potential users—both local officials and members of the general public—up to speed in using an online mapping system. There are additional challenges in developing a common understanding about what kind of data are being sought, and further, how such data should be acquired and added to the database. While community-based mapping for resilience has considerable theoretical appeal, a range of practical challenges limit the ability to put such a system in place. In the end, a successful community-based mapping platform probably needs a local champion and a compelling event—like a flood—that provides a reason and opportunities to upload geographically specific data. Only then will something like CHIP be more than just a "viewer" and generate the momentum needed for continued updating and maintenance.

References

For additional information about mapping for resilience, refer to the following:

"Identifying and Mapping Community Vulnerability" Betty Hearn Morrow, *Disasters*, 1999, 23(1): 1-18

"Community Vulnerability Assessment Tool Methodology." Flax et al., 2002. Describes NOAA's Community Vulnerability Assessment Tool, a methodology based on findings of the H. John Heinz III Center's Panel on Risk, Vulnerability, and the True Cost of Hazards, as reported in the *Hidden Costs of Coastal Hazards* (2000). See http://www.csc.noaa.gov/products/nchaz/startup.html.

"Creating Resilient Communities: The Work of SERRI and CARRI." National Security Directorate, Oak Ridge National Laboratory. 2009. ORNL 2009-G00844/jcn. (Available at http://www.resilientus.com.)

Revealing the Vulnerability of People and Places: A Case Study of Georgetown County, South Carolina. Susan L. Cutter, Jerry T. Mitchell, Michael S. Scott. Annals of the Association of American Geographers, Vol. 90, No. 4 (Dec., 2000), pp.713-737.

APPENDIX B: CONTEXT AND PRINCIPLES FOR COMMUNITY RESILIENCE

Resilience is achieved through the consistent use of key principles. To be effective, citizens, business leaders, community organizations, elected officials and government representatives (among others) can apply these principles to their community policy and decision frameworks.

Regardless of the specific threat(s) a community faces, resilience is built on a common set of ideas and principles. Said another way, communities that utilize resilience principles to guide policy and decision making will be better able to anticipate, absorb, adapt to and recover from any number of disturbances or changes that might occur.

In 2014, the Stockholm Resilience Center released a summary publication entitled "Applying Resilience Thinking: Seven Principles for building resilience in social-ecological systems."[1] The summary provides an overview of the book "Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems", published by Cambridge University Press in 2014. The following principles are derived from these two publications. This section provides short explanations of the principles with relevant examples. These concepts can be used when answering the questions presented in Section 3.

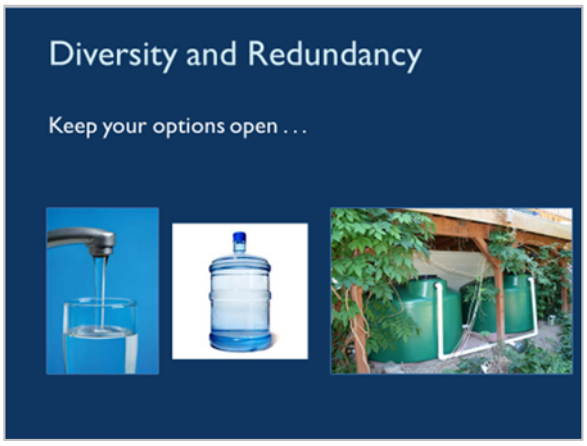
Principle 1: Maintain Diverse and Redundant System Components

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. If one part of the system fails as a result of disaster or natural hazard event, other parts of the system remain operational to ensure that basic community functions are maintained. An important element to diversity and redundancy is focusing less on maximum efficiency and short-term economic gains. Investments made today can result in significant savings down the road. In the long run, diverse and redundant systems are better able to support the community when disasters occur.

Consider a city with an economy that is built around a single industry. Any impact to a segment of that industry – supply or distribution, product demand, availability of raw materials, regulation, or disaster event – can have disastrous consequences. If you live in a company town and the company leaves, your livelihood goes with it because there are no other employment options for you. As a result, single industry economies tend to be less resilient than diverse economies.

[1] Stockholm Resilience Center, Stockholm University. *Applying resilience thinking: Seven Principles for building resilience in social-ecological systems.* <http://www.stockholmresilience.org/download/18.10119fc11455d3c557d6928/1398150799790/SRC+Applying+Resilience+final.pdf>.

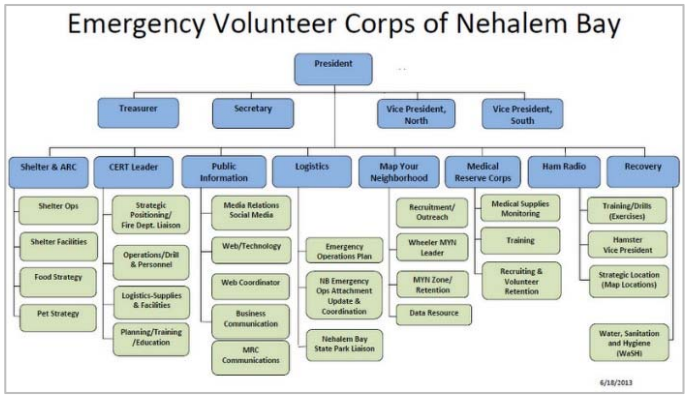
Example: Portland, Oregon has invested in a multi-modal transportation system made up of roads for automobiles, rail for freight and passenger service, public transit systems and dedicated infrastructure for bicycles and pedestrians. Because of this, Portland's transportation system provides both diversity and redundancy for its citizens. If gas prices go up or if bridges are destroyed in an earthquake, Portlanders will have options that allow them to get around. Importantly, the availability of transportation options encourages the use of alternatives on a daily basis. Every sector should have a diverse and redundant system in place like Portland's transportation system.



Principle 11: Manage Connectivity

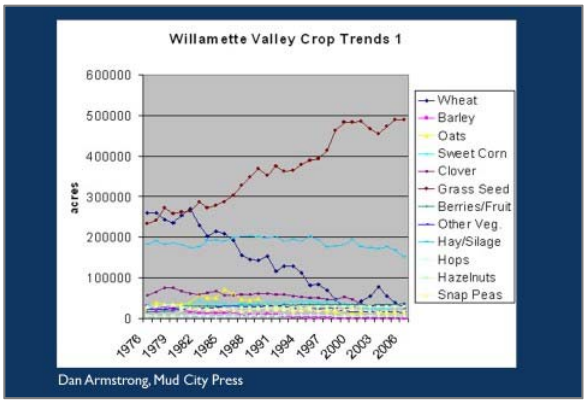
Connected systems can overcome and recover from disturbances more quickly. Greater numbers of participants and wide-ranging connections across networks can ensure resources can be accessed to help adapt and recover when hazardous events occur.

Example: The Emergency Volunteer Corps of Nehalem Bay embodies a connected system. Formed in 2008 in response to a coastal storm event that isolated Manzanita, Nehalem, Wheeler and the surrounding rural areas, the group has 300 trained volunteers 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.



Principle III: Manage Slow Changes and Feedback Loops

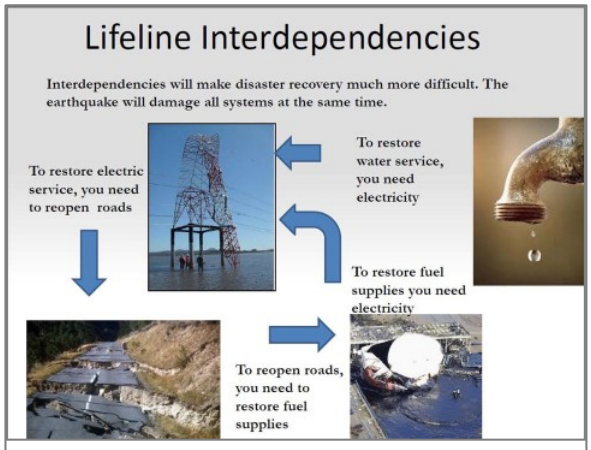
The way society functions has changed over time. It is important to pay attention to these changes and do our best to not let them affect how resilient we are as a community.



Example: Our current food systems currently depend on a global food network. In the Willamette Valley, 97% of the valley's food is imported (Armstrong, 2008). This is consistent with regions across the United States. The Willamette Valley's dependence on an international food network means the region is not nearly as resilient as it could be (or has been historically). For example, 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 lots 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.

Principle IV: Systems Thinking

Building off of principles 2 and 3, systems thinking is the idea that connections and interdependencies matter. Often times, communities make decisions without considering the direct or indirect impacts to other functional segments of the community. 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.



Source: Oregon Resilience Plan

Example: The Oregon Resilience Plan offers the following example of how systems thinking can be applied to "lifeline" systems. A, "major factor that amplifies the effects of a Cascadia earthquake is the interdependency of our lifeline systems, coupled with the wide geographic spread of a Cascadia disaster. Unlike a severe storm, a Cascadia subduction earthquake would simultaneously damage power,

natural gas, and petroleum lines, roads and bridges, water and sewer systems, critical buildings, and communications over large parts of three states (i.e., California, Oregon and Washington). Restoration of communication service would require that electric power be restored, which would require that roads and bridges be repaired, which in turn would require that the petroleum delivery and distribution system be repaired. These interdependencies between lifeline systems would be made even more difficult by the broad geographic extent of the damage. The nearest undamaged urban areas from which assistance could be organized would be Spokane, Washington, Boise, Idaho, and Redding, California. Virtually all of the resources required for the recovery of lifeline systems would have to come from outside the affected states."

Principle V: 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 its 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:

- 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; and,
- Identifying complementary issues/problems that serve as opportunities to collaborate with other APA Divisions.
  (Planning.org)

Principle VI: Broaden Participation

Broad participation builds trust and creates a greater understanding. Important considerations include clarifying goals and expectations, getting the right people

involved, finding leaders that can mobilize the 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; and
- Membership of a global network of member cities who can learn from and help each other.
  (100resilientcities.org)

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.

Principle VII: Promote Polycentric Governance Systems

Collaboration across institutions improves communication and efficiency. Well-connected governance structures can better deal with change and disturbance. 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

Source: Southeast Florida Climate Compact

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 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. (iscvt.org)

Appendix C:
Technical Memo #1: Resilience Assessment Methodology Literature Review and Recommendations

Memo

To: DLCD, NOAA, FEMA

From: Josh Bruce, Casey Hagerman, and Jack Heide, Oregon Partnership for Disaster Resilience (OPDR)

Date: May 5, 2013

Re: **Technical Memo #1: Resilience Assessment Methodology Literature Review and Recommendations**

This memo summarizes a review of literature related to coastal resilience assessments and climate change vulnerability assessments across multiple sectors and the globe.

Background

The purpose of this literature review is to (1) summarize existing risk; vulnerability and resilience assessment methodologies (2) outline the strengths and weaknesses of each and (3) present a list of specific vulnerability and resilience method recommendations. The tools will be reviewed by the steering committee and refined for use in developing Community Coastal Resilience Plans for the participating pilot project communities.

Methodology

OPDR conducted the literature review of possible assessment tools using sources provided from Eugene-Springfield city representatives, the Department of Land Conservation and Development (DLCD), the National Oceanic and Atmospheric Administration (NOAA), and through internet searches. OPDR identified and reviewed 32 assessments and frameworks from North America, Europe, Asia and Australia. OPDR identifies and summarizes several assessment examples that could be applied to this project in the Findings section below.

Findings

OPDR reviewed 22 assessment tools and methodologies. The documents are compiled and listed in two different categories, those from North American sources and those from international sources. Each table displays a brief review based on several categories (see Tables 1.1 and 1.2 below). OPDR also has summarized Resilience Planning; applicable Strategies, Action Items, and Policies; General Vulnerability Assessment Types; and General Vulnerability Assessment Processes.

Table 1.1 Summary of North American Assessments

	Assessment Name	Date	Locale/Agency	Assessment Type	Clear	Strengths	Weaknesses	Needs
1	A Framework for Assessing the Vulnerability of Communities in the Canadian Arctic to Risks Associated with Climate Change	2004	Journal Article	Local Indigenous Peoples	Yes	Emphasizes Local Knowledge	Focused on Small Artic Tribes in Canada	Time, Low Cost
2	Assessing patterns of vulnerability, adaptive capacity and resilience across urban centers.	2009	National Center for Atmospheric Research/ University of Colorado-Boulder	Affects of hazards and climate change on urban centers	Yes	Five Component Definition of Vulnerability; Triangulation approach to assessment	Review of other case studies, not an actual assessment	Low
3	California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008	2009	California Natural Resource Agency	Comphrensive Stratgey for Climate Adaptation	Yes	Assessments across eight sectors; connects sectors; promotes inter-agency collaboration as an imperative	State level hard to aply to local level	Medium
5	Developing Adaptation Strategies for San Luis Obispo County: Preliminary Climate Change Vulnerability Assessment for Social Systems	2010	County of San Luis Obispo	Technical Report on Climage Change Effects on Human Systems	Yes	Analytical Framework for assessing multiple levels and sectors of human systems	County level, limited urban and city analysis	Low-Medium
6	Climate Change Vulnerability Assessments: Four Case Studies of Water Utility Practices	2011	EPA	Water Systems	Yes	Deep Analysis of Water systems, case studies, projections, and climate scenarios	Completely focused on water systems, very technical	High (Considering Technical Aspects)
7	Public Health Impacts of Climate Change in Multnomah County	2012	Multnomah County	Health Vulnerability	Yes	Uses BRACE, Building Resilience Against Climate Effects, a five step framework developed by the CDC	Healthcare and technical knowledge required	Medium-High (Technical Knowledge)
8	Asset Mapping Roadmap: A Guide to Assessing Regional Development Resources		U.S. Department of Labor's Employment and Training Administration	Economic and Business Asset Assessment	Yes	Comprehensive framework for assessing business and economic resources, assets, innovation, and culture	Climate Change not incorporated	High
9	Social Vulnerability to Climate Change: A Neighborhood Analysis of the Northeast U.S. Megaregion	2006	Union of Concerned Scientists	Social Vulnerability Index	Yes	Statistical analysis of multiple vulnerable populations, statistical formula for determing vulnerability	Reliance on census data and census tract mapping	Low-Medium
10	Chicago Area Climate Change Quick Guide: Adapting to the Physical Impacts of Climate Change	2008	City of Chicago	Risk Assessment	Yes	Detailed risk assessment of likelihood and consequences; screening process for business processess and decision matrices in relation to climate change	Minimal assessment of vulnerability	Low
11	Swinomish Climate Change Initiative: Climate Adaptation Action Plan + Impact Assessment Technical Report	2009/ 2010	Swinomish Indian Tribal Community	Climate Adaptation Plan	Yes	Cultural importance and resilience considered; considers multiple and open-ended options for climate adaptation	Limited in geographic area; detailed technical assessment required	Medium-High (Technical Knowledge)
12	Pathways to Climate Change Resilience: A Guidebook for Canadian Forest-Based Communities	2011	Mountain Labyrinths, Inc., Canada	Climate Adaptation Plan	Yes	Rural forest-based communities considered; community engagement emphasized	Minimal assessment of vulnerability	Low
13	Adapting to Coastal Erosion Hazards in Tillamook County: Framework Plan	2011	Tillamook County, OCMP, DLCD	coastal resilience	Yes	coastal specific assessment for underserved rural communities	Focuses on coastal erosion hazards, not full range of hazards	High-Time

Table 1.2 Summary of International Assessments

	Assessment Name	Date	Locale/Agency	Assessment Type	Clear	Strengths	Weaknesses	Needs
1	How Resilient Is Your Coastal Community? A Guide for Evaluating Coastal Community Resilience to Tsunamis and Other Hazards.	2007	USAID	Community Resilience Assessment	Yes	Detailed Methodology; holistic community approach; local knowledge considered	Multiple stakeholders required to complete assessment	Low-Medium
2	Provisions of research to identify indicators for the Adaptation Sub-Committee	2011	UK Government/Adaptation Sub-committee	Climate Change Impacts	Yes	Drivers-Impacts-Actions (Adaptations) by sectors; detailed methodology	Have to focus on subsets of impacts for applicable actions; availability of suitable data;	Data collection; Time
3	Basic Resilience Assessment: A Practitioners Guideline For Learning About Resilience While Doing A Resilience Assessment	2010	Worldwide (Sweden)/Resilience Alliance	Resilience of systems	Yes	Contains good questions to ask stakeholders; emphasizes nested systems and cross-sector/cross-scale analysis, considers disturbance events	doesn't pertain specifically to climate change, but resilience is the proper 'lens'	Time; stakeholder inputs
4	Methods for assessing coastal vulnerability to climate change	2011	Europe/European Environment Agency	Coastal	Yes	Good methods for any assessment	Doesn't advocate a single approach	Time, Quantitative heavy
5	Assessing Vulnerability for Climate Adaptation		UK/India	Vulnerability assessment best practices	Yes	includes future vulnerability; examples of graphing 3-d vulnerability;		
6	A Methodology for an Integrated Risk Assessment of Spatially Relevant Hazards	2006	Germany/U of Dortmund	Multi-hazard vulnerability	Yes	measures/weighs multihazards at once for overall risk; detailed;	requires lots of detailed data	Time; Money for data collection
7	Ecosystem Based Adaptation Guidance	2012	United Nations	Adaptive Ecosystems Assessment	Yes	step by step guidance applicable to any ecosystem analysis	very broad, time and data intensive	Time
8	Rural Disaster Resilience Planning Guide: Assessing risks and building resilience for disasters in rural, remote and coastal communities.	2012	Office of Applied Research, Justice Institute of British Columbia, Canada	Resilience of rural community	Yes	Step-by-step assessment; accessible to nonprofessional communities	time intensive; depends on engaged community	Time
9	Planning for Urban Climate Resilience: Framework and Examples from the Asian Cities Climate Change Resilience Network	2010	International group studying India, Vietnam, Indonesia	Climate Resilience	Yes	Community engagement and tailoring to specific location	time intensive; depends on engaged community	Time

Resilience Planning

Community resilience dictates how quickly, and with what vitality, a community will recover following a disaster or shock. To a certain degree, resilience acknowledges that impacts and stresses will occur, and resilience helps a community thrive despite them. For communities on the coast, planning for resilience means planning ahead. By considering all of one's risks, threats and resources, communities can better predict the stresses and impacts to their area. With a resilience assessment, communities can then better prepare, respond, recover, and adapt to the changes that are faced.

Resilience assessments and plans are not the same as hazard or vulnerability assessment and plans. Resilience plans utilize and are built on the work of hazard, threat and risk assessments, emergency operations plans, mitigation plans and recovery plans. Resilience plans go beyond natural hazards to include issues of government and culture. They consider climate change uncertainties, most likely or worst-case scenarios, even surprises and downturns. They look at ecosystem health and well being, and the capacity of community members to help prepare, respond, or rebuild. In order to understand the resilience of any community, our research suggests assessing multiple areas and sectors in a community. In fact, the more the better. The following is a compiled list of areas and sectors communities can consider in their resilience assessment and planning efforts.

- Governance and Planning
- Society and Economy
- Cultural Resources

- Risk Knowledge
- Transportation
- Food and Water Systems
- Coastal Resource Management
- Land Use and Structural Design
- Warning and Evacuation
- Emergency Response
- Disaster Recovery
- Critical Infrastructure
- Eco-system Services

General Resilience Assessment Process

Based on our review, resilience assessments in their various forms tend to focus on analyzing sector thresholds in relation to hazard and climate change issues. From a process perspective, these assessments generally follow a similar set of steps. The depth and scope of each step depends on the identification of what a community is concerned about (resilience "of what" and "to what"), the capacity of the parties and stakeholders to participate, and the intended outcomes of the planning efforts (project implementation). The following process summary represents methods used by a number of domestic and international climate change and resilience assessments. A generalized assessment process involves the following four steps:

1. Data Collection and Analysis
   Collect existing and necessary baseline data: non-climate change hazard predictions, regional climate change models, sector data, community capacity assessment, resource analysis, etc. Data can be analyzed using sophisticated computer modeling, narrative analysis, or standard quantitative analysis.
2. Stakeholder Participation
   The process requires bringing the appropriate local residents and professional stakeholders to the table. Stakeholders should include: technical sector experts, project managers, policy makers, climate change experts, local property owners, etc.
3. Scenario Exercises
   Using data and stakeholder input, testing sector systems against climate change scenarios will provide input for critical thresholds of concern, and suggest possible mitigation and adaptation strategies. Scenarios are pulled from existing climate change resources and/or created by collaborative processes.
4. Develop Strategies and Actions
   Individual and multi-sector needs and opportunities are identified and developed to ensure robust and resilient sector systems. Implementation and funding strategies should also be considered.

Resilience Plan Review

In addition to our review of assessment methodologies, OPDR also collected and evaluated resilience plans and frameworks. The purpose of the evaluation was to identify common plan elements in order to present a sample resilience plan table of contents for consideration by the Technical and Local Work Groups.

The ten plan plans below were used to develop a comprehensive understanding of what a Coastal Community Resilience Plan could look like. The discussion after each source indicates how the guide provides a unique feature not found in either the primary guide or other secondary guides.

1. ***Rural Disaster Resilience Planning Guide: Assessing risks and building resilience for disasters in rural, remote and coastal communities.*** Office of Applied Research, Justice Institute of British Columbia, Canada. June 2012. Link: www.rdrp.ca

Designed for rural and coastal countries in Canada, the Rural Disaster Resilience Planning Guide (RDRP) includes user-friendly forms and step-by-step processes for assessing community resilience. Includes processes for: (1) getting started through engaging stakeholders and developing a community profile; (2) conducting a resilience assessment, including analysis of a community's social, contextual, and disaster and emergency management factors; (3) developing a resilience plan, drawing on locally defined vision, goals and the outputs of the resilience assessment; (4) plan implementation and evaluation.

The RDRP includes five tools to enhance organizational all-hazards response planning:

1. Rural Resiliency Index (RRI): assess community's disaster resilience and provide information on enhancing resilience.
2. Hazard Resilience Index (HRI): 16 specific hazard resilience documents to rate and assess community resilience to hazards.
3. Hazard Risk Assessment (HRA): 16 hazard specific factors to assess risk.
4. Hazard Resilience Strategies (HRS): 16 strategies to help develop a plan.
5. Rural Resilience Strategies (RRS): action for enhancing disaster resilience.

These RDRP tools are nicely outlined in question forms that walk communities through the process and makes analysis of answers easy. It is a visually attractive guidebook, helping with engagement and legibility, and also effectively captures otherwise qualitative and subjective inputs.

2. ***Planning for Urban Climate Resilience: Framework and Examples from the Asian Cities Climate Change Resilience Network (ACCCRN).*** Tyler, S. et al. 2010. *Climate Resilience in Concept and Practice Working Paper Series.* Boulder, Colorado. Link: www.i-s-e-t.org/images/.../isetworkingpaper3-resilienceplanning.pdf

   This report outlines ACCCRN's studies of cities in India, Vietnam and Indonesia, and utilizes the Urban Resilience Framework. It emphasizes the role of *systems and social agents* for building resilience in cities. Strengthening resilience includes building the capacity of agents to visualize and act, organize and reorganize, and learn; and the performance of systems with enhanced flexibility and diversity, redundancy and modularity; and that fail safely rather than catastrophically.

   This tool emphasizes shared learning, engaging local agents and external experts to produce knowledge and build local understanding and ownership of actions and outcomes. While the study focuses on urban cities, some are also coastal and face similar hazards as Oregon.

3. ***Adapting to Coastal Erosion Hazards in Tillamook County: Framework Plan.*** Tillamook County, OCMP, DLCD. June, 2011.
   Link:http://www.neskowincommunity.org/Adaptation%20Plan%20Final%20Draft%2010%20Jun%202011%20(2).pdf

   This framework addresses continued and increasing threats from coastal erosion issues, landslides, ocean flooding and sea level rise. While not strictly a resilience plan, this framework allows communities to plan for adaptations due to climate change and natural hazards, within the existing comprehensive and hazard mitigation plan frameworks. Each community would develop a sub-plan focusing on the specifics of each place, according to a 40 year planning period. This plan does not address the full array of climate-induced hazards, but does outline a process that could facilitate such a plan.

4. ***Town of Guilford Community Coastal Resilience Plan Risk and Vulnerability Report.*** Town of Guilford, Connecticut, in association with The Nature Conservancy and Yale University. September 2012. Link: http://www.ci.guilford.ct.us/pdf/community-coastal-resilience-plan.pdf.

   This report is part of the Nature Conservancy's Coastal Resilience Program, utilizing The Nature Conservancy's web-based Coastal Resilience Tool. Membership or subscription to the tool is required to view its contents. Link: http://coastalresilience.org/

5. ***Swinomish Climate Change Initiative: Impact Assessment Technical Report.*** Swinomish Indian Tribal Community, Office of Planning and Community Development. La Conner, WA, October 2009.
6. ***Swinomish Climate Change Initiative: Climate Adaptation Action Plan.*** Swinomish Indian Tribal Community, Office of Planning and Community Development. La Conner, WA, October 2010.

   Link to both: http://www.swinomish-nsn.gov/climate_change/project/reports.html

   The Swinomish Indian Tribal Community is small Washington State Tribe located in the Puget Sound area. The Tribe's reservation is located on a small island in Skagit County, WA. The Tribe relies heavily on the ocean and coast for their cultural and economic livelihood. In recent years they have recognized and witnessed sea-level rise and thus completed an Impact Assessment, followed by a Climate Adaptation Action Plan under their own Climate Change Initiative. The unique feature of the Tribe's plan is the idea of Cultural Resilience. Cultural Resilience is the ability of a people to maintain their cultural identity and practices in the face of outside forces and hazards. The Swinomish are greatly worried about climate change impacts because of its potential effect on their cultural, and are less worried about infrastructure and economics.

7. ***A Practitioners Guideline for Learning about Resilience While Doing a Resilience Assessment. Mike Jones, Resilience Alliance, October, 2012.***

   Tool to assess sector's "thresholds of concern" and adaptive cycles. Recommends small-scale adaptations.

8. ***Risk and Adaptation Assessment to Climate Change in Lombok Island, Indonesia.*** Ministry of the Environment. August, 2010.

   Multi-sector analysis of regional system vulnerabilities. Looks at natural and social systems.

9. ***Social Vulnerability to Climate Change: A Neighborhood Analysis of the Northeast U.S. Megaregion.*** Union of Concerned Scientists, Northeast Climate Change Impact Study, November 15, 2006.

   A vulnerability assessment which focuses on various populations, within the Northeast, and their vulnerability to climate change measured against race, education, location, income, and access to resources.

10. ***Adapting to Climate Change: A Planning Guide for State Coastal Managers.*** NOAA, National Ocean Service, Office of Ocean and Coastal Resource Management. Silver Springs, MD, 2010. Link: res://ieframe.dll/acr_depnx_error.htm#noaa.gov,http://coastalmanagement.noaa.gov/climate/docs/adaptationguide.pdf

Recommendations

Recommended Methodological Framework

How Resilient Is Your Coastal Community? A Guide for Evaluating Coastal Community Resilience to Tsunamis and Other Hazards. U.S. Indian Ocean Tsunami Warning System Program. USAID. Washington, D.C., 2007. Link: http://www.csc.noaa.gov/psc/riskmgmt/resilience.html

After review of the wide variety of frameworks and methods from North America and International sources, OPDR recommends a guide developed by the United States Agency for International Development. This source represents an appropriate method to apply to the Oregon coastal communities. This methodology can be adapted successfully for use here.

The USAID document lays out a fairly comprehensive, community-based approach for developing a coastal resilience plan. Although the document was intended for areas of the developing world and Southeast Asia, it could easily be applied to the Oregon Coast. The bulk of the plan is based around eight resilience areas, which a community should assess for how resilient their community is. The approach is very qualitative, with minimal technical data needed. The most technical data needed would be based on GIS mapping, and climate change and sea-level rise data.

Steps to Developing Coastal Community Resilience

In order to develop and understand Community Coastal Resilience (CCR), the USAID guide follows seven steps, similar versions of which many of the subsequent plans and frameworks in this summary also use. Each step in the process is summarized below:[1]

1. Define the purpose, scope, and participants of the assessment - Use maps to limit boundaries and for reference to important geographic, demographic, natural resource, and hazard features of a given area. Limit scale to manageable units, as defined by human communities in relation to their general area of habitation and resource uses, and in consideration of local political jurisdictions. Identify stakeholders both within and outside the physical boundaries of the assessment. Consider that the scope will vary for different elements of resilience, ranging from political jurisdictions to natural resource use areas.

2. Review CCR benchmarks - Adapt benchmarks as needed to local context and consider establishing a rating system for benchmark evaluation. Benchmarks should be considered for each resilience area (discussed below).

3. Prepare for the assessment - Identify sources of information. Determine assessment method by benchmark through: secondary data and information compilation and review, participatory mapping, interviews with key informants, and focus group discussions. Organize and train the CCR assessment team. Develop assessment work plan and schedule.

4. Collect information and data – Information can be collected through interviews and focus groups at the local, regional, state, and national level. Participatory mapping is the another step in which one defines the scope and purpose, identifies facilitators, note takers, and key informants, gather

[1] For additional detail, refer to Chapter Four of the USAID guide: http://www.csc.noaa.gov/psc/pubs/How_Resilient_is_Your_Coastal_Community.pdf

necessary materials, create a checklist of features to be mapped, prepare a base map, and begin mapping.

5. Compile and analyze results - The compilation and analysis stage of the CCR assessment process is intended to provide the assessment team with a number of outputs, including (1) an assessment and/or score for each benchmark, (2) community strengths and weaknesses for resilience, and (3) summary statements for each resilient element.

6. Validate and communicate results - The CCR assessment report should include the following sections: background and purpose, stakeholders and audience, CCR assessment process, summary of findings by element, opportunities to enhance resilience, existing good practices, links between issues, and conclusions and next steps.

7. Provide recommendations to adapt plans and programs for enhanced resilience

Table of Contents Recommendation

Based on our review, OPDR recommends the following general Table of Contents for plans focused on Oregon coastal communities:

- i. **Purpose**
- ii. **Executive Summary**
- I. **Introduction**
  - a. Introduction to Resilience, Hazards, Risks and Vulnerabilities
  - b. Community Profile
  - c. Local Climate Change and Hazards
  - d. Methodology
    - i. Stakeholders
    - ii. Committee Members and Meetings
    - iii. Public Engagement
- II. **Existing Activities**
  - e. Community Plans
    - i. Comprehensive Land Use Plan
    - ii. Natural Hazards Mitigation Plan
    - iii. Climate Impact Assessment
    - iv. Emergency Operations Plan
    - v. Comprehensive Economic Development Strategy
  - f. Community Analysis
    - i. Government & Politics
    - ii. Socio-Economics
    - iii. Coastal Resource Management
    - iv. Land Use & Structural Design
    - v. Risk Knowledge
    - vi. Warning & Evacuation
    - vii. Emergency Response
    - viii. Disaster Recovery
    - ix. Other
- III. **Resilience Assessment (Per USAID Guide)**
  - g. Purpose, Scope, and Participants
  - h. Coastal Community Resilience Goals
  - i. Collect Information and Data
  - j. Compile and Analyze Results
- IV. **Action Plan**
  - k. Strategies

i. Community Vision
ii. Education & Outreach
iii. Nesting Formal & Informal Networks

l. Action Items
i. Managed Realignment
ii. Ecosystem Restoration
iii. Coastal Management Program

m. 4.3. Policies
i. Community Self-Insurance & Taxes
ii. Land Use Code & Building Ordinances
iii. Community Contracts for Recovery

n. Implementation & Monitoring

V. **Conclusion**

Conclusion

OPDR recommends developing an Oregon Coastal Resilience Plan Framework based heavily on the USAID guide. This guide will provide coastal communities with the outline of steps needed, while allowing for customization through community input, direct measurement of hazards, and through developing local answers to questions such as "Resilience of what?" and "Resilience to what?"

Appendix D: Coastal Community Resilience Plans: A Summary of the USAID's Resilience Assessment Process

Coastal Community Resilience Plans:

A Summary of the USAID's Resilience Assessment Process

Photo Source: Oregon State Archive

July 1, 2013

Local Work Group Study Guide

Prepared for:

Department of Land Conservation and Development
North Coast Resilience Network Project

Prepared by:

Oregon Partnership for Disaster Resilience

A Program of the
Community Service Center

UNIVERSITY OF OREGON

SPECIAL THANKS & ACKNOWLEDGEMENTS

The Oregon Partnership for Disaster Resilience developed this study guide through a National Oceanic and Atmospheric Agency funded pilot project to develop a North Coast Resilience Network. This study guide is based on the following publication:

How Resilient is Your Coastal Community? A Guide for Evaluating Coastal Community Resilience to Tsunamis and Other Hazards.[1]

Project Leads:

- Principal Investigator: Jeffrey Weber, Oregon Coastal Management Program, Oregon Department of Land Conservation and Development.
- Co-Investigator: Patrick Corcoran, Oregon Sea Grant, Oregon State University
- Co-Investigator: Josh Bruce, Oregon Partnership for Disaster Resilience, University of Oregon

Community Service Center Student Researchers:

- Jack Heide, Research Associate
- Casey Hagerman, Research Associate
- Sarah Allison, Research Intern

[1] U.S. Indian Ocean Tsunami Warning System Program. 2007. How Resilient is Your Coastal Community? A Guide for Evaluating Coastal Community Resilience to Tsunamis and Other Coastal Hazards. U.S. Indian Ocean Tsunami Warning System Program supported by the United States Agency for International Development and partners, Bangkok, Thailand. 144 p.

About the Community Service Center

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.

About the Oregon Partnership for Disaster Resilience

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.

Introduction

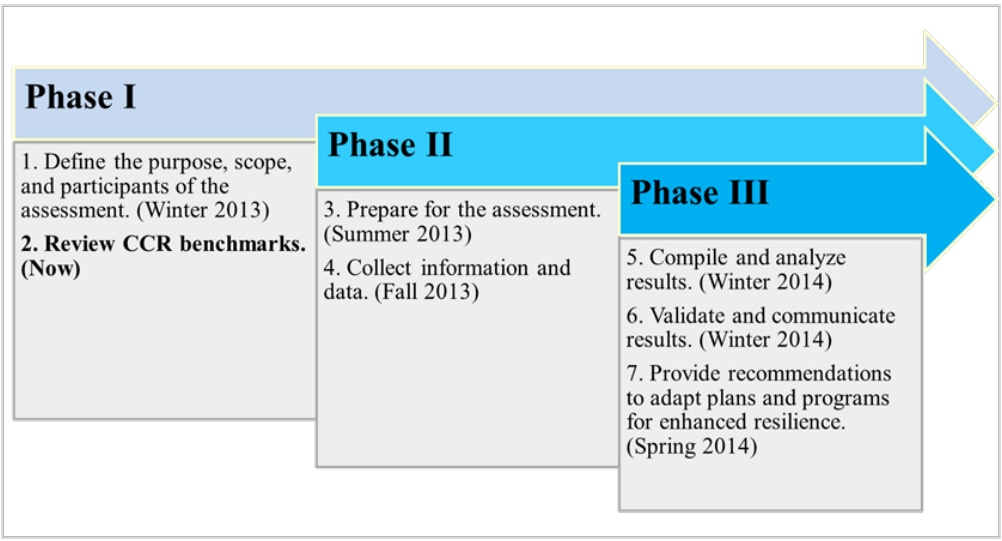
USAID and other partners developed the Coastal Community Resilience (CCR) Guide building on lessons learned and experience gained in the Indian Ocean region after the 2004 tsunami. The purpose of the guide is to reduce risk to vulnerable communities from coastal hazards. The guide attempts to broaden the perspective of individual community-based planning activities so that a more holistic and robust planning framework evolves to support community resilience.

This "study guide" is intended to introduce one of the first major steps in developing a resilience plan: assessing community resilience. The results of the resilience assessment process will be used as the foundation for the local resilience plans. This guide focuses on two specific sections of the USAID guide- **Chapter Four, "What Are the Steps to Assess Coastal Community Resilience?," and Chapter Six, "Reference Guide to Resilience Elements and Benchmarks.**" Chapter Four focuses on the steps and processes involved in the resilience assessment and planning. Chapter Six provides in-depth reference to the eight identified resilience areas and the development of community benchmarks.

In order to facilitate the upcoming community meetings more efficiently, the organizers request that the community stakeholders take the time to prepare for the meetings by following the checklist below:

- ☐ Review the USAID Summary Guide
- ☐ Read USAID Chapter Four, "What Are the Steps to Assess Coastal Community Resilience?"
- ☐ Read USAID Chapter Six, "Reference Guide to Resilience Elements and Benchmarks"
- ☐ Work through and consider the questions posed throughout the Guide
- ☐ Be prepared to propose, discuss and consider answers to the questions asked throughout the provided material

How does what we're doing fit into the overall project schedule?



Purpose of Coastal Community Resilience

Oregon communities exist in a dynamic and highly variable landscape. Changes can be as divergent as a downturn in the local economy or rising sea levels that impact the entire coast. In order to prepare for these changes communities should come together to act in accordance with the change.

Resilience – the ability to anticipate, absorb, adapt to, and recover from disruptions – is one way to address changes. In building resilience, a community can choose to mitigate, eliminate, or absorb changes, depending on the specific circumstances of those changes. The purpose of a Coastal Community Resilience Plan is to provide a voice and guide for the community to act on, making intentional, thoughtful choices about how to respond to any change impacting the community. The community can use this plan to decide when to adapt to, absorb, mitigate, eliminate, or accept change. Because of sea level rise, diminishing ocean resources, and the increasing threat of earthquakes and tsunamis, coastal communities will experience more intense change than most other communities in the coming years. It is imperative that communities develop a way to approach the inevitable changes and meet them on their own terms.

Hilo, Hawaii

The Town of Hilo, Hawaii, situated between the flanks of the volcanic peaks Mauna Kea and Mauna Loa. Hilo was impacted by 17 tsunamis during the period from 1837 to 1975. The tsunamis impacting Hilo ranged from minor tsunamis of 1.5 feet to devastating tsunamis of 35 feet (Fletcher et al 2002). Hilo was devastated by a 26-foot tsunami in 1946, generated by a 7.8 earthquake in the northern Pacific near the Aleutian Islands. Following the devastation, the town recovered and rebuilt without taking tsunami resilience into consideration and without incorporating any lessons learned from its experiences into its redevelopment plan. Catastrophe again struck Hilo in 1960, when a 9.5 earthquake in Chile resulted in tsunami run-ups of 35 feet. The 1960 tsunami caused 61 deaths and over $26.5 million in damages. Following the 1960 tsunami, Hilo undertook a concerted effort to enhance its resilience to the impacts of tsunamis.

Describe your vision of a resilient coastal community:

Opportunities

The CCR Plan presents many opportunities for an assessment of community's resilience. One example is the opportunity to break down institutional silos and encourage various organizations, agencies, private and public entities, and the general public to engage in a dialogue that will enhance understanding of the risks and impacts faced by the community. The plan allows the community to gain an understanding of interdependencies and shared strengths and weaknesses across the community and between communities. The CCR Plan can be used to link community plans and policies together to share resilience planning efforts and reduce redundant activities. The CCRP can be a bridge between emergency operations plans, natural hazards mitigation plans, recovery plans, public health plans, comprehensive land use and economic development plans, parks and open space plans, visioning processes, and even private sector and business plans. The CCR Plan can and should be used by decision makers at all levels of the community to inform future plans and policies in order to ensure a more resilient coastal community.

Minamisanriku Japan

Following the devastating effects of the 2011 Great Tohoku earthquake and tsunami event, the city of Minisanriku is developing a new vision for the city. Based on principles of resilience, the city is relocating key community assets to high ground and restoring low-lying areas to open space and habitat areas. The new vision is based on two levels – 100 year and 1,000 year - of tsunami protection.

Source: Jay Wilson, Clackamas County Emergency Management

Figure: Post-Tsunami Vision for Minamisanriku, Japan

Source: Jay Wilson, Clackamas County Emergency Management

What the Coastal Community Resilience Plan is NOT

With all the potential opportunities that the Coastal Community Resilience Plan presents, it is also important to understand how the plan should not be viewed and/or used. Most importantly, the final product should not be left on the shelf and forgotten, but instead should be reviewed frequently and integrated into other policy and planning efforts throughout the community. What the CCRP is NOT includes but is not limited to the following:

- The CCRP is not another emergency operations, natural hazards mitigation, or preparedness plan, nor can it be used to replace any of the mentioned plans, but should be used to inform each. The Plan can involve more than just resilience to natural disaster recovery and response.
- The Plan is not a regulatory document, but can be used to inform and/or guide new policies, laws, and regulations to make a community more resilient.
- The CCRP is not a plan focused on any one area within the community; it should include a holistic view of the community. Land use planning and critical infrastructure placement are not the only areas under consideration.
- It is not currently a source of potential funding. Having the plan will not ensure funding for projects within a community, but it can justify the need for projects and activities within a community.
- The CCRP is not a single public official's or government agency's plan or vision for the community. The Plan is meant to incorporate everyone in the community from disenfranchised populations to public and elected officials, and everyone in between.

What are your best outcomes and worst fears for the coastal community resilience plan and assessment? Consider the process, your community, other communities, and end results.	
Best Outcomes	Worst Fears

Seven Steps of the Coastal Resilience Assessment

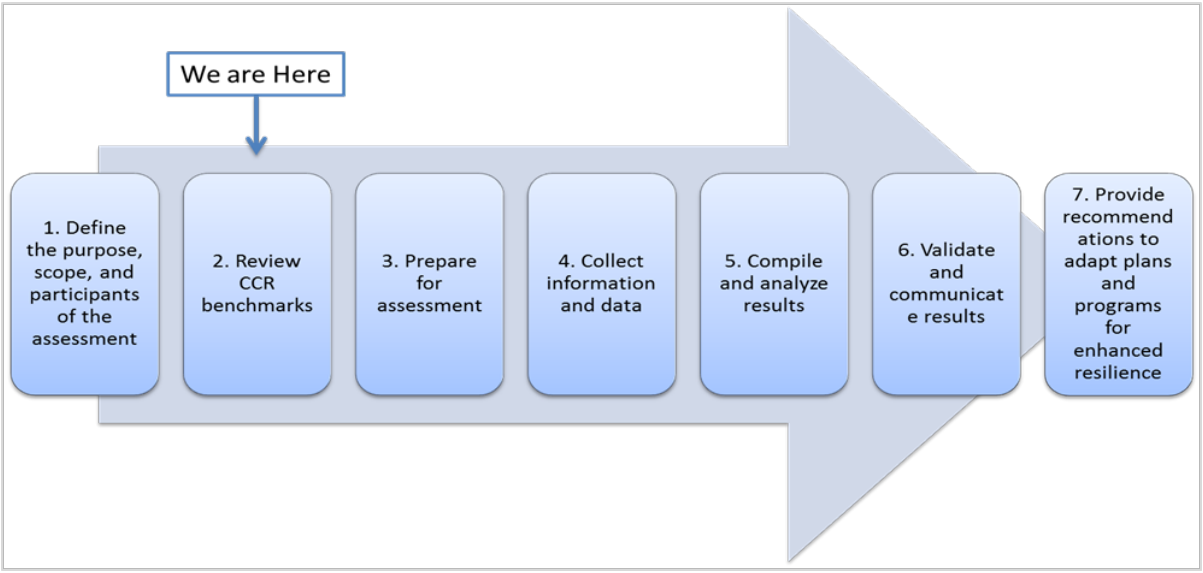
The USAID process suggests that communities undertake seven steps to evaluate and recommend steps to increase community resilience. The graphic below illustrates the seven steps of the CCR assessment. **Please read "Chapter 4: What Are the Steps to Assess Coastal Community Resilience?" before continuing on with this study guide.** After reading Chapter 4, you should:

- Know the steps in the assessment process
- Understand what a "community resilience benchmark" is
- Be able to describe how benchmarks can be used to rate community resilience

Consideration:

The USAID guide uses the term "benchmarks".

Is your community more familiar/ comfortable with other terms such as "goals and objectives?"



Chapter 4 Notes, Observations and Questions:

Community Resilience Elements

The USAID Coastal Community Resilience guide identifies eight emphasis areas or categories in which a community can assess and plan for resilience. The eight resilience areas include: governance, society & economy, coastal resource management, land use & structural design, risk knowledge, warning & evacuation, emergency response, and disaster recovery. (Reference USAID document for further detail, Chapter Six, pg. 6-1).

Consideration:

Have all appropriate stakeholders been identified and invited, from all pertinent sectors, to join the CCR planning and assessment process?

The resilience areas are meant to capture a holistic picture of coastal communities. While holistic, the identified resilience areas may not be exhaustive and some discussion should take place around whether or not there are more elements to consider in your community. Other areas for consideration include, but are not limited to: health, natural resources (non-coastal), cultural resources, critical infrastructure, and housing. Furthermore, several identified areas are broad or combinations of systems, and a community might consider breaking down identified resilience areas to create new categories.

Please read "Chapter 6: Reference Guide to Resilience Elements and Benchmarks" before continuing on with this study guide.

After reading Chapter 6, you should:

- Be able to describe the eight (8) community resilience elements
- Understand how resilience elements and benchmarks relate
- Have an opinion about the need for additional resilience elements

Using the prompts provided below, Consider whether or not the identified eight resilience areas cover the desired systems your community should include in the resilience plan.	
What systems are not listed but should be? For example, are health, natural resources (non-coastal), critical infrastructure, housing, and cultural resources adequately addressed? Should resilience areas be broken down further into separate categories? Should Society & Economy be two separate categories? Should the community consider resources, business, and management outside the context of the coast?	

Benchmark Review and Development

The eight resilience areas provide a holistic overview for the resilience "of what?" In order to guide resilience assessment, the community will need to develop a series of benchmarks (addressed earlier in the study guide) for each of the identified resilience areas. Each benchmark will provide the community with a vision and a goal to achieve in order to create a resilient coastal community.

USAID has identified four categories for benchmark development for consideration under each resilience area. USAID provides a benchmark for each category meant to be used by the community to review and adapt their own benchmarks. Although the areas all contain a benchmark for each category, each benchmark is tailored for the given resilience area. The categories for benchmark development include:

Consideration:

Review benchmark language in Chapter 6.

How might you adapt the benchmarks to best address local goals and needs?

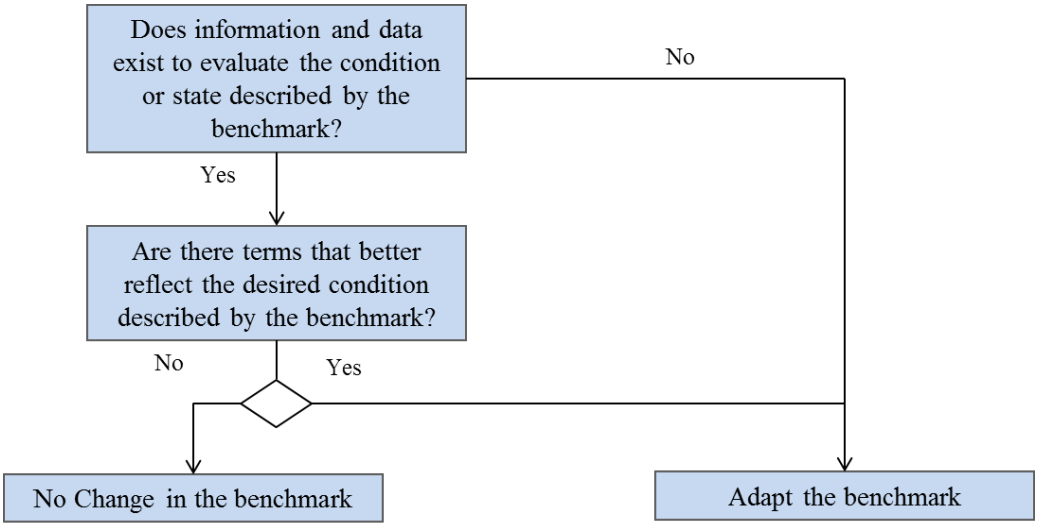
Planning & Policy	Physical & Natural Resources	Social & Cultural	Technical & Financial
• Current policies • Planning activities • Community attitudes	• Use of physical space • Livelihoods • Natural Resources • Community Identity • Recreation • Tourism	• Socio-economics • Formal & informal social networks • Community attitudes	• Technical • Institutions • Technology • Equipment • Financial • Budgets • Grants • Loans

Once they have been reviewed and adapted for each resilience area, the benchmarks will be used in the assessment process to determine the current resilience of the coastal community in relationship to the community-developed benchmarks.

Refer to Chapter 6 of the USAID guide. Are the benchmark categories comprehensive? Should benchmarks reflect other capacity issues or areas within your community?

Benchmark Development Guidance

The following flow diagram illustrates the process we will use to assess the USAID proposed benchmarks for local relevance. **Please review the flow diagram and the questions it suggests. Be prepared to use these questions in our review of benchmarks at the next meeting.**



Example Benchmark Development

The following example provides an example of a resilience area, Land Use & Structural Design, and a benchmark category, Policy and Planning. USAID provides a benchmark example on the left, and the local adaptation to the benchmark on the right. **At the next local planning team meeting, you will be developing benchmarks for resilience areas.**

Land Use & Structural Design	
Policy and Planning Category	
USAID Benchmark	Adapted Benchmark
Land use policies and building standards that incorporate measures to reduce risks from hazards and protect sensitive habitats are established, monitored, and enforced.	National organizations (Urban Development Authority, Coast Conservation Department, Reconstruction and Development Authority, and Ministry of Lands) and local mayors and councils consider both coastal hazards and natural resources when developing policies and standards and making land use decisions. These same or other organizations monitor these policies and standards to make sure they are being followed and, if not, have mechanisms to enforce them.

Rating System Consideration

A rating system can serve as a useful tool to compare the current condition described by the CCR assessment results with the desired condition described for each benchmark. The USAID guide recommends developing a rating system to evaluate community resilience. The rating system used should be simple and easy to communicate to local stakeholders. Although scoring is not required to evaluate the level of resilience, it is a useful method because it sets a baseline for future comparison and provides a cross comparison among elements to aid in defining priorities for action. We will develop a rating system at a future meeting.

Consideration:

Review Rating Options in Chapter Four, Pg. 4-5

What kind of rating system would work best in your community?

Example Rating Representation

5 = Excellent (81 to 100% fulfilled, sustainable)
4 = Very Good (61 to 80% fulfilled)
3 = Good (41 to 60% fulfilled)
2 = Fair (21 to 40% fulfilled)
1 = Poor (1 to 20% fulfilled)
0 = Condition Absent

Study Guide Review

In order to facilitate the upcoming community meetings more efficiently, the organizers request that the community stakeholders take the time to prepare for the meetings by following the checklist below:

- ☐ Read USAID Chapter Four, "What Are the Steps to Assess Coastal Community Resilience?"
- ☐ Read USAID Chapter Six, "Reference Guide to Resilience Elements and Benchmarks"
- ☐ Review the USAID Summary Guide and Worksheets
- ☐ Work through and consider the questions posed throughout the Guide
- ☐ Review the benchmark development worksheets for Risk Knowledge
- ☐ Be Prepared to discuss and listen to your and others answers to the questions asked throughout the provided material

Study Guide Notes: