The "Big One":

Attracting Funding to Natural Hazard Mitigation Along the Oregon Coast

Photo Credit: Christian Gowan

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Conservation Capital, LLC works to attract private money to conservation projects that merge natural hazard mitigation and environmental sustainability. Partnering with stakeholders they build public-private partnerships (PPPs) that monetize the value of ecosystem services. After successfully implementing this model in Texas by combining flood mitigation for oil companies with wetland restoration, they are now seeking to adapt this business model to Oregon and build resiliency against the Cascadia Subduction Zone (CSZ) earthquake and tsunami.

The overarching goal of the project is to answer the question: How does Conservation Capital engage with coastal Oregon to attract funding in natural hazard mitigation for a CSZ event? To address the research question, the final project provides our client with: (1) In-depth analysis of three coastal communities; (2) Scorecard of evaluative criteria for potential coastal community partnerships; (3) Access to key stakeholder perspectives through eleven qualitative interviews; and, (4) Contact list of key coastal stakeholders who have agreed to be contacted by the client.

Case Study Analysis and Evaluative Criteria

By reviewing government documents such as Natural Hazard Mitigation Plans (NHMP), comprehensive plans, and budgets, the case studies analyze each community through four lenses: environmental, political, social, and economic. Then, communities were assessed against a scorecard with eight criteria designed to identify the most promising community partner for Conservation Capital's work.

The eight criteria of the scorecard include:

- *Loss Assessment* - Has the community monetized property loss levels based on different scenarios of natural hazard events?
- *Economic Diversity* - What percentage of employment comes from how many industries?
- *Existing Partnerships* - To what extent are partners from the public, private, and nonprofit sectors involved in preparedness efforts?
- *Political will* - To what extent is community leadership engaged in natural hazard mitigation?
- *Existing Staff Capacity* - What is the city staff's capacity to engage in, and complete mitigation efforts?
- *Public support* - Are residents aware of natural hazard mitigation efforts? Are they supportive of them?
- *Quantified financial need* - Have the costs of mitigation needs and efforts been quantified in dollars?
- *Financial allocation* – Has the city identified funding or earmarked revenues for natural hazard mitigation efforts?

This scorecard creates a replicable process that the client can use to assess other communities' readiness for engagement in incentivizing investment in mitigation projects. A score of 0 indicates that the community did not meet the threshold of the defined criteria. Scores 1 through 3 indicate poor, fair, and good respectively.

Figure 1: Case Study Evaluation Matrix

	Newport	Tillamook	Coos County
Year of MJNHMP	2015	2011*	2016
Loss Assessment	1	3	0
Economic Diversity	2	1	1
Existing Partnerships	2	3	2
Political Will	3	2	1
Existing Staff Capacity	2	1	1
Public Support	3	2	1
Quantified Financial Need	2	0	0
Financial Allocation	1	0	0
Total Score	16	12	6

* 2017 update in process

While all of the communities are diligently preparing for CSZ and other natural hazards, evaluation finds that Newport is most prepared for engagement with Conservation Capital.

Key Interview Takeaways

Twenty-nine interviews related to land use advocacy and environmental sustainability were requested of local officials, city staff, state policymakers and agency representatives as well as area nonprofits. Eleven interviews were completed and included perspectives from one nonprofit, three state agencies, three cities, and two counties.

Key interview takeaways are:

- Coastal realities differ from state and national perceptions
- Policy frameworks across state and federal agencies lack coordination
- Urban growth boundary regulation delays, but does not prohibit, natural hazard mitigation projects
- Building codes alone do not incentivize private funding for natural hazard mitigation projects
- Implementation is expensive and difficult to fund
- FEMA funding for communities is predominantly retroactive
- Staff capacity to address natural hazard mitigation is limited
- Due to the high cost of implementing infrastructure projects, communities prioritize saving lives through preparedness

Final Recommendations

Compelling opportunities for partnership and investment exist for Conservation Capital on the Oregon coast. Together, the case study analyses and interview findings provide context for the following four recommendations to Conservation Capital: create an immersed presence in Newport and Lincoln County; consider nonprofit mechanisms to facilitate public capital stacks; focus funding efforts on implementation of mitigation projects; and, invest in mitigation projects for high-probability hazards.

INTRODUCTION

Conservation Capital, LLC (Conservation Capital) works to attract private money into conservation projects that merge natural hazard mitigation and environmental sustainability. They successfully implemented this business model in Texas by combining oil company flood mitigation needs with wetland restoration. Now in Oregon, they are actively engaged in adapting their business model to build resiliency along the coast against the Cascadia Subduction Zone (CSZ) earthquake and tsunami. Conservation Capital commissioned this project to answer the question: how can Conservation Capital engage with coastal Oregon to attract funding for natural hazard mitigation or resilience against a CSZ event? The following report details current federal, state, and local policies regarding hazard mitigation, evaluates three coastal communities for possible partnership with Conservation Capital, provides key stakeholder perspectives on mitigation efforts and needs, and finally, provides recommendations for Conservation Capital's future involvement with coastal Oregon.

BACKGROUND

Conservation Capital is a limited liability corporation whose primary function is to "bring private capital to land conservation in a way that leverages and supplements the limited public and philanthropic sources of funding that have carried the primary burden of land conservation across the world" ("Conservation Capital," 2016). The company works as a third-party contractor with various private businesses, agencies, nonprofits, utility providers and landowners to evaluate land and its potential ecological service value. Conservation Capital monetizes the enviro-economic value of land and identifies parties who may have an interest in investing in that enviro-economic value. Conservation Capital's model builds public-private partnerships (PPPs), attracts private funding to environmental efforts, and creates incentives to maintain natural ecological services long term.

The types of projects Conservation Capital undertakes share a common goal of merging hazard mitigation projects with environmental sustainability. Seeking new and alternative funding sources beyond traditional public or nonprofit sector funding helps monetize the true value of natural spaces and ecosystems while also attracting new kinds of support to environmental projects. This business model supports, and eases, the burden on existing funding sources for such projects. Conservation Capital is educating the for-profit sector on the added economic value of environmental sustainability practices and is folding these businesses into the triple bottom line of profit, people, and planet. At the same time, they are also educating the public sector on the potential benefits of partnering more fully with private sector actors.

The Research Problem

Oregon's coastal communities face multiple natural hazards such as windstorms, winter storms, flooding, coastal erosion, landslides, earthquakes, and tsunamis. These naturally occurring events can happen annually, seasonally, or unexpectedly. Each have the potential for severe damage to human life, property, and the economy. With potential impacts on local jurisdictions ranging from minor to severe, it can be difficult to secure public support and funding for mitigation strategies related to known natural hazards. Federal and state support for implementation struggle to meet the real needs and costs associated with proper mitigation strategies.

In Oregon, the statewide *Oregon Resilience Plan* identifies risk associated with the most prominent and costly natural hazard - the CSZ earthquake and tsunami. This plan, while focused on a major earthquake and local tsunami, has actions that can be applied to mitigate other natural hazards. The report is organized by region and service sectors and evaluates the state's preparedness for the largest possible catastrophic event – a 9.0 magnitude earthquake and 45'+ local tsunami. It also identifies aspects of each region and service sector that must be addressed to minimize the impact of such an event.

The main challenge to implementing the *Oregon Resilience Plan* is a lack of human capacity and funding. Oregon's proposed state budget for the 2017-2019 biennium has a $1.8 billion deficit (Hubbard, 2017). Adding to the lack of state funding is the uncertainty of federal agency funding available to communities seeking disaster resilience. With a new US President and executive administration, federal agencies anticipate changes to their agency's priorities, funding, and grant-making capabilities. Oregon's coastal city governments equally face budget challenges and staff capacity hurdles in implementing natural hazard mitigation plans. Furthermore, Oregon does not experience natural hazard events as frequently or as severely as other states who can secure public support for local bond measures and tax increases minimizing their reliance on federal funds.

These challenges show the importance of identifying new and innovative ways to fund coastal resiliency projects through private sources. Conservation Capital may be well positioned to help the Oregon coast fund hazard mitigation efforts through PPPs. This project will help Conservation Capital to determine their next course of action regarding coastal resiliency projects in the state of Oregon.

Research Questions

One overarching question drives the work on this project: how can Conservation Capital engage with coastal Oregon to attract funding for natural hazard mitigation around the CSZ events? In order to address the research question, the final project provides our client with: (1) In-depth analysis of three coastal communities; (2) Scorecard of evaluative criteria for potential coastal community partnerships; (3) Access to key stakeholder perspectives through qualitative interviews; and, (4) Contact list of key coastal stakeholders who have agreed to be contacted by the client. These inform the creation of recommendations for potential partnerships between Conservation Capital and coastal Oregon.

CURRENT POLICY AND REGULATORY CONTEXT

Implementing community wide hazard mitigation plans does not happen in a vacuum. National and state policies affect the development of local hazard mitigation planning and projects through mandates, incentives, disincentives, and funding.

National Policy and Regulatory Background

There is no general requirement at the federal level that jurisdictions have land use or mitigation plans. However, to remain eligible to receive federal aid from FEMA, the 2000 Disaster Mitigation Act requires states and local governments to craft mitigation plans that are approved

by a legislative body. These plans must be updated every five years. It is important to note that having an eligible plan does not guarantee full FEMA funding. In fact, FEMA only pays out $0.75 per $1.00 of requested disaster funding (Bruce, 2017).

Oregon State Land Use & Hazard Mitigation Planning Background

Oregon currently manages its land use planning through a unique governing and policy infrastructure which began in 1973 with the passage of SB 100 (Oregon Encyclopedia, 2017). This state law requires each city, county, special district, and state agency to have a comprehensive plan as well as all of the zoning and land-division ordinances required for its implementation (Oregon's Statewide Planning Goals & Guidelines, 2010). There are 19 Statewide Planning Goals (see Appendix A), each of which are adopted Oregon administrative rules – OAR 660.015, meaning they are required actions for local jurisdictions (Oregon's Statewide Planning Goals & Guidelines, 2010). However, within these goals there are non-mandatory guidelines and recommendations for jurisdictions to consider above and beyond the stipulated requirements (Oregon's Statewide Planning Goals & Guidelines, 2010).

The Statewide Planning Goals describe the State's intention for land use and cover a variety of land development subjects. There are specific goals regulating hazard mitigation planning and the incorporation of hazards mitigation into local city planning documents. Planning Goal Seven (Goal #7) – *Areas Subject to Natural Hazards* requires jurisdictions to include an inventory in their comprehensive plan of possible hazards and policy measures that mitigate risk to people and property. Risk is evaluated in terms of frequency and severity, effects on existing and future development, how new development may exacerbate the risk, and the land uses allowed in hazard areas (Oregon's Statewide Planning Goals & Guidelines, 2010).

Locally, counties are leading efforts to create Multi-Jurisdictional Natural Hazard Mitigation Plans (NHMP), which, once approved at the local and federal levels, help ensure that the locality is eligible for pre- and post-disaster mitigation grants ("Basic Plan," 2016). Despite requiring both state and local plans as well as goals for natural hazard mitigation, state regulation does not discuss, require, or identify funding strategies or sources for implementing the planned mitigation strategies and actions.

FUNDING NATURAL HAZARD MITIGATION IN COASTAL OREGON

Jurisdictions across the US are better able to pass bond measures or tax incentives for natural hazard mitigation projects after an event has occurred. For public servants, a hazard event can be a "policy window" --a period of time when there is enough public will to support policy changes--and requires policymakers to act quickly. However, relying on the policy window created by a CSZ event would mean action taken too late. It is expected that Oregon, especially coastal communities, will take years to recover from a CSZ event and a "lost generation" will be created (see Appendix B; The Oregon Resilience Plan, 2013). With limited public support for local funding options, there is the opportunity and necessity to identify private and alternative sources for funding. For example, Seaside, Oregon gained citizen approval for a $99.7 million bond measure only after it partnered donated land and a $4 million match from the state, which lowered the cost to the local community (Foden-Vencil, 2016; Marx, 2016).

To identify alternative funding opportunities specifically for this report, an annotated bibliography was completed to understand the current condition of: 1.) PPPs for ecosystem services, coastal resilience and coastal hazard mitigation; 2.) investment in coastal resilience and coastal hazard mitigation; and, 3.) coastal ecosystem service projects. This research provides a basic background on how these three topic areas inform Conservation Capital's potential work in Oregon's coastal communities. This review included government and academic resources on ecosystem services, public-private partnerships, and coastal resiliency projects.

DESCRIPTION OF METHODS

To address the overarching research question, we conducted an initial analysis of nine coastal communities, three in-depth case study analyses, eleven stakeholder interviews, and developed a scorecard to help our client evaluate communities for collaborative partnership potential. From these methods, our project provides four major deliverables for our client: 1) In-depth analysis of three coastal communities; 2) Scorecard of evaluative criteria for potential coastal community partnerships; 3) Access to key stakeholder perspectives through qualitative interviews; and, 4) Contact list of key coastal stakeholders who have agreed to be contacted by the client.

Interviews with Key Stakeholders

We considered key stakeholders to be those who are currently dealing with hazard mitigation issues across the public, private, and nonprofit sectors. Interviewees are not confined to people working in the three selected case study jurisdictions, but perspectives from these communities was helpful in identifying the current efforts and priority status of mitigation activities.

Interviews were conducted in person, by phone, or by email. All interviewees were given a copy of our project description and research question in a summary document before the interview. Additionally, interviewees were informed that their names and associated response would remain anonymous. Interviews were conducted at the case study phase and were used to improve background understanding about the realities facing hazard mitigation along the Oregon coast. Full sets of the interview questions can be found in Appendix C. Data gathered from these interviews are not intended to be generalizable beyond their respective communities. For the purposes of this project, there is a clear distinction between the individual's perspectives discovered through these interviews and the generalizability and replicability of our evaluation process. Therefore, if Conservation Capital wants to move forward in a particular community or with a particular project, new interviews may need to be conducted.

Case Study Analysis

The case studies are meant to provide a cross-sectional analysis of the realities of natural hazard mitigation efforts along the Oregon coast. Natural hazard mitigation, and more broadly coastal resiliency, require interdisciplinary understanding of the community. Therefore, the analysis provides the social, political, economic, and environmental context of each community to identify natural hazard risks, issues, resources, capacities, and existing networks.

First, the analysis answers whether social capital and political will exist in the community to address these needs. This includes the extent to which hazard mitigation plans have been integrated with other community plans, and existing networks that provide a basis for

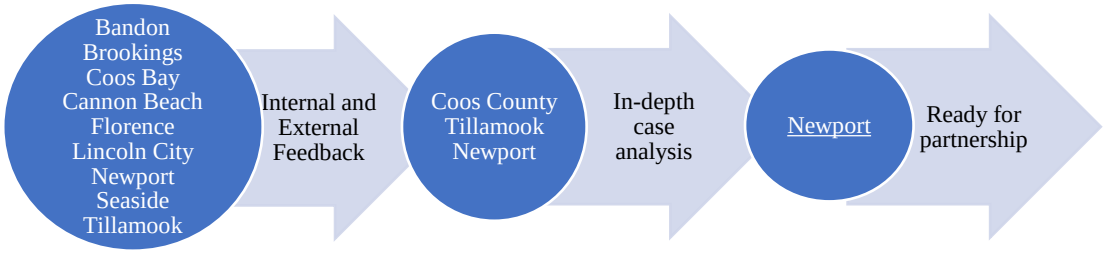
cooperation and collaboration. The demographics of each community serve as a backdrop against which the capacities or lack thereof can be understood. Further, analysis of economic drivers within each of these coastal communities is a necessary component of identifying potential areas for investment. Therefore, the analysis assesses the main economic drivers of each community. Finally, the case studies provide the environmental context within which we understand the natural hazards and risks facing these coastal communities.

Case Study Selection

To understand the specific challenges and opportunities for mitigation projects along the Oregon coast, a brief analysis of nine different cities was conducted: Bandon, Brookings, Cannon Beach, Coos Bay, Florence, Lincoln City, Newport, Seaside, and Tillamook.

Analysis included identifying if the city had a comprehensive plan and/or a natural hazard mitigation plan with a risk and vulnerability assessment, and an evaluation of its economic drivers and community demographics. Selecting three cities to conduct further analysis and assessment was completed by comparing size and location of communities as well as availability of information, and included external considerations such as geography for relocation options, and tourism economies that may entice outside investment in mitigation strategies.

Figure 2: Case Study Selection and Evaluation Process



The selected communities: Coos County, Newport, and Tillamook represent large and small population size, diverse topography for retreat options, varying degrees of political will and staff capacity, represent the South, Central and North Coast Regions, and various economies of tourism and industry.

Document Review

Since the analysis relies on understanding the realities of the case study communities, many industry and governmental resources are used to conduct the document review which include:

- Multi-Jurisdictional Natural Hazard Mitigation Plans (NHMP) for Coos, Tillamook and Lincoln Counties and case study cities.
- Case study city comprehensive plans, budgets, and comprehensive financial annual reports.
- City Council priorities and goals, council and committee meeting agendas and minutes.
- Newspaper articles.
- Reports from the Federal Emergency Management Agency and the State of Oregon.

Evaluation Criteria

The evaluation criteria are designed to identify the most promising community with which Conservation Capital could partner. This is a replicable process that the client can use to assess other communities' readiness for engagement in incentivizing investment in mitigation projects.

- *Loss Assessment* - Has the community monetized property loss levels based on different scenarios of natural hazard events?
- *Economic Diversity* - What percentage of employment comes from how many industries?
- *Existing Partnerships* - To what extent are partners from the public, private, and nonprofit sectors involved in preparedness efforts?
- *Political will* - To what extent is community leadership engaged in natural hazard mitigation?
- *Existing Staff Capacity* - What is the city staff's capacity to engage in, and complete mitigation efforts?
- *Public support* - Are residents aware of natural hazard mitigation efforts? Are they supportive of them?
- *Quantified financial need* - Have the costs of mitigation needs and efforts been quantified in dollars?
- *Financial allocation* – Has the city identified funding or earmarked revenues for natural hazard mitigation efforts?

In other words, does the community have the necessary information to provide cost-benefit analysis for potential investors, the political will and support of its residents, and partnerships within the larger community to complete large-scale mitigation projects.

FINDINGS

Using information gathered during case study analysis (Appendix D), the communities were evaluated against the eight criteria described above and given a score from 0 to 3. A score of 0 indicates that the community did not meet the threshold of the defined criteria. Scores 1 through 3 indicate poor, fair, and good respectively.

Figure 3: Case Study Evaluation Matrix

	Newport	Tillamook	Coos County
Year of MJNHMP	2015	2011*	2016
Loss Assessment	1	3	0
Economic Diversity	2	1	1
Existing Partnerships	2	3	2
Political Will	3	2	1
Existing Staff Capacity	2	1	1
Public Support	3	2	1
Quantified Financial Need	2	0	0
Financial Allocation	1	0	0
Total Score	16	12	6

* 2017 update in process

The following comparative analysis provides scoring reasoning for each criterion across the three communities. Attempts to standardize scoring have been made but of course, many of the criteria are subjective. Except for staff capacity, scores were not influenced by interview findings to not bias results in favor of communities that responded to interview requests. For many of the criteria, like public support or political will, the passage of a new bond measure or the completion of a new comprehensive plan could change the community's score drastically. Thus, this analysis represents a specific point in time and is limited in its reliance on availability of information.

Further, during the time of this analysis, the future of the Jordan Cove natural gas project in Coos Bay was uncertain and therefore, not a part of the evaluation. However, a local ballot initiative, written broadly to block the project, was rejected by voters in May of 2017 (Sickinger, 2017). Given that the community did not pass the measure and the fact that the Trump administration has committed itself to supporting the fossil fuel industry, this project now seems more likely to move forward. The addition of this project to the Coos Bay and Coos County economies could change the evaluation and moving forward, this may be an interesting project for Conservation Capital to explore.

Comparative Analysis

To compare the three communities effectively, it is important to understand how they experience natural hazards. Figure 4 below shows the respective ranking of hazards for each of the communities. For more information on how risk assessments are calculated, see Appendix F.

Figure 4: Comparative Risk Assessment by cumulative hazard rank

	Communities & Hazard Rank		
Hazard	Coos County	Tillamook	Newport
Windstorm	1	2	1
Winter Storm	-	3	2
Earthquake	2	4	3
Tsunami	3	5	4
Flood	4	1	8
Wildfire	5	8	7
Landslide	7	9	5
Drought	6	6	10
Coastal Erosion	-	10	6
Volcano	-	7	9

Source: Coos County Hazard Analysis, November 2008; Analysis and Ranking by OPDR as cited in "Basic Plan," 2016, p. i-3; Tillamook County Department of Community Development, 2017, p.48-149; Lincoln County NHMP, 2015, p.363

While the CSZ earthquake and tsunami rank among the top five concerns for the three communities, more frequent events are the primary concern. For Coos County and Newport, windstorms rank as the highest threat and the greatest potential hazard. Tillamook, on the other

hand, suffers most frequently from flooding due to its floodplain location. In all three cases, damage to property can be severe and communities face being cut-off by downed trees or flood waters.

Loss Assessment

The loss assessment criterion asks to what extent has the community monetized property loss associated with different natural hazard scenarios. This is a first step in justifying public and private investment in mitigation.

Loss Assessment
Newport = 1
Tillamook = 3
Coos County = 0

Newport's only loss assessment refers to coastal and riverine flooding. Because of the limited scope of Newport's assessment, they receive a 1 in this area. On the other hand, Tillamook receives a score of 3 due to the inclusion of loss assessments for five hazards in the 2017 NHMP update. In contrast, loss assessments in Coos County serve more to prioritize projects and do not monetize loss and thus, Coos County receives a score of 0.

Economic Diversity

Economic diversity is key to overall community resilience to natural disasters and this criterion refers to the number and size of employment industries within the community. Scores are based on the economic diversity ranking[1] of each county and supplemented by local data.

Economic Diversity
Newport = 2
Tillamook = 1
Coos County = 1

Lincoln County ranks among the top two-thirds of counties in Oregon in terms of economic diversity. As the largest city in Lincoln County, Newport offers tourism, fishing, timber, and a growing marine science industry resulting in a score of 2. Among the bottom third of counties in terms of economic diversity, the City of Tillamook serves as the central Tillamook region's economic hub in the three areas of commercial, industrial, and governmental activity. Nevertheless, industrial manufacturing is on the decline in Tillamook and most residents leave the city for work ("Economy", 2012). For these reasons, Tillamook's final score for economic diversity is a 1. Also among the bottom third, Coos County's largest employer is the local government and therefore receives a score of 1.

Existing Partnerships

The nature of hazard mitigation projects requires a network of community partners to assist with the associated financial demands. This criterion assesses how many partners from the public, private, and nonprofit sectors are involved in mitigation efforts.

Existing Partnerships
Newport = 2
Tillamook = 3
Coos County = 2

Newport receives a score of 2 in this category. While the City has partnered with FEMA in their Safe Haven Hill project, this score is reflective of efforts to proactively identify partners for future projects. Tillamook identifies and works with several partners in the public and nonprofit sectors. For example, The Southern Flow Corridor project has several funding partners including

[1] The Oregon Employment Department ranks counties based on economic diversity from 1 to 36 with 1 signifying the most diverse. To utilize their ranking in this evaluation, scores of 1-11 equate to 3, scores of 12-24 equate to 2, and scores of 25-36 equate to 1.

local, state and federal agencies, and the Tillamook Bay Estuary Partnership ("Partners", 2013). Therefore, the city of Tillamook receives a 3. Like Newport, Coos County also actively identifies community partners for mitigation efforts resulting in a score of 2.

Political Will

This criterion assesses the extent to which city leadership is engaged with natural hazard mitigation. Scores are based on whether mitigation efforts are integrated into larger community plans or goals.

Political Will
Newport = 3
Tillamook = 2
Coos County = 1

Newport's City Council currently identifies several natural hazard mitigation projects as annual goals (Newport City Council, 2017). Day-to-day worries remain top priorities but the engagement of the City Council earns Newport a 3. Similarly, Tillamook prioritizes flood mitigation due to repetitive loss issues and those efforts are well integrated with the comprehensive plan ("Natural Disasters and Hazards," 2012). Yet, other hazard issues are not independently mentioned in the comprehensive plan and mitigation is not listed as a goal or priority of the City Council ("City of Tillamook | City goals and objectives," n.d.). Therefore, Tillamook's final score for political will is a 2. Available information for Coos County does not show that community leaders have prioritized natural hazard mitigation projects. This may be due to few recurring natural hazard events and for this reason, Coos County receives a 1.

Existing Staff Capacity

Existing staff capacity answers what is the city staff's ability to engage in and complete mitigation efforts. Scores are based on self-description, response to requests for information, and a city's need for external help on mitigation efforts.

Staff Capacity
Newport = 2
Tillamook = 1
Coos County = 1

The staff at the City of Newport have dedicated resources to education and preparedness. The City has an Emergency Preparedness Coordinator position and staff time across several departments committed to mitigation efforts. Still, limitations remain and therefore, Newport earns a 2. Unlike Newport, Tillamook does not have staff dedicated to mitigation, demonstrated by the fact that the most recent flood mitigation plan update had to be contracted out (Leversque, 2013, p. 31). Therefore, Tillamook receives a score of 1. Coos County also receives a score of 1. While it has an emergency manager, that is the only full-time staff dedicated to mitigation for the entire county ("Coos County Emergency Management," n.d.).

Public Support

Public support measures the extent to which residents are aware and supportive of mitigation efforts. Scores are based on a two-part measure: are residents involved in volunteer teams or associations related to mitigation and have residents passed bond measures to fund city projects.

Public Support
Newport = 3
Tillamook = 2
Coos County = 1

The residents of Newport have passed two bonds in recent years to fund wastewater and water treatment facilities and therefore, we assume that future bonds are feasible. Additionally, Newport has an active volunteer Community Emergency Response Team (CERT) earning the city a score of 3 ("C.E.R.T.,"

n.d.). Unlike Newport, Tillamook does not have a local CERT group but, residents recently passed a $4 million bond measure to increase school safety and update facilities ("2017 Special Election," n.d.). For these reasons, Tillamook receives a score of 2. In contrast to Newport and Tillamook, Coos County residents seem reluctant to support bond measures, as evidenced by the recent rejection of a Coos Bay school safety bond (Ward, 2017). However, there is an active CERT team within the County resulting in a score of 1("Search CERT Programs by Zip Code," n.d.).

Quantified Financial Need

This criterion assesses the extent to which communities have associated prices with mitigation projects. Cost estimates are a necessary component of cost-benefit analysis for projects.

Quantified Financial Need
Newport = 2
Tillamook = 0
Coos County = 0

Newport assigns price tags to their top priority mitigation projects only and therefore receives a 2. On the other hand, neither Tillamook nor Coos County have identified funding needs for any of their stated projects and both receive a 0.

Financial Allocation

Financial allocation answers whether the community has identified public sources of funding or earmarked revenues for natural hazard mitigation efforts. This criterion begins to address the community's ability to move past the planning phase and into implementation.

Financial Allocation
Newport = 1
Tillamook = 0
Coos County = 0

Of the three communities, Newport is the only one that includes a line-item in their budget for mitigation efforts. Nonetheless, the amount falls far short of the need, resulting in a score of 1. A review of financial documents from Coos County and Tillamook did not reveal dedicated sources of funding. This results in a score of 0 for both.

Interview Summary

Informed by client interests and selection of case studies, 29 interview requests were sent to local officials and city staff, state policymakers and agency representatives, and area nonprofits related to land use advocacy and environmental sustainability. A full list of the various stakeholder interview requests is in Appendix E. Eleven interviews were completed and provide input from one nonprofit, three state agencies, three cities, and two counties. Interviews were 30-80 minutes long and the responses are used together with the case studies to provide context for the recommendations for Conservation Capital's coastal efforts.

Interview Takeaways

Coastal Realities Differ from State and National Perspectives

All interviewees expressed a disconnect between coastal resilience efforts and the perception of those efforts by those outside of coastal Oregon. People and organizations at all levels on the coast are actively engaged in smart, thoughtful, effective strategies for resilience in the face of a Cascadia and tsunami event. Media accounts of the impending event, such as the article "The Really Big One - An earthquake will destroy a sizable portion of the coastal Northwest.

The question is when" (New Yorker, July 20, 2015 Issue), have contributed to an outsider versus coastal perspective. Many stakeholders discussed a sentiment of outsider perspectives portraying the coast as uneducated, ill-informed, and lacking tangible action for preparedness. Addressing the complex issues around natural hazards and resilience on Oregon's coast takes a lived understanding or deep immersion into the existing frameworks. Most stakeholders we talked with are now inundated with requests for information or offers of advice from people outside of Coastal Oregon because of the New Yorker article. While this can sometimes be helpful, it can also become overwhelming for staff who are already managing so many responsibilities.

Policy Frameworks Lack Coordination Across State and Federal Agencies

While policy frameworks at the city, county, state, and federal level exist pertaining to coastal hazard mitigation and resilience, ninety-one percent of respondents expressed a lack of coordination between these frameworks. This creates an incomplete patchwork of regulation and incentives. Concerning hazard mitigation in general, regulatory expectations can vary between jurisdictional levels. For example, Hazard Vulnerability Assessments (HVA) are not required by Oregon Revised Statutes (ORS), but FEMA requires a community have one to be eligible for funding. There are few, if any, regulatory frameworks that directly address tsunami resilience in a comprehensive way. The state may want cities to create these tsunami specific recommendations for their jurisdictions, but interviews indicate that at least some local officials consider it to be the state's role to develop a uniform standard.

Urban Growth Boundary Delays, But Does Not Prohibit, Natural Hazard Mitigation Projects

Land use regulations can be interpreted to support development and building for tsunami resilience, but there is little precedence for clear interpretation or implementation of these recommendations for such. Urban Growth Boundaries (UGBs) were developed in coastal communities independently from inundation zone mapping. This means that, for many communities, the UGB requires that development be encouraged within areas impacted by the inundation zone. Initially, we expected interview responses to indicate a conflict, or large barrier, for natural hazard mitigation projects due to the UGB. However, two interviewees felt that Oregon's 19 Statewide Planning Goals already prevent such conflict. Goal 14 specifically allows communities to modify their UGB to accommodate Natural Hazard Mitigation Plan projects like relocating schools and essential facilities. Overall, thirty-six percent of interviewees did not believe the UGB is barrier to implementing natural hazard mitigation projects. Administrative procedure may make application of Goal 14 onerous for local communities and confusion remains around the acceptable use of vacated land, but these were perceived as potentially challenging delays rather than outright barriers.

According to several stakeholders, some jurisdictions want to redevelop vacated land for housing or businesses. However, this is not the intention of Goal 14, which instead intends for the land to be redeveloped into parks, parking lots, or evacuation ready sites. A successful example is the relocation of the community school in Waldport. Residents voted to relocate the school and funding from FEMA was acquired to help with the demolition of the old building. Because FEMA funds were used, FEMA has final approval over how the old school site is used. Waldport is currently pitching proposals to FEMA for appropriate development of the evacuated site.

Building Codes Alone Do Not Incentivize Private Funding for Natural Hazard Mitigation Projects

There is a lack of regulatory frameworks that incentivize or require tsunami-ready building and development. In Newport, for example, Oregon State University (OSU) is building a new marine science campus in South Beach. One of their main buildings will be sited within the inundation zone. City Council approved code changes to allow for taller development because OSU designed the building as a vertical evacuation tower. When the city made these changes, they researched whether private developers might also take advantage of the new standards. Their findings suggest it is unlikely since there is no obvious financial return on the added investment to make a building tsunami resilient and no regulatory framework to mandate it. Thirty-six percent of interviewees indicated that OSU is going the extra mile in their building both because it is the right thing to do and it will be an example that it can be done. These are considerations a public-serving entity may be more likely to make than a purely private development entity.

Implementation is Expensive and Difficult to Fund

Funding for natural hazard mitigation focuses on four different areas: science and research, planning, education and outreach, and built project implementation. All stakeholders stated that while there is funding readily available for planning at each jurisdictional level, finding funds for implementation remains difficult. One stakeholder felt this disparity existed because "the planning is cheap compared to the solutions." Required infrastructure projects, such as updates to bridges, dams, and roads, are huge, expensive projects and often have several jurisdictions, agencies, and organizations responsible for their maintenance. While having resilient infrastructure is essential, the cost to effectively update it is daunting for small communities.

One stakeholder shared that no private firm or individual wants to invest in infrastructure solutions on the coast because the projects are just too massive. The examples of successful project implementation come from the communities themselves and not private firms. Examples include Waldport relocating its school and Newport building Safe Haven Hill. Communities use tools like general obligation bonds, tax increment financing, and matching state or federal money to create the needed capital stacks for these projects. The point consistently highlighted by interviewees is that projects that move forward are funded by communities and not private firms.

FEMA Funding for Communities is Predominantly Retroactive

Forty-five percent of interviewees responded that FEMA funding is difficult to obtain before a disaster occurs as most funding is retroactive. The only FEMA grant program that offers financial assistance pre-event is its Pre-Disaster Mitigation Grant Program, which presents challenges for local jurisdictions in a couple of ways. First, the grant requires that the locality provide matching funds which are generally out of reach for small communities. Additionally, coastal jurisdiction staff are not typically experienced grant writers and they lack the time to work on proposals. Some jurisdictions contract with third parties to apply for grants, but this adds to the overall. Coastal communities, like Newport, have been able to receive some FEMA money for tsunami related resilience projects because of the federal declaration of emergency on the West Coast after the Japanese tsunami. Stakeholders have to be smart and creative to make the most of the funding they are eligible for and are making as much progress as they can given these challenges.

Staff Capacity to Address Natural Hazard Mitigation is Limited

Ninety-one percent of respondents expressed that everyday demands on city and county staff create challenges for tackling larger, long term infrastructure projects related to Cascadia and tsunami resilience. Implementing new or large infrastructure projects can require new codes or requirements from city governments and can take many years to plan and complete. No coastal jurisdiction has a mitigation manager, therefore existing staff must work within their roles to coordinate, prioritize, and address natural hazards. This can be a challenge when priorities differ depending on jurisdictional needs or staff perceptions. Beyond the challenges of coordinating priorities across jurisdictions, is that high-probability events like landslides or flooding are often overlooked by outsiders. Small, constant natural hazards add up to create major challenges for communities and therefore tend take precedence for staff time.

Due to High Costs of Implementation Efforts, Communities Prioritize Saving Lives Through Preparedness

In light of the challenges facing infrastructure resilience implementation and the uncertainty of the magnitude of devastation that will be caused by the tsunami, sixty-four percent of respondents are focusing their efforts on saving human lives through preparedness. These stakeholders felt that massive rebuilding will be necessary after the tsunami no matter how prepared they become now. Therefore, staff prioritize their time and efforts for saving human life. This focus on human safety through preparedness includes educating people on evacuation, fortifying evacuation routes (prioritizing bridge retrofits to evacuation routes), improved signage, education and maps, meeting individually with citizens, and providing accurate information on what people need to be prepared.

Most stakeholders feel that Cascadia and the tsunami could isolate the coast for weeks due to road and bridge damage. Additionally, there is concern that the I-5 corridor will also be affected by Cascadia and resources may be deployed there before coming out to the coast. At the city and county level, stakeholders shared that their goal is ensuring that their local government is prepared to keep people, communications, and networks in tact to respond after the event. Some efforts described consist of researching alternative energy sources, ensuring that community certifications and requirements are up to date for FEMA response funding, and scenario practice.

RECOMMENDATIONS

The intent of this capstone project is to evaluate whether Conservation Capital's model of public-private partnerships for conservation could translate to success in supporting coastal resilience in Oregon. Compelling opportunities for productive engagement and investment do exist for Conservation Capital on the Oregon coast. To guide them in its pursuit of these opportunities, we have four overarching recommendations: 1) create an immersed presence in Newport and Lincoln County; 2) consider nonprofit mechanisms to facilitate public capital stacks; 3) focus funding efforts on implementation of mitigation projects; and, 4) invest in mitigation projects for high-probability hazards.

Create an immersed presence in Newport and Lincoln County.

Each community has its unique needs, resources, and approaches when it comes to resilience, making these issues incredibly nuanced and complex. In addition, the widely read New Yorker article regarding the Cascadia Subduction Zone (CSZ) event has resulted in a distracting level of calls and requests from "outsiders" wanting to "help" the coast prepare. A weekly or monthly level of engagement from an outside actor like Conservation Capital will not be sufficient enough to a) understand the nuanced and complex considerations, trade-offs, and opportunities an individual coastal community faces and b) show enough commitment to be accepted by stakeholders as a true member of the team.

It is because of this, that we recommend that Conservation Capital consider relocating and immersing itself in Newport and Lincoln County. The case studies and comparative evaluation show that Newport and Lincoln County are already employing a creative vision toward building their capital stacks for implementation of projects and that they have fostered both the public support and staff time to have the capacity to potentially engage in new partnerships. Additionally, Newport is home to an already promising public-private partnership involving Oregon State University (OSU). The city has changed building codes to allow OSU to build a vertical evacuation tower in its marine science campus located within the inundation zone.

Consider nonprofit mechanisms to facilitate public capital stacks.

Conservation Capital has primarily focused on leveraging private money from businesses in their model of conservation work. Coastal Oregon does not have the large, consolidated economic drivers needed to provide pools of private capital. Along with, and perhaps because of, this lack of private capital on the coast, pipelines have not been created to connect potential investments with potential investment opportunities. This situation is very different from the conservation investment opportunities Conservation Capital facilitated in Texas. While private money mechanisms are not currently developed or available on the coast, findings suggest that there may be other financing opportunities if Conservation Capital is open to considering philanthropic private money and nonprofit mechanisms.

A strategy to consider would be to structure its work more like a foundation that pools interested public and philanthropic capital to serve as a match for communities--allowing jurisdictions to qualify for more state and federal funding, drawing more money to the coast for hazard mitigation and resilience. In this same vein, Conservation Capital could issue requests for proposals, allowing city and county governments to access grant money without creating a 501 (C)(3) counterparty. Another strategy to consider: partner with mission-driven organizations on the coast like OSU who are willing to go above and beyond with their resilience projects because of their commitment to the community above profit. Because OSU has concurrent incentives to offer hands-on education to its students, while also demonstrating that vertical evacuation structures can be successful in coastal communities, they are willing to go beyond what is required to think about what is possible. This makes them an intriguing community partner for Conservation Capital.

Focus funding efforts on implementation of mitigation projects.

Communities have many opportunities to receive funding for planning, but as soon as they are ready to implement, the money disappears. Resilience can be broken into four areas--science, planning, implementation, and education. Science includes the data collection and technology needed to map the inundation zone and measure the likelihood of an event. Planning includes the Natural Hazard Mitigation Plans and FEMA preparedness plans. Implementation involves the actual execution of a plan, project, or program. Education includes preparedness and outreach efforts to ensure that individual citizens know their evacuation routes and stockpile resources. Of these four buckets, implementation remains the most difficult and expensive to fund. No state and only one limited federal agency specifically focuses on funding proactive implementation directly. Local jurisdictions cannot fundraise or accept in-kind donations for community projects without creating a nonprofit arm or partnership. Small, low-hanging work can get done through routine maintenance funds or pieces of other state and federal funding, but larger projects like retrofitting dams and bridges remain too costly and frustratingly low priority for outside funding partners.

A focus on implementing mitigation projects would allow Conservation Capital to both address the most challenging piece of the resilience funding puzzle while also best leveraging their experience in working with tangible, real asset projects.

Invest in mitigation projects for high-probability hazards.

Finally, Conservation Capital could consider engaging with communities on hazards beyond Cascadia. Drawing more resources to the proactive implementation of projects that protect and improve these small communities from the high-risk, high-probability hazards that occur on a weekly, monthly or annual basis.

By supporting these projects, the communities will see immediate benefits while also preparing for the Cascadia event through the layering of projects. This approach may also provide better, tangible investment opportunities that are more in line with Conservation Capital's work from Texas. For example, the $10 million Southern Flow Corridor project in Tillamook focuses on high-probability flooding and combines flood mitigation with restoration of wetland habitats leveraging interest and funding from eleven sources ("The Project," 2013).

CONCLUSION

Conservation Capital has strong potential as a community partner for coastal Oregon. If the they choose to focus their work on the Oregon coast, it will not only be challenging, but will vary greatly depending on the location. This report aims to provide Conservation Capital with the considerations and understandings they will need to get started on the right foot. Armed with the recommendations, background information, and suggested connections provided through this report, Conservation Capital will be able to engage as a true partner with a coastal community and benefit from being a leader in the space of private investment into resilience work.

APPENDIX A: OREGON'S STATEWIDE PLANNING AND POLICY GOALS

The following is an excerpt from Oregon's Statewide Planning Goals & Guidelines, 2010, published by Oregon Department of Land Conservation & Development.

- Goal 1: Citizen Involvement,
- Goal 2: Land Use Planning,
- Goal 3: Agricultural Lands,
- Goal 4: Forest Lands,
- Goal 5: Natural Resources, Science and Historic Areas, and Open Spaces,
- Goal 6: Air, Water and Land Resources Quality,
- Goal 7: Areas Subject to Natural Hazards,
- Goal 8: Recreational Needs,
- Goal 9: Economic Development,
- Goal 10: Housing,
- Goal 11: Public Facilities and Services,
- Goal 12: Transportation,
- Goal 13: Energy Conservation,
- Goal 14: Urbanization,
- Goal 15: Willamette River Greenway,
- Goal 16: Estuarine Resources,
- Goal 17: Coastal Shoreline,
- Goal 18: Beaches and Dunes,
- Goal 19: Ocean Resource.

APPENDIX B: SERVICE RECOVERY TIMEFRAMES

Figure 1: Timeframes for Service Recovery in Oregon - Current Conditions

Critical Service	Zone	Estimated Time to Restore Service
Electricity	Valley	1 to 3 months
Electricity	Coast	3 to 6 months
Police and fire stations	Valley	2 to 4 months
Drinking water and sewer	Valley	1 month to 1 year
Drinking water and sewer	Coast	1 to 3 years
Top-priority highways (partial restoration)	Valley	6 to 12 months
Healthcare facilities	Valley	18 months
Healthcare facilities	Coast	3 years

Source: The Oregon Resilience Plan, 2013, p. xx.

APPENDIX C: INTERVIEW QUESTIONS

State Interview Questions

The following list of questions will be used by University of Oregon Graduate students within the Planning, Public Policy & Management department as part of their research for a terminal project. The student group is researching how to attract both public and private funding to natural hazard mitigation and resilience efforts in coastal Oregon.

About You & Your Profession

1. Please tell us more about your work on natural hazard mitigation and resilience efforts in coastal Oregon.

   a. What is your professional role in these efforts?

   b. What is your organization's role in these efforts?

   c. What is your role in securing funding for these efforts?

   d. What are the barriers you see that impede implementation of hazard mitigation plan projects in coastal Oregon?

Community Details

1. What do you feel is currently the highest priority natural hazard mitigation and resilience issue in Oregon?

2. How would you describe the state of Oregon's engagement with coastal hazard mitigation and resilience efforts?

   a. Is there public support for resilience efforts?

   b. Is there public support for resilience project funding?

   c. Is there state government support for resilience efforts?

   d. Is there state government support for resilience project funding?

   e. Which community or activist groups are most active in resilience efforts?

Funding for Natural Hazard Mitigation and Resilience

3. Please tell us more about current funding for natural hazard mitigation and resilience efforts in coastal Oregon.

   a. Is the current level of funding adequate to complete all planned projects? Why or why not?

b. Is the current level of funding adequate to complete all required projects? Why or why not?

c. Is the current level of funding adequate to complete all desired projects? Why or why not?

d. What are current sources of funding for coastal hazard mitigation and resilience projects?

4. Please tell us more about potential future funding for natural hazard mitigation and resilience efforts.

a. How much funding is currently needed for mitigation and resilience projects in coastal Oregon?

b. Have additional funding sources for these projects been identified?

i. If yes, what are the primary sources?

ii. If not, why not?

c. Is any of your current or potential funding sources from private sector money (either individuals or businesses)?

5. Are some natural hazard mitigation and resilience projects easier to fund than others? Why or why not?

6. Who are the primary funders of natural hazard mitigation and resilience efforts in coastal Oregon?

7. How would you describe the level of paid staff capacity at the state level to:

a. Address natural hazard mitigation efforts in coastal Oregon?

b. Identify and/or apply for funding for these projects?

8. Are there ways you would like to see agencies, organizations and/or individuals coordinate differently to achieve hazard mitigation and resilience goals?

9. Were there resilience or mitigation funding programs (local, state, federal, or private) that were once available, but no longer are? If yes, what happened?

10. What do you think coastal communities could do to attract private investment to hazard mitigation and resiliency efforts?

11. What do you think coastal communities could do to attract government funding to hazard mitigation and resilience efforts?

12. Are there state level policies that you consider barriers to providing funding for natural hazard mitigation and resilience projects in coastal Oregon?

a. If yes, what are the policies and how could they be changed?

Economic Impacts from a Tsunami Event

13. If not previously covered, what do you see as the primary impacts of a tsunami event on coastal Oregon? (population, local economy, infrastructure, etc.)

14. After a tsunami event, how long do you believe it would take for coastal Oregon to return to functioning as it does today?

15. What insurance plans cover the effects of a tsunami event on coastal Oregon?

16. What would the financial impacts be for the state of Oregon from a tsunami event?

Concluding Thoughts

17. Thank you very much for taking the time to talk with us. Is there anything else related to funding for natural hazard mitigation and resilience that you would like to share with us?

Community Interview Questions

The following list of questions will be used by University of Oregon Graduate students within the Planning, Public Policy & Management department as part of their research for a terminal project. The student group is researching how to attract both public and private funding to natural hazard mitigation and resilience efforts in coastal Oregon.

About You & Your Profession

1. Please tell us more about your work on natural hazard mitigation and resilience efforts in coastal Oregon.

   a. What is your professional role in these efforts?

   b. What is your organization's role in these efforts?

   c. What is your role in securing funding for these efforts?

   d. What are the barriers you see that impede implementation of hazard mitigation plan projects?

Community Details

2. What do you feel is currently the highest priority natural hazard mitigation and resilience issue for your community?

3. How would you describe your community's engagement with coastal hazard mitigation and resilience efforts?

   a. Is there public support for resilience efforts?

   b. Is there public support for resilience project funding?

   c. Is there local government support for resilience efforts?

   d. Is there local government support for resilience project funding?

   e. Which community groups are most active in resilience efforts?

4. In your opinion, how well do community members understand the risks of coastal hazards?

5. What population groups in your community are most vulnerable to coastal hazards?

6. How does tourism affect coastal hazard planning efforts in your community?

   a. Does your community generate any resilience project funding from tourists?

7. Does your community have special districts? If yes, are there overlapping boundaries between districts or other types of areas?

8. Are there areas where your community is growing that are problematic for natural hazard

mitigation or resilience efforts?

a. If yes, how is this currently being addressed?

Funding for Natural Hazard Mitigation and Resilience

9. Please tell us more about current funding for natural hazard mitigation and resilience efforts.

a. Is the current level of funding adequate to complete all planned projects? Why or why not?

b. Is the current level of funding adequate to complete all required projects? Why or why not?

c. Is the current level of funding adequate to complete all desired projects? Why or why not?

d. What are current sources of funding for coastal hazard mitigation and resilience projects?

e. Is funding for efforts needed as a steady stream or in lump sums?

10. Please tell us more about potential future funding for natural hazard mitigation and resilience efforts.

a. How much funding do you currently need for mitigation and resilience projects?

b. Have you identified potential funding sources for these projects?

i. If yes, what are the primary sources?

ii. If no, why not?

c. Is any of your current of potential funding sources from private sector money (either individuals or businesses)?

11. Are some natural hazard mitigation and resilience projects easier to fund than others? Why or why not?

12. Who are your primary partners in natural hazard mitigation and resilience efforts?

a. Which of these partners provide funding for your work?

13. How would you describe the level of paid staff capacity to:

a. Address natural hazard mitigation plans in your community?

b. Identify and/or apply for funding for these projects?

14. Are there ways you would like to see agencies, organizations and/or individuals in your community coordinate differently to achieve hazard mitigation and resiliency goals?

15. Are there resilience or mitigation funding programs (local, state, federal, or private) that were once available that are no longer available? If yes, what happened?

16. What do you think coastal communities could do to attract private investment to hazard mitigation and resiliency efforts?

17. What do you think coastal communities could do to attract government funding to hazard mitigation and resilience efforts?

18. Are there state level policies that you consider barriers to receiving funding for natural hazard mitigation and resilience projects?

a. If yes, what are the policies and how would you like to see them change?

Economic Impacts from a Tsunami Event

19. If not previously covered, what do you see as the primary impacts of a tsunami event on your community? (population, local economy, infrastructure, etc.)

20. After a tsunami event, how long do you believe it would take for your community to return to functioning as it does today?

21. What insurance plans cover the effects of a tsunami event in your community?

22. What would the financial impacts be for your community from a tsunami event?

23. Does your community have an economic resiliency plan for large-scale events like tsunami?

24. Does your community have any local economic development community groups that work on resiliency efforts?

Concluding Thoughts

25. Thank you very much for taking the time to talk with us. Is there anything else related to funding for natural hazard mitigation and resilience that you would like to share with us?

APPENDIX D: CASE STUDY ANALYSIS

Case study analysis took place in three coastal Oregon communities, Coos County, Tillamook and Newport. Each of these assessments considers the environmental, political, social and economic contexts of the communities. The analysis serves as the backdrop to the evaluation matrix and comparative analysis.

Coos County

Coos County is located in southwest coastal Oregon between Douglas and Curry County. The County spans 1,600 square miles, and is home to 63,043 people in seven cities including Coos Bay and Bandon (Coos County website, 2017). Distinct natural beauty and several golf courses attract a number of visitors to the county ("Coos Bay Visitor Information Center," n.d.).

Environment

With a mild climate, Coos County experiences one or two storms per winter, with occasional heavy rains. Infrequently, these rains cause flooding (Oregon Climate Service, 2017). As a part of the 2016 Natural Hazard Mitigation Plan, the following natural hazard risks were identified and associated ranks assigned to them.

Figure 1: Coos County Risk Assessment, ordered by highest risk level

Hazard	Vulnerability	Probability
Windstorm	Moderate	High
Earthquake	High	Moderate
Tsunami	Moderate	High
Flood	Moderate	High
Wildfire	Moderate	Moderate
Drought	Moderate	High
Landslide	Low	High

Source: Coos County Hazard Analysis, November 2008;
Analysis and Ranking by OPDR as cited in "Basic Plan," 2016, p. i-3.

For Coos County, windstorms rank as the highest threat and the greatest potential hazard. From 2005-2010 nearly 1 million dollars of damage was caused in Coos County due to windstorms ("Basic Plan", 2016).

To address damage from and increase resiliency to natural hazards, the county has identified priority mitigation efforts. Figure 2 summarizes these efforts.

Figure 2: Coos County Priority Hazard Mitigation Efforts

Hazard	Projects
Multi-Hazard	Participate in the FEMA Risk Map discovery, hazard study, and resilience
Multi-Hazard	Utilize DOGAMI's final multi-hazard risk report and assessment
Coastal Erosion	Reduce risk of coastal erosion through hazard mapping and regulation
Flood	Complete a risk analysis for the flood hazard using newly acquired Light Detection and Ranging (LIDAR) data
Multi-Hazard	Through multi-agency coordination, implement abatement efforts to control noxious weeds, specifically Gorse, Scotch Broom and Butterfly Brush.

Source: NHMP Steering Committee; Oregon Partnership for Disaster Resilience as cited in "Basic Plan," 2016, p. 3-6.

Political

Coos County planning documents reveal a mitigation approach centered around compliance with existing state and federal land use regulations. Natural hazard mitigation planning happens at both the city and county level. At the county level, natural hazard mitigation planning occurs within the Multi-Jurisdictional Natural Hazard Mitigation Plan (NHMP), but is entirely left out of the County Comprehensive Plan. Additionally, the County budget includes no mention of funding for mitigation efforts. Interestingly, the city of Coos Bay does include provisions for mitigation efforts, but the focus remains largely on current issues like decreased water quality, over long-term planning (City of Coos Bay, 2010). Additionally, the city of Coos Bay budget has no line item designations for mitigation efforts, despite mention in the Comprehensive Plan.

Social

Coos County has identified nine community partners within their NHMP. These partners were already involved in "education and outreach" and "information dissemination" efforts as related to natural hazard mitigation ("Basic Plan", 2016). However, none of the community partnerships identified are engaged in either planning or implementation efforts. This means that the burden of implementing mitigation efforts falls largely on the County government.

Existing Networks

Contained within both the NHMP, and listed on the Coos County website, the county identifies multiple organizations as existing and potential partners for mitigation efforts in Coos County. The organizations, as cited in the NHMP, are shown below.

Figure 3: Coos County Community Partners in Mitigation Efforts

Organization
Oregon Coast Community Action
Southwestern Oregon Community College
Boys and Girls Club of Southwestern Oregon
Bridges Advocacy and Outreach Center
OSU Extension Service
Coos Bay Habitat for Humanity
U.S. Department of Agriculture Natural Resources Conservation Service
U.S. Department of Agriculture Farm Service Agency
Coos Forest Protective Association

Source: Coos *County Natural Hazard Mitigation Plan, 2016, p. 51-52.*

Demographics

Coos County has an aging population, with nearly one fourth of residents aged 65 or older. From 2005 to 2015, the population aged 65 or older grew 28.8%, while the population under 18 years of age decreased 11.4%, which suggests a significant shift in age of the general population (US Census 2015 "Profile of General Demographic Characteristics", as cited in Coos County Multi-Jurisdictional Natural Hazard Mitigation Plan, 2016, p 33). The County acknowledges this demographic shift in its mitigation planning, and has seen pushback against any public financing efforts. For example, a 2017 bond measure for public school repairs and retrofits for earthquake preparedness was overwhelmingly denied in Coos County (Ward, 2017).

Figure 4: Socio-Economic Demographics, 2015

	Coos County
Population Estimate	62,775
Age	
Persons under 5 years	4.9%
Persons under 18 years	13.7%
Persons under 65	58.1%
Persons 65 years and older	23.3%
Education	
High school graduate or higher, persons 25+	84.8%
Bachelor's degree or higher, persons 25+	14.8%
Housing	
Owner occupied housing	65.0%
Renter occupied housing	35.0%
Income	
Median Household income	$38,605
Individuals in poverty	18.3%

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

Economic

There are a variety of different industries that offer employment, recreation and revenue for the county: forest products, including myrtle wood manufacturing, agriculture - dairy farming and cranberry production, fishing, boating, shipbuilding and repair, and a service industry (Coos County website, 2017). The city of Bandon hosts a large-scale golf resort, the Bandon Dunes Golf Resort which attracts tourists from across the U.S. to this small community (Coos County website, 2017). According to the Oregon Employment Department, Coos County's 2009 economic diversity rating was 26 (with 1 being the most diverse, and 36 being the least) (Oregon Partnership for Disaster Resilience, 2012).

As shown in Figure 5 below, local government is the largest employer in Coos County, providing 21.1% of the county's jobs.

Figure 5: Coos County Employment by Industry

Coos County Employment by Major Industry, 2016	
Industry	**% of Workforce**
Trade, Transportation, and Utilities	19.2
Leisure and Hospitality	11.1
Education and Health Services	10.1
Professional and Business Services	9.3
Manufacturing	7
Natural Resources and Mining	4.5
Construction	4.2
Financial Activities	3.4
Other Services	3.1
Information	1.1
Total Federal Government	***1.5***
Total State Government	***4.3***
Total Local Government	***21.1***

Source: *Coos County Natural Hazard Mitigation Plan, 2016, p. 35.*

Coos Bay may soon have a new economic driver that could be of interest to Conservation Capital if it is approved and implemented. A Canadian company has proposed building a liquefied natural gas export facility in the Port of Coos Bay. The facility would be located on an industrially zoned site on the North Spit of lower Coos Bay that is currently undeveloped. This site is a designated Enterprise Zone ("Jordan Cove LNG," n.d.). The Jordan Cove project would also include building a 231-mile pipeline to bring the natural gas to the export terminal. Proponents of the project estimate that it would be a $7.5 billion project and create both temporary and permanent jobs for the area (Sickinger, 2017). The Jordan Cove project has been in the works for over a decade and was blocked by federal authorities under the Obama administration. Jordan Cove, and its parent company Veresen hope that the new Trump administration will reverse the federal block on the project. A local ballot initiative, written broadly to block the project, was rejected by voters in May of 2017 (Sickinger, 2017). Due to the uncertain future of the Jordan Cove project, it was not considered during case study evaluation.

City of Tillamook

Located in Tillamook County on the northern coast of Oregon, the City of Tillamook is situated on the south side of Tillamook Bay 74 miles west of Portland ("City of Tillamook | Tillamook Oregon," n.d.). The city boasts varied natural resources including "rich agricultural lowlands and the forested foothills of the Coast Range" ("History of the City of Tillamook," 2012, p.1). Home to the Tillamook, Trask, and Wilson Rivers the city is surrounded by floodplains ("History of the City of Tillamook," 2012, p. 1).

Environment

Due to its location, flooding remains the highest natural hazard risk for the city. Indeed, from 1996 to 2015 the city and adjacent areas of the county have experienced major flooding events (Tillamook County Department of Community Development, 2017, p. 80).

However, this is not the only natural hazard the city faces as can be seen from Figure 6. For Tillamook, one of the greatest risks associated with these hazards is isolation. Landslides, heavy snow, and flooding cut off access to the city from U.S. Hwy 101. Further, alternate access to the city is across bridges and dikes that could be compromised in a large-scale earthquake ("Tillamook, Oregon: Local Natural Hazards Mitigation Plan," 2011, p. 4-6).

Figure 6: Tillamook Local Risk Assessment, ordered by highest risk level

Hazards	Vulnerability	Probability
Flood	High	High
Windstorms	High	High
Winter Storms	High	High
Earthquake	High	Moderate
Tsunami	High	Low
Drought	Low	High
Volcanic Ash Fall	Low	Low
Wildfire	Moderate	Low
Landslide	Low	Low
Coastal Erosion	Low	Low

Source: Tillamook County Department of Community Development, 2017, p.48-149

Tillamook County is currently coordinating the 5-year update to the Natural Hazard Mitigation Plan. This represents both a unique opportunity and challenge for this project. The opportunity lies in the fact that thinking about hazard mitigation is part of the daily tasks of staff and elected officials. The challenge is that a full draft is currently not available which once finalized should include an assessment of any completed, ongoing, or pending projects.

The current draft update identifies the following essential facilities and mitigation interests and projects for the City of Tillamook:

Figure 7: Tillamook Essential Facilities
subject to moderate to complete damage CSZ earthquake

Schools
East Elementary School
Liberty Elementary School
Sacred Heart Catholic School
Tillamook High School
Tillamook Bay Community College
Tillamook Junior High School
Public Safety
Tillamook 911 Center
Tillamook City Police Department
Tillamook Fire District Main Station #71
Health
Tillamook Regional Medical Center

Source: Tillamook County Department of Community Development, 2017, p. 192

Figure 8: Tillamook Priority Hazard Mitigation Efforts

Hazard	Projects
Earthquake	Retrofit schools
Multi-Hazard	Obtain school generators
Multi-Hazard	Conduct full natural hazard impact analysis
Multi-Hazard	Develop emergency response plan for school district
Flood	Continue to elevate or relocate vulnerable structures, including Tillamook High School

Source: Tillamook County Department of Community Development, 2017, p. 193

Political

While the City of Tillamook recognizes the risks associated with other natural disasters, it focuses much of its energy on flood mitigation. Indeed, flood mitigation is well integrated into the city's Comprehensive Plan while other natural hazards receive very little mention. The city's goals and policies regarding natural hazard mitigation can be found in Appendix G. "Relocating businesses off of 101 is one of the local efforts to minimize flooding and to assist Tillamook in becoming a disaster resistant community" ("Natural Disasters and Hazards," 2012, p. 5). This focus is likely due to the repetitive losses faced by the city considering frequent flooding. Therefore, in addition to NHMP, Tillamook also uses a Flood Mitigation Plan ("Natural

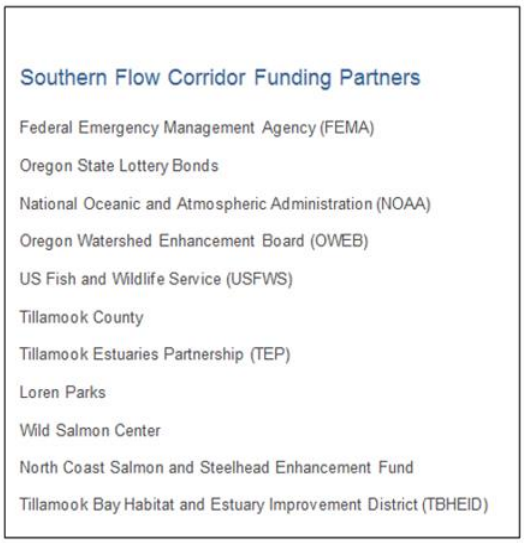
Disasters and Hazards," 2012, p. 6). In 2008, the city lacked the capacity to update the plan in-house and was awarded $27,500 from Oregon Solutions to contract with VLG Consulting who completed the update in 2009 (Leversque, 2013, p. 31). The city has not completed a recent update to this plan and city staff indicate that they were awaiting new FEMA flood maps.

Social

By reviewing existing networks and the demographics of Tillamook we can identify potential partners and the existing social capital within the city.

Existing Networks

An Oregon Solutions project, the Southern Flow Corridor combines the need for flood mitigation along the Tillamook Bay where the City of Tillamook is located with restoration of wetland habitats to reduce flooding impacting residences, agriculture land and US Hwy 101 businesses, improve water quality, and restore habitats for threatened species ("The Project," 2013). The project seeks to accomplish these goals by removing "manmade impediments to flood flows," construction of new setback tidal dikes, and restoration and permanent protection of 522 acres of wetland habitats ("The Project," 2013). The project is estimated to cost a total of $9,446,910 ("The Project," 2013). By combining habitat restoration with flood mitigation, Oregon Solutions found eleven sources of funding.



Source: "Partners".

Demographics

The city of Tillamook hosts the youngest population in Tillamook County with roughly 60% under the age of 65 (U.S. Census Bureau). Figure 9 provides comparative socio-economic demographics between the county and the city. One striking comparison is that median household income in the city at $29,889 is considerably lower than the county-wide figure of $42,581 (U.S. Census Bureau). Additionally, the renter occupied housing in the city is twice that of the rest of the county.

Figure 9: Socio-Economic Demographics, 2015

	Tillamook County	City of Tillamook
Population Estimate	25,430	4,958
Age		
Persons under 5 years	5.4%	7.3%
Persons under 18 years	14.0%	18.7%
Persons under 65 years	56.4%	60.1%
Persons 65 years and older	24.2%	13.9%
Education		
High school graduate or higher, persons 25+	34.6%	37.4%
Bachelor's degree or higher, persons 25+	13.4%	7.7%
Housing		
Owner occupied housing	72.4%	36.7%
Renter occupied housing	27.6%	63.7%
Income		
Median Household income	$42, 581	$29,889
Households in poverty	12.8%	14.6%

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

A disproportionate renter population can many times stymie public funding efforts such as general obligation bonds for residents that may not see the city as their home. Despite this, Tillamook residents recently passed a $4 million bond for school safety and facility upgrades and will receive at least a $1.92 million match from the state. This is in addition to a school district bond of $12.1 million passed in 2002 ("2017 Special Election," n.d; Wolfe, 2017). This indicates that bonds may be attainable for large-scale mitigation projects.

Economic

As the largest city in Tillamook County, the city serves as the central Tillamook region's economic hub in the three areas of commercial, industrial, and governmental activity. The city not only hosts the County government but is also home to the district office of the Bureau of Land Management ("Economy," 2012, p. 1). The Tillamook County General Hospital is also located within the city limits and is the second highest job provider. Overall, the medical industry accounts for more than 410 employees ("Economy," 2012, p. 3).

Lumber and cheese industries continue to be productive. Hampton Lumber mill (Tillamook Lumber Company) which is within the city limits owns over 87% of the city's industrial property and is the largest industrial employer ("Economy," 2012, p. 5). However, overall manufacturing accounts for less than 10% of all employment within the city ("Economy," 2012, p. 4). Interestingly, most of those who work within the city do not live within city limits and 69% of city residents work outside of the city ("Economy," 2012, p. 5). Just north of Tillamook is the Tillamook County Creamery Association's Cheese Factory which is the region's largest employer. Additionally, it attracts about one million visitors annually ("Economy," 2012 p. 1-2).

Figure 10: Largest employers, Tillamook

Employer	Employees
Within City Limits	
Fred Meyer	300
Tillamook County General Hospital	260
Tillamook County Personnel	250
Tillamook Lumber Company	150
Tillamook Medical Group	150
Outside of City Limits	
Tillamook County Creamery Association	400
Tillamook County Smoker	200
Trask River Wood Works	101
Nestucca Ridge Storage	90

Source: "Economy," 2012, p. 3

Tourism is a big industry for the region and the Tillamook County Fairgrounds and Pioneer Museum are both located within the city limits. The city hosts three annual events that draw outside visitors, "the Taste of Tillamook County in March, the June Dairy Parade and Rodeo at the County Fairgrounds in June, and the Tillamook County Fair in August" ("Economy," 2012, p. 2). Of the roughly 2.6 million overnight visitors to the county in 2015, 226,000 of those overnight stays were in the City of Tillamook (Oregon Travel Impacts: 1991–2015, May 2016. Dean Runyan Associates, http://www.deanrunyan.com/doc_library/ORImp.pdf; Tillamook County Transit Lodging Tax receipts by location, 2014-2016 as cited in Tillamook County Department of Community Development, 2017). While it is hard to estimate a complete economic impact of these visitors, the transient lodging tax alone added $345,331 to the city's revenues (Merina & Company, LLP, 2015, p. 36).

City of Newport

"Located in Lincoln County along the central Oregon coast, Newport lies about 135 miles south of Astoria and the Oregon-Washington border, 114 miles southwest of Portland, and 55 miles west of Corvallis. It is the largest city in Lincoln County and is the County seat" (Newport Comprehensive Plan, 2015, p. 1).

Environment

The City of Newport clearly defines the natural hazard risks faced by the City as well as proposed mitigation activities in the Newport addendum to the Lincoln County Natural Hazard Mitigation Plan (NHMP). This plan was adopted in 2015 by both the County and the City. Figure 11 shows the city's rankings of hazards. Windstorms are the primary concern for Newport, due mainly to the frequency of these events (Lincoln County NHMP, 2015). The CSZ earthquake and tsunami are also high on the list based on the potential impact in terms of loss of life and property.

Figure 11: Newport Local Risk Assessment, ordered by highest risk level

Hazard	Probability	Vulnerability
Windstorm	High	High
Winter Strom	High	High
Earthquake (Cascadia)	Moderate	High
Tsunami (Local)	Moderate	High
Landslide	High	Moderate
Coastal Erosion	High	Moderate
Flood (Coastal)	High	Moderate
Tsunami (Distant)	High	Moderate
Wildfire	Moderate	Low
Flood (Riverine)	High	Low
Volcano	Low	Low
Earthquake (Crustal)	Moderate	Moderate
Drought	Low	Low

Source: Lincoln County NHMP, 2015, p.363

Figure 12 lists top priority hazard mitigation efforts for the City of Newport. The Safe Haven Hill is the only location deemed viable as an assembly area in the case of a tsunami. Newport secured funding from FEMA and increased access with the addition of sidewalks and additional signage. The building was also retrofitted to ensure it could serve as an assembly area. This project is the only large-scale mitigation effort to have been completed to date. Another high priority mitigation effort is securing the Big Creek Dams which are part of Newport's domestic water supply infrastructure. Currently both dams are vulnerable to tsunami and earthquake impacts. The cost of structural mitigation is estimated at $30-40 million and far exceeds the City's current capacity.

Figure 12: Newport Priority Hazard Mitigation Efforts

Hazard	Projects
Multi-Hazard	Safe Haven Hill
Tsunami	Big Creek Dams
Earthquake	Seismically retrofit vulnerable structures and critical facilities
Multi-Hazard	Encourage electric utility providers to convert overhead lines to underground lines

Source: Lincoln County NHMP, 2015, p. 383

Critical facilities are identified as schools and a variety of public safety buildings as well as the area hospital (See Figure 13). There is a total of six schools in Newport and none are in the inundation zone, however, as seen in Figure 13, there is a potential for collapse and it is noted that the schools would be cut off from transportation networks and services in the event of an earthquake (Lincoln County NHMP, 2015).

Figure 13: Newport Critical Facilities with Collapse Potential

Schools
Sam Case Elementary School
Yaquina View Elementary School
Newport High School - East
Newport High School - West
Newport Early Childhood Center
Lincoln Newton Magnet School
Public Safety
Lincoln County Communications Agency
Newport Fire Department - Station 1
Lincoln County Sheriff's Office
Newport Police Department
Health
Samaritan Pacific Communities Hospital

Source: Lincoln County NHMP, 2015 p. 371

Political

The Newport City Council and City departments annually identify goals for the coming fiscal year and prioritize them for funding. Financial limitations and daily administration demands delay education, and action around preparedness for the CSZ earthquake and tsunami and the focus instead is on mitigating more frequent hazards. While the City Council identifies mitigation efforts as goals, city staff has taken the lead (Newport City Council, 2017).

The Emergency Preparedness Department, headed by the Fire Chief, has several goals including evaluating vulnerabilities in emergency operations centers and critical facilities, and education efforts. Large scale projects such as seismic retrofitting exceed the City's capacity at this time and have a timeline that extends beyond five years (Newport Department of Emergency Preparedness, 2017). The City has hired an Emergency Preparedness Coordinator and is updating the Emergency Operation Plan. Both actions indicate that the City is actively preparing officials and residents for a variety of hazards (Newport Department of Emergency Preparedness, 2017).

Social

This section assesses the City of Newport's existing partnerships and efforts to identify partners for future projects as well as a brief discussion of demographics and measurable public support.

Existing Networks

Potential partners include Lincoln County, FEMA, Oregon Department of Emergency Management, DOGAMI, Oregon Department of Transportation, and the Department of Environmental Quality, among others. Most of these are identified partners, but a completed project, the Safe Haven Evacuation Area retrofitting, was funded by the City's Urban Renewal Agency ($157,120) and FEMA ($471,361) (Lincoln County NHMP, 2015).

Demographics

Figure 14 provides general demographic information for both Newport and Lincoln County. Most of the population is under 65 and this may attribute to Newport's responsiveness to hazard mitigation. The presence of an active volunteer Citizen Emergency Response Team (CERT), a group which educates residents about emergency preparedness, is a great indicator of the population's engagement with mitigation and hazard-related issues ("C.E.R.T.," n.d.).

Figure 14: Socio-Economic Demographics, 2015

	Lincoln County	City of Newport
Population Estimate	46,347	10,101
Age		
Persons under 5 years	5.0%	6.1%
Persons under 18 years	14.3%	16.1%
Persons under 65 years	56.6%	58.7%
Persons 65 years and older	24.1%	19.0%
Education		
High school graduate or higher, persons 25+	88.8%	90.2%
Bachelor's degree or higher, persons 25+	23.7%	26.1%
Housing		
Owner occupied housing	63.8%	50.0%
Renter occupied housing	36.2%	50.0%
Income		
Median Household income	$42,101	$37,452
Individuals in poverty	16.9%	18.8%

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

Another way to measure public support of mitigation efforts is the willingness of communities to pass bond measures to fund large-scale projects. In Newport bonds are a viable option for funding projects and have enjoyed wide support in recent years. Notably, bonds to fund wastewater and water treatment facilities were passed in the last decade and a municipal swimming pool bond was also passed in the last three years (City of Newport, 2016). The NHMP lists a number of projects which exceed the current capacity of the City, including seismic retrofitting and structural mitigation projects, and these efforts are examples of large-scale mitigation projects which could be good candidates for bond funding.

Economic

Lincoln County has a moderately diverse economy based on 2009 data from the Oregon Employment Department. The county received a diversity ranking of 22 out of 36 (Oregon Partnership for Disaster Resilience, 2012). As the largest city in Lincoln County, Newport is a hub for economic activity. As can be seen in Figure 15, many industries associated with tourism (arts & entertainment, retail trade, etc.) are present in Newport. The current budget notes that the marine science sector is growing, perhaps aided by the presence of Hatfield Marine Science Center and the presence of the National Oceanic and Atmospheric Administration (NOAA) which relocated to Newport in 2011 (City of Newport, 2016).

Figure 15: Employment by Industry: Newport, Oregon

Industry	Percent of Employed Population over 16
Arts, entertainment, and recreation, and accommodation and food services	22.20%
Educational services, and health care and social assistance	17.70%
Retail trade	10.60%
Professional, scientific, and management, and administrative and waste management services	8.90%
Manufacturing	7.70%
Agriculture, forestry, fishing and hunting, and mining	5.80%
Other services, except public administration	5.50%
Finance and insurance, and real estate and rental and leasing	5.30%
Public administration	5.00%
Construction	4.30%
Transportation and warehousing, and utilities	3.70%
Wholesale trade	1.70%
Information	1.60%

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

APPENDIX E: LIST OF INTERVIEW REQUESTS

- 1000 Friends of Oregon
- City of Coos Bay
- City of Eugene
- City of Newport
- City of Tillamook
- Clinton Climate Initiative
- Coos County Planning Department
- Department of Land Conservation and Development
- Department of Oregon Emergency Management
- Lincoln County Planning Department
- Lincoln County Sheriff's Office
- Newport Community Development Department
- Oregon Coast Alliance
- Oregon Department of Energy
- Oregon Department of Geology and Mineral Industries
- Oregon Governor's Office
- Oregon's Transfer Development Rights (TDR) Pilot Program
- State Interagency Hazard Mitigation Team
- Tillamook County

APPENDIX F: METHODOLOGY FOR HAZARD ANALYSIS

The following is an excerpt from the *Hazard Analysis Methodology* published by the Oregon Military Department: Office of Emergency Management in May 2015. Pages 3-4.

COMPLETING THE HAZARD ANALYSIS MATRIX

The Hazard Analysis Matrix Worksheet on page 5 is provided for you and your team to complete. You would probably benefit by transferring this worksheet onto a large format, such as a flipchart, dry erase board, etc., to assist in facilitating your meeting.

In this analysis, severity ratings are applied to the four categories of history, vulnerability, maximum threat (worst-case scenario), and probability based as follows:

Low = choose the most appropriate number between 1 to 3 points

Medium = choose the most appropriate number between 4 to 7 points

High = choose the most appropriate number between 8 to 10 points

Weight factors also apply to each of the four categories as shown below.

<u>HISTORY</u> (weight factor for category = 2)

History is the record of previous occurrences. Events to include in assessing history of a hazard in your jurisdiction are events for which the following types of activities were required:

- The EOC or alternate EOC was activated;
- Three or more EOP functions were implemented, e.g., alert & warning, evacuation, shelter, etc.;
- An extraordinary multi-jurisdictional response was required; and/or
- A "Local Emergency" was declared.

Low - score at 1 to 3 points based on 0 - 1 event past 100 years

Medium – score at 4 to 7 points based on 2 - 3 events past100 years

High – score at 8 to 10 points based on4 + events past100 years

<u>VULNERABILITY</u> (weight factor for category = 5)

Vulnerability is the percentage of population and property likely to be affected under an "average" occurrence of the hazard.

Low – score at 1 to 3 points based on < 1% affected

Medium – score at 4 to 7 points based on 1 - 10% affected

High – score at 8 to 10 points based on > 10% affected

MAXIMUM THREAT (weight factor for category = 10)

Maximum threat is the highest percentage of population and property that could be impacted under a worst-case scenario.

Low – score at 1 to 3 points based on < 5% affected

Medium – score at 4 to 7 points based on 5 - 25% affected

High – score at 8 to 10 points based on > 25% affected

PROBABILITY (weight factor for category = 7)

Probability is the likelihood of future occurrence within a specified period of time.

Low – score at 1 to 3 points based on one incident likely within 75 to 100 years

Medium – score at 4 to 7 points based on one incident likely within 35 to 75 years

High – score at 8 to 10 points based on one incident likely within 10 to 35 years

By multiplying the weight factors associated with the categories by the severity ratings, we can arrive at a subscore for history, vulnerability, maximum threat, and probability for each hazard. Adding the subscores will produce a total score for each hazard. For example, look at "landslide" on the “Sample Hazard Analysis Matrix” shown on page 6. The history of landslides is high in the sample jurisdiction. History has a weight factor of two (2), and in this case, high is scored with ten (10) points for the severity rating. 2 X 10 = subscore of 20. The vulnerability of the sample jurisdiction is medium. However, a landslide normally would not affect much more than 1% of the people and property in the jurisdiction. Vulnerability has a factor weight of five (5) and this team decided on four (4) points for the severity rating. 5 X 4 = subscore of 20. After figuring maximum threat and probability, the total score for landslides is 133.

The total score isn't as important as how it compares with the total scores for other hazards the jurisdiction faces. By comparing scores, the jurisdiction can determine priorities: Which hazards should the jurisdiction be most concerned about? Which ones less so?

APPENDIX G: GOALS AND POLICIES FOR NATURAL HAZARD MITIGATION IN TILLAMOOK

The following is an excerpt from chapter 6, Natural Disasters and Hazards, of the *City of Tillamook Comprehensive Plan* completed in 2012, pages 6-8.

Goals for Natural Disasters and Hazards and Flood Mitigation

"To protect life and property from natural disasters and hazards."
"Preserve Natural Areas Related to Flooding."
"Coordinate and Enhance Emergency Services."
"Improve Structural Projects."
"Enhance and Promote Public Education."
"Improve and Promote Partnerships, Coordination, and Implementation."

Objective for Natural Disasters and Hazards and Flood Mitigation: To maintain damage or loss of life and property caused by natural hazards in the Tillamook area by carefully managing development and redevelopment in areas subject to natural hazards.

Policies for Natural Disasters and Hazards and Flood Mitigation

Policy C-39: Development may take place within areas of natural hazards only if appropriate safeguards are provided to protect the property in question as well as adjacent properties, from damage. A developer shall assume the burden of proof that a development project is appropriate in this regard.

Policy C-40: In all areas of flood hazard the requirements of the National Flood Insurance Program will be adhered to.

Policy C-41: Flood plain and Floodway overlay zoning for all hazard areas will be applied by the City in terms of the Flood Hazard Overlay (FHO District) in the City Zoning Ordinance; building permits will be reviewed to insure that necessary requirements of structures are met. The purpose shall be to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas The legislature of the State of Oregon has in ORS Chapter 227 delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry.

Policy C-42: Natural hazards that could result from new developments, such as runoff from new buildings, paving projects and/or soil slippage due to weak foundation soils, that has the potential to have adverse impacts and a cumulative effect on property owners downstream, will be considered and evaluated. Measures that prevent or minimize the extent of the natural hazard, adverse impacts and cumulative effects on property owners downstream shall be provided for.

Such natural hazards, adverse impacts and cumulative effects on property owners downstream shall be considered in evaluating zone changes, conditional uses, site plans, variances, and in issuing building permits.

Policy C-43: All estuaries in Tillamook City shall be maintained so as to not restrict water flows. Tillamook City shall develop and help coordinate a plan to clean and maintain all estuaries in the Tillamook area with Tillamook County, the Port of Tillamook Bay, the Port of Bay City, and any other affected agencies. These activities shall be centered around the task of minimizing flood conditions for areas adjacent to the estuarine areas.

Policy C-44: All water bodies within the City of Tillamook shall be maintained free and clear of all obstructions by the appropriate landowner with coordination between the property owner and DSL, ACE, and ODFW.

Policy C-45: The city will discourage residential, commercial and industrial development in the identified floodway, but will consider the fiscal ramifications of "takings" issues.

Policy C-46: Any new development within the floodplains shall be designed to avoid damage from flooding and to minimize the damage potential to other developments or properties.

Policy C-47: The city will promote increased public awareness of flood hazards and how to deal with them.

Policy C-48: The City shall enforce the Flood Hazard Development Ordinance (Ordinance No. 971), and the Flood Hazard Overlay District as listed in Ordinance #979, and promote flood control measures that help minimize flood hazards and are environmentally sound.

Policy C-49: The city will cooperate with the Tillamook County Office of Emergency Management Office and other agencies working to protect life and property from natural disasters and hazards.

Policy C-50: The city will promote flood control measures that help minimize flood hazards and are environmentally sound and encourage the continued practice of feasibility studies conducted by the County Sanitarians on proposed sites for septic system installation outside the City Limits but inside the Urban Growth Area where city services are not available.

APPENDIX H: STAKEHOLDER CONTACT LIST

Figure 1: Stakeholder Contact List

Name	Title	Jurisdiction	Phone	Email
Derrick Tokos, AICP	Community Development Director	Newport	541-574-0626	d.tokos@newportoregon.gov
Virginia "Jenny" Demaris	Emergency Manager	Lincoln County Sheriff's Office	(541) 265-4199	vdemaris@co.lincoln.or.us
Onno Husing	Director	Lincoln County Dept of Planning & Development.	541-265-4192	ohusing@co.lincoln.or.us
Meg Reed	Coastal Shores Specialist, Ocean and Coastal Services Division	OR Department of Land Conservation and Development	(541) 574-0811	meg.reed@state.or.us
Matt Spangler	Senior Coastal Policy Analyst, Oregon Coastal Management Program	OR Department of Land Conservation and Development	(541) 574-1095	mspangler@dlcd.state.or.us
Mary Kyle McCurdy	Deputy Director, 1000 Friends of Oregon	State	(503) 497-1000 x130	mkm@friends.org
Cameron La Follette	Executive Director, Oregon Coast Alliance (ORCA)	Astoria/Coastal Region	(503) 391-0210	cameron@oregoncoastalliance.org

APPENDIX I: SOCIAL MEDIA STRATEGY

Social media can be a powerful tool for gathering data, creating a brand, and reaching a large and diverse audience. Conservation Capital may find that social media is an effective way to establish their presence and expertise in Oregon while also spreading information about and engaging communities involved with their projects. The work that we completed for Conservation Capital analyzed the viability of their presence on the Oregon coast and the possibility of building partnerships within these communities to attract investment in hazard mitigation efforts. We recommend that Conservation Capital create a social media strategy that focuses on using the various social media platforms to build credibility as experts on ecosystem services and to build political and social will for public private partnerships. Currently, Conservation Capital does not engage with any social media platforms. Having a strategy in place before engaging on any of these platforms will not only help Conservation Capital be much more effective in their use of social media, but will also save them time in the long run. This plan will act as a starting guide should the company decide to use social media as a tool for their work going forward.

Overview of Social Media Strategy

It can be tempting to think that using social media for business purposes should be as easy as using it for social purposes. If Conservation Capital chooses to engage in social media, they should start by creating a written strategy for why, how, and when they will use each platform they decide to use. Social media presence can help grow and strengthen a business when used well, but it can also weaken perceptions of a business or just be a waste of time if used poorly. Hootsuite (2016), a social media platform coordination company, offers two especially usefully general pieces of advice: the social media content rule of thirds and aligning social goals to business goals. The social media content rule of thirds says that business should divide the type of content they post evenly between three types of content: promoting your business, promoting ideas from other thought leaders in your field, and original thoughts, stories, and ideas that align with your brand. Hootsuite's second piece of advice translates typical business goals to the metrics that capture those goals on social media. The following table is taken from Hootsuite's recent article *Social Media Strategy Template: Your Tool for Crafting your Company's Social Strategy in 5 Steps* and clearly lays out the important social media metrics for companies new to using social media for business.

Figure 1: Aligning Social Goals and Business Goals

Business Goals	Social Goals
Brand Awareness	Reach
Thought Leadership	Consumption
Word of Mouth	Shares, Likes, Retweets
Leads	Actions
Sales	Conversion

Source: Hootsuite, 2016

Social Media Platforms

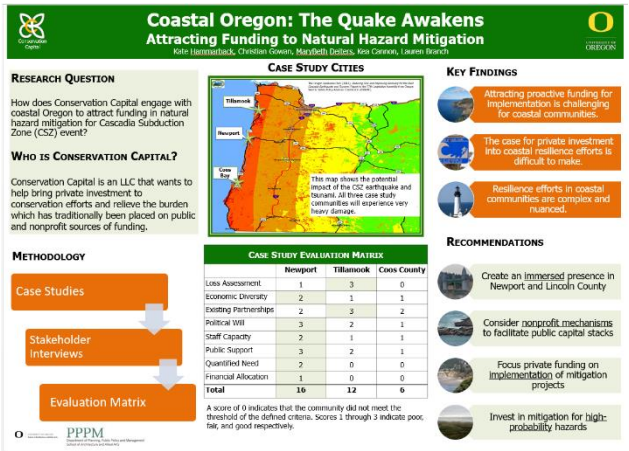
Social media encompasses a variety of platforms that provide different tools to reach a diverse range of audiences. Facebook, Twitter, and Instagram are each used in different ways and capture slightly different audiences. Facebook is a primarily social platform, but can be a great conduit to consumers through their targeted ads. Twitter is often used within industries to share new, relevant, or innovative information. Instagram is a primarily visual medium and is more popular with younger users than Facebook and Twitter. Conservation could use all three of these platforms or choose one or two that either feel most comfortable to use or fit their goals the best.

Facebook

Facebook allows for an interactive presence and for lengthier communications. Using Facebook Live, Conservation Capital could stream groundbreakings, project updates, and a variety of events while also engaging with the community they are working in. The average Facebook user is aging in terms of the demographics of who uses the platform, but a variety of community organizations, local governments, and others effectively spread information on the platform.

Below are three sample posts Conservation Capital could use to 1) demonstrate their expertise; 2) promote public private partnerships; and, 3) engage with the community they are working in. This content is fictional, but is a model of the types of posts Conservation Capital could use to drive their different social media strategies on Facebook.

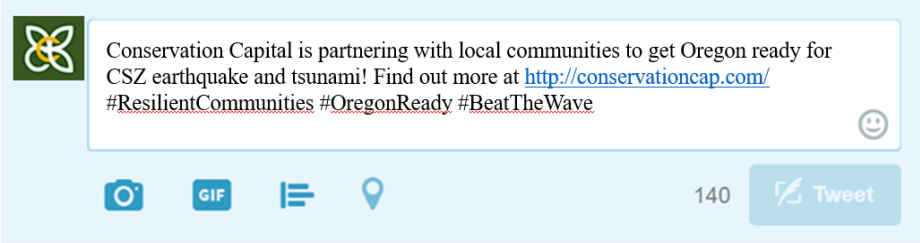
1. Spent a wonderful day at the Big Creek Dam brainstorming green infrastructure opportunities with local planner, Donny Tsunami. Always a pleasure to spend the day in Coastal Oregon.
2. Conservation Capital believes that full immersion and clear communication is crucial to building successful and long-lasting public-private partnerships.
3. Meet the newest member of Newport Rotary Club: Conservation Capital President and CEO Brad Raffle! Brad presented ideas from a UO student research team on funding for coastal resilience efforts.

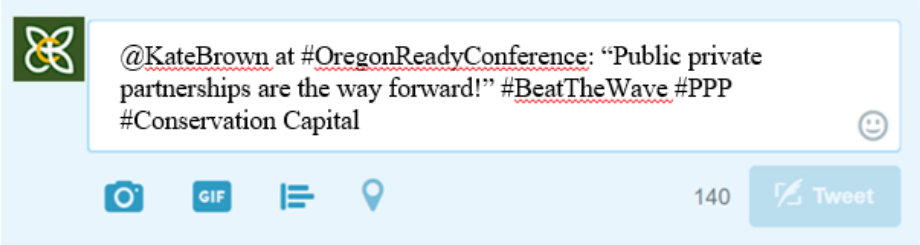


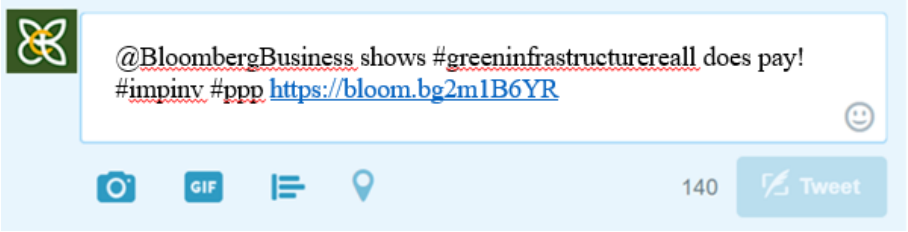
Twitter

Twitter allows for more targeted content sharing, mainly through the use of hashtags. While the content shared must be shorter (no more than 140 characters), links to projects and larger conversations can easily be provided. Because of the character limit, Twitter users often utilize more informal language. Success on this platform relies on providing timely, relevant content and leveraging tagging to engage your network of followers.

Below are sample tweets which utilize visuals, hashtags, and link sharing to demonstrate Conservation Capital's involvement and expertise while also engaging the community of followers who care about similar issues. This content is fictional, but is a model of the different types of posts Conservation Capital could use to drive their different social media strategies on Twitter.







@uoregon students get statewide perspective from @OregonOEM director. #conservationcapital #resilience #ppp

33 Tweet

Great work by @uoregon #mpa students on #CoastalResilience check out their fresh ideas @UO_EMU Poster prez 12-2

Instagram

Instagram attracts a younger demographic and allows Conservation Capital to show progress on projects, interesting data points, and community engagement through visuals. Photographs of meetings with community stakeholders (as seen in the sample), infographics which highlight important data, and photos of the work that Conservation Capital does will all help establish a presence on this platform. Similar to Twitter, Instagram uses hashtags to categorize posts and these can be utilized to increase visibility or to engage with the broader Instagram community. The content of this example post is fictional, but is a model of the types of post Conservation Capital could use to support their social media strategy on Instagram.

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