Integrating Climate Adaptation into Natural Hazards Mitigation Planning



FEMA Region 10 Mitigation Planning Program Coffee Break Webinar Series

August 25, 2017

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By the end of this webinar, participants will be introduced to:

- 1. Understanding nuances between climate adaptation and hazard mitigation.
- 2. Using a hazard mitigation plan as a tool for addressing local impacts of climate change.
- 3. Knowing where to go for climate data and tools.
- 4. Integrating climate adaptation planning into other planning mechanisms or regulatory tools.

Objectives









I.

Review:

- Mitigation Planning
- Climate Adaptation Planning
- Overlap

II. Explore:

- Your HMP as a mechanism for climate adaptation
- Tools that support adaptation planning [Dan Rizza]
- Plan Integration

III. Implement:

Funding Opportunities

IV. Understand:

 What this looks like for the Quinault Indian Nation [Michael Cardwell]



Agenda









Emergency Management Activities



Integrating Climate Adaptation into a Hazard Mitigation Plan











Mitigation Increases Resiliency









and **resilience**.

#RebuildBETTER

Review:

Mitigation Planning Climate Adaptation Planning Overlap



Integrating Climate Adaptation into a Hazard Mitigation Plan

Adaptation...

- "...is a process that intends to reduce long-term risks from hazards associated with climate variability and climate change."
 - Baltimore Disaster Preparedness Plan
- is "... The process of adjusting to actual or expected climate change. In human systems, adaptation <u>seeks to moderate harm</u> or exploit opportunities. In natural systems, human intervention may facilitate adjustments to expected climate change and its effects."
 - IPCC 2014a





Adaptation Planning Cycle



Nine steps in adaptation planning development. The gray steps are part of vulnerability assessment (steps 1-5) and the <u>blue</u> <u>steps are adaptation</u> <u>strategy</u> development (steps 6-9).

SOURCE: California Planning for Adaptive Communities Guide, 2012







Figure 5: The intersection of Hazard Mitigation and Climate Adaptation Planning

SOURCE - Integrating Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned, ICLEI



Integrating Climate Adaptation into a Hazard Mitigation Plan

Review:

Mitigation Planning Climate Adaptation Planning **Overlap**

■You Say Hazard Mitigation, I Say Adaptation

- Goals are the Same. Protect:
 - People
 - Property
 - Economy
 - Natural Resources
- Use Hazard Mitigation Plans to Drive Climate Adaption Planning!
 - Supports the required Hazard Identification and Risk Assessment (44 CFR 201.6)
 - State Hazard Mitigation Plans are required to consider future conditions (44 CFR 201.4(c)(2)(i))
 - Future conditions = increased risk and vulnerability should be assessed in local hazard mitigation planning efforts





Addressing Future Conditions

| State Mitigation Plan Review Guide Released March 2015 Effective March 2016 FP 302-094-2 | ELEMIENT S4. Does the risk assessment provide an overview of the probabilities of future hazard events? [44 CFR §201.4(c)(2)(i)] Intent: To understand the probability of hazard events in the future as the basis for anticipated impacts of hazard risks statewide. | State Mitigatic a. The risk assessment m future hazard events th for each natural hazard requency, and/or dura b. Probability must inclu- conditions, including t patterns and climate ou Probability means the like defined in terms of genera- highly likely), historical fr example: 1% chance of oc probability maps. If using provide a definition. For e equals near 100% chance of | Image: Second | B2. Does the Plan include information on previous occurrences of hazard events ar on the probability of future haz events for each jurisdiction? 44 201.6(c)(2)(i) <u>Intent</u> : To understand potential impacts to the community based information on the hazard event that have occurred in the past ar the likelihood they will occur in t future. | a. ard b. I CFR I on s nd he C. | The plan must include the history of previous hazard events for each of the identified hazards. The plan must include the probability of future events for each identified hazard. Probability means the likelihood of the hazard occurring and may be defined in terms of general descriptors (for example, unlikely, likely, highly likely), historical frequencies, statistical probabilities (for example: 1% chance of occurrence in any given year), and/or hazard probability maps. If general descriptors are used, then they must be defined in the plan. For example, "highly likely" could be defined as equals near 100% chance of occurrence next year or happens every year. Plan updates must include hazard events that have occurred since the last plan was developed. |
|--|--|--|--|--|--|--|
| FEMIA | | | Local Mitigatic Plan Review G October 1, 2011 | on iuide | | |



Overlap

CALIFORNIA ADAPTATION PLANNING GUIDE



| PLANN | NING |
|-------|---------|
| FOR | R |
| ADAP | TIVE |
| COMMU | INITIES |
| | Cal EMA |

Table 1. Secondary impacts associated with primary impacts individually or in combination

| PRIMARY IMPACT | ASSOCIATED SECONDARY IMPACTS | | | | |
|--|--|--|--|--|--|
| | Inundation or long-term waterline change | | | | |
| See level view | Extreme high tide* | | | | |
| Sea level rise | Coastal erosion* | | | | |
| | Saltwater intrusion* | | | | |
| Changed temperature and/ or precipitation patterns | Changed seasonal patterns* | | | | |
| Increased temperature | Heat wave | | | | |
| Increased temperature and/ or changed precipitation | Intense rainstorms* | | | | |
| Wildfire and/or increased precipitation | Landslide* | | | | |
| | Drought* | | | | |
| Increased temperature and/ or reduced precipitation | Wildfire | | | | |
| or reduced precipitation | Reduced snowpack | | | | |
| Wildfire and/or increased precipitation Increased temperature and/ or reduced precipitation | Landslide [*] Drought [*] Wildfire Reduced snowpack | | | | |

[*Indicate secondary impacts that do not have projections available through Cal-Adapt.org] Source: IPCC. 2007.WG1 Physical Science Basis, Section 10 & 11.









Exploring Climate Adaptation in Mitigation Plans:

Stakeholder Engagement Hazards Assessment Support Tools Plan Integration Mitigation Strategies



Integrating Climate Adaptation into a Hazard Mitigation Plan

Stakeholder Engagement

| - | Image: Second system | Cities Climate Collaboration King County and the cities of Issaquah, Kirkland, Mercer Island, Redmond, Renton, Seattle, Shoreline, Snoqualmie and Tukwila have formed a partnership to "coordinate and enhance the effectiveness of local |
|---------------|---|--|
| | KING COUNTY REGIONAL HAZARD MITIGATION PLAN UPDATE Volume 1: Proving-Some Wide Elements Foul Durit November 2014 | 7-6 |
| | and the | CLIMATE CHANGE CONSIDERATIONS FOR HAZARD MITIGATION |
| | and the second | government climate and sustainability efforts." (King County, 2014) The effort focuses on developing and coordinating the following (King County, 2014): Outreach—Develop, refine and use messaging and tools for climate change outreach to engage decision makers, other cities and the general public. |
| | and the second second | Coordination—Collaborate on adopting consistent standards, benchmarks, strategies and overall goal related to responding to climate change. |
| | The second | Solution—Share local success stories, challenges, data and products that support and enhance The climate mitigation efforts by all partners. Funding and resources—Collaborate to secure grant funding and other shared resource |
| | and the second | opportunities to support climate related project and programs. |
| TE TETRA TECH | | |
| | | Eugene-Springfield Multi-Jurisdictional NATURAL HAZARDS MITIGATION PLAN |
| | | |
| | | December 2014 |
| | | Prepared for: City of Eugene City of Springfield 940 Willametle #200 225 Fifth Street Eugene, Oregon 97401 Springfield, Oregon 97477 |
| | | |

2.2.4 Vulnerability Assessment

In 2013 and 2014 the cities of Eugene and Springfield conducted a climate and hazards vulnerability assessment to inform this NHMP. The assessment team met with local and regional experts in each of the following sectors: drinking water, healthcare and public health, electricity, transportation, food, housing, communication, stormwater, wastewater, natural systems, and public safety. The assessment identifies the following specific earthquake-related vulnerabilities:

- Except for natural systems, all sectors are extremely sensitive to a magnitude 9.0 CSZ earthquake event.
- Very little has been done to prepare any systems, infrastructure or personnel to handle the initial impact and ongoing response and recovery that will follow a CSZ event.
- Exceedingly limited staff availability in the aftermath of a severe earthquake will create problems and challenges that are difficult to predict or mitigate.
- Every sector will experience substantial failures and interruptions that are unfamiliar and therefore difficult (though not impossible) to plan for.
- Very few Eugene and Springfield residents have firsthand experience with a major earthquake, making it difficult to describe the potential experience and results.

Additional system vulnerability details are included in Section 4 as part of the Hazard and Climate Vulnerability Assessment Report.

2-4



December 2014

3rd EDITION HAZARDS MITIGATION PLAN

FOR THE THURSTON REGION

The Emergency Management Council of Thurston County

April 2017

Prepared by Thurston Regional Planning Council



Climate change is already impacting water resources, and resource managers have observed the following:

- Historical hydrologic patterns can no longer be solely relied upon to forecast the water future.
- Precipitation and runoff patterns are changing, increasing the uncertainty of water supply and quality, flood management, and ecosystem functions.
- Extreme climatic events will become more frequent, necessitating improvement in flood protection and emergency response.

Hazards Mitigation Plan

March 2017

Exploring Climate Adaptation in Mitigation Plans:

Stakeholder Engagement Hazards Assessment Support Tools Plan Integration Mitigation Strategies



Integrating Climate Adaptation into a Hazard Mitigation Plan

Hazard Assessment Process





Hazard Assessment Process





6505063

Hazards Assessment: Flood





http://fema.maps.arcgis.com/apps/Styler/index.html?appid=6bccc 9c8386748b08d20f08626856fed



Hazard Assessment: Wildfire



Chapter 4.5 Wildland Fire Hazard

Effects of Climate Change on Wildland Fires

Research and climate forecasts offer evidence that long-term climate change will have a measurable impact on the risk of wildland fires for Puget Sound Iowlands. The University of Washington Climate Impacts Group published a detailed report on the state of science on climate change and its effects within the region titled. "State of Knowledge: Climate Change in the Puget Sound." The report identifies several factors that will influence wildland fires for communities around the Puget Sound.

Air temperatures are increasing in the region. They are projected to warm rapidly during the 21st century. By mid-century, warming will be outside of the range of historical variations. Warming is projected for all seasons, but will be greatest for summer. Warmer, drier, and longer summers will result in a greater supply of fire fuels. The Wildland Urban Interface areas and heavily forested, but less developed areas will both face a greater risk for fires than they do at present.





"Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot dry spells create the highest fire risk. Increased temperatures may intensify wildfire danger by warming and drying out vegetation. Climate change also may increase winds that spread fires."



Hazard Assessment: Public Health

HOW CLIMATE CHANGE AFFECTS YOUR HEALTH





0.05740.053

Integrating Climate Adaptation into a Hazard Mitigation Plan

Changing Probabilities

"Idaho's State Hazard Mitigation Plan (SHMP) is taking critical steps to decrease and potentially avoid these impacts associated with climate change....

Vulnerabilities include:

- Increased occurrences and magnitudes of hazard events, including severe storms, flooding, drought, and wildland fires
- Changing climatic and precipitation patterns that may impact the State's agricultural, hydroelectric, recreational, and economic sectors
- Increased exposure to hazard events for all of Idaho's citizens and infrastructure
- Expanding diversity of extreme weather events
- Increased temperatures and altered stream flows impacting the ecosystem and species migration "



CHAPTER 3 RISK ASSESSMENT: CLIMATE CHANGE

3.2 RISK ASSESSMENT: CLIMATE CHANGE

OVERVIEW

This plan is prepared with the understanding that climate change will impact state mitigation planning and the hazards that it addresses. Depending upon the research sources and methods utilized, a variety of changes, severities, and outcomes have been predicted in regards to climate change. However, for the purposes of this plan, a general understanding is that:

- The climate is changing;
- These changes are and will have an effect on the hazards within Idaho;
- The type and severity of the known hazards are both changing and increasing; and
- A dynamic planning approach will be needed going forward to ensure hazard planning remains resilient.

Environmental, social, and economic health is essential to disaster resilience. Climate change can affect natural hazards, which can result in damages and hardships for a community, region, and the entire state of Idaho for years following the event. Some climate change impacts include sea level rise, extreme storm events, and increased flooding, drought, and wildfire. Hazard mitigation includes both short-term and long-term actions to reduce the severity of the effects of these hazards. Risk analysis helps to identify the steps necessary to reduce climate change impact. As an indicator of a changing climate, during 2012 Idaho experienced some of the worst wildfires and drought conditions in its history.

BACKGROUND

Climate change impacts include threats to our health, safety, infrastructure, and economic vitality within Idaho. Scientific experts are analyzing climate change impacts and our government is noticing such observations.

The United States Global Change Research Act passed in 1990, requiring the United States Global Change Research Program (USGCP) to report effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity, to the President and Congress every four years. This group analyzes current trends in global change (both human induced and natural caused), to project major trends for the subsequent 25 to 100 years.¹

The National Climate Assessment (NCA) is one important resource for understanding and communicating climate change science and impacts in the United States. It informs the nation about already observed changes, the current status of the climate, and anticipated trends for the future. The

¹ US Global Change Research Program. (1989). Our Changing Planet (OCP). Washington D.C.: USGCRP STATE OF IDAHO HAZARD MITIGATION PLAN 2013





Exploring Climate Adaptation in **Mitigation Plans:**

Stakeholder Engagement Hazards Assessment **Support Tools Plan Integration Mitigation Strategies**

reator of impartial & actionable science and as a catalyst for esilience.





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Support Tools: http://sealevel.climatecentral.org/matrix/



Free web tool created to provide the planning and coastal management communities with an expandable chart to compare the functions and methods of publicly available sea level rise and coastal flood web tools.



Community Rating System

- Climate Central's Surging Seas CRS Guide: Find out how you can use Climate Central's free Surging Seas web tools to support a wide range of activities that receive points within the FEMA/NFIP CRS program. Provides step-by-step instructions on how to access information and downloads from the tool. Learn more: <u>http://sealevel.climatecentral.org/crs</u>
- ASFPM AND CSO CRS Green Guide: Features best practices and case studies derived from interviews with CRS communities earning top-scores for CRS elements that preserve or enhance the natural and beneficial functions of floodplains. Learn more: <u>https://www.floodsciencecenter.org/products/crs-communityresilience/green-guide/</u>
- NOAA's new interactive, online How to Map Open Space for Community Rating System Credit and companion GIS Workflow detail the process for mapping and calculating credits for preserved open space in seven easy to follow steps, with links to helpful data and information sources and job aids. These products will be available this fall on NOAA's Digital Coast under "Training" (Self-Guided) webpage.
- TNC: As part of TNC's <u>Coastal Resilience approach</u> and decision support tool, the <u>Community Rating</u> <u>System Explorer</u> app allows planners to more effectively visualize OSP opportunities, explore unprotected parcels to protect for the future, and engage decision makers to influence land management. TNC is partnering with NOAA, Esri, and Microsoft to leverage and scale the app around the U.S., while also coordinating CRS product development and outreach with Digital Coast Partners and Esri to better communicate the importance of protecting open space while guiding users to the tool or workflow that addresses their needs.
- Learn more about ASFPM, CSO, NOAA, and TNC efforts: <u>https://www.conservationgateway.org/ConservationPractices/Marine/crr/library/Documents/CRS_factsheet_4_18_17.pdf</u>
- Learn more about the Community Rating System (CRS): <u>http://crsresources.org/</u>



Support Tools:

- Adaptation Clearinghouse: <u>http://www.adaptationclearinghouse.org/</u>
- Alaska Climate Change Information: <u>https://climatechange.alaska.gov/</u>
- Alaska Sea Grant: <u>https://seagrant.uaf.edu/map/climate/</u>
- Climate Adaptation Knowledge Exchange: <u>http://www.cakex.org/</u>
- Oregon Climate Change Research Institute: <u>http://www.occri.net/</u>
- Oregon DLCD Planning for Climate Change: <u>http://www.oregon.gov/LCD/CLIMATECHANGE/Pages/index.aspx</u>
- Oregon State University Climate Impacts Research Consortium: <u>http://pnwcirc.org/circteam</u>
- NOAA Digital Coast: <u>https://coast.noaa.gov/digitalcoast/</u>
- U.S. Dept. of Housing & Urban Development Climate Resources: <u>https://portal.hud.gov/hudportal/HUD?src=/program_offices/economic_development/resilience/about</u>
- U.S. Resilience Toolkit: <u>https://toolkit.climate.gov/</u>
- UW Climate Impacts Group: <u>https://cig.uw.edu/</u>
- WA Coastal Hazards Resilience Network: <u>http://www.wacoastalnetwork.com/</u>





CTED Community, Trade and Economic Development

Planning for Climate Change

Addressing Climate Change through Comprehensive Planning under the Growth Management Act

December 2008 Report to the Legislature Juli Wilkerson, Director

Exploring Climate **Adaptation in** Mitigation **Plans:**

Stakeholder Engagement Hazards Assessment **Support Tools Plan Integration Mitigation Strategies**



Integrating Climate Adaptation into a Hazard Mitigation Plan

Plan Integration

3rd EDITION HAZARDS MITIGATION PLAN

FOR THE THURSTON REGION

The Emergency Management Council of Thurston County

April 2017

Prepared by Thurston Regional Planning Council

Chapter 2.0 Mitigation Strategy

Priority: 11 of 12

Status: New

March 2017

Hazard Addressed: Multi-Hazard Category: Plan Coordination and Implementation

CW-MH 10: Develop and adopt a Climate Adaptation Plan

Rationale: Preparing for and adjusting to the effects of a warming world — is now "unavoidable," the Intergovernmental Panel on Climate Change (IPCC) — the United Nations" climate research arm — concluded in its 2007 climate assessment. Even the most stringent efforts to reduce greenhouse gases "cannot avoid further impacts of climate change in the next fixed leaders," the report explained. TRPC received a ULS. ERA National Extuary Program (NEP) grant administered by the Washington State Department of Commerce to draft a watershedbased climate adaption plan that will recommend actions Thurston County stakeholders could take to prepare for and cope with floods, droughts, wildfires, and other climate change exacerbated hazards in the decades ahead. The planning work — which began in late 2015 and will conclude in tate 2017 — includes: researching and analyzing climate change projections; assessing regional climate change vulnerabilities and risks; developing adaptation strategies and conducting benefit-cost analyses; and, presenting TRPC policymakers a draft plan with adaptation recommendations.

Relates to Plan Goal(s) and Objectives: 4A, 4B, 4C, 5B, 7D, 8B

Implementer: TRPC and regional stakeholders

Estimated Cost: \$270,000

Time Period: 2015-2017

Funding Source: National Estuary Program grant and TRPC Regional Transportation Program funding (funding secured)

Source and Date: Creating Places Preserving Spaces, a Sustainable Development Plan for the Thurston Region

Adopted Plan Number: E-2.1

Reference Page: 211

Initiative and Implementation Status: The adaptation plan's vulnerability analysis will lead to flood and landslide mitigation projects that will be included in future updates to this plan.

Evaluation of Mitigation Initiatives: This is a new initiative and progress will be reported in the next plan update cycle.

2.0-23 Hazards Mitigation Plan

FEMA



Mitigation Ideas

A Resource for Reducing Risk to Natural I

January 2013



Integrating Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned

For the 2015 San Diego County Multi-Jurisdictional Hazard Mitigation Plan Update February 2014

ICLEI- Local Governments for Sustainability USA





Exploring Climate Adaptation in Mitigation Plans:

Stakeholder Engagement Hazards Assessment Support Tools Plan Integration Mitigation Strategies



Integrating Climate Adaptation into a Hazard Mitigation Plan

Strategy Development Process





Remember....

- Each jurisdiction will go through this process
- Each jurisdiction will identify actions based on their hazards
- Each jurisdiction will have their own set of strategies
- Each jurisdiction will identify their primary lead agency/department





Mitigation Action Categories





Mitigation Strategies

Action Items

The following action items are detailed recommendations for activities that local departments, citizens, and others could engage in to reduce risk. Each action identifies which of the county's goals are addressed. Goals are identified within the actions as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation. Please see full action item forms below for more information.

- Upgrade and expand the interior storm water collection system to accommodate the yearly amounts of water and potential flooding and to resist seismic activity.
- Replace stormwater pumps and pump stations and add backup systems to prevent future flooding caused severe winter events generated by climate change and with the capability to withstand severe seismic events.
- Ensure continued compliance with the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances.
- 4. Seek certification for the city's levee system to ensure safety and functionality.
- Assess critical and educational facilities rated medium and high potential of collapse by DOGAMI's rapid visual assessment.
- Install Master Heights water storage tank and associated seismically resistive water lines to hospital and fire station for water resilience during emergency situation.
- Develop a pathway atop the levee system to provide an evacuation route, emergency vehicle access, and maintenance access.
- Consider relocating critical and essential facilities out of the floodplain and tsunami inundation zone.
- Develop and regulate a Tsunami overlay zone, which aims to restrict development of critical and essential facilities within a Tsunami Inundation zone.
- 10. Identify potential evacuation/supply routes in the event of a highway or bridge closure.
- Elevate the levee to the FEMA 500 year standard to protect the community against more severe floods and tsunami.
- Replace the Scholfield Bridge and assess the adjoining water pipe for consideration as a potential retrofit.
- Identify locations suitable for setting up temporary housing or shelters, should a major hazard event occur and displace a large portion of the community.

1 Reedsport Natural Hazard Mitigation Plan



Plan for: City of Reedsport 451 Winchester Ave. Reedsport, OR 97467

Prepared by: Reedsport Planning Department

April 2016

😵 FEMA

Mitigation Strategies

| | | | | | Appendix A: NHMP Action Item Table | | | |
|--|---|------------|-------------------------------------|---|---|---|--|--|
| | | Hazard | Action Name | Problem Statement | Mitigation Action | Implementation Leads and Partners | Estimated Cost | Timeline |
| Eugene-Springfield N NATURAL HAZARDS | Multi-Jurisdictional MITIGATION PLAN | | Emergency Fuel Distribution Plan | Following a significant natural hazard, there are several critical needs for available fossil fuel supplies to a) fuel emergency response vehicles, b) fuel service vehicles to repair communications systems, transportation systems, utilities, and other critical services, and c) operate generators at critical facilities including hospitals, fire stations, police facilities, and more. Many service providers indicate heye spect to receive priority access to fuel following an emergency. Nowers it is unclear how limited fuel supplies would be distributed in the wake of a significant disturbance to supplies, such as an earthquake. | Once the Fossi Fiel Sector Aussument is completed, develop & Eugene/Springfield emergency fuel distribution plan that considers 1) the likely local fuel available during specific scenarios (earthquake, winter storm, mass execution) 21 the needs for transportation fuels and natural gas (including backup generators) of both public and private (hospital), communications, others) essential systems as well as hose of neighboring communities supplied by the Eugene Kinder Morgan / Williams Pipeline (tel terminal, and 3) the existing on-site fuel storage and operation capacity of those critical services. | Leads: City of Eugene Office of Emergency Management, City of Springfield Office of Emergency Management. Parteners: Lane Transit District, Lane County, PeaceHealth, McKenzie Willamett Hospital, private hazard response and recovery contractors, EWEB, SUB, and others. | \$10k-\$100k depending on scope | Develop plan by 2020 |
| SF | PRINGFIELD | | Community Recovery Planning | Eugene and Springfield currently do not maintain recovery plans to inform the recovery from any natural hazards. | List and prioritize the hazards likely to warrant recovery plans. Develop appropriate and necessary community recovery plans starting with the highest priority hazards. | Leads: City of Eugene Office of Emergency Management, City of Springfield Office of Emergency Management. Partner: Lane County. | Depends on scope, number of hazards addressed, and number of partners involved | List and prioritze haza recovery planning by 3 Begin working on at le recovery plan by 2017 |
| Eugene | OREGON | | Local Electricity Generation | Relatively little of the electricity used in the Eugene/Springfield area is generated locally, resulting in a) dependency on extensive transmission lines, b) little local influence on maintenance and reliability of electric generation infrastructure, c) little influence on prioritization of service restoration following a major hazard event or regional outage. | Develop a plan to increase local control of EWEB electric generation in the event of a regional outage (for example; given a regional outage, develop ability to direct locally generated power to critical facilities such as water treatment plants and hospital). Encourage small scale local electricity generation that can be operated independently of the regional and/or local pirit in the event of a local or regional power outage (for example: install local renewable electricity generation in support of critical facilities so they can operate during an outage). | Leads: Eugene Water and Electric Board; Springfield Utility Board. Partners: City of Eugene Office of Emergency Management, City of Springfield Office of Emergency Management. Bonneville Power Administration, Bonneville Environmental Foundation | Varies widely depending on scale. | Develop plan (part 1) Begin implementation by 2020 |
| Prepared | d for: | | | | | | | |
| City of Eugene 940 Wilamette #200 Eugene, Oregon 97401 | City of Springfield 225 Film Street Springfield, Oregon 97477 | Multhazard | Downed Power Lines | Downed power lines result in power failures and block critical transportation routes. The loss of electric power for a long period of time (more than 72 hours) can lead to failures of multiple critical systems including health care, water filtration, wastewater treatment, communications, transportation, and others. Impassable roadways from downed lines also inhibit emergency response and restoration of ritical services, such as dimining water and health care, and is particularly problematic if fuel for backup generators cannot be delivered. The haards most likely to impair surface transportion and distry leticitic service are serve winter storm (mox, ice, downed trees, utility pole, and wire failures) and earthquake, (downed trees, utility pole and wire failures). | Over the next five years, a) identify critical transportation corridors (including primary emergency, evacuation, and access routes) and electric distribution routes b) develop a list of key backbone transmission and distribution routes that zerve critical customers and enable efficient restoration to the broader distribution system () develop a long- term plan to underground, relocate, or "harden" key lext: distribution in loss along critical corridors (including feasibility assessment and prioritization) d) seek funds and opportunities to rolecate power poles and power lines, or harden existing facilities, where feasible and appropriate, to roduce interruption to the transportation system and to reduce risk of outages from severe winter storms or earthquakes. | Ladd: City of Eugene Public Works, City of Springfield Development and Public Works, Eugene Water and Electric Board, Springfield Utilty Board, City of Eugene Public Works, Springfield Public Works, Lane Transit District. | Plan development: \$10-\$60k plus staff time. The cost of implementation will be estimated within the plan. | Develop plan by 2020 |
| | | | Credentials | Some critical private-party service providers may not be allowed into emergency areas following a hazard event. Several private entities such as cellular phone service providers, cable service providers and others, may need access to emergency personnel or restricted locations in order to restore service and support emergency operations in the wake of a hazard event. | Explore a strategy to facilitate credentialling of non-traditional partners during an emergency hazard event | Leads: City of Eugene Office of Emergency Management, City of Springfield Office of Emergency Management. Partner: Lane County Sheriff's Office | Staff time | Lower priority. Impl 2025. |

Appendix A: NHMP Action Item Table

| Action Name | Problem Statement | Mitigation Action | Implementation Leads |
|--------------------|--|---|-----------------------------|
| Fossil Fuel Sector | During the process of conducting a community-wide hazards and climate vulnerability assessment, | Develop a list of critical information needs pertaining to the regional fuel transmission | Leads: City of Eugene Offic |
| Assessment | there emerged a gap in information regarding private fossil fuel distributors. The community as a | and distribution system. Develop a plan to acquire the necessary information to a) | Management, City of Sprin |
| | whole, and emergency response functions depend heavily on fossil fuels to function. In order to better | better understand the factors that could disrupt the regional fossil fuel supply and b) | Emergency Management. |
| | plan for and reduce the risk of disruptions, Eugene and Springfield need to aquire better information | ensure essential emergency functions can be sustained. | County, DOGAMI, and priv |
| | about the supply of fossil fuels in the area. | | providers including William |
| | | | |



Adaptation Framework

| | Oregon I | Oregon NHMP Hazards | | | | | | | |
|---|--------------------|---------------------|----------------|----------|----------------|------------|-----------------|------------------|---------------|
| Adaptation Framework climate risks | Coastal Erosion | Droughts | Dust Storms | Wildfire | Floods/ CMZ | Landslides | Wind- storms | Winter Storms | Heat Wave* |
| Increased temperatures | х | Х | x | X | | | | | X |
| Changes in hydrology | | Х | x | | х | х | | | |
| Increased wildfires | | x | х | х | x | x | | | |
| Increase in ocean temperatures and changes in ocean chemistry | x | | | | x | | | x | |
| Increased drought | · · · · · · | Х | | X | | 1.1 | | | 1 |
| Increased coastal erosion | Х | 1.1.1.1.1.1.1 | 2 | C - 10 | | x | | ÷. | 3 |
| Changes in habitat | | | | | | 1.56 | | | |
| Increase in invasive species and pests | | x | | x | | | | | |
| Loss of wetland ecosystems and services | | x | x | | x | | | | |
| Increased frequency of extreme precipitation events and flooding | | | | | x | x | | x | |
| Increased landslides | 10 | 1 | | 10 N | 1 | х | | | 1 |

Table 2-6. Relationship Between Adaptation Framework Risks and Hazards in the Oregon NHMP

*Heat waves are not identified as a natural hazard in the current natural hazards mitigation plan.

OREGON NATURAL HAZARDS MITIGATION PLAN 2015





Opportunities for Climate Adaptation Support through FEMA Hazard Mitigation Assistance

Community Flood Mitigation Projects:

- Floodplain and stream restoration
- Floodwater storage and diversion
- Infrastructure protective measures
- Localized flood control to protect critical facilities
- Aquifer storage and recovery
- Stormwater management
- Utility protective measures
- Water and sanitary sewer system protective measures
- Wetland restoration/creation

Implement:

Hazard Mitigation Assistance (HMA)



Hazard Mitigation Assistance Guidance

Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program February 27, 2015

ary 27, 2015

😸 FEMA

Federal Emergency Management Agens Department of Homeland Security 500 C Street, S.W. Washington, DC 20472



Implement

Flood Mitigation Assistance & Pre-Disaster Mitigation Grants

OPEN NOW – Due November 14th

Hazard Mitigation Grant Program

- Available following a Presidential major disaster declaration
- For more information: <u>https://www.fema.gov/hazard-mitigation-assistance</u>





Michael Cardwell, AICP Quinault Indian Nation 1214 Aalis PO Box 189 Community Services Director mcardwell@quinault.org

Understand:

Quinault Indian Nation

Climate Adaptation & Hazard Mitigation Planning



Integrating Climate Adaptation into a Hazard Mitigation Plan

Vancouver Island

Strait of Georgia Vancouver

Abbotsford Patos Island Stuart Island Henry Island Victoria Salish Sea Camano Island

Washington

Oregon

NUMBER

Spokane

aart

Bainbridge Island Vashon Island McNeil Island Anderson Island

Portland

Salem

Data SIO, NOAA, U.S. Navy, NGA, GEBCO











Integrating Climate Adaptation into a Hazard Mitigation Plan





Lower Village Inundation Map with Various Community Buildings $_{\rm N}$







Legend

FEMA

| Important Community Buildings | Inundation Depth (meters) | 6 | 6 |
|-------------------------------|---------------------------|---|----|
| Other Community Buildings | 0.1 - 3 (<10 feet) | 9 | 9. |
| Relocationbndyw3062 | 3.1 - 6 (10 to 20 ft) | | 1 |

| ation Depth (meters) | 6.1 - 9 (20 to 30 ft) | 15.1 - 18 (49 to 59 ft) |
|----------------------|-------------------------|---------------------------|
| .1 - 3 (<10 feet) | 9.1 - 12 (30 to 40 ft) | 18.1 - 21 (59 to 69 ft) |
| 1 - 6 (10 to 20 ft) | 12.1 - 15 (40 to 49 ft) | 21.1 - 23.1 (69 to 76 ft) |











| | | Near-term | Mid-Century | Late Century (2070) | End of Century (2090) |
|---|---|-------------|-------------|------------------------|--------------------------|
| Climate Driver/Indicator | Baseline (1990) | (2030) | (2050) | (2070) | (2070) |
| Temperature (avg. annual) | 49.5°F | 51.5°F | 52.9°F | 55.0°F | 57.0°F |
| Temperature (avg. number consecutive days above 76.5°F) | 18.3 days | 36.5 days | 52.8 days | 76.1 days | 100.3 days |
| Temperature (avg. number consecutive days above 83.9°F) | 3.7 days | 9.2 days | 15.3 days | 28.3 days | 47.2 days |
| Temperature (highest 4-consecutive day avg. temp) | 82.8°F | 85.6°F | 87.4°F | 88.9°F | 90.9°F |
| Temperature (highest 7-consecutive day avg. temp) | 78.8ºF | 81.6°F | 83.4ºF | 85.1ºF | 87.3ºF |
| Temperature (number of days/year below freezing) | 60.9 days | 45.2 days | 38.8 days | 30.7 days | 25.9 days |
| Temperature (lowest 4-consecutive avg. winter low) | | 22.4°F | 24.0°F | 26.6°F | 28.0°F |
| Temperature (lowest 7-consecutive avg. winter low) | 22.8°F | 25.1°F | 26.5°F | 29.0°F | 29.8°F |
| Precipitation (average annual, inches) | 107.3 | 108.1 | 111.6 | 113.2 | 114.3 |
| Precipitation (seasonal averages, inches) | | | | | |
| Winter | 45.2 | 46.7 | 48.6 | 49.5 | 50.2 |
| Spring | 23.9 | 23.3 | 25.0 | 24.5 | 25.2 |
| Summer | er 7.7 7.4 7.3 7.2 | | | | |
| Fall | 30.5 30.7 30.7 32.0 32.1 | | | | |
| Precipitation (avg. number of events per year with >1.4 inches in 24 hours) | 13.7 | 15.3 | 16.9 | 17.9 | 19.0 |
| Precipitation (avg. number of events per year with >2.3 inches in 24 hours) | 2.8 | 3.5 | 4.1 | 4.8 | 5.3 |
| Sea Level Rise | | +2.4 inches | +6.7 inches | N/A | +24 inches |
| Ocean Acidification | Globally, +30% acidity since industrial revolution (National Oceanic and Atmospheric Administration, 2012). Northwest Pacific is particularly vulnerable. Trend is projected to continue with ocean acidity under RCP8.5 reaching levels not seen during past 100 years (Melillo et al., 2014). | | | | |
| Streamflow | Streamflow projected to increase during the winter months and generally decrease or experience no change during the summer months, compared to simulated historical norms. | | | | |



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- 1. Understanding nuances between climate adaptation and hazard mitigation.
- 2. Using a hazard mitigation plan as a tool for addressing local impacts of climate change.
- 3. Knowing where to go for climate data and tools.
- 4. Integrating climate adaptation planning into other planning mechanisms or regulatory tools.

Review Objectives







DOCUMENTS

- Local Mitigation Planning Handbook <u>http://www.fema.gov/library/viewRecord.do?id=7209</u>
- Mitigation Ideas <u>http://www.fema.gov/library/viewRecord.do?id=6938</u>
- Local Mitigation Planning Guidance <u>https://www.fema.gov/media-library/assets/documents/23194</u>
- Tribal Multi-Hazard Mitigation Planning Guidance <u>http://www.fema.gov/media-library/assets/documents/18355</u>
- California HMP & Climate Adaptation Guidance http://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/california-climate-adaptation
- ICLEI: "Integrating Hazard Mitigation & Climate Adaptation Planning" <u>http://icleiusa.org/wp-content/uploads/2015/08/Integrating-Hazard-Mitigation-and-Climate-Adaptation-Planning.pdf</u>

TRAINING

- Climate Adaptation Training Opportunities
- https://toolkit.climate.gov/training-courses
- WEBSITE
- FEMA Mitigation Planning <u>https://www.fema.gov/hazard-mitigation-planning</u>







- January: Introduction to Mitigation Planning
- February: Building the Mitigation Planning Team
- March: Effective Public Engagement in Mitigation Planning
- April: Developing FEMA Mitigation Planning Grants
- May: Performing Natural Hazard Risk Assessments
- June: Integrating Natural Hazard Mitigation Plans and Community Wildfire Protection Plans
- July: Developing Natural Hazard Mitigation Strategies
- August: Climate Adaptation and Mitigation Planning
- September: Tribal Mitigation Planning
- October: Addressing Social Equity through Mitigation Planning
- November: Integrating Natural Hazard Mitigation Plans into Local Comprehensive Plans
- December: Mitigation and Recovery Planning (Change)





Anchorage, Alaska

- Hosted by Alaska Division of Homeland Security & Emergency Management
- September 27-28
- Registration open now

Camp Murray, Washington

- Hosted by Washington State Emergency Management Division
- November 1-2
- Registration open now:

https://www.train.org/washington/course/1064698

/live_event

Region 10 In-Person Training

2017 Schedule

G-318: Mitigation Planning Workshop







FEMA REGION 10 MITIGATION PLANNING TEAM

- Brett Holt, Mitigation Planning Program Manager, brett.holt@fema.dhs.gov
- Amanda Siok, Mitigation Planner, amanda.siok@fema.dhs.gov

FEMA REGION 10 PLANNING SUPPORT

 Kate Skaggs, Mitigation Planner, kate.Skaggs@mbakerintl.com

ALASKA

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- George Grady, State Mitigation Planner, george.grady@alaska.gov

IDAHO

- Susan Cleverley, SHMO, <u>scleverley@imd.idaho.gov</u>
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<u>OREGON</u>

- Angie Lane, SHMO, <u>angie.lane@mil.state.or.us</u>
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WASHINGTON

- Tim Cook, SHMO, <u>Tim.Cook@mil.wa.gov</u>
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CONTACT



