

Volume II: Appendices

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APPENDIX A: PLANNING AND PUBLIC PROCESS

This appendix describes the changes made to the 2009 Polk County NHMP Natural Hazards Mitigation Plan (NHMP) during the 2016-2017 plan update process.

Project Background

Polk County collaborated with the Oregon Partnership for Disaster Resilience (OPDR) to update the multi-jurisdictional 2009 Polk County NHMP. The Disaster Mitigation Act of 2000 requires communities to update their mitigation plans every five years to remain eligible for Pre-Disaster Mitigation (PDM) program funding, Flood Mitigation Assistance (FMA) program funding, and Hazard Grant Mitigation Program (HMGP) funding. OPDR met with members of the Polk County steering committee, and participating city steering committees (Dallas, Falls City, Independence, and Monmouth) to update their NHMP. OPDR and the committee(s) made several changes to the previous NHMP. Major changes are documented and summarized in this memo.

2017 Plan Update Changes

The sections below only discuss *major* changes made to the NHMPs during the 2016-2017 plan update process. Major changes include the replacement or deletion of large portions of text, changes to the plan's organization, updated hazard risk and vulnerability assessment, and new mitigation action items. If a section is not addressed in this memo, then it can be assumed that no significant changes occurred.

Table A-1 lists the 2009 Polk County NHMP plan section names and the corresponding 2017 section names, as updated (major Volumes are highlighted). This memo will use the 2017 plan update section names to reference any changes, additions, or deletions within the plan.

Table A-I Changes to Plan Organization

2009 Polk County MNHMP	2017 Polk County MNHMP
-	Acknowledgements
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Front Pages

1. Acknowledgements have been updated to include the 2016-2017 project partners and planning participants.
2. The FEMA approval letter, review tool, and city resolution of adoption are included. *(will be included with the final version of the NHMP)*

Volume I: Basic Plan

Volume I provides the overall plan framework for the 2017 NHMP update, including the following sections:

Plan Summary

The 2017 NHMP includes an updated plan summary that provides information about the purpose of natural hazards mitigation planning and describes how the plan will be implemented.

Section 1: Introduction

Section 1 introduces the concept of natural hazards mitigation planning and answers the question, “Why develop a mitigation plan?” Additionally, Section 1 summarizes the 2016-2017 plan update process, and provides an overview of how the plan is organized. Major changes to Section 1 include the following:

- Most of Section 1 includes new information that replaces out of date text found in the 2009 NHMP. The new text describes the federal requirements that the plan addresses and gives examples of the policy framework for natural hazards planning in Oregon.
- Section 1 of the 2017 update, outlines the entire layout of the plan update, which has been altered as described above (Table A-1).

Section 2: Risk Assessment

Section 2, Risk Assessment, consists of three phases: hazard identification, vulnerability assessment, and risk analysis. Hazard identification involves the identification of hazard geographic extent, its intensity, and probability of occurrence. The second phase, attempts to predict how different types of property and population groups will be affected by the hazard. The third phase involves estimating the damage, injuries, and costs likely to be incurred in a geographic area over a period of time. Changes to Section 2 include:

- The hazard chapters of the previous Polk County NHMP (2009 NHMP, Section 5) have been integrated into this section.
- Hazard identification, characteristics, history, probability, vulnerability, and hazard specific mitigation activities were updated. Information previously provided in the Hazard Chapters is placed in this section. Extraneous information was removed and links to technical reports were added as a replacement.
- Links to specific hazard studies and data are embedded directly into the plan where relevant and available.
- National Flood Insurance Program (NFIP) information was updated.

Section 3: Mitigation Strategy

This section provides the basis and justification for the mission, goals, and mitigation actions identified in the NHMP. Major changes to Section 3 include the following:

- Mission and Goals were reviewed and compared with the State NHMP Mission and Goals, no changes were made.
- The Polk County steering committee met to review the previous NHMP action items. Steering Committee members provided updates and edits to the actions where applicable. Including, the revision and consolidation of existing actions, managing department/agency designations, timeframe, potential funding source, and benefit-costs/technical feasibility (as shown in Tables 3-1 and 3-2). See Table A-2 through A-6 for changes for the County and Cities.
- A list of prioritized actions for the County was included, Table 3-1.

- New action items are based upon continuous community needs, the identification of new hazards, deferred action items, and current needs based upon the community risk assessment. They are designed to be feasibly accomplished within the next five years and can be found in Table 3-1.

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Table A-2 County Action Item Status and Changes

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
Multi-Hazard (MH)						
1	MH 1		-	Sustain an education and outreach program for local jurisdictions and assist them in developing emergency operations, public information, and hazard mitigation plans.	Completed (Ongoing)	Ongoing action. Not considered necessary to retain in NHMP.
2	MH 2	Combine lines 2 and 3	MH 4	Review and update the Polk County Emergency Operations Plan and the Natural Hazards Mitigation Plan on an annual basis. Conduct a complete review of the plans and have them officially promulgated by the BOC every five years.	Revised	Annual reviews conducted by Emergency Management.
3	MH 3	Combine lines 2 and 3	MH 4	Evaluate the effectiveness of existing programs and identify natural hazard mitigation needs. Balance the objectives of existing programs' goals with natural hazards mitigation.	Revised	Annual reviews conducted by Emergency Management.
4	MH 4	Combine lines 4, 6, 7	MH 5	Identify coordination opportunities to maximize or leverage funding opportunities that address multi-jurisdictional projects.	Revised	
5	MH 6		MH 1	Determine the impact that each natural hazard could have on the priority transportation routes to and from emergency facilities and first responder sites.	Revised/ Prioritized	On-going project - Emergency Management and Public Works have met several times along with ODOT and have outlined primary and secondary routes within the County. Emergency facilities have been identified as a map layer in our GIS system.
6	MH 7	Combine lines 4, 6, 7	MH 5	Identify collaborative programs that recognize ways to decrease the risks of natural hazards.	Revised	
7	MH 8	Combine lines 4, 6, 7	MH 5	Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration in Polk County.	Revised	
8	MH 9		-	Develop GIS inventories of essential facilities, at-risk buildings and infrastructure, and prioritize mitigation projects.	Completed (Ongoing)	Developed with ongoing maintenance.
9	MH 10		MH 6	Strengthen emergency services preparedness and response by linking emergency services with natural hazard mitigation programs, and enhance public education on a regional scale.	Retained	Polk County is currently developing a Continuity Operations Plan that includes not only preparedness activities in the public sector but outreaches into the private sector. Polk County is also a partner in the Regional 211 program that provides resource information to the public.
10	MH 11	Combine lines 10, 11, 17, 84, and 90	MH 7	Develop, enhance, and implement education programs aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property owners, businesses, and schools.	Revised	Emergency Management has completed two tasks in this area by involving schools in our communications emergency planning. Communications is a vital part of the basic response tools. Other tasks include information on the County website to help citizens in the event natural hazard incident.
11	MH 12	Combine lines 10, 11, 17, 84, and 90	MH 7	Sustain a public awareness campaign about natural hazards.	Revised	Web based resources updated regularly.
12	MH 14		-	Promote hazard-resistant utility construction and maintenance methods.	Completed (Ongoing)	Part of floodplain permit process.
13	MH New	Combine lines 13 and 14	MH 8	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation, and emergency operations plans, etc to demonstrate multi-benefit considerations and facilitate using multiple funding sources.	Revised	Planning activities are routinely coordinated.

Table A-2 Action Item Status and Changes (continued)

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
14	MH New	Combine lines 13 and 14	MH 8	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.	Revised	Polk County Planning routinely provides recommendations and conditions in community development process that protect floodway and critical infrastructure through the newly developed floodplain development permit process.
15	MH New	Combine lines 15, 45, and 87	MH 10	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)	Revised	Generators upgraded at some County facilities.
16	MH New		MH 10	Install lightning rods and lightning grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Retained	Some have been installed.
17	MH New	Combine lines 10, 11, 17, 84, and 90	MH 7	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all natural hazards.	Revised	Web based resources.
18	MH New	Combine lines 18, 24, and 25	FL 2	Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.	Revised	The County has identified all repetitive loss structures and has mitigated through elevation the only repetitive flood loss home.
19	MH New	Combine lines 19, 22, and 23	FL 11	Review hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design at the planning level.	Revised	Note: these projects could potentially receive federal funding if it is a vital component of a large construction project.
Flood						
20	FST 2	Combine lines 20 and 26	FL 1	Conduct workshops for target audiences on National Flood Insurance Programs, mitigation activities.	Revised	Polk County regularly targets surveyors and engineers and provides a workshop on NFIP activities, such as how to accurately complete elevation certificates.
21	FST 3		FL 3	Continue to coordinate with appropriate agencies, and maintain an inventory of all aggregate operations adjacent to or within the floodplain.	Revised	Aggregated site list prepared and site information geocoded in GIS.
22	FLT1	Combine lines 19, 22, and 23	FL 11	Update the Flood Insurance Rate Maps (FIRM) for Polk County as funding becomes available.	Revised	
23	FLT2	Combine lines 19, 22, and 23	FL 11	Enhance data and mapping for floodplain information within Polk County.	Revised	Polk County has procured LIDAR data for much of the county that assists in evaluating the floodplain.
24	FLT6	Combine lines 18, 24, and 25	FL 2	Mitigate repetitive flood loss properties.	Revised	Polk County Planning is currently working to elevate the only repetitive flood loss dwelling in the county.
25	Flood New	Combine lines 18, 24, and 25	FL 2	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.	Revised	Polk County evaluated a repetitive loss property and obtained funding for mitigation that will elevate the dwelling.
26	Flood New	Combine lines 20 and 26	FL 1	Develop an outreach program to educate public concerning NFIP participation benefits, floodplain development, land use regulation, and NFIP flood insurance availability to facilitate continued compliance with the NFIP.	Revised	Web based outreach.
27	Flood New	Combine lines 27, 28, 29, and 30	FL 4	Increase culvert size to increase its drainage efficiency.	Revised	Some locations completed.
28	Flood New	Combine lines 27, 28, 29, and 30	FL 4	Install debris cribs over culvert inlets to prevent inflow of coarse bed-load and light floating debris.	Revised	Some locations completed. Activity covered in other actions.

Table A-2 Action Item Status and Changes (continued)

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
29	Flood New	Combine lines 27, 28, 29, and 30	FL 4	Raise bridge height or convert bridge from a multi-span to single span to increase water flow and reduce debris catchment.	Revised	Some locations completed. Ongoing process to replace as funding is available.
30	Flood New	Combine lines 27, 28, 29, and 30	FL 4	Construct concrete wing walls at culvert or bridge entrances and outlets to direct water flow into their openings.	Revised	Some locations completed. Ongoing
Winter Storm (WS) (Includes Drought and ENSO)						
31	WSST 1		WT 1	Enhance strategies for management of debris from severe winter storms.	Retained (Ongoing)	Discussed annually.
32	WSST 2		WT 2	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.	Ongoing	The County has begun prioritizing infrastructures/facilities that will be outfitted for backup power.
33	WSST 3	Combine lines 33 and 82	MH 11	Update the county's debris management plan.	Revised	Evaluated annually.
34	WSLT 1	Combine lines 34 and 43	WT 3	Increase and maintain public awareness of severe winter storms and the benefits of mitigation activities through education aimed at households and businesses, and increase targeting of special needs populations.	Revised	Web based outreach.
35	WSLT 4		WT 4	Encourage harvesting of trees along utility and road corridors, preventing potential winter storm damage.	Revised	Public Works implements in the field.
36	WSLT 5		-	Encourage right-of-way coordination, education and management between property owners, utility operators, and government agencies.	Delete	Public Works implements in the field.
37	WS	Combine lines 37 and 39	DR 1	Encourage dissemination of ideas by county-based agencies on effective methods of water use curtailment.	Revised	Polk County is currently studying water use curtailment ideas.
38	WS		DR 2	Encourage water providers to inter-tie water systems	Retained	Polk County is currently studying potential water system inter-ties.
39	WS	Combine lines 37 and 39	DR 1	Provide information about emergency water rights for domestic uses.	Revised	Provide information when requested.
40	WS		DR 3	Support the technical service and low interest loans provided to farmers and ranchers so that they can develop livestock watering systems.	Retained	Provide assistance when requested.
41	WS		DR 4	Encourage storage of water, especially off stream storage.	Retained	Polk County is currently studying potential water storage projects within the county.
42	WS		DR 5	Support agencies' plan for long-range water resources development that leads to additional water supplies and help determine funding sources for the studies.	Retained	Polk County has obtained two SB 1069 grants from the Oregon Department of Water Resources to assist in long range water planning.
43	WS New	Combine lines 34 and 43	WT 3	Develop and implement strategies and educational outreach programs for debris management from severe winter storms.	Revised	This is part of debris management planning.
44	WS New		-	Update or develop, implement, and maintain jurisdictional debris management plans.	Delete	This is part of debris management planning.
45	WS New	Combine lines 15, 45, and 87	MH 10	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.	Revised	Developed critical facility list.
46	WS New		FL 5	Install new precipitation measuring gauges and develop monitoring and early warning program.	Retained/Ongoing	Completed gauge install. Warning program developed and is ongoing.
47	WS New		WT 5	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.	Revised/Ongoing	Part of permit program. Ongoing

Table A-2 Action Item Status and Changes (continued)

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
48	WS New		WT 6	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Retained	Upgrades have been made to government buildings.
Landslide						
49	Landslide ST1	Combine Lines 49 and 50	LS 1	Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	Revised	Polk County is obtaining LIDAR data to improve knowledge of landslide hazard areas.
50	Landslide ST3	Combine Lines 49 and 50	LS 1	Identify alternative travel routes in high risk debris flow and landslide areas.	Revised	Polk County is obtaining LIDAR data to assist in identifying alternative travel routes.
51	Landslide LLT1		-	Mitigate activities in identified potential and historical landslide areas through public outreach.	Deleted	Polk County is obtaining LIDAR data to assist in landslide mitigation. See LS 1
52	Landslide LLT2		FL 6	Maintain public and encourage property owners to maintain private drainage systems.	Retained	
53	Landslide New		-	Develop prioritized list of mitigation actions for threatened critical facilities and other buildings or infrastructure.	Deleted	Developed critical facility list. Incorporated actions in Emergency Operations Plan.
Wildland Fire (WF)						
54	WFST1	Combine lines 54 and 65	WF 1	Work with Polk Fire Defense Board in the review of plans and inspection of structures, access, and water supply for fire code compliance.	Revised	
55	WFST 2		WF 2	Advocate accessible water storage facilities in developments not connected to a community water/hydrant system in the wildland/urban interface (WUI).	Retained	Part of permit program.
56	WFST 3	Combine lines 56, 61, 62, 66, and 70	WF 3	Continue to promote public awareness campaigns for individual property owners living in the WUI.	Revised	Web based outreach.
57	WFST 4	Combine Lines 57, 68, and 69	WF 4	Create incentives and assist landowners in reducing fuel loads on private property.	Revised	Part of land use permit program.
58	WFST 6		-	Enhance emergency services to increase the efficiency of wildfire response and recovery activities.	Deleted	
59	WFLT 1		WF 5	Look for solutions to protect structures located outside of fire districts through partnerships, grant funding, fire protection contracts, or expansion of fire district services.	Retained	
60	WFLT 4		-	Maintain and further develop interagency and private industry relationships for continuing strong fire response in Polk County.	Deleted	
61	WFLT 5	Combine lines 56, 61, 62, 66, and 70	WF 3	Enhance existing outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural hazards.	Revised	Web resources updated.
62	WFLT 6	Combine lines 56, 61, 62, 66, and 70	WF 3	Encourage development and dissemination of maps relating to fire hazards to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities, and to help guide emergency services during response.	Revised	Maps available as outreach from Assessors Office.
63	WF New		WF 6	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.	Retained	

Table A-2 Action Item Status and Changes (continued)

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
64	WF New		WF 7	Develop Community Wildland Fire Protection Plans for all at-risk communities.	Revised	Polk County completed a Wildland Urban Interface fire protection plan (2009). Revise action to "maintain" CWPP.
65	WF New	Combine lines 54 and 65	WF 1	Promote FireWise building siting, design, and construction materials.	Revised	Part of permit program. Web resources part of Assessors Office.
66	WF New	Combine lines 56, 61, 62, 66, and 70	WF 3	Provide wildland fire information in an easily distributed format for all residents.	Revised	Web based resources part of Assessors Office.
67	WF New		-	Schedule and perform government facility "fire drills" at least twice per year.	Deleted	
68	WF New	Combine Lines 57, 68, and 69	WF 4	Develop outreach program to educate and encourage home landscape cleanup (defensible space) and define debris disposal programs.	Revised	Web based resources and a handout.
69	WF New	Combine Lines 57, 68, and 69	WF 4	Identify, develop, and implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.	Revised	Incorporated as enforceable conditions in residential permits in forest zones.
70	WF New	Combine lines 56, 61, 62, 66, and 70	WF 3	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.	Revised	Outreach as part of permit review. Web resources.
Earthquake (EQ)						
71	EQST 2	Combine lines 71 and 72	EQ 1	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices.	Revised	The County has provided literature at safety fairs as well as information on our website on how people can mitigate hazards at home, work and schools.
72	EQST 3	Combine lines 71 and 72	EQ 1	Inform residents of value of earthquake hazard insurance.	Revised	The County provides literature on Earthquake insurance. The County continues to review current standards and makes changes to reflect best practices in the building industry.
73	EQLT 1	Delete	-	Promote and continue building code standards.	Implemented	Part of building permit program.
74	EQLT 2	Combine lines 74 and 75	EQ 2	Encourage seismic strength evaluations of critical facilities to identify vulnerabilities and to meet current seismic standards.	Revised	The County has participated in the seismic study of critical facilities. Currently, Dallas Fire just completed a seismic upgrade of their Fire Station here in Dallas.
75	EQLT 5	Combine lines 74 and 75	EQ 2	Improve local capabilities to perform earthquake building safety evaluations.	Revised	Polk County has provided training opportunities to building officials on building safety evaluations.
76	EQ New		EQ 3	Retrofit bridges that are not seismically adequate for lifeline transportation routes.	Revised	Many bridges completed.
77	EQ New	Combine lines 77, 78, and 79	EQ 4	Update existing (or adopt the most current) Uniform Building Code.	Revised	Automatic updates.
78	EQ New	Combine lines 77, 78, and 79	EQ 4	Implement and enforce the Uniform, International, and State Building Codes.	Revised	Part of permit program.
79	EQ New	Combine lines 77, 78, and 79	EQ 4	Inspect and/or certify all new construction as applicable.	Revised	Part of permit program.
Volcano						
80	VST 1		VE 1	Increase awareness of volcanic eruptions and their potential impact to the county.	Retained	Web based outreach.
Wind (W)						
81	WST 1	Combine lines 81, 86, 88, and 89	WS 1	Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during windstorm events.	Revised/ Prioritized	
82	WST 2	Combine lines 33 and 82	MH 11	Enhance strategies for debris management and/or removal after windstorm events.	Revised	Part of debris management planning.

Table A-2 Action Item Status and Changes (continued)

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
83	WLT2	Combine lines 83 and 85	WS 2	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Revised	Outreach ongoing.
84	WLT3	Combine lines 10, 11, 17, 84, and 90	MH 7	Increase public awareness of windstorm and tornado mitigation activities.	Revised	Polk County has developed a link on the County website to help the public obtain information on all hazards.
85	WLT4	Combine lines 83 and 85	WS 2	Support/encourage contractors, homeowners, and electrical utilities to use windstorm resistant construction methods where possible to reduce damage and power outages from windstorms.	Revised	Polk County has developed information on the County website to help the public and contractors obtain information on wind and snow load standards. Provide support and encouragement on a project by project basis.
86	WLT6	Combine lines 81, 86, 88, and 89	WS 1	Identify trees that are potentially susceptible to wind throw.	Revised/ Prioritized	This task is primarily conducted by Public Works in the field.
87	WLT7	Combine lines 15, 45, and 87	MH 10	Encourage critical facilities to secure emergency power.	Revised	
88	WLT8	Combine lines 81, 86, 88, and 89	WS 1	Encourage harvesting of trees along utility and road corridors, preventing potential windstorm damage.	Revised/ Prioritized	
89	WLT9	Combine lines 81, 86, 88, and 89	WS 1	Encourage harvesting of trees blown down during a windstorm or tornado.	Revised/ Prioritized	Polk County Public Works has removed known hazards during windstorm events to mitigate further issues like power outages.
90	WLT10	Combine lines 10, 11, 17, 84, and 90	MH 7	Increase and maintain public awareness of severe windstorms and the benefits of mitigation activities through education aimed at households and businesses and increase targeting of special needs populations.	Revised	Polk County has developed a link on the County website to help the public obtain information on all hazards.
<i>Erosion - Change to Landslide Hazard since Erosion is not covered as a separate hazard</i>						
91	Erosion New		FL 7	Develop and provide information to all residents on riverbank erosion and methods to prevent it in an easily distributed format.	Revised	Web resources.
92	Erosion New		FL 8	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.	Revised	Some areas completed.
93	Erosion New		FL 9	Install bank protection such as rock, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.	Revised	Some projects incorporated as appropriate.
94	Erosion New		FL 10	Harden culvert entrance bottoms with asphalt, concrete, rock, to reduce erosion or scour.	Revised	Some areas completed.
<i>Expansive Soils (ES)</i>						
95	ESLT1		DR 6	Educate the public about expansive soils.	Revised	Regular component of permit review.
96	ESLT2	Combine lines 96 and 97	DR 7	Develop revisions for and revise the Polk County Road Standards for areas of the county with expansive soils.	Revised	To date, the standards have not been updated. However, Polk County has developed an appropriate cross-section drawing for road construction in areas of expansive soils to be incorporated into the Polk County Road Standards. Polk County has also mapped the areas of the county with expansive soils.
97	ES New	Combine lines 96 and 97	DR 7	Require road design, engineering, and construction processes that address expansive soil conditions. Water absorption prevention, impermeable membrane, soil compaction, and drainage methods need to be considered once geologic studies determine soil composition.	Revised	

Table A-2 Action Item Status and Changes (continued)

Line #	2009 Action Item #	Combined Actions	2017 Action Item #	Description (2009)	Status	Status Comments
98	-	-	MH 2	Reduce potential isolation of critical facilities in the event of a natural hazard by creating redundancy. Create a map with alternatives transportation routes. Create a plan for multiple communication alternatives.	New/ Prioritized	
99	-	-	MH 3	Utilize social media as a communication outlet in the event of a natural hazard.	New/ Prioritized	The Sheriff's Office already maintains a Facebook account where they announce important information. Emergency Management is part of the Sheriff's Department and can use this outlet for: important announcements (ie road closures in the event of a natural hazard, training opportunities, upcoming meetings, etc.) Members from the Steering Committee can inform the Emergency manager when we would like something "posted".

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Table A-3 Dallas: Status of Complete and Deleted Action Items

2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit- Costs / Technical Feasibility
Determined to be complete by City					
MH	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc.)	Community Development	Ongoing	General Fund, DHS	BC: TBD TF: Yes
MH	Explore the need for, develop, and implement hazard zoning ordinances for high-risk hazard area land-use.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake	Update existing (or adopt the most current) Uniform Building Code	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake	Implement and enforce the Uniform, International, and State Building Codes.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Earthquake	Inspect and/or certify all new construction.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Develop, or revise, adopt, and enforce storm water ordinances and regulations to manage run-off from new development, including buffers and retention basins.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Increase culvert size to increase its drainage efficiency.	Public Works	Ongoing	General Fund, HMGP	BC: TBD TF: Yes
Wind	Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)	Community Development	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
Wind	Revise requirements to place utilities underground to reduce power disruption from wind storm / tree blow down damage when upgrading or during new development.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding and implement mitigation actions.	Police, Public Work	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Implement and enforce the most current Uniform International, and State, Building Codes to ensure structures can withstand winter storm hazards such as high winds, rain, water and snow.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Winter Storm	Review critical facilities and government building energy efficiency, winter readiness, and electrical protection capability. Identify, prioritize, and implement infrastructure upgrade or rehabilitation project prioritization and development.	Police, Fire, Public Work/ Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Obsolete or determined to be unrealistic and deleted by City					
MH	Review ordinances and develop outreach programs to assure mobile homes and manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, and other methods as applicable)	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
MH	Review ordinances and develop outreach programs to assure fuel oil and propane tanks are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as seismic or flooding events.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
MH	Install lightning rods and lightning grade surge protection devices on critical electronic components such as warning systems, communications equipment, and computers for critical facilities.	Community Development	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
MH	Acquire, demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	Community Development, Public Works	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
MH	Establish a formal role for the jurisdictional Hazard Mitigation Planning Committees to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.	County Administration, Community Development, Police, Fire, Public Works /	Ongoing	General Fund	BC: TBD TF: Yes

Table A-3 Dallas: Status of Complete and Deleted Action Items (continued)

2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Obsolete or determined to be unrealistic and deleted by City					
MH	Identify and pursue funding opportunities to implement mitigation actions.	Public Works, Community Development	Ongoing	General Fund	BC: TBD TF: Yes
MH	Develop and incorporate building ordinances commensurate with building codes to reflect survivability from wind, seismic, fire, and other hazards to ensure occupant safety.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Erosion	Install riprap, or pilings to harden or "armor" a stream bank where severe erosion occurs.	Public Works	Ongoing	General Fund, HMGP, HMA, NRCS	BC: TBD TF: Yes
Erosion	Harden culvert entrance bottoms with asphalt, concrete, rock, to reduce erosion or scour.	Public Works	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
Erosion	Install embankment protection such as vegetation, riprap, gabion baskets, sheet piling, and walls to reduce or eliminate erosion.	Public Works	Ongoing	General Fund, HMGP, HMA, NRCS	BC: TBD TF: Yes
Erosion	Apply for grants/funds to implement riverbank protection methods.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Expansive Soils	Review construction codes to require non-absorbent fill soils that slope away from foundations for a minimum of five feet to prevent ponding and water retention.	Community Development	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Develop and maintain GIS mapped inventory of repetitive loss properties to include the types and numbers of properties.	Public Work	1-5 years	General Fund, HMA	BC: TBD TF: Yes
Flood	Develop and implement mitigation actions for repetitive loss properties.	Public Works	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
Flood	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100- year floodplain using survey elevation data.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
Flood	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.	Public Works	1-5 years	General Fund, HMGP, HMA	BC: TBD TF: Yes
Flood	Develop outreach program to educate residents concerning flood proofed well and sewer/septic installation.	Public Works	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
Flood	Install new streamflow and rainfall measuring gauges.	Public Works	Ongoing	General fund, NOAA/NWS, HMGP, HMA	BC: TBD TF: Yes
Dam Failure	Prepare high resolution dam failure inundation area maps; use to update emergency response plans, evacuation route identification, public notification, and evacuation procedures.	Public Works	Ongoing	General Fund, USACOE	BC: TBD TF: Yes
HAZMAT	Enhance emergency planning, emergency response training, and equipment acquisition to address hazardous materials incidents for emergency and first responders and public works staff.	Public Works, Police, Fire	Ongoing	General Fund, EPA, SARA, HSGP	BC: TBD TF: Yes
HAZMAT	Evaluate existing security measures for sites with large quantities of hazardous substances (HS) or any quantities of extremely hazardous substances (EHS) and enhance security as necessary.	Public Works, Police, Fire	Ongoing	General Fund, EPA, SARA, HSGP	BC: TBD TF: Yes
HAZMAT	Train Public Works staff to identify extremely hazardous substances (EHS) and to follow EMS protocols.	Public Works, Police, Fire	Ongoing	General Fund, SARA, HSGP	BC: TBD TF: Yes
HAZMAT	Research, develop, and implement methods to protect waterways from hazardous materials events.	Police Dept	Ongoing	General Fund, SARA, EPA, USACOE, NRCS	BC: TBD TF: Yes
HAZMAT	Prepare a site-specific summary of hazardous materials used, stored, and commonly transported in the jurisdictional area. The summary should include mapped facility locations with a hazardous materials inventory, emergency response protocols, and mitigation actions.	Public Works	Ongoing	General Fund, SARA, EPA, HSGP,	BC: TBD TF: Yes

Table A-4 Falls City: Status of Complete and Deleted Action Items

2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit- Costs / Technical Feasibility
Obsolete or determined to be unrealistic and deleted by City					
MH 2	Pursue funding opportunities to implement mitigation actions.	City Manager	1-5 yrs	General Fund, HMGP, HMA, HSGP, NRCS, NOAA/ NWS	BC: TBD TF: Yes
MH 4	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, land use, transportation plans, etc to demonstrate multi- benefit considerations and facilitate using multiple funding source consideration.	MWVCOG	Ongoing	General Fund	BC: TBD TF: Yes
MH 5	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.	MWVCOG	Ongoing	General Fund	BC: TBD TF: Yes
MH 6	Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to acquire, relocate, elevate, and/or flood proof to protect the threatened population.	MWVCOG	Ongoing	General Fund	BC: TBD TF: Yes
FL 3	Evaluate and implement preferred flood protection initiatives to prevent or reduce riverine flood damages to residential structures and road drainage systems.	MWVCOG Planning & City Manager	1-5 yrs	General Fund, HMGP, HMA	BC: TBD TF: Yes
FL 4	Develop and implement mitigation actions for repetitive loss properties.	MWVCOG Planning, Public Works	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
FL 5	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
FL 6	Develop, implement, and enforce floodplain management ordinances.	MWVCOG and City Manager	Ongoing	General Fund	BC: TBD TF: Yes
FL 9	Apply for grants/funds to implement riverbank protection methods.	MWVCOG Planning, City Manager, & Public Works	1-5 yrs	General Fund	BC: TBD TF: Yes
WF 2	Develop, adopt, and enforce burn ordinances that require burn permits, restricts campfires, and controls outdoor burning.	Polk County South West (PCSW) Rural Fire District	Ongoing	General Fund, FMAP	BC: TBD TF: Yes
WD 2	Review ordinances and develop outreach programs to assure manufactured buildings are protected from severe wind and flood hazards. (Anchoring, elevation, siting, and other methods as applicable)	County Bldg Dept	Ongoing	General Fund, HMGP, HMA	BC: TBD TF: Yes
WT 1	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding, and implement mitigation actions.	Public Works	Ongoing	General Fund	BC: TBD TF: Yes
DUTS	Purchase backup power systems for all identified critical facilities.	City Manager & Public Works	Ongoing	General Fund, HSGP	BC: TBD TF: Yes
DUTS	Review and update emergency response plans for utility and transportation disruptions.	MWVCOG Planning City Engineer & City Manager	1-5 yrs	General Fund, HSGP	BC: TBD TF: Yes

Table A-5 Independence: Status of Complete and Deleted Action Items

2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Determined to be complete by City					
MH	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e., City Hall, first responder and medical facilities, schools, correctional facilities, and water and sewage pump stations, etc..	City/Community Development	0-2 years	Homeland Security Grants/State Grants	BC: TBD TF: Yes
Earthquake	Build a new City Hall/Civic Center to mitigate the present building's significant seismic vulnerabilities.	City/Community Development	1+ year	General Fund/URD/State Public Facility Grants	BC: TBD TF: Yes
Flood	Relocate sand and gravel operation to avoid repeated flooding.	City/LUBA/Community Development/Mayor	0-5 years	General Fund/URD	BC: TBD TF: Yes
Flood	Build flood walls around City Hall.	City/Community Development	0-2 years	General Fund	BC: TBD TF: Yes
Flood	Clean out the ditch line that runs Hoffman Road to Ash Creek so that it can move more freely and retain more water to mitigate flooding in nearby neighborhoods	City/Public Works	0-5 years	General Fund/Stormwater Fund/Mitigation Grant	BC: TBD TF: Yes
Landslide	Update the storm water management plan to include regulations to control runoff, both for flood reduction and to minimize saturated soils on steep slopes that can cause landslides.	City/Community Development	0-5 years		BC: TBD TF: Yes
Wildfire	Define a city yard waste disposal program to prevent fires from back yard burnings.	Fire District/City/Community Development	0-5 years		BC: TBD TF: Yes
Obsolete or determined to be unrealistic and deleted by City					
Flood	Deepen the Willamette River channel to mitigate floods hazards in our community.	DEQ/Community Development	5-10 years	Feds	BC: TBD TF: Yes
Erosion	Pursue embankment protection alternatives to protect identified infrastructure	DEQ/Community Development	0-5 years		BC: TBD TF: Yes
Volcano	Evaluate capability of water treatment plants to deal with high turbidity from ash falls, update emergency response plans, and upgrade treatment facilities' physical plant to deal with ash falls. Prioritize and initiate actions to fill capability gaps.	City/Public Works	0-5 years	General Fund/Water Fund/DEQ	BC: TBD TF: Yes
Volcano	Evaluate ash impact on storm water drainage system and develop mitigation actions.	City/Public Works	0-5 years	General Fund/Storm Fund	BC: TBD TF: Yes
Winter Storm	Trim back trees growing into power lines to prevent line damage during high winds or ice storms.	PP&L/Public Works	0-2 years	PP&L	BC: TBD TF: Yes
MH	Work with power company to remove overhead utilities that could drop during high winds, ice storms, earthquakes and fires.	PP&L/Fire District/Community Development	0-5 years	PP&L & General Fund	BC: TBD TF: Yes
MH	Maintain a formal role for the jurisdictional Hazard Mitigation Planning Committee to develop a sustainable process to implement, monitor and evaluate citywide mitigation actions.	City/Project Coordinator	0-5 years		BC: TBD TF: Yes
HAZMAT	Evaluate and improve railroad track conditions to address potential hazardous materials incidents due to instability of railroad tracks.	Willamette RR/Community Development	0-2 years	RR/State & Fed Transportation Grants/URD/General Funds	BC: TBD TF: Yes
HAZMAT	Create a well defined, multi-agency public/private response plan to the Simplot hazardous chemical storage plant.	City/Simplot/Fire District/Police Dept/Community Development	0-5 years	URD/Simplot Hazard Mitigation Grant	BC: TBD TF: Yes
HAZMAT	Develop a hazardous materials drop-off program more often than annual.	Polk County/Fire District	0-5 years		BC: TBD TF: Yes
HAZMAT	Relocate hazardous material critical facilities for prevention of hazmat incidents.	City/Simplot/Fire District/Police Dept/Community Development	0-5 years	URD/Simplot Hazard Mitigation Grant	BC: TBD TF: Yes

Table A-5 Independence: Status of Complete and Deleted Action Items (continued)

2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Obsolete or determined to be unrealistic and deleted by City					
Terrorism	The South Well Field needs fencing and other security systems installed to protect this critical infrastructure from unauthorized entry.	City/Public Works	0-5 years	Homeland Security	BC: TBD TF: Yes
Terrorism	Harden the perimeter security around City owned critical infrastructures to mitigate against potential terrorist attacks.	City/Public Works	0-5 years	Homeland Security	BC: TBD TF: Yes
Terrorism	Create an enhanced, special Emergency Response Team (Swat Team) to respond to terrorist issues.	City/Police Department	0-5 years	Homeland Security	BC: TBD TF: Yes
Terrorism	The Sewer Treatment Plant, #4 Lagoon needs fencing and other security systems installed to protect this critical infrastructure from unauthorized entry.	City/Public Works	0-5 years	Homeland Security	BC: TBD TF: Yes

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Table A-6 Monmouth: Status of Complete and Deleted Action Items

2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Determined to be complete by City					
Multi-Hazard	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, City Hall, and water and sewage pump stations, etc.).	Public Works Department	2-5 years	General Fund, HSGP, HMGP	BC: TBD TF: Yes
Multi-Hazard	Based on known high-risk hazard areas, identify hazard-specific signage needs and purchase and install hazard warning signs near these areas to notify and educate the public of potential hazards.	Public Works Department	0-2 years	General Fund, HMGP, HMA, NEHRP	BC: TBD TF: Yes
Winter Storm (Drought)	Develop educational programs and initiatives related to water conservation and irrigation during drought periods.	Community Development Department Public Works Department	0-2 years	General Fund, NRCS	BC: TBD TF: Yes
Wildland Fire	Develop, adopt, and enforce burn ordinances that require burn permits, restrict campfires, and controls outdoor burning.	Community Development Department Fire District	2-5 years	General Fund, FMAP	BC: TBD TF: Yes
Wind	Identify alternate interoperable communication method as backup for emergency personnel when phone lines are disrupted due to down power lines and cell phones are inoperable.	Hazard Mitigation Plan Steering Committee	2-5 years	General Fund, HSGP, IECGP	BC: TBD TF: Yes
2009 Action Item #	Description	Managing Department / Agency	Timeframe	Potential Funding Source(s)	Benefit-Costs / Technical Feasibility
Obsolete or determined to be unrealistic and deleted by City					
Multi-Hazard	Establish and maintain a formal role for the jurisdictional Hazard Mitigation Steering Committee to develop a sustainable process to implement, monitor, and evaluate citywide mitigation actions.	Hazard Mitigation Steering Committee	0-2 years	General Fund	BC: TBD TF: Yes
DUTS	Develop outreach program to educate and encourage residents to maintain several days of emergency supplies for power outages or road closures.	Community Development Department Public Works Department	0-2 years	General Fund, HSGP, EMPG	BC: TBD TF: Yes
DUTS	Review and update emergency response plans for utility disruptions.	Hazard Mitigation Plan Steering Committee	0-2 years	General Fund, HSGP, EMPG	BC: TBD TF: Yes
DUTS	Identify and prioritize all "jurisdiction owned" & "non-jurisdiction owned" critical facilities that have backup power and emergency operations plans.	Hazard Mitigation Plan Steering Committee	0-2 years	General Fund	BC: TBD TF: Yes
HAZMAT	Enhance emergency planning, emergency response training, and equipment acquisition to address hazardous materials incidents for emergency and first responders and public works staff.	Public Works Department Fire District Police Department	0-5 years	General Fund, EPA, CERCLA, CSEEP, EPA, HSGP	BC: TBD TF: Yes
Terrorism	Enhance emergency planning, organization, equipment, exercise, and emergency response training to address all potential terrorism incidents.	Hazard Mitigation Plan Steering Committee	2-5 years	General Fund, HSGP, CTGP	BC: TBD TF: Yes

Volume II: Jurisdictional Addenda

All cities that participated in the previous NHMP also participated in this update process. City changes are reflected herein and within each city addendum.

Volume III: Appendices

Appendix A: Planning and Public Process

This planning and public process appendix reflects changes made to the Polk County NHMP and documents the 2017 planning and public process.

Appendix B: Community Profile

The community profile has been updated to conform with the OPDR template and includes information for Polk County.

Appendix C: Economic Analysis of Natural Hazard Mitigation Projects

Updates are provided for the economic analysis of natural hazard mitigation projects.

Appendix D: Grant Programs and Resources

Some of the previously provided resources were deemed unnecessary since this material is covered within the Oregon NHMP. Updates were made to the remaining grant programs and resources.

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PUBLIC PARTICIPATION PROCESS

2016-2017 NHMP Update

Polk County is dedicated to directly involving the public in the review and update of the natural hazard mitigation plan. Although members of the steering committee represent the public to some extent, the residents of Polk County were also given the opportunity to provide feedback about the Plan. In addition, the public will be involved during the annual implementation and maintenance meeting.

Polk County made the draft NHMP available via the Oregon Partnership for Disaster Resilience's website for public comment from January 17, 2017 through the FEMA review period.

Public Involvement Summary

Polk County provided a press release on January 17, 2017 and announced the plan on its website to inform the public that an update to the NHMP was occurring and to provide an opportunity for the public to learn more about the update and comment.

Falls City also provided a press release on their website.

There were no comments received during the public review period via the OPDR project page for the Polk County NHMP update. Members of the steering committee provided edits and updates to the NHMP during this period as reflected in the final document.

Press Release – Polk County

NOTICE FOR ITEMIZER-OBSERVER ATTENTION: IO LEGALS

Polk County Community Development

Press Release - Polk County's Multi-jurisdictional Hazard Mitigation Plan Update

Please start ad on: January 18, 2017

For this number of weeks: one (1) time only

Via E-Mail @ iolegals@polkio.com

Please submit the attached press release in the Public Notice section of the Itemizer-Observer. Please send us an Affidavit of Publication, and we would appreciate you forwarding one to us following publication, along with your invoice for services.

If you have any questions please give me a call.

Thank you,

Cole Steckley
Polk County Community Development
Phone: (503) 623-9237
Fax: (503) 623-6009

Submitted to Itemizer-Observer on January 10, 2017 @ 11:30 AM

PRESS RELEASE

REQUEST FOR COMMENTS: MULTI-JURISDICTIONAL NATURAL HAZARD MITIGATION PLAN UPDATE

The Polk County Multi-jurisdictional Natural Hazard Mitigation Plan is the result of collaborative planning effort between Polk County, local cities, Polk County residents, public agencies, and federal, state, and regional organizations. The purpose of this plan is to provide a set of strategies and measures the County can pursue to reduce the risk and fiscal loss to the County and its residents in the event of a natural hazard. Polk County is currently in the process of updating its Natural Hazard Mitigation Plan which was last updated in 2009. Prior to the plan's final approval, Polk County is requesting input and comments from the public. Please submit comments to the Polk County Community Development Department at 850 Main Street, Dallas, Oregon 97338, before February 1, 2017.

For more information, please contact Austin McGuigan with the Polk County Community Development Department at: 503-623-9237.

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Falls City, Oregon

[Home](#) [Community](#) [City Committees](#) [Major Documents Center](#) [Water Master Plan Project](#) [Contact Us](#) [Helpful Links](#)

Welcome to Falls City, to view main tabs, just click and scroll down. Dropdown menus contain additional information not listed on main pages. Select dropdown and scroll to view that page.



2016 Update of the Falls City Appendix of the Polk County Natural Hazard Mitigation Plan

Summary: The purpose of hazard mitigation planning is to implement projects that eliminate the risk or reduce the severity of hazards on people and property. Mitigation programs may include short and long-term activities to reduce the hazard; reduce exposure to hazards; or reduce the effects of hazards. Mitigation could include better preparation, response and recovery measures. There are very specific federal requirements that must be met when preparing a Hazard Mitigation Plan: planning process, hazard identification, risk assessment, goals, mitigation programs, actions and projects, and a resolution adopting the plan.

Background: In 2009, Polk County adopted a Polk County Multi-Jurisdictional Natural Hazard Mitigation Plan (NHMP). The NHMP plan expired October 2014. On July 27, 2016, Polk County hosted a multi-jurisdiction project Kick-Off Meeting to update the plan. The NHMP needs to be updated to regain the eligibility for Federal pre-disaster mitigation project grant assistance from Federal Emergency Management Agency (FEMA).

In 2009, Falls City organized a Natural Hazard Mitigation Plan (NHMP) development Steering Committee that identified hazard threats and developed actions that could be taken to mitigate damage and life losses from those threats. Steering Committee participants included staff, city planner, mayor, public works, fire chief, two members of the planning commission and citizens. This project will update the [Falls City NHMP created in 2009](#).

Plan Update Process: [The Oregon Partnership for Disaster Resilience \(OPDR\)](#) has been contracted with Polk County through Oregon Emergency Management and a Pre-Disaster Mitigation Grant provided by FEMA to assist with the plan update. This effort will review the existing NHMP for needed revisions and for identification and prioritization of pre-disaster mitigation candidate projects. Each jurisdiction will participate. Public comments are welcome. The updated plan will be sent to FEMA in January 2017 for their review and approval. Once the plan is approved by FEMA, the plan will assist when applying for mitigation funding. This includes earthquake retrofitting, storm water management, elevate/ or relocate structures to avoid riverine flooding, public education, protective measures for utilities, water and sanitary sewer systems, and/ or infrastructure such as roads and bridges, localized flood control projects, and volunteer acquisition of real property for conversion to open space in perpetuity (any hazard).

Project Timeline

July 27, 2016
Multi-Jurisdiction Project Kick off meeting

- August 2016
- Falls City City Council NHMP Project Agenda included in the August 11, 2016 Agenda packet.
 - Add a tab to the website for the project and encourage public participation.
 - Public Notice inviting comments.

August – October 2016
Update the Falls City Appendix of the Polk County Hazardous Mitigation Plan (e.g., community profile, action items, risk assessment, recent flood/wind events...)

October 2016

- Next Meeting of the Steering Committee. Steering Committee will review updates to action items & risk assessment.

November 2016

Final Review of updated plan

November –December 2016

Jurisdictions adopt their Appendix of the Polk County Hazardous Mitigation Plan by Resolution. Polk County adopts the overall plan.

January 2017

Polk county natural hazard mitigation plan forwarded to FEMA for Review and Acceptance.

How to participate:

1. Review the Falls City Appendix of the Polk County Natural Hazard Mitigation Plan and provide comments to City Hall at 299 Mill Street, Falls City, Oregon 97344: [Falls City Appendix](#)
2. Monitor this tab of the Falls City Website and read the monthly newsletter for updates.

Resources:

Polk County Natural Hazard Mitigation Plan: <http://www.co.polk.or.us/sheriff/em/multi-jurisdictional-hazard-mitigation-plan-mhmp>

2009 Falls City Natural Hazard Mitigation Plan: [Falls City Appendix](#)

City of Falls City
299 Mill St.
Falls City, Oregon 97344
503-787-3631

Office hours: Monday - Thursday 10:00 am to 5:30 pm Closed for lunch 1:00 pm to 1:30 pm
Closed to the public each Friday

THIS ORGANIZATION IS AN EQUAL OPPORTUNITY PROVIDER

Polk County Steering Committee

Steering committee members possessed familiarity with the Polk County community and how it's affected by natural hazard events. The steering committee guided the update process through several steps including goal confirmation and prioritization, action item review and development and information sharing to update the plan and to make the plan as comprehensive as possible. Member's from the city steering committees also participated in the county steering committee meeting that met on the following dates:

- **Meeting #1:** Kickoff, July 27, 2016
- **Meeting #2:** Risk Assessment, Mitigation Strategies, Implementation and Maintenance, October 18, 2016

In addition, each city held steering committee meeting as indicated below, for a list of meeting attendees see the individual city addendum within Volume II:

Dallas:

- December 6, 2016 – Dallas Steering Committee Meeting #1
- December 13, 2016 – Dallas Steering Committee Meeting #2

Falls City:

- August 2016 – NHMP project agenda to city council. Also, added an NHMP update tab to city website and encouraged public participation.

Independence:

- November 1, 2016 – City meeting focused on mitigation strategy. Several follow-up conversations between steering committee members.

Monmouth:

- April 3, 2017 – Reviewed draft Monmouth addendum.

The county's and cities' NHMP reflects decisions decided upon at the plan update meetings and during subsequent work and communication internally between steering committee members and other staff and externally with OPDR.

The following pages provide copies of meeting agendas and sign-in sheets from county steering committee meetings.

Meeting #1



Agenda

Meeting: Polk County Natural Hazard Mitigation Plan Update: Kick-off Meeting
Date: July 27, 2016
Time: 10:00 AM – 12:00 PM
Location: Polk County Courthouse, First Floor Hearing/Conference Room,
850 Main Street, Dallas

- | | |
|--|-------------------|
| I. Introduction and Background | 5 minutes |
| a. Community Service Center | |
| b. Project Context | |
| c. Committee Introductions | |
| II. Natural Hazard Mitigation Planning | 10 minutes |
| a. Emergency Management Overview | |
| b. Natural Hazard Mitigation Plans (NHMP) Overview | |
| c. Project Timeline | |
| III. Community Profile Update | 20 minutes |
| a. Community Profile | |
| b. Critical facilities | |
| IV. FEMA Discovery Report Review | 20 minutes |
| a. Hazard History | |
| BREAK | 5 minutes |
| V. State and County Goals | 15 minutes |
| VI. Mitigation Actions Review | 30 minutes |
| VII. Public Outreach Strategy | 10 minutes |
| VIII. Wrap Up and Next Steps | 5 minutes |
| a. Next Steps | |
| b. Future Meetings | |

OREGON PARTNERSHIP FOR DISASTER RESILIENCE | COMMUNITY SERVICE CENTER
1209 University of Oregon | Eugene, Oregon 97403 | T: 541.346.3889 | F: 541.346.2040 <http://csc.uoregon.edu/opdr>



Meeting Sign-In

Polk County NHMP Update: Kickoff July 27, 2016
Dallas, Oregon

Please complete your contact information and initial next to your name

FIRST	LAST	AGENCY	TITLE	EMAIL
Sidney	Mulder	Polk County	Assistant Planner	mulder.sidney@co.polk.or.us
Domenica	Proteroco	Falls City	City Clerk	domenica.proteroco@fallscl.gov
Austin	McGowan	Polk County	Com Dev Dir	mcgowan.austin@co.polk.or.us
JASON	Loeber	DALLAS	Com Dev Dir	jason.loeber@dallas.gov
Autumn	Hillebrand	Polk County	Com. Dev. Dept. Manager	hillebrand.autumn@co.polk.or.us
Shawn	Irvin	Independence	Com Dev. Dir	shawn@ci.independence.or.us
Mark	Fancy	City of Monmouth	Comm-Dev. Director	mfancy@ci.monmouth.or.us
DEAN	RENDER	PCSO	County EM	Dean.Render@co.polk.or.us

Meeting #2



Agenda

Meeting: Polk County Natural Hazard Mitigation Plan Update: Kick-off Meeting
Date: October 18, 2016
Time: 9:00 AM – 12:00 PM
Location: Polk County Courthouse, First Floor Hearing/Conference Room,
850 Main Street, Dallas

- | | |
|--|-------------------|
| I. Welcome and Meeting Goals | 5 minutes |
| a. Project Updates | |
| II. Risk Assessment Updates (County and City) | 60 minutes |
| a. Jurisdiction Vulnerabilities | |
| b. Polk Hazard Vulnerability Assessment (Jan. 2016) | |
| i. City Risk Assessments | |
| Break | 5 minutes |
| III. Action Item Update and Review | 60 minutes |
| a. Present changes | |
| b. Discuss new actions | |
| c. Prioritize actions | |
| Break | 5 minutes |
| IV. Plan Implementation and Maintenance | 30 minutes |
| a. Recommended updates | |
| b. Discuss committee membership | |
| c. Discuss meeting schedule | |
| V. Questions and Discussion | 10 minutes |
| VI. Wrap Up and Next Steps | 5 minutes |
| a. Next Steps | |



Meeting Sign-In

Polk County NHMP Update: Meeting #2 October 18, 2016
Dallas, Oregon

Please complete your contact information and initial next to your name

FIRST	LAST	AGENCY	TITLE	EMAIL
Anthony	Hillebrand	Polk County	Com. Dev. Dept. Manager	hillebrand.antonio@co.polk.or.us
Sidney	Muder	Polk County	Associate Planner	muder.sidney@co.polk.or.us
JERRY	UNKRICHT	Falls City	MAYOR/MANAGER	mayor@cityoffalls.org
TRICIA	ROTHROB	" "	City Clerk	drothrob@cityofpolk.org
Shawn	Irvine	Independence	Economic Development	srivina@independence.or.us
STAN	Locke	DALLAS	Construction Director	stan.locke@dallas.or.us
TODD	WHITAKER	Polk Co Pw	Pub Works Dir	whitaker.todd@co.polk.or.us
MELK	Fancy	City of Monthouth	Community Dev. Director	mfancy@ci.monthouth.or.us

2009 Plan Update

The 2009 Polk County Multi-Jurisdictional Hazard Mitigation Plan Update: included newly identified hazards affecting individual jurisdictions; provided a comprehensive risk assessment and vulnerability analysis; provided community based mitigation actions; identified funding sources; and included the incorporated jurisdictions with the county as part of the update.

The first step in the planning process was to establish Steering Committees within each participating jurisdiction. These Steering Committees consisted of the county and city representatives as well as representatives from the rural fire districts within the county. Austin McGuigan, Polk County, Community Development Director, served as the primary point of contact for the overall plan update and development.

Once the Steering Committees were formed, the following six-step planning process took place during April 2008 to March 2009.

1. **Organize Resources:** The Steering Committees identified resources, including county staff, city departments and agencies, and local non-governmental organizations (NGOs), which could provide the technical expertise and historical information needed to update the MHMP.
2. **Profile Hazards:** Each Steering Committee identified the hazards specific to Polk County and the cities of Dallas, Falls City, Independence, and Monmouth. A hazard analysis was then developed for these hazards.
3. **Assess Risks:** A vulnerability analysis was developed for the county and each of the incorporated communities. The county and incorporated communities used the vulnerability analyses results during the mitigation strategy development.
4. **Assess Capabilities:** Each Steering Committee reviewed the current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards in each respective jurisdiction.
5. **Develop Mitigation Strategy:** Each Steering Committee developed a comprehensive range of potential mitigation goals and actions. Subsequently, Polk County and the incorporated communities identified, evaluated, and prioritized the actions to be implemented in the jurisdiction-specific Mitigation Action Plans (Appendices A-E).
6. **Monitor Progress:** Each Steering Committee developed an implementation process to ensure the success of an ongoing program to minimize hazard impacts to Polk County and the incorporated communities.

The comprehensive planning process enabled the County to review and update each section of the 2006 HMP; converting it to a Multi-Jurisdiction Hazard Mitigation Plan containing “incorporated city” specific planning initiatives as well as addressing the update criteria for the county portion of the plan.

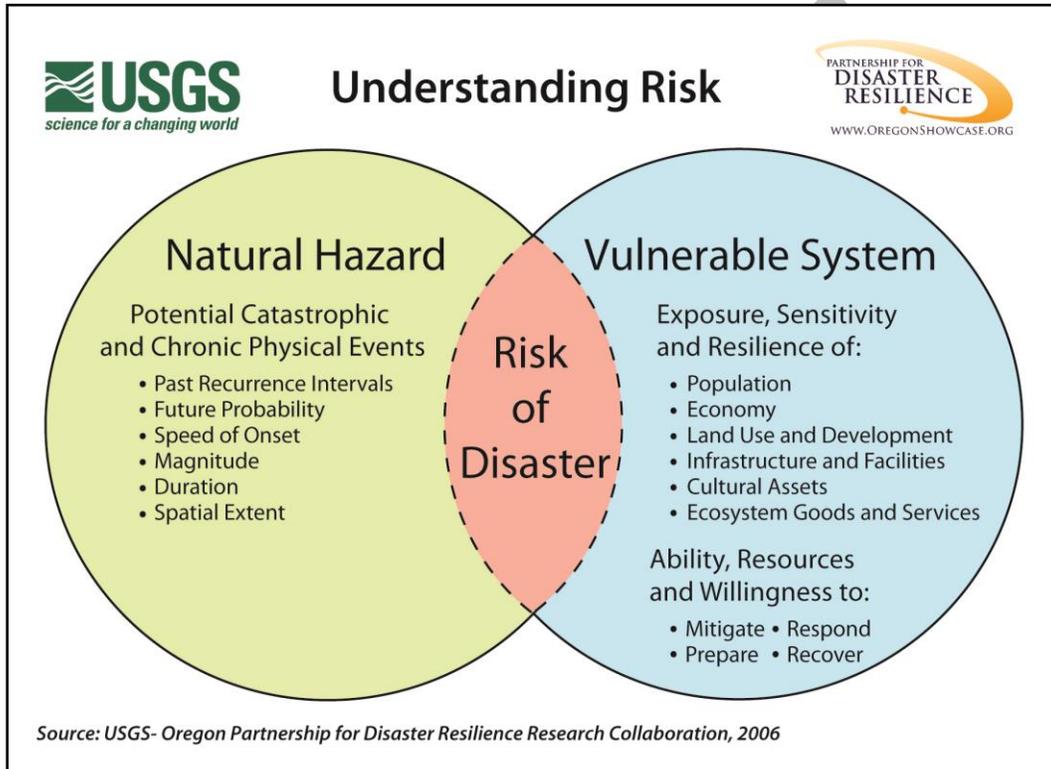
APPENDIX B: COMMUNITY PROFILE

Community resilience can be defined as the community’s ability to manage risk and adapt to natural hazard impacts. In order to help define and understand the county’s sensitivity and resilience to natural hazards, the following capacities must be examined:

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The Community Profile describes the sensitivity and resilience to natural hazards of Polk County, and its incorporated cities, as they relate to each capacity. It provides a snapshot in time when the plan was developed and will assist in preparation for a more resilient county. The information in this section, along with the hazard assessments located in Section 2 – Risk Assessment, should be used as the local level rationale for the risk reduction actions identified in Section 3 – Mitigation Strategy. The identification of actions that reduce the county’s sensitivity and increase its resiliency assist in reducing overall risk of disaster, the area of overlap in the figure below.

Figure B-1 Understanding Risk



Source: Oregon Partnership for Disaster Resilience

Natural Environment Capacity

Natural environment capacity is recognized as the geography, climate, and land cover of the area such as, urban, water and forested lands that maintain clean water, air and a stable climate.¹ Natural resources such as wetlands and forested hill slopes play significant roles in protecting communities and the environment from weather-related hazards, such as flooding and landslides. However, natural systems are often impacted or depleted by human activities adversely affecting community resilience.

Location, Geography, History

Polk County is located in the lower northwestern part of Oregon within the Mid-Willamette Valley between the Coastal Range and the Cascade Range (see Map B-1). The county was officially created from the Yamhill District of the Oregon Territory on December 22, 1845. On August 13, 1848, President James K. Polk signed a bill approving the boundaries of the Oregon territory, which officially separated the territory from England.

The present area of Polk County comprises 472,960 acres (739 square miles). Elevations within the county range from 325 feet in the east to 3,450 feet near Sugarloaf Mountain in the west. The western half of the County is timbered, with the eastern half as prairie or farmlands.

Further settlement from eastern United States migrations began in the early 1840's, one of the earliest settlements is near the present site of Dallas. Jason Lee was the vanguard of this settlement, having established his mission at Wheatland on the east bank of the Willamette River in 1834.

The County seat was located at Cynthian (later Dallas) in 1850. A new courthouse was completed in 1860 and destroyed by fire in 1898 and the present courthouse was completed in 1900. The City of Dallas is the northern most incorporated jurisdiction located centrally within the county.

The City of Independence was named after Independence, Missouri by E.A. Thorp, a former resident of the Missouri city who platted the town in 1850. The site began to be settled in 1845. Located close to the eastern border of the county, the City of Independence is a close neighbor to the City of Monmouth.

The City of Monmouth was founded in 1853 by settlers from Monmouth, Illinois in August, 1852 who spent their first winter at a point about three and one-half miles north-northeast of Rickreall. Monmouth University, now known as Western Oregon State College, was originally founded in 1858.

Falls City, named for the historically prominent falls was originally named both Syracuse and Luckiamute Falls. In 1891, when the town was incorporated, the name was changed. However, due to the dual origin, there are two "Main Streets" in town – North and South Main Street run parallel to each other on either side of the river. Historical photos show a power plant constructed at the top of the falls, and records indicate a sawmill operation

¹ Mayunga, J. 2007. Understanding and Applying the Concept of Community Disaster Resilience: A capital-based approach. Summer Academy for Social Vulnerability and Resilience Building.

operated by John Thorpe in 1852. The elevation at the falls is approximately 300 feet. Falls City is located centrally in the county.

The Grand Ronde Indian Reservation was formed in 1856 combining settlements from several Willamette Valley Indian tribes as well as Indians from other parts of Oregon. The reservation is located in northwestern Polk County as well as southwestern Yamhill County. More than 1,000 Indians were on the reservation at one time during the 1860's. The reservation was divided in 1908 among the various Indians residing there. The Grand Ronde Agency was terminated in 1925 with the U.S. Federal Government maintaining supervisory control over the remaining 500 acres of reservation land until 1957.

River navigation, agriculture, timber, and livestock all contributed to Polk County's development, economy, industry, and trade activities during its early history. World War II changed the county's land use focus towards more residential or other urban uses. Agricultural land was decreasing rapidly requiring the County to allocate agricultural and timber land to preserve the industries.

Climate

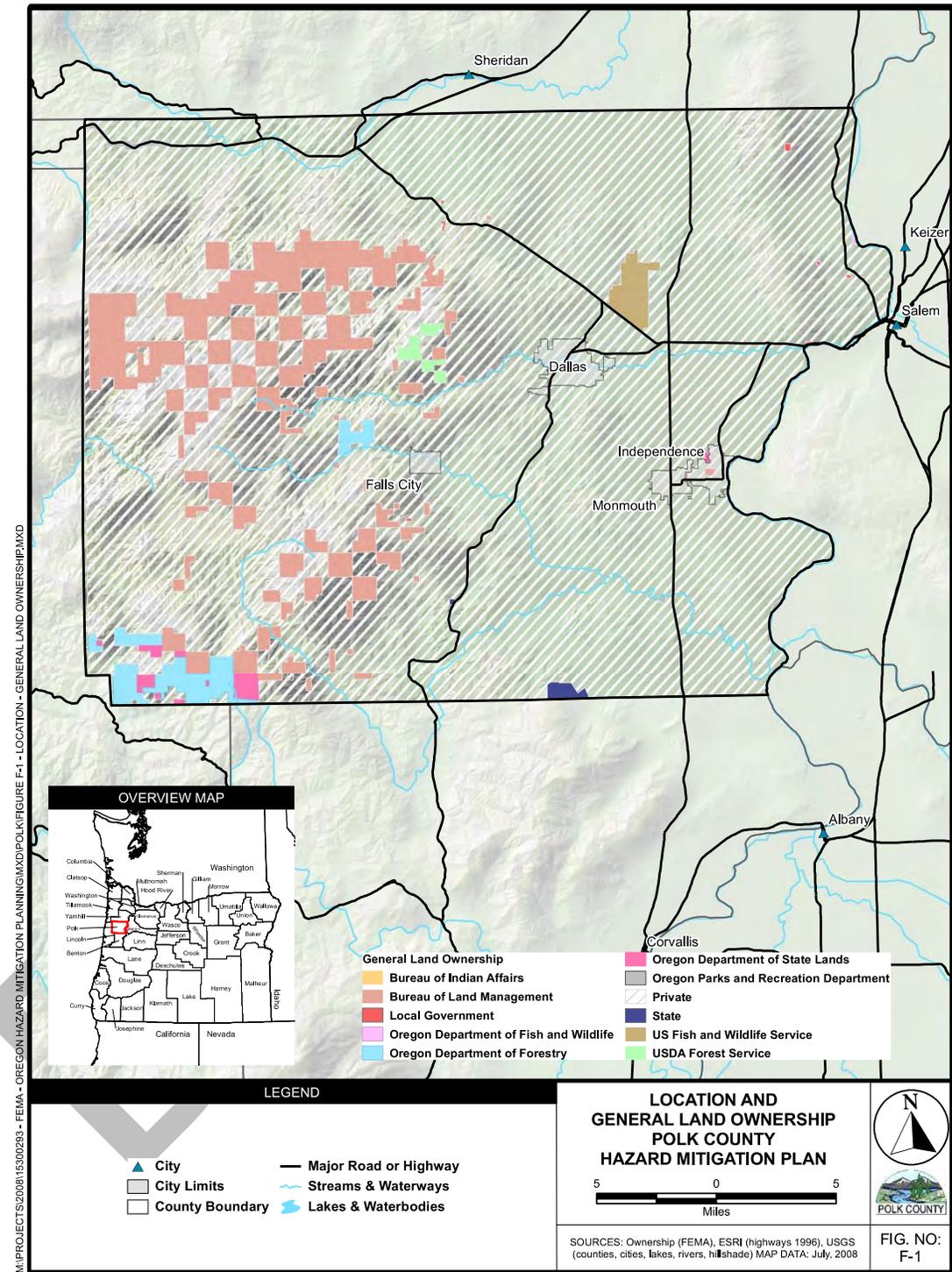
Polk County has a modified marine climate where winters are cool and wet, while summers are moderately warm and dry. Cool air flows west from the Pacific Ocean and is tempered by the Cascade Mountains to the east. From 1961 to 1990, the average annual precipitation in Polk County was approximately 52 inches with most received in the Coast Range and gradually decreasing eastward toward the Willamette Valley floor. The Laurel Mountain Weather Station, located at an elevation of 3,589 feet in the Coast Range west of Falls City, was established in 1970. Between 1970 and 2000, average annual precipitation recorded at the station was about 121 inches. A total of 204 inches was recorded during the winter of 1996-97. In the Mid-Willamette Valley, 90 percent of the rainfall is experienced between October and the end of May.

Total precipitation in the Pacific Northwest region may remain similar to historic levels but climate projections indicate the likelihood of increased winter precipitation and decreased summer precipitation.

Increasing temperatures affects hydrology in the region. Spring snowpack has substantially decreased throughout the Western part of the United States, particularly in areas with milder winter temperatures, such as the Cascade Mountains. In other areas of the West, such as east of the Cascades Mountains, snowfall is affected less by the increasing temperature because the temperatures are already cold and more by precipitation patterns.²

² Mote, Philip W., et. al., "Variability and trends in Mountain Snowpack in Western North America," <http://cses.washington.edu/db/pdf/moteetalvarandtrends436.pdf>

Map B-I Location and Land Ownership



Source: Polk County NHMP (2009).

Hazard Severity

Dynamic weather combined with the diverse geography across Polk County are indicators of hazard vulnerability when combined with the changing climate and severe weather related events. Both wet and dry cycles are likely to last longer and be more extreme, leading to periods of deeper drought and more frequent flash flooding. Less precipitation in the summers and subsequently lower soil moisture with hotter temperatures will likely increase the amount of vegetation consumed by wildfire.

Synthesis

The physical geography, weather, climate and land cover of an area represent various interrelated systems that affect overall risk and exposure to natural hazards. The projected climate change models representing Western Oregon indicate the potential for increased effects of hazards, particularly drought and wildfire due to changing climate of the region. Western Oregon is projected to have warmer and drier summers with less precipitation. In addition, winter temperatures will be warmer, which means a decrease in mountain snowpack. These factors combined with periods of population growth and development intensification can lead to increasing risk of hazards, threatening loss of life, property and long-term economic disruption if land management is inadequate.

Social/Demographic Capacity

Social/demographic capacity is a significant indicator of community hazard resilience. The characteristics and qualities of the community population such as language, race and ethnicity, age, income, educational attainment, and health are significant factors that can influence the community's ability to cope, adapt to and recover from natural disasters. Population vulnerabilities can be reduced or eliminated with proper outreach and community mitigation planning.

Population

Polk County's population grew 4.1% from 2010 to 2015, Dallas and Salem (portion in Polk County) had the fastest growth rate at 3.1% and 5.1% respectively, while the unincorporated areas of the county outpaced them all at 6.7%. The western part of Salem (25,542), Dallas (15,040), and the unincorporated parts of the county (17,775) are the county's most populous. The unincorporated area of the county accounts for about 22.6% of the overall population and is growing faster than the largest cities (1.31% AAGR).

Oregon's state-wide land use planning policies require local jurisdictions to manage growth using an urban growth boundary, which contains most new growth inside of incorporated areas. Since 2010 the unincorporated area of the county grew faster than almost all of the incorporated cities; reversing the trend from previous years when incorporated areas grew faster. Although the trend reversed the growth in these areas does emphasize the importance of partnerships between the county and the cities for effective county-wide mitigation efforts.

Table B-1 Population Estimates for Polk County and Cities

Jurisdiction	2010		2015		Change (2010-2015)		AAGR
	Number	Percent	Number	Percent	Number	Percent	
Polk County	75,495	100%	78,570	100%	3,075	4.1%	0.80%
Dallas	14,590	19.3%	15,040	19.1%	450	3.1%	0.61%
Falls City	945	1.3%	950	1.2%	5	0.5%	0.11%
Independence	8,600	11.4%	8,775	11.2%	175	2.0%	0.40%
Monmouth	9,545	12.6%	9,640	12.3%	95	1.0%	0.20%
Salem*	24,312	32.2%	25,542	32.5%	1,231	5.1%	0.99%
Willamina*	845	1.1%	848	1.1%	3	0.3%	0.07%
Unincorporated	16,658	22.1%	17,775	22.6%	1,116	6.7%	1.31%

Source: Portland State University, Population Research Center, "Annual Population Estimates", 2015.

* - Portion of city within Polk County.

The Office of Economic Analysis' Long-term County Population Forecast projects that by 2035 Polk County's population will increase to over 113,000, a 44% increase from the 2015 estimate.³

³ Office of Economic Analysis. Long Term County Population Forecast, 2010-2050 (2013 release).

Tourists

Tourists are not counted in population statistics; and are therefore considered separately in this analysis. Tourists are specifically vulnerable due to the difficulty of locating or accounting for travelers within the region. Tourists are often at greater risk during a natural disaster because of unfamiliarity with evacuation routes, communication outlets, or even the type of hazard that may occur. Knowing whether the region's visitors are staying in friends'/relatives' homes in hotels/motels, or elsewhere can be instructive when developing outreach efforts.⁴ For hazard preparedness and mitigation purposes, outreach to residents in Polk County will likely be transferred to these visitors in some capacity. Visitors staying at hotel/motels are less likely to benefit from local preparedness outreach efforts aimed at residents.

Vulnerable Populations

Vulnerable populations, including seniors, disabled citizens, women, and children, as well as those people living in poverty, often experience the impacts of natural hazards and disasters more acutely. Hazard mitigation that targets the specific needs of these groups has the potential to greatly reduce their vulnerability. Examining the reach of hazard mitigation policies to special needs populations may assist in increasing access to services and programs. FEMA's Office of Equal Rights addresses this need by suggesting that agencies and organizations planning for natural hazards identify special needs populations, make recovery centers more accessible, and review practices and procedures to remedy any discrimination in relief application or assistance.

Population size itself is not an indicator of vulnerability. More important is the location, composition, and capacity of the population within the community. Research by social scientists demonstrates that human capital indices such as language, race, age, income, education and health can affect the integrity of a community. Therefore, these human capitals can impact community resilience to natural hazards.

Language

Special consideration should be given to populations who do not speak English as their primary language. Language barriers can be a challenge when disseminating hazard planning and mitigation resources to the general public, and it is less likely they will be prepared if special attention is not given to language and culturally appropriate outreach techniques.

There are various languages spoken across Polk County; the primary language is English. Approximately 13% of the Polk County population speaks a language other than English, Spanish is the second most widely spoken language with about 10% of the population 5 years and over speaking Spanish (25% of the population of Independence speaks Spanish).⁵ Overall, about 4.4% of the total population in Polk County is not proficient in English. Independence (11,4%) and Monmouth (5.5%) have the largest populations of residents who

⁴ MDC Consultants (n.d.). When Disaster Strikes – Promising Practices. Retrieved March 18, 2014, from <http://www.mdcinc.org/sites/default/files/resources/When%20Disaster%20Strikes%20-%20Promising%20Practices%20-%20Tourists.pdf>

⁵ U.S. Census Bureau, 2011-2015 American Community Survey, Table DP02.

have limited or no English language proficiency. Outreach materials used to communicate with, plan for, and respond to non-English speaking populations should take into consideration the language needs of these populations.

Table B-2 Polk County Language Barriers

	Population 5 years and over	English Only		Multiple Languages		Limited or No English	
		Number	Percent	Number	Percent	Number	Percent
Polk County	72,709	63,018	86.7%	9,691	13.3%	3,196	4.4%
Dallas	13,730	12,737	92.8%	993	7.2%	150	1.1%
Falls City	938	903	96.3%	35	3.7%	7	0.7%
Independence	7,883	5,815	73.8%	2,068	26.2%	899	11.4%
Monmouth	9,492	7,809	82.3%	1,683	17.7%	524	5.5%

Source: U.S. Census Bureau, 2011-2015 American Community Survey Estimates, Table DP02.

Race

The impact in terms of loss and the ability to recover may also vary among minority population groups following a disaster. Studies have shown that racial and ethnic minorities can be more vulnerable to natural disaster events. This is not reflective of individual characteristics; instead, historic patterns of inequality along racial or ethnic divides have often resulted in minority communities that are more likely to have inferior building stock, degraded infrastructure, or less access to public services. The table below describes Polk County's population by race and ethnicity.

The majority of the population in Polk County is racially white (79.7%); Independence and Monmouth have the largest percentages of non-white population. Individually, Independence supports a 34% Hispanic or Latino population while Monmouth supports 25%. Approximately 13% of the county population is Hispanic or Latino.

Table B-3 Polk Race and Hispanic or Latino Origin

Race	Polk	Dallas	Falls City	Independence	Monmouth
Total Population	77,264	14,896	994	8,772	9,869
White	79.7%	89.9%	88.0%	66.1%	75.1%
Black	0.7%	0.1%	0%	0.4%	1.5%
AIAN	1.0%	0.5%	2.0%	0.1%	0.6%
Asian	2.1%	1.6%	0.1%	0.6%	3.3%
NHPI	0.4%	0.1%	0%	0.4%	0%
Some Other Race	0.0%	0.0%	0%	0.0%	0.0%
Two or More Races	3.4%	2.6%	7.0%	3.8%	4.5%
Hispanic or Latino	9,910	772	28	2,503	1,482
Percent	12.8%	5.2%	2.8%	28.5%	15.0%

Source: Social Explorer, Table T12, U.S. Census Bureau, 2011-2015 American Community Survey Estimates
AIAN = American Indian and Alaskan Native, NHPI = Native Hawaiian and Other Pacific Islanders

It is important to identify specific ways to support all portions of the community through hazard mitigation, preparedness, and response. Culturally appropriate, and effective outreach can include both methods and messaging targeted to diverse audiences. For example, connecting to historically disenfranchised populations through already trusted sources or providing preparedness handouts and presentations in the languages spoken by the population will go a long way to increasing overall community resilience.

Gender

Polk County has slightly more females than males (Female 51.9%, Male: 48.1%).⁶ It is important to recognize that women tend to have more institutionalized obstacles than men during recovery due to sector-specific employment, lower wages, and family care responsibilities.⁷

Age

Of the factors influencing socio demographic capacity, the most significant indicator in Polk County may be age of the population. Depicted in the table below, as of 2015, 16.4% of the county population is over the age of 64, a percentage that is projected to rise to 21.7% by 2035. The Polk County age dependency ratio⁸ is 55.4 (Dallas has the largest age dependency ration at 70.3). The age dependency ratio indicates a higher percentage of dependent aged people to that of working age. The Oregon Office of Economic Analysis projects that, in 2035, there will be a higher percentage of the county population over the age of 64. As the population ages, Polk county may need to consider different mitigation and preparedness actions to address the specific needs of this group. The age dependency ratio for Polk County is expected to rise to 61.5 in 2035, largely because of the rise in the older age cohorts.

Table B-4 Polk Population by Vulnerable Age Groups

Jurisdiction	Total	< 15 Years Old		> 64 Years Old		15 to 64 Years Old	Age Dependency Ratio
		Number	Percent	Number	Percent		
Oregon	3,939,233	712,967	18.1%	606,877	15.4%	2,619,389	50.4
Polk County	77,264	14,887	19.3%	12,648	16.4%	49,729	55.4
Dallas	14,896	3,225	21.7%	2,922	19.6%	8,749	70.3
Falls City	994	159	16.0%	185	18.6%	650	52.9
Independence	8,772	2,232	25.4%	722	8.2%	5,818	50.8
Monmouth	9,869	1,628	16.5%	934	9.5%	7,307	35.1
2035							
Oregon	4,995,200	865,889	17.3%	1,082,781	21.7%	3,046,530	62.9
Polk County	113,348	20,994	18.5%	21,798	19.2%	70,556	61.5

Source: Social Explorer, Table 17, U.S. Census Bureau, 2011-2015 American Community Survey Estimates, Office of Economic Analysis, Long-Term County Population Forecast, 2010-2050 (2013 release).

⁶ Social Explorer, Table 4, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

⁷ Ibid.

⁸ The age dependency ratio is derived by dividing the combined under 15 and 65-and-over populations by the 15-to-64 population and multiplying by 100. A number close to 50 indicates about twice as many people are of working age than non-working age. A number that is closer to 100 implies an equal number of working age population as non-working age population. A higher number indicates greater sensitivity.

The age profile of an area has a direct impact both on what actions are prioritized for mitigation and how response to hazard incidents is carried out. School age children rarely make decisions about emergency management. Therefore, a larger youth population in an area will increase the importance of outreach to schools and parents on effective ways to teach children about fire safety, earthquake response, and evacuation plans. Furthermore, children are more vulnerable to the heat and cold, have few transportation options and require assistance to access medical facilities. Older populations may also have special needs prior to, during and after a natural disaster. Older populations may require assistance in evacuation due to limited mobility or health issues. Additionally, older populations may require special medical equipment or medications, and can lack the social and economic resources needed for post-disaster recovery.⁹

Families and Living Arrangements

Two ways the census defines households are by type of living arrangement and family structure. A householder may live in a “family household” (a group related to one another by birth, marriage or adoption living together); in a “nonfamily household” (a group of unrelated people living together); or alone. Polk County is predominately comprised of family households (68.0%). Of all households, 23.4% are one-person non-family households (householder living alone). Countywide about 11% of householders live alone and are over the age of 65 (about 15% of all households in Dallas).

Table B-5 Polk County Family vs. Non-Family Households

Jurisdiction	Total Households	Family Households		Household Living Alone		Householder Living Alone (age 65+)	
	Estimate	Estimate	Percent	Estimate	Percent	Estimate	Percent
Polk County	28,458	19,363	68.0%	6,672	23.4%	3,165	11.1%
Dallas	5,667	3,896	68.7%	1,432	25.3%	838	14.8%
Falls City	357	260	72.8%	78	21.8%	37	10.4%
Independence	2,932	2,055	70.1%	493	16.8%	140	4.8%
Monmouth	3,500	1,653	47.2%	1,007	28.8%	305	8.7%

Source: U.S. Census Bureau, 2011-2015 American Community Survey Estimates, Table DP02

The table below shows household structures for families with children. Nearly 20% of all households within the county are married family households that have children; Independence and Dallas have the highest percentages. Dallas (11.4%) and Independence (14.4%) have the highest percentage of single parent households. These populations will likely require additional support during a disaster and will inflict strain on the system if improperly managed.

⁹ Wood, Nathan. Variations in City Exposure and Sensitivity to Tsunami Hazards in Oregon. U.S. Geological Survey, Reston, VA, 2007.

Table B-6 Polk County Family vs. Non-Family Households

Jurisdiction	Total Households	Married-Couple with Children		Single Parent with Children	
	Estimate	Estimate	Percent	Estimate	Percent
Polk County	28,458	5,677	19.9%	2,129	7.5%
Dallas	5,667	1,062	18.7%	646	11.4%
Falls City	357	41	11.5%	27	7.6%
Independence	2,932	720	24.6%	421	14.4%
Monmouth	3,500	561	16.0%	157	4.5%

Source: U.S. Census Bureau, 2011-2015 American Community Survey Estimates, Table DP02

Income

Household income and poverty status are indicators of socio demographic capacity and the stability of the local economy. Household income can be used to compare economic areas as a whole, but does not reflect how the income is divided among the area residents. Between 2010 and 2015 the share of households making less than \$15,000 increased more than other income cohorts; no other income cohort saw a gain.

Table B-7 Household Income

Household Income	2010 [^]		2015		Change in Share	
	Households	Percent	Households	Percent	Households	Percent
Less than \$15,000	2,904	10.5%	3,638	12.8%	734	2.3%
\$15,000-\$29,999	3,876	16.2%	4,479	15.7%	603	-0.4%
\$30,000-\$44,999	4,276	14.2%	3,929	13.8%	-347	-0.4%
\$45,000-\$59,999	3,785	13.7%	3,876	13.6%	91	0.0%
\$60,000-\$74,999	2,973	11.7%	3,228	11.3%	255	-0.3%
\$75,000-\$99,999	3,739	13.6%	3,753	13.2%	14	-0.4%
\$100,000-\$199,999	5,297	19.1%	4,987	17.5%	-310	-1.6%
\$200,000 or more	840	3.0%	568	2.0%	-272	-1.0%

Source: Social Explorer, Table 56, U.S. Census Bureau, 2011-2015 American Community Survey and 2006-2010 American Community Survey

[^] 2010 dollars are adjusted for 2015 using the Social Explorers Inflation Calculator.

The 2015 median household income across Polk County is \$52,821; this is lower than the inflation adjusted 2010 figure, representing a 4.7% decline in real incomes. Dallas and Independence have the highest median household incomes, while Monmouth and Falls City have the lowest median household incomes. The table below shows decreases in real incomes across Polk County and cities.

Table B-8 Median Household Income

	Median Household Income		Percent Change
	2010 [^]	2015	
Polk County	\$55,433	\$52,821	-4.7%
Dallas	\$52,969	\$48,843	-7.8%
Falls City	\$43,588	\$33,309	-23.6%
Independence	\$50,304	\$44,454	-11.6%
Monmouth	\$39,516	\$32,027	-19.0%

Source: Social Explorer, Table 57, U.S. Census Bureau, 2011-2015 American Community Survey Estimates and 2006-2010 American Community Survey Estimates

Note: [^] - 2010 dollars adjusted for 2015 via Social Explorer's Inflation Calculator

The table below identifies the percentage of individuals and cohort groups that are below the poverty level in 2015. It is estimated that about 16% of individuals, 19% of children under 18, and 7% of seniors live below the poverty level across the county. Falls City, Independence, and Monmouth have the highest poverty rates. Falls City has the highest poverty rate for children under 18. Overall, 8% of Polk County residents live in "deep poverty" (having incomes below half the federal poverty level), the percent is greatest in Monmouth at 20%.¹⁰

Table B-9 Poverty Rates

	Total Population in Poverty		Children Under 18 in Poverty		18 to 64 in Poverty		65 or over in Poverty	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Polk County	12,270	16.3%	3,378	18.9%	7,988	17.7%	904	7.2%
Dallas	2,449	16.7%	913	25.3%	1,287	15.8%	249	8.7%
Falls City	250	25.7%	84	44.0%	149	24.9%	17	9.2%
Independence	2,168	24.8%	650	26.5%	1,443	25.8%	75	10.8%
Monmouth	2,807	32.3%	391	22.5%	2,340	39.0%	76	8.1%

Source: Social Explorer Tables 114, 115, 116, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

Cutter's research suggests that lack of wealth contributes to social vulnerability because individual and community resources are not as readily available. Affluent communities are more likely to have both the collective and individual capacity to more quickly rebound from a hazard event, while impoverished communities and individuals may not have this capacity –leading to increased vulnerability. Wealth can help those affected by hazard incidents to absorb the impacts of a disaster more easily. Conversely, poverty, at both an individual and community level, can drastically alter recovery time and quality.¹¹

¹⁰ Social Explorer Tables 117, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

¹¹ Statewide Supplemental Nutrition Assistance Program Activity - Nov. 2014 (SSP, APD, and AAA combined); P. 3 of report. Temporary Assistance for Needy Families One and two Parent Families Combined; P. 3 of report. <http://www.oregon.gov/dhs/assistance/Pages/data/main.aspx>

Federal assistance programs such as food stamps are another indicator of poverty or lack of resource access. Statewide social assistance programs like the Supplemental Nutritional Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF) provide assistance to individuals and families. In Polk County, TANF reaches approximately 1,192 families per month and SNAP helps to feed about 10,428 people per month.¹² Those reliant on state and federal assistance are more vulnerable in the wake of disaster because of a lack of personal financial resources and reliance on government support.

Education

Educational attainment of community residents is also identified as an influencing factor in socio demographic capacity. Educational attainment often reflects higher income and therefore higher self-reliance. Widespread educational attainment is also beneficial for the regional economy and employment sectors as there are potential employees for professional, service and manual labor workforces. An oversaturation of either highly educated residents or low educational attainment can have negative effects on the resiliency of the community.

Approximately 88.6% of the Polk County population over 25 years of age has graduated from high school or received a high school equivalency, with 26.7% going on to earn a Bachelor’s Degree. Independence (82.1%) and Falls City (86.5%) have the lowest percentages of high school graduates.

Table B-10 Educational Attainment

	Polk County		Falls City		Independence	Monmouth
Population 25 years and over	49,104	10,041	719	4,506	4,734	
Less than high school	4,274	737	92	757	350	
High school graduate or GED	13,150	3,113	261	1,139	1,199	
Some college, no degree	17,226	4,130	287	1,754	1,577	
Bachelor's degree	8,879	1,465	48	605	974	
Graduate or professional degree	4,236	455	26	200	473	
Percent without Highschool Degree	8.7%	7.3%	12.8%	16.8%	7.4%	
Percent High School Graduate or Higher	88.6%	91.3%	86.5%	82.1%	89.2%	
Percent Bachelor's Degree or Higher	26.7%	19.1%	10.3%	17.9%	30.6%	

Source: Social Explorer, Table 25, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

Health

Individual and community health play an integral role in community resiliency, as indicators such as health insurance, people with disabilities, dependencies, homelessness and crime

¹² Sabatino, J. (2016). Oregon TANF Caseload FLASH, “One and Two Parent Families Combined”, District 3 (Dallas); December 2016 data, and Sabatino, J. (2016). Oregon SNAP Program Activity, “SSP, APD and AAA Combined”, District 3 (Dallas); December 2016 data. Retrieved from State of Oregon Office of Business Intelligence website: <http://www.oregon.gov/DHS/ASSISTANCE/Pages/Data.aspx>, January 2017.

rate paint an overall picture of a community's well-being. These factors translate to a community's ability to prepare, respond to, and cope with the impacts of a disaster.

The Resilience Capacity Index recognizes those who lack health insurance or are impaired with sensory, mental or physical disabilities, have higher vulnerability to hazards and will likely require additional community support and resources. Polk County has 10.3% of its population without health insurance; Monmouth (15.4%) has the highest percentage. The percentage of uninsured changes with age, the highest rates of uninsured are within the 18 to 64-year cohort; Monmouth has the highest percentage of this age group that is uninsured. The ability to provide services to the uninsured populations may burden local providers following a natural disaster.

Table B-11 Health Insurance Coverage

Jurisdiction	Population	Without Health Insurance							
		Total Population		Under 18 years		18 to 64 years		65+	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Polk County	76,884	7,934	10.3%	984	1.3%	6,907	9.0%	43	0.1%
Dallas	14,695	1,376	9.4%	193	1.3%	1,183	8.1%	0	0.0%
Falls City	994	134	13.5%	37	3.7%	97	9.8%	0	0.0%
Independence	8,737	920	10.5%	0	0.0%	920	10.5%	0	0.0%
Monmouth	9,863	1,520	15.4%	146	1.5%	1,361	13.8%	13	0.1%

Source: Social Explorer, Table 146, U.S. Census Bureau, 2011-2015 American Community Survey Estimates.

The table below describes disability status of the population. Approximately 14.7% of the Polk County civilian non-institutionalized population identifies with one or more disabilities. Falls City has the highest percentage of its total population with a disability (30.5%) and the highest percentage of individuals 65 years and over with a disability (54.1%). Independence has the highest percentage of individuals under 18 with a disability (8.5%).

Table B-12 Disability Status by Age Group

	Population Estimate^	With a disability		Under 18 years with a disability		65 years and over with a disability	
		Estimate	Percent	Estimate	Percent*	Estimate	Percent*
Polk County	76,884	11,292	14.7%	846	4.7%	4,647	37.0%
Dallas	14,695	2,728	18.6%	136	3.7%	1,169	40.8%
Falls City	994	303	30.5%	8	3.8%	100	54.1%
Independence	8,737	974	11.1%	209	8.5%	249	35.8%
Monmouth	9,863	1,157	11.7%	67	3.9%	368	39.4%

Source: U.S. Census Bureau, 2011-2015 American Community Survey, Table DP02.

^ Non-institutionalized civilian population, * Percent of age group

The table below describes disability status of the population by type and age. Older populations tend to have more disabilities than younger populations in Polk County. Approximately 8.0% of the population has an ambulatory disability while 6.3% have a cognitive disability, and 6.2% have an independent living disability. More than 22% of the 65 and over population has an ambulatory disability. Depending on the type of disability outreach, mitigation, and response efforts may need to be adjusted.

Table B-13 Disability Type by Age Group

	Hearing Disability	Vision Disability	Cognitive Disability	Ambulatory Disability	Self-Care Disability	Independent Living Disability
Total Population^	4.4%	2.1%	6.3%	8.0%	3.1%	6.2%
Under 18*	0.9%	0.7%	5.1%	0.7%	0.9%	0.0%
18 to 64*	2.4%	2.0%	5.8%	6.3%	2.2%	4.2%
65 and over*	17.0%	4.7%	9.2%	22.1%	8.7%	13.7%

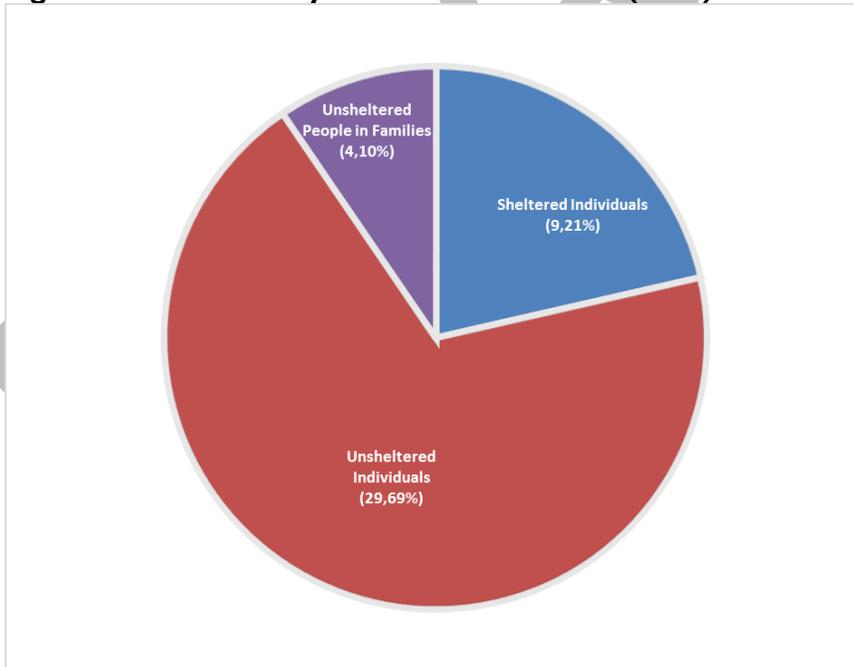
Source: U.S. Census Bureau, 2011-2015 American Community Survey, Table S1810.

^ Non-institutionalized civilian population, * Percent of age group

In 2015, Oregon Housing and Community Services (OHCS) conducted a point-in-time homeless count to identify the number of homeless, their age and their family type. The OHCS study found that 42 individuals and persons in families in Polk County identify as homeless; 9 were sheltered, 33 were unsheltered (29 individuals and 4 persons in families).

The homeless have little resources to rely on, especially during an emergency. It will likely be the responsibility of the county and local non-profit entities to provide services such as shelter, food and medical assistance. Therefore, it is critical to foster collaborative relationships with agencies that will provide additional relief such as the American Red Cross and homeless shelters. It will also be important to identify how to communicate with these populations, since traditional means of communication may not be appropriate or available.

Figure B-2 Polk County PIT Homeless Count (2015)



Source: Oregon Housing and Community Services, 2015 Point-in-Time Homeless Count

Synthesis

For planning purposes, it is essential Polk County consider both immediate and long-term socio-demographic implications of hazard resilience. Immediate concerns include the growing elderly population and language barriers associated with a culturally diverse community. Even though the vast majority of the population is reported as proficient in English, there is still a segment of the population not proficient in English. These populations would serve to benefit from mitigation outreach, with special attention to cultural, visual and technology sensitive materials. The current status of other social/-demographic capacity indicators such as graduation rate, poverty level, and median household income can have long-term impacts on the economy and stability of the community ultimately affecting future resilience.

In mitigation and preparedness planning it is critical for the safety of all residents that messaging and actions are culturally sensitive to all racial and ethnic groups. This may range from providing multi-lingual services to adopting entirely different strategies for outreach or specialized mitigation actions to address the unique risk faced by various racial and ethnic groups. For example, if multigenerational family units are more typical in some cultures, evacuation may be more take longer to accommodate the elderly and children living at home, or could even be impeded if there is only one family car. Additionally, varying cultural perceptions of the trustworthiness of government may need to be overcome so that suggestions to evacuate or shelter in place are taken seriously by residents.

Economic Capacity

Economic capacity refers to the financial resources present and revenue generated in the community to achieve a higher quality of life. Income equality, housing affordability, economic diversification, employment and industry are measures of economic capacity. However, economic resilience to natural disasters is far more complex than merely restoring employment or income in the local community. Building a resilient economy requires an understanding of how the component parts of employment sectors, workforce, resources and infrastructure are interconnected in the existing economic picture. Once any inherent strengths or systematic vulnerabilities become apparent, both the public and private sectors can take action to increase the resilience of the local economy.

Regional Affordability

The evaluation of regional affordability supplements the identification of Social/demographic capacity indicators, i.e. median income, and is a critical analysis tool to understanding the economic status of a community. This information can capture the likelihood of individuals' ability to prepare for hazards, through retrofitting homes or purchasing insurance. If the community reflects high-income inequality or housing cost burden, the potential for home-owners and renters to implement mitigation can be drastically reduced. Therefore, regional affordability is a mechanism for generalizing the abilities of community residents to get back on their feet without Federal, State or local assistance.

Income Equality

Income equality is a measure of the distribution of economic resources, as measured by income, across a population. It is a statistic defining the degree to which all persons have a similar income. The table below illustrates the county and cities level of income inequality. The Gini index is a measure of income inequality. The index varies from zero to one. A value of one indicates perfect inequality (only one household has any income). A value of zero indicates perfect equality (all households have the same income).¹³

The cities within the county have similar income equality scores; Dallas and Independence have slightly greater income equality than do Falls City and Monmouth. Independence and Monmouth have the highest level of income inequality of the incorporated cities (0.46). Based on social science research, the region's cohesive response to a hazard event may be affected by the distribution of wealth in communities that have less income equality¹⁴.

¹³University of California Berkeley. Building Resilient Regions, Resilience Capacity Index. <http://brr.berkeley.edu/rci/>.

¹⁴Susan Cutter, Christopher G. Burton, and Christopher T. Emrich. 2010. "Disaster Resilience Indicators for Benchmarking Baseline Conditions," *Journal of Homeland Security and Emergency Management* 7, no.1: 1-22

Table B-14 Regional Income Equality

Jurisdiction	Income Inequality Coefficient
Polk County	0.42
Dallas	0.42
Falls City	0.46
Independence	0.40
Monmouth	0.46

Source: Social Explorer, Table 157, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

Housing Affordability

Housing affordability is a measure of economic security gauged by the percentage of an area's households paying less than 30% of their income on housing.¹⁵ Households spending more than 30% are considered housing cost burdened. The table below displays the percentage of homeowners and renters reflecting housing cost burden across the region.

Overall roughly 30% of homeowners with a mortgage have a housing cost burden, compared to over 50% of renters. Amongst renters, the cities of Falls City, Independence, and Monmouth have more than 60% of renters with a housing cost burden. In general, the population that spends more of their income on housing has proportionally fewer resources and less flexibility for alternative investments in times of crisis.¹⁶ This disparity imposes challenges for a community recovering from a disaster as housing costs may exceed the ability of local residents to repair or move to a new location. These populations may live paycheck to paycheck and are extremely dependent on their employer, in the event their employer is also impacted it will further the detriment experienced by these individuals and families.

Table B-15 Households Spending > 30% of Income on Housing

Jurisdiction	Owners		Renters
	With Mortgage	Without Mortgage	
Polk County	31.4%	5.3%	53.1%
Dallas	27.2%	7.1%	51.6%
Falls City	43.3%	20.3%	63.9%
Independence	34.3%	1.5%	65.0%
Monmouth	41.4%	2.8%	69.5%

Source: Social Explorer, Tables 103 and 109, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

¹⁵ University of California Berkeley. Building Resilient Regions, Resilience Capacity Index. <http://brr.berkeley.edu/rci/>.

¹⁶ Ibid.

Economic Diversity

Economic diversity is a general indicator of an area’s fitness for weathering difficult financial times. Business activity in the Willamette Valley region is fairly homogeneous and consists mostly of small businesses.

Economic diversity is a general indicator of an area’s fitness for weathering difficult financial times. One method for measuring economic diversity is through use of the Herfindahl Index, a formula that compares the composition of county and regional economies with those of states or the nation as a whole. Using the Herfindahl Index, a diversity ranking of 1 indicates the county with the most diverse economic activity compared to the state as a whole, while a ranking of 36 corresponds with the least diverse county economy. The table below describes the Herfindahl Index Scores for counties in the region.

Table B-16 shows that Polk County has an economic diversity rank of 9 as of 2013, this is on a scale between all 36 counties in the state where 1 is the most diverse economic county in Oregon and 36 is the least diverse. The county’s ranking has increased since 2008.

Table B-16 Regional Herfindahl Index Scores

County	2008			2013		
	Employment	Number of Industries	State Rank	Employment	Number of Industries	State Rank
Polk	12,837	178	18	12,179	167	9
Benton	26,433	199	23	25,247	201	21
Linn	36,360	225	5	33,934	222	4
Marion	105,758	252	3	101,571	245	3
Yamhill	27,797	209	9	27,860	209	6

Source: Oregon Employment Department

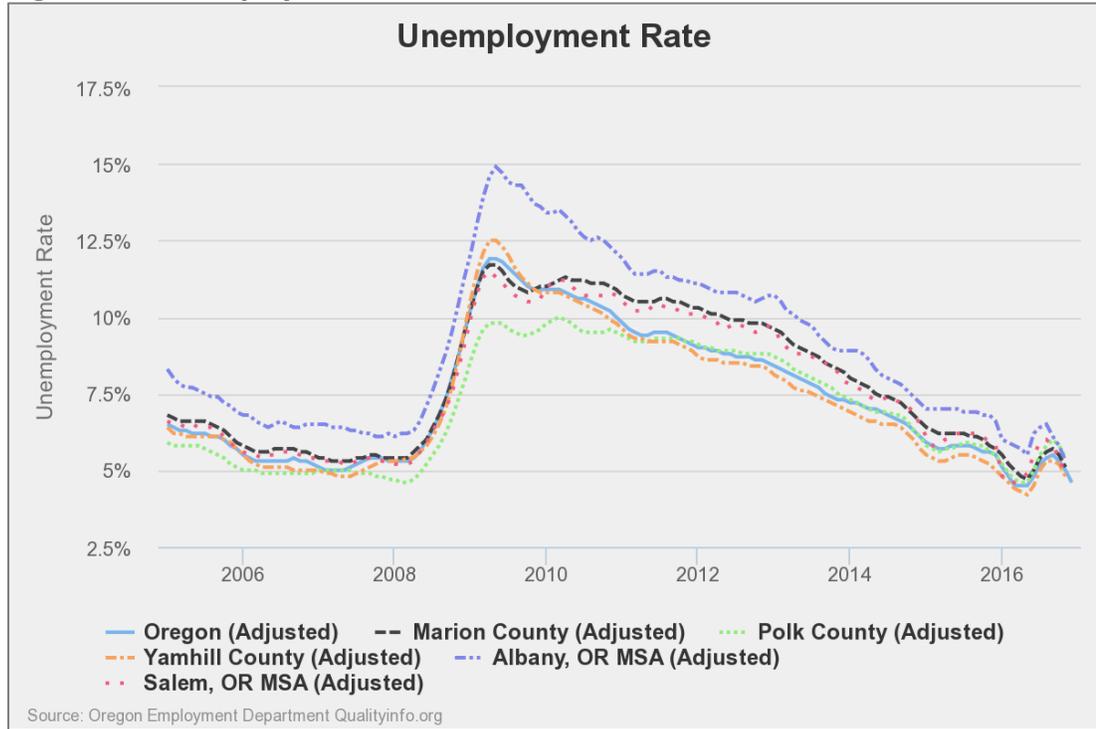
While illustrative, economic diversity is not a guarantor of economic vitality or resilience. Polk County, as of 2017, is not listed as an economically distressed community as prescribed by Oregon Law. The economic distress measure is based on indicators of decreasing new jobs, average wages and income, and is associated with an increase of unemployment.¹⁷

¹⁷ Business Oregon – Oregon Economic Data “Distressed Communities List”, <http://www.oregon4biz.com/Publications/Distressed-List/>

Employment and Wages

According to the Oregon Employment Department, unemployment has declined since 2009 (9.8%) and remains at a rate similar to the State of Oregon and other counties in the region (5.4%).

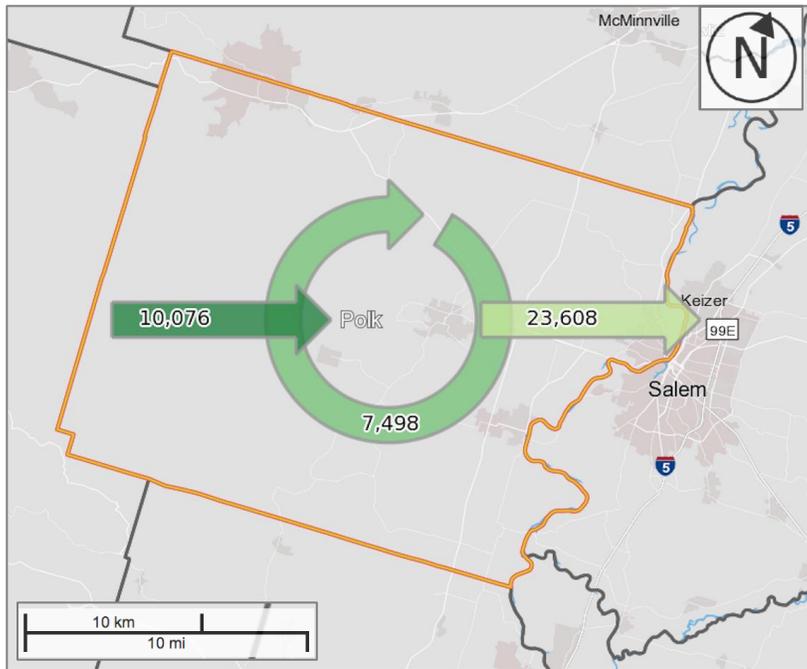
Figure B-3 Unemployment Rate



Source: Oregon Employment Department, "Local Area Employment Statistics" 2005-2016, Qualityinfo.org .

Polk County employers draw in more than 57% (10,076) of their workers from outside the county. The Polk County economy is a cornerstone of regional economic vitality. Figure B-4 shows the county's laborshed; the map shows that about 18% of workers live and work in the county (7,498), 25% of workers come from outside the county (10,076), and about 57% of residents work outside of the county (23,608).

Figure B-4 Polk County Laborshed



Source: U.S. Bureau of the Census, [On The Map](#).

Mitigation activities are needed at the business level to ensure the health and safety of workers and limit damage to industrial infrastructure. Employees are highly mobile, commuting from all over the surrounding area to industrial and business centers. As daily transit rises, there is an increased risk that a natural hazard event will disrupt the travel plans of residents across the region and seriously hinder the ability of the economy to meet the needs of Polk County residents and businesses.

Industry

Key industries are those that represent major employers and are significant revenue generators. Different industries face distinct vulnerabilities to natural hazards, as illustrated by the industry specific discussions below. Identifying key industries in the region enables communities to target mitigation activities towards those industries' specific sensitivities. It is important to recognize that the impact that a natural hazard event has on one industry can reverberate throughout the regional economy.

This is of specific concern when the businesses belong to the basic sector industry. Basic sector industries are those that are dependent on sales outside of the local community; they bring money into a local community via employment. The farm and ranch, information, and wholesale trade industries are all examples of basic industries. Non-basic sector industries are those that are dependent on local sales for their business, such as retail trade, construction, and health services.

Employment by Industry

Economic resilience to natural disasters is particularly important for the major employment industries in the region. If these industries are negatively impacted by a natural hazard, such that employment is affected, the impact will be felt throughout the regional economy. Thus, understanding and addressing the sensitivities of these industries is a strategic way to increase the resiliency of the entire regional economy.

The table below identifies Employment by industry. The top five industry sectors in Polk County with the most employees, as of 2015, are Local Government (3,536), Education and Health Services (2,659), Manufacturing (2,232), Trade, Transportation and Utilities (2,141), and Natural Resources and Mining (1,781). While Polk County has some basic industries, such as Manufacturing four out of the five largest industrial sectors are of the non-basic nature and thus they rely on local sales and services. Trending towards basic industries can lead to higher community resilience.

Table B-17 Total Employment by Industry 2015, Expected Growth 2024

Employment Sector	2015				Percent Change in Employment (2009-2015)	Employment Forecast* (2014-2024)
	Firms	Employees	Percent Workforce	Average Wage		
Total Payroll Employment	1,807	18,985	100%	\$ 33,896	14.9%	9.6%
Total Private	1,719	13,769	72.5%	\$ 31,121	15.4%	11.5%
Natural Resources and Mining	127	1,781	9.4%	\$ 31,983	15.5%	10.7%
Construction	186	840	4.4%	\$ 45,704	-14.3%	18.6%
Manufacturing	84	2,232	11.8%	\$ 38,003	18.3%	8.5%
Trade, Transportation & Utilities	232	2,141	11.3%	\$ 32,203	0.9%	8.4%
Information	18	54	0.3%	\$ 42,748	20.0%	0%
Financial Activities	143	435	2.3%	\$ 37,661	4.4%	5.0%
Professional and Business Services	222	1,127	5.9%	\$ 32,219	18.7%	16.7%
Education and Health Services	219	2,659	14.0%	\$ 31,421	21.0%	15.5%
Leisure and Hospitality	141	1,584	8.3%	\$ 14,511	27.0%	9%
Other Services	343	909	4.8%	\$ 19,579	53.8%	14.6%
Private Non-Classified	0	-	-	-	-	-
Government	88	5,216	27.5%	\$ 41,221	6.0%	2.9%
Federal	12	70	0.4%	\$ 52,460	-29.4%	-4.8%
State	11	1,609	8.5%	\$ 39,678	0.0%	4.2%
Local	64	3,536	18.6%	\$ 41,712	0.0%	2.3%

Source: Oregon Employment Department, "2009 and 2015 Covered Employment and Wages Summary Reports" and "Regional Employment Projections by Industry & Occupation 2014-2024". <http://www.qualityinfo.org>.

*Based on 2024 projections for Linn, Marion, Polk, and Yamhill counties – Department of Administrative Services

High Revenue Sectors

In 2012, the three sectors with the highest revenue were Manufacturing, Retail Trade, and Health Care & Social Assistance. The table below shows the revenue generated by each economic sector (Note: not all sectors are reported).

Polk County relies on both basic and non-basic sector industries and it is important to consider the effects each may have on the economy following a disaster. Basic sector businesses have a multiplier effect on a local economy that can spur the creation of new jobs, some of which may be non-basic. The presence of basic sector jobs can help speed the

local recovery; however, if basic sector production is hampered by a natural hazard event, the multiplier effect could be experienced in reverse. In this case, a decrease in basic sector purchasing power results in lower profits and potential job losses for the non-basic businesses that are dependent on them.

Table B-18 Revenue of Top Sectors in Polk County (Employer)

Sector Meaning (NAICS code)	Sector Revenue (\$1,000)
Manufacturing	\$ 424,650
Retail trade	\$ 360,670
Health care and social assistance	\$ 168,554
Transportation and warehousing	\$ 46,192
Professional, scientific, and technical services	\$ 36,222
Administrative and support and waste management and remediation services	\$ 26,321
Other services (except public administration)	\$ 25,738
Real estate and rental and leasing	\$ 19,399
Arts, entertainment, and recreation	\$ 4,599
Educational services	\$ 1,701
Utilities	Q
Information	N
Finance and insurance	N
Accommodation and food services	D

Source: U.S. Census Bureau, 2012 Economic Census, Table EC1200A1.

D = Withheld to avoid disclosing data for individual companies; data are included in higher level totals

N = Not available or not comparable

Q= Revenue not collected at this level of detail for multi-establishment firms

The *Manufacturing* sector was the largest revenue generator, generating \$424.6 million. It is highly dependent upon the transportation network in order to access supplies and send finished products to outside markets. As a base industry, manufacturers are not dependent on local markets for sales, which contribute to the economic resilience of this sector.

The *Retail Trade* sector generated \$360.7 million, making it the second largest earning sector in Polk County. The *Retail Trade* sector typically relies on local residents and tourists and their discretionary spending ability. Residents' discretionary spending diminishes after a natural disaster when they must pay to repair their homes and properties. In this situation, residents will likely concentrate their spending on essential items that would benefit some types of retail (e.g., grocery) but hurt others (e.g., gift shops). The potential income from tourists also diminishes after a natural disaster as people are deterred from visiting the impacted area. Retail trade is also largely dependent on wholesale trade and the transportation network for the delivery of good for sale. Disruption of the transportation system could have severe consequences for retail businesses. In summary, depending on the type and scale, a disaster could affect specific segments of retail trade, or all segments.

Health Care & Social Assistance generated about \$168.6 million. Health Care & Social Assistance has a broad client base, with families and non-families as the typical clientele. Health and social services will likely see an increase in demand after a natural disaster, as affected populations seek care and assistance. Functional operation of health and social

services may be negatively impacted by hazards and access to services by residents may be limited.

In the event that any of these primary sectors are impacted by a disaster, Polk County may experience a significant disruption of economic productivity.

Future Employment in Industry

Between 2009 and 2015, the sectors that experienced the largest percent growth were Other Services (53.8%), Leisure and Hospitality (27.0%), Education and Health Services (21.0%), Information (20.0%), and Professional and Business Services (18.7%). Some of these sectors often require more training and education, while others require less education and have lower wages. Education and Health Services (2,659 employees) and Local Government (3,536) are among the highest employers, Other Services (53.8%) and Leisure and Hospitality (27%) are the fastest growing, and Federal Government (\$52,460) and Construction (\$45,704) have the highest average wages.

Sectors that are anticipated to be major employers in the future also warrant special attention in the hazard mitigation planning process. As shown in Table B-17, between 2014 and 2024, the largest employment growth in the region is anticipated within Construction (18.6%), Professional and Business Services (16.7%), Education and Health Services (15.5%), and Other Services (14.6%); Federal Government is expected to continue to decline by almost 5%.¹⁸

Synthesis

The current and anticipated financial conditions of a community are strong determinants of community resilience, as a strong and diverse economic base increases the ability of individuals, families and the community to absorb disaster impacts for a quick recovery. Because Local Government, Education and Health Services, and Manufacturing are key to post-disaster recovery efforts, the region is bolstered by its major employment sectors. The county's economy is expected to grow by 2024, with much of the growth within the industries of Construction, Professional and Business Services, Education and Health Services, and Other Services. It is important to consider what might happen to the county economy if the largest revenue generators and employers are impacted by a disaster. Areas with less income equality, particularly in the smaller cities, higher housing costs, and overall low economic diversity are factors that may contribute to slower recovery from a disaster.

¹⁸ Oregon Employment Department, "Employment Projections by Industry and Occupations: 2014-2024 Oregon and Regional Summary", <https://www.qualityinfo.org/documents/10182/92203/Mid-Valley+Industry+Employment+Projections+2014-2024?version=1.5>, January 2017.

Built Environment Capacity

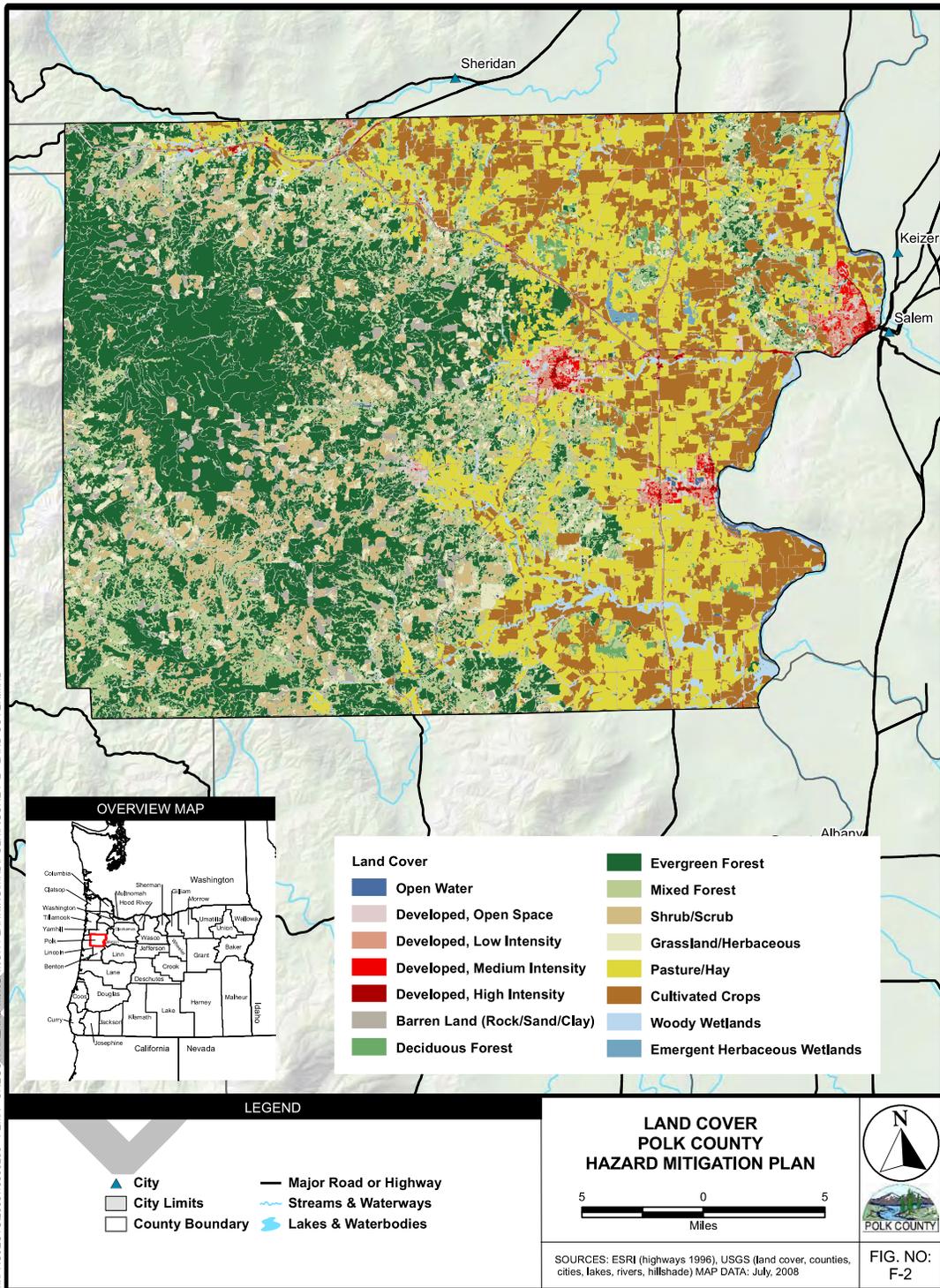
Built Environment capacity refers to the built environment and infrastructure that supports the community. The various forms, quantity, and quality of built capital mentioned above contribute significantly to community resilience. Physical infrastructures, including utility and transportation lifelines, are critical during a disaster and are essential for proper functioning and response. The lack or poor condition of infrastructure can negatively affect a community's ability to cope, respond and recover from a natural disaster. Following a disaster, communities may experience isolation from surrounding cities and counties due to infrastructure failure. These conditions force communities to rely on local and immediately available resources.

Land Use and Development Patterns

The Polk County Comprehensive Plan states that the vast majority of the County is devoted to private timber production with minimal federal, state, and county managed forested lands (see Map B-2). A very limited percentage of land is designated as High Density Use, approximately four percent. The county feels limited high density increases will occur around the four incorporated jurisdictions of Dallas, Falls City, Independence, and Monmouth. However, there is significant pressure to develop low density residential development. The County has designated two percent of its land area for such use.

One significant way in which Polk County residents can increase or decrease their vulnerability to natural hazards is through development patterns. The way in which land is used – is it a parking lot or maintained as an open space – will determine how closely the man-made systems of transportation, economy, etc., interact with the natural environment. All patterns of development, density as well as sprawl, bring separate sets of challenges for hazard mitigation.

Map B-2 Land Cover



Source: Polk County NHMP (2009).

Regulatory Context

Oregon land use laws require land outside Urban Growth Boundaries (UGBs) to be protected for farm, forest, and aggregate resource values. For the most part, this law limits the amount of development in the rural areas. However, the land use designation can change from resource protection in one of two ways:

- The requested change could qualify as an exception to Statewide Planning Goals, in which case the city must demonstrate to the State that the change meets requirements for an exception. These lands, known as exception lands, are predominantly designated for residential use.
- Resource land can also be converted to non-resource use when it can be demonstrated that the land is no longer suitable for farm or forest production.

Local and state policies currently direct growth away from rural lands into UGBs, and, to a lesser extent, into rural communities. If development follows historical development trends, urban areas will expand their UGBs, rural unincorporated communities will continue to grow, and overall rural residential density will increase slightly with the bulk of rural lands kept in farm and forest use. The existing pattern of development in the rural areas, that of radiating out from the urban areas along rivers and streams is likely to continue. Most of the “easy to develop” land is already developed, in general leaving more constrained land such as land in the floodplains or on steep slopes to be developed in the future, perhaps increasing the rate at which development occurs in natural hazard areas.

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of 19 statewide planning goals that express the state's policies on land use and on related topics, such as citizen involvement, land use planning, and natural resources.

Most of the goals are accompanied by "guidelines," which are suggestions about how a goal may be applied. Oregon's statewide goals are achieved through local comprehensive planning. State law requires each city and city to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect. The local comprehensive plans must be consistent with the statewide planning goals. Plans are reviewed for such consistency by the state's Land Conservation and Development Commission (LCDC). When LCDC officially approves a local government's plan, the plan is said to be "acknowledged." It then becomes the controlling document for land use in the area covered by that plan.

Goal 7

Goal 7: Areas Subject to Natural Disasters and Hazards has the overriding purpose to “protect people and property from natural hazards”. Goal 7 requires local governments to adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards. Natural hazards include floods, landslides, earthquakes, tsunamis, coastal erosion, and wildfires.

To comply with Goal 7, local governments are required to respond to new hazard inventory information from federal or state agencies. The local government must evaluate the hazard risk and assess the:

- a) frequency, severity, and location of the hazard;
- b) effects of the hazard on existing and future development;
- c) potential for development in the hazard area to increase the frequency and severity of the hazard; and
- d) types and intensities of land uses to be allowed in the hazard area.

Local governments must adopt or amend comprehensive plan policies and implementing measures to avoid development in hazard areas where the risk cannot be mitigated. In addition, the siting of essential facilities, major structures, hazardous facilities and special occupancy structures should be prohibited in hazard areas where the risk to public safety cannot be mitigated. The state recognizes compliance with Goal 7 for coastal and riverine flood hazards by adopting and implementing local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements.

In adopting plan policies and implementing measures for protection from natural hazards local governments should consider:

- a) the benefits of maintaining natural hazard areas as open space, recreation, and other low density uses;
- b) the beneficial effects that natural hazards can have on natural resources and the environment; and
- c) the effects of development and mitigation measures in identified hazard areas on the management of natural resources.

Local governments should coordinate their land use plans and decisions with emergency preparedness, response, recovery and mitigation programs. Given the numerous waterways, agricultural, and forest lands, special attention should be given to problems associated with river bank erosion and potential for wild land/urban interface fires.

Goal 7 guides local governments to give special attention to emergency access when considering development in identified hazard areas, including:

- a) Consider programs to manage stormwater runoff as a means to address flood and landslide hazards,
- b) Consider non-regulatory approaches to help implement the goal,
- c) When reviewing development requests in high hazard areas, require site specific reports, appropriate for the level and type of hazards. Site specific reports should evaluate the risk to the site, as well as the risk the proposed development may pose to other properties.
- d) Consider measures exceeding the National Flood Insurance Program.

Housing

In addition to location, the characteristics of the housing stock affect the level of risk posed by natural hazards. The table below identifies the types of housing most common throughout the county. Of particular interest are mobile homes, which account for about 7.4% of the housing in Polk County. Mobile homes are particularly vulnerable to certain natural hazards, such as windstorms, and special attention should be given to securing the structures, because they are more prone to wind damage than wood-frame construction. In other natural hazard events, such as earthquakes and floods, moveable structures like

mobile homes are more likely to shift on their foundations and create hazardous conditions for occupants.

Table B-19 Housing Profile

	Housing Units	Single Family		Multi-Family		Mobile Homes*	
		Estimate	Percent	Estimate	Percent	Estimate	Percent
Polk County	30,651	21,971	71.7%	6,425	21.0%	2,255	7.4%
Dallas	5,907	4,014	68.0%	1,528	25.9%	365	6.2%
Falls City	393	284	72.3%	2	0.5%	107	27.2%
Independence	3,200	1,912	59.8%	1,091	34.1%	197	6.2%
Monmouth	3,687	2,279	61.8%	1,249	33.9%	159	4.3%

Source: Social Explorer, Table 97, U.S. Census Bureau, 2011-2015 American Community Survey

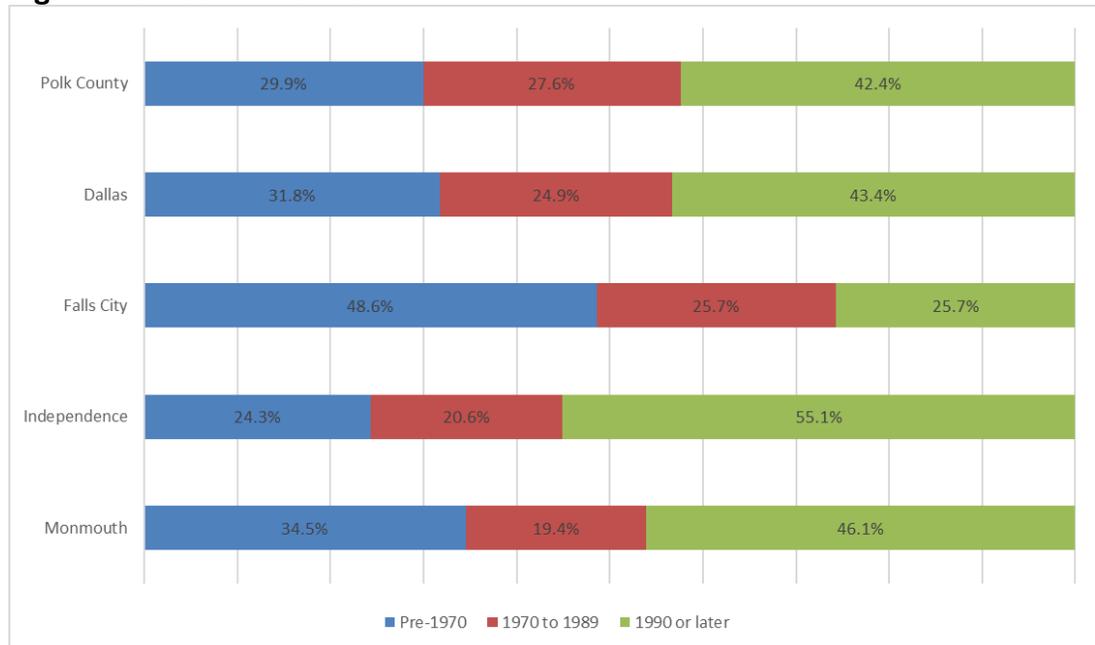
* Also includes boats, RVs, vans, etc. that are used as a residence.

Aside from location and type of housing, the year structures were built has implications. Seismic building standards were codified in Oregon building code starting in 1974; more rigorous building code standards were passed in 1993 that accounted for the Cascadia earthquake fault.¹⁹ Therefore, homes built before 1993 are more vulnerable to seismic events. Also in the 1970's, FEMA began assisting communities with floodplain mapping as a response to administer the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Upon receipt of floodplain maps, communities started to develop floodplain management ordinances to protect people and property from flood loss and damage.

As Figure B-5 shows, regionally, 29.9% of the county housing stock was built prior to 1970, before the implementation of floodplain management ordinances; however, Falls City has about one-half of its housing units built prior to 1970. Countywide, 57.5% of the housing stock was built before 1990 and the codification of seismic building standards.

¹⁹ State of Oregon Building Codes Division. *Earthquake Design History: A summary of Requirements in the State of Oregon*, February 7, 2012. http://www.oregon.gov/OMD/OEM/ossprac/docs/history_seismic_codes_or.pdf

Figure B-5 Year Structure Built



Source: U.S. Census Bureau, 2011-2015 American Community Survey Estimates, Table DP04

The National Flood Insurance Program’s (NFIP’s) Flood Insurance Rate Maps (FIRMs) delineate flood-prone areas. They are used to assess flood insurance premiums and to regulate construction so that in the event of a flood, damage minimized. The initial FIRMs for the county were created in 1978 (1981 for Falls City, 1988 for Dallas, Independence, and Monmouth), while the current FIRMs effective date for Polk County and cities is December 19, 2006. For more information about the flood hazard, NFIP, and FIRMs, please refer to Flood Hazard section of the Risk Assessment.

Infrastructure Profile

Infrastructure and critical facilities are vital to the continued delivery of key governmental and private services as well as recovery efforts. The loss of these services may cause serious secondary impact as well as significantly hamper the public’s ability to recover from a disaster event. Homeland Security Presidential Directive 7 calls out seventeen sectors as Critical Infrastructure and Key Resources that are “essential to the nation’s security, public health and safety, economic vitality, and way of life.” This section identifies critical infrastructure and key resources in Polk County. The sectors include:

Agriculture and food: This is a primarily private sector industry but includes both imported / exported food as well and what is grown in the county.

Banking and finance: For Polk County, this sector would include not only accounts payable /receivable and payroll, but social services provided to residents through community welfare programs.

Chemical: Manufacturing and agricultural processes can often require the use of chemicals and substances that would harm residents if air or water resources were contaminated.

Communications and Information technology: Phone lines, cell towers, broadcast internet, and radio and television signals are mediums for interpersonal connection, economic vitality, and emergency communications in the county. Additionally, and of importance to the region as much as to the county, weather stations such as the Valsetz site in the Coast Range of Polk County, can be quickly cut off by fire or earthquake. In the case of a crisis, the ability to transmit information between responders and to residents can mean the difference between life and death.

National Guard: The Oregon Military Department (Oregon National Guard) maintains the Polk County Readiness Center (12835 Westview Drive, Dallas - unincorporated Polk County).

Emergency services: 911 call centers and police and fire stations provide first responders for most hazard events and often become the base of response operations during prolonged hazard events. Population distribution and service areas as well as the availability and duplication of resources at each station can play a role in determining how, where, and when response and recovery are effective.

Table B-20 Critical Facilities: Emergency Response

Facility Name	Address/ City
<i>Polk County</i>	
Rickreall Fire Station	275 N Pacific Highway W, Rickreall
<i>Dallas</i>	
Dallas Police Department	187 SE Court Street, Dallas
Dallas Fire Department	910 SE Shelton, Dallas
Dallas Ambulance Service	SE Washington, Dallas
Polk County Sheriff's Office Headquarters	850 Main St, Dallas
Polk County Jail	884 SE Jefferson St, Dallas
Southwest Polk Rural Fire District	915 SE Shelton St, Dallas
<i>Falls City</i>	
Falls City Fire and Police Department	320 N Main Street, Falls City
<i>Independence</i>	
Independence Police Department	555 S Main St., Independence
Polk County Fire District #1 (Administration)	1800 Monmouth St, Independence
Polk County Fire District #1 (Station 40)	5979 Main St, Independence
<i>Monmouth</i>	
Monmouth Police Department	238 W Jackson Street, Monmouth
Oregon State Police	550 Monmouth Ave N, Monmouth
<i>Other</i>	
West Valley Fire District Station 8	825 NE Main St, Willamina

Note: Table is organized by location not by owner/ operator (except as noted). See city addenda for additional detail.

Energy: In Polk County, electrical and gas utilities are provided by both private companies and some smaller cooperatives. Organizing mitigation across these diverse organizational structures and philosophies will ensure that services are provided equitably, even if a hazard incident stresses the supply or demand. Critical infrastructure includes power substations, gas-lines, and both underground and above ground transmission lines.

Governmental facilities: Every day, community leaders and residents rely on the buildings that house essential governmental functions: City Halls, Court Houses, public works buildings and more. Protecting and reinforcing these facilities will facilitate the return to “business as usual” after a hazard event. The following government buildings are considered critical facilities:

Table B-21 Critical Facilities: Government

Facility Name	Address/ City
Polk County	
Polk County Fairgrounds	520 S Pacific Highway, Rickreal
Polk County Human Services (W. Salem)	1520 Plaza Street NW, Salem
Dallas	
Dallas City Hall/ Civic Center/ Police Department	187 SE Court St, Dallas
Polk County Courthouse/Sheriff’s Office	850 Main St, Dallas
Polk County Public Works	820 SW Ash St, Dallas
Polk County Human Services/ Extension Services	182 SW Academy St, Dallas
Agricultural, Polk Soil, Farm Home Administration/ USDA	289 E Ellendale, Dallas
Oregon Volunteer Services	177 SW Oak, Dallas
Adult and Family Services	77 SW Clay, Dallas
Falls City	
City Hall	299 Mill Street, Falls City
Independence	
Independence City Hall/ Police Station	240 Monmouth St, Independence
Public Works	160 G Street, Independence
Monmouth	
Monmouth City Hall	151 W Main Street , Monmouth
Monmouth Public Works / Public Utilities	401 N Hogan Road, Monmouth
Polk County Human Services (Monmouth)	1310 Main Street East, Monmouth

Note: Table is organized by location not by owner/ operator (except as noted). See city addenda for additional detail.

Schools: Schools are occupied by vulnerable younger populations and may also be used as emergency shelters during hazard events. The following school districts are within the county (for a list of locations see the Earthquake profile within Section 2, *Risk Assessment*).²⁰:

- Dallas School District 2 (6 schools)
- Falls City School District 57 (2 schools)
- Central School District 13J (5 schools)
- Willamina School District 30J (2 schools)

²⁰ "School District Maps." *Polk County Oregon Official Website*. Polk County, n.d. Web. 10 Aug. 2016.

- Perrydale School District 21 (3 schools)
- Charter Schools

Healthcare and public health: Hospitals, clinics, and shelters often play a critical role in the immediate aftermath of a hazard incident in saving lives and keeping residents safe. In addition to satellite clinics, doctors’ offices, and urgent care facilities. The following healthcare, care facilities are considered critical:

Table B-22 Critical Facilities: Healthcare/ Care Facilities

Facility Name	Address/ City
Polk County	
<i>None noted</i>	
Dallas	
Hospital: Salem Health West Valley	525 SE Washington Street, Dallas
Oregon Adult and Family Services	770 SW Clay Street, Dallas
Dallas Retirement Village	340 NW Brentwood Ave, Dallas
Falls City	
<i>See city addendum.</i>	
Independence	
<i>See city addendum.</i>	
Monmouth	
<i>See city addendum.</i>	

Note: Table is organized by location not by owner/ operator (except as noted). See city addenda for additional detail.

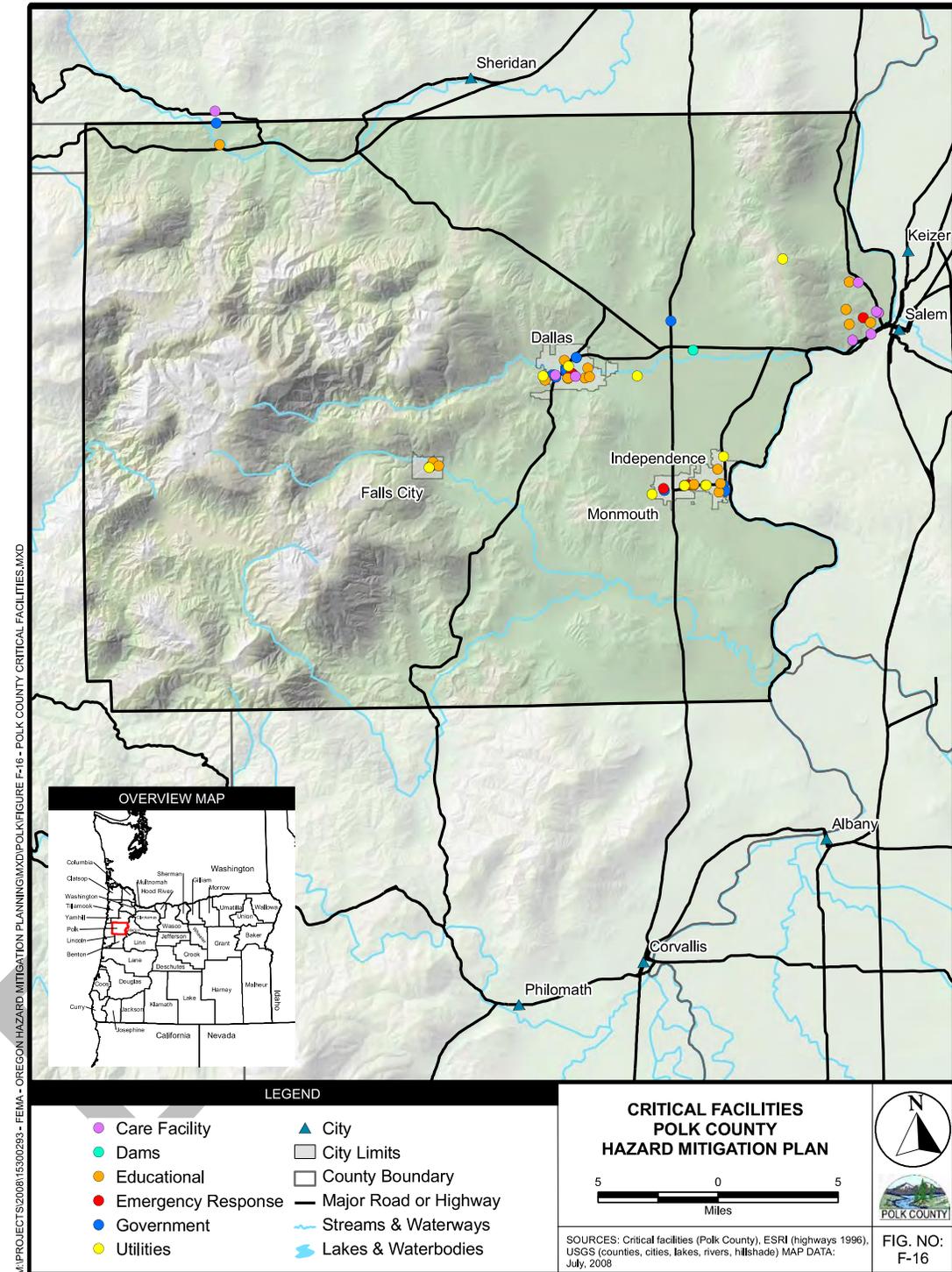
Transportation systems: Urban Polk County meets its current transportation needs through a mixture of municipal road systems, county roads, and state and federal highways. Major highways in the county include Oregon Route 99W, which runs from north to south, linking the cities of McMinnville and Corvallis, and Oregon Route 22, running east to west and connecting Salem to the coast. Oregon Route 223 branches west from Rickreall and connects Dallas to Wren along Interstate 20 to the south. Oregon Route 194 spans a 7.5-mile connection from east to west between Monmouth and Oregon Route 223.

Cycling / pedestrian paths are used both for commuting and recreation and their bridges and overpasses connect communities in crucial ways. Through Salem-Keizer Transit, the CARTS program (Chemeketa Area Regional Transportation System) connects rural Marion and Polk counties across five bus lines. The CARTS 40 bus line connects to the cities of Dallas, Independence and Monmouth while CARTS 50 connects to Rickreall and Dallas. Falls City is not directly serviced by any routes within the Salem-Keizer Transit system²¹.

In Polk County, rail lines and bridges are more vulnerable to impacts from flood and earthquake as even minor shifts in their alignment can render them unusable and stop the flow of civilian and emergency service traffic on either side of the affected area.

²¹ "CARTS: Connecting Rural Marion and Polk Counties." CARTS. Salem-Keizer Transit, n.d. Web. 10 Aug. 2016.

Map B-3 Critical Facilities



Source: Polk County NHMP (2009).

Utilities/ Water: In Polk County, water resources are abundant yet fragile and can even be dangerous. Water resources are susceptible to pollution from runoff or toxic spills. Low rain years can increase the risk of drought in the summer while intense periods of rain can bring

floods or landslides. Rivers and their tributaries can only be managed so much by dams and culverts. Responsible development in the floodplain and throughout the county that maintains and supports and natural drainage system can help protect water resources.

A major valuable asset within the county is the series of water treatment plants. Many of these facilities rely on power to pump and purify water or have storage tanks that sit vulnerable to earthquakes without retrofit or on unstable soil. Additionally, the vulnerability of septic systems may be heightened in more rural areas due to power failures, severe weather, and earthquake.

Physical infrastructure such as dams, levees, roads, bridges, railways and airports support Polk County communities and economies. Due to the fundamental role that physical infrastructure plays both in pre- and post-disaster, they deserve special attention in the context of creating resilient communities.

Utility systems such as potable water, wastewater, natural gas, telecommunications, and electric power are all networked systems. That is, they consist of nodes and links. Nodes are centers where something happens - such as a pumping plant, a treatment plant, a substation, a switching office and the like. Links are the connections (pipes or lines) between nodes. The following utilities are considered critical:

Table B-23 Critical Facilities/ Infrastructure: Utilities

Facility Name	Address/ City
Polk County	
Polk County Communications Sites/ Towers	-
Dallas	
Pacific Power and Light	583 SE Jefferson, Dallas
Dallas Sewer Lagoon	Bowersville Road, Dallas
Dallas Water Reservoir	Reservoir Road, Dallas
Falls City	
See city addendum	
Independence	
Independence Water Tower	1180 Monmouth Street, Independence
Pacific Power & Light Sub Station	1150 Monmouth Street, Independence
Independence Water Wells	off Hannah Road, Independence
Sewage Lagoon and Pump Station	Riverside Park, Independence
Monmouth	
Monmouth Water Tower	Cupids Knoll, Monmouth
Monmouth Power (Bonneville sub.)	Monmouth
Monmouth Public Works/Public Utilities	401 N Hogan Rd, Monmouth
Monmouth Water Wells	Across Independence Bridge (Marion Co.)

Note: Table is organized by location not by owner/ operator (except as noted). See city addenda for additional detail.

Dams: These critical infrastructure pieces not only protect water resources that are used for drinking, agriculture, and recreation, but they protect downstream development from inundation. Dams may also be multifunction, serving two or more of these purposes.

The National Inventory of Dams, NID, which is maintained by the United States Army Corps of Engineers, is a database of approximately 76,000 dams in the United States. The NID does not include all dams in the United States. Rather, the NID includes dams that are deemed to have a high or significant hazard potential and dams deemed to pose a low hazard if they meet inclusion criteria based on dam height and storage volume. Low hazard potential dams are included only if they meet either of the following selection criteria:

- exceeds 25 feet in height and 15 acre-feet of storage, or
- exceeds 6 feet in height and 50-acre feet of storage.

There are many thousands of dams too small to meet the NID selection criteria. However, these small dams are generally too small to have significant impacts if they fail and thus are generally not considered for purposes of risk assessment or mitigation planning.

This NID potential hazard classification is solely a measure of the probable impacts if a dam fails. Thus, a dam classified as High Potential Hazard does not mean that the dam is unsafe or likely to fail. The level of risk (probability of failure) of a given dam is not even considered in this classification scheme. Rather, the High Potential Hazard classification simply means that there are people at risk downstream from the dam in the inundation area, if the dam were to fail.

Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the dam owner's property.

Dams assigned to the significant hazard potential classification are those where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities. Significant hazard potential dams are often located in predominantly rural or agricultural areas.

Dams assigned to the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life. Failure of dams in the high classification will generally also result in economic, environmental or lifeline losses, but the classification is based solely on probable loss of life.

The Oregon Water and Resources Department maintains an inventory of all dams located in Oregon. There are two dams categorized as high hazard in Polk County Croft Reservoir located on Gibson Gulch, and Mercer Reservoir located on Rickreall Creek. There are also seven (7) dams categorized as significant hazard and 52 low hazard dams.

Table B-24 Polk County Dam Inventory

Threat Potential	Number of Dams	River (Dam)
High	2	Gibson Gulch (Croft Reservoir); Rickreall Creek (Mercer Reservoir)
Significant	7	Gooseneck Creek (Mt. Springs Ranch Dam); Berry Creek (Kennel Reservoir); Ash Swale (Olson Reservoir, Deraeve Reservoir #1); Tributary to Ash Creek (Koning "E" Reservoir); Tributary to King Creek (Eola Hills Reservoir); Tributary to South Yamhill River (Shaffer Reservoir)
Low	52	-
Total	61	

Source: Oregon Water Resources Department, "Dam Inventory Query"

Dam failures can occur at any time in a dam’s life; however, failures are most common when water storage for the dam is at or near design capacity. At high water levels, the water force on the dam is higher and several of the most common failure modes are more likely to occur. Correspondingly, for any dam, the probability of failure is much lower when water levels are substantially below the design capacity for the reservoir.

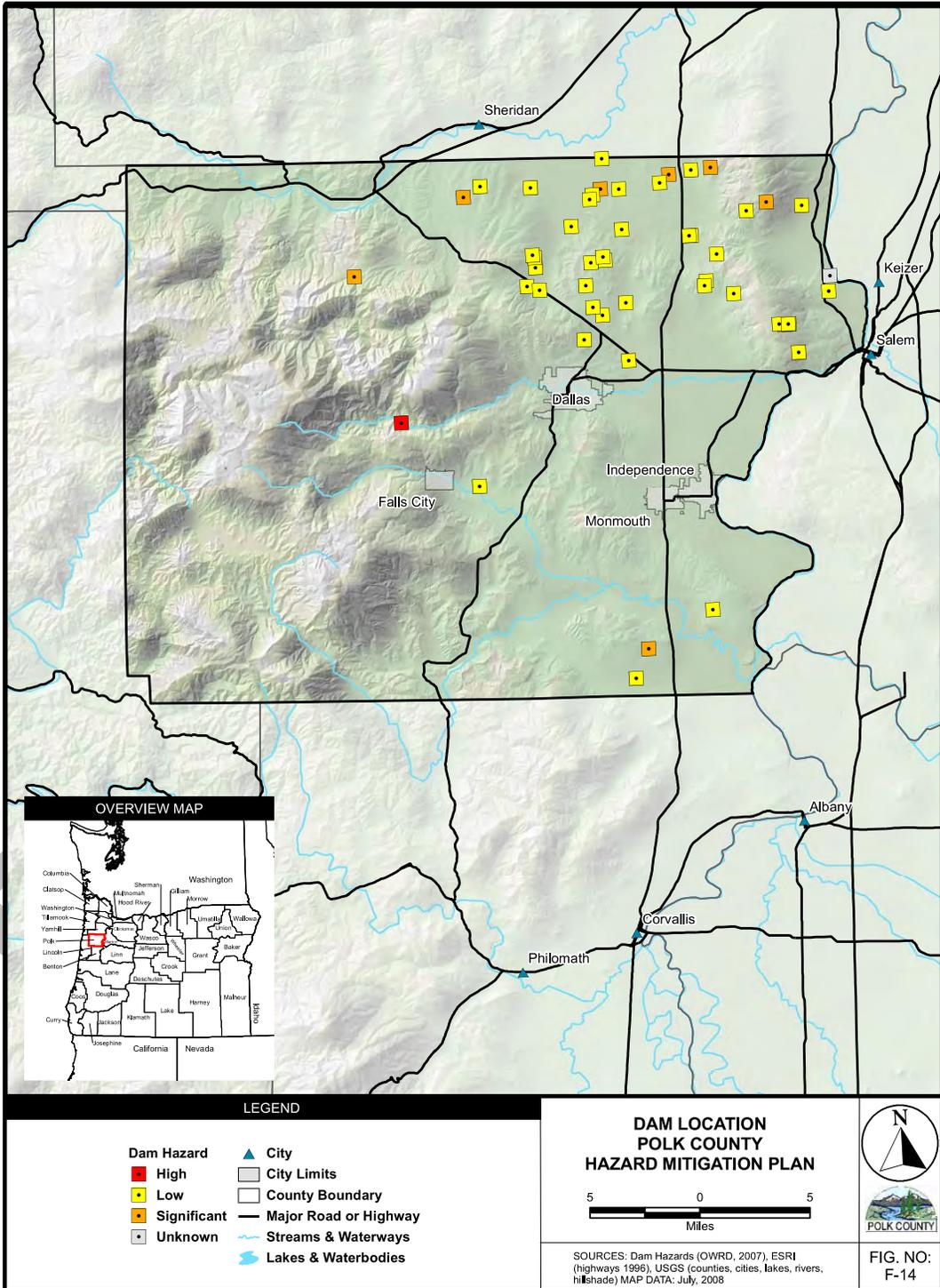
For embankment dams, the most common failure mode is erosion of the dam during prolonged periods of rainfall and flooding. When dams are full and water inflow rates exceed the capacity of the controlled release mechanisms (spillways and outlet pipes), overtopping may occur. When overtopping occurs, scour and erosion of either the dam itself and/or of the abutments may lead to partial or complete failure of the dam. Especially for embankment dams, internal erosion, piping or seepage through the dam, foundation, or abutments can also lead to failure. For smaller dams, erosion and weakening of dam structures by growth of vegetation and burrowing animals is a common cause of failure.

For embankment dams, earthquake ground motions may cause dams to settle or spread laterally. Such settlement does not generally lead, by itself, to immediate failure. However, if the dam is full, relatively minor amounts of settling may cause overtopping to occur, with resulting scour and erosion that may progress to failure. For any dam, improper design or construction or inadequate preparation of foundations and abutments can also cause failures. Improper operation of a dam, such as failure to open gates or valves during high flow periods can also trigger dam failure. For any dam, unusual hydrodynamic (water) forces can also initiate failure. Landslides into the reservoir, which may occur on their own or be triggered by earthquakes, may lead to surge waves which overtop dams or hydrodynamic forces which cause dams to fail under the unexpected load. Earthquakes can also cause seiches (waves) in reservoirs that may overtop or overload dam structures. In rare cases, high winds may also cause waves that overtop or overload dam structures.

Concrete dams are also subject to failure due to seepage of water through foundations or abutments. Dams of any construction type are also subject to deliberate damage via sabotage or terrorism. For waterways with a series of dams, downstream dams are also subject to failure induced by the failure of an upstream dam. If an upstream dam fails, then downstream dams also fail due to overtopping or due to hydrodynamic forces.

Dam failures can occur rapidly and with little warning. Fortunately, most failures result in minor damage and pose little or no risk to life safety. However, the potential for severe damage still exists.

Map B-4 Dam Location



Source: Polk County NHMP (2009).

Bridges: Because of earthquake risk, the seismic vulnerability of the county’s bridges is an important issue. Non-functional bridges can disrupt emergency operations, sever lifelines, and disrupt local and freight traffic. These disruptions may exacerbate local economic losses if industries are unable to transport goods. The county’s bridges are part of the state and interstate highway system that is maintained by the Oregon Department of Transportation (ODOT) or that are part of regional and local systems that are maintained by the region’s counties and cities.

The bridges in Polk County require ongoing management and maintenance due to the age and types of bridges. Modern bridges, which require minimum maintenance and are designed to withstand earthquakes, consist of pre-stressed reinforced concrete structures set on deep steel piling foundations.

The table below shows the structural condition of bridges in the region. A distressed bridge is a condition rating used by the Oregon Department of Transportation (ODOT) indicating that a bridge has been identified as having a structural or other deficiency, while a deficient bridge is a federal performance measure used for non-ODOT bridges; the ratings do not imply that a bridge is unsafe.²² The table shows that the county has a lower percentage of bridges that are distressed and/ or deficient (19.6%), than does the state (21.3%). About 12.5% of the county and 30.8 % of the city owned bridges within Polk county are distressed, compared to 28.0% of State Owned (ODOT) bridges.

Table B-25 Bridge Inventory

	Bridge Condition	Oregon	Region 3	Polk
State Owned	Distressed	610	118	14
	Sub-total	2,718	610	51
	Percent Distressed	22.4%	19.3%	28.0%
County Owned	Deficient	633	194	11
	Sub-total	3,420	942	88
	Percent Distressed	18.5%	20.6%	12.5%
City Owned	Deficient	160	44	4
	Sub-total	614	208	13
	Percent Deficient	26.1%	21.2%	30.8%
Other Owned	Deficient	40	6	1
	Sub-total	115	24	2
	Percent Deficient	34.8%	25.0%	50.0%
Area Total (All Owners)	Deficient	1,443	362	30
	Sub-total	6,769	1,741	153
	Percent Deficient	21.3%	20.8%	19.6%
Historic Covered		334	71	6

Source: Oregon Department of Transportation, 2014; Oregon Department of Transportation (2013), Oregon’s Historic Bridge Field Guide

²² Oregon. Bridge Engineering Section (2012). 2012 Bridge Condition Report. Salem, Oregon: Bridge Section, Oregon Department. of Transportation.

Note: ODOT bridge classifications overlap and sub-total is not used to calculate percent distressed, calculation for ODOT distressed bridges accounts for this overlap.

Utility lifelines: are the resources that the public relies on daily, (i.e., electricity, fuel and communication lines). If these lines fail or are disrupted, the essential functions of the community can become severely impaired. Utility lifelines are closely related to physical infrastructure, (i.e., dams and power plants) as they transmit the power generated from these facilities.

Most of the natural gas Oregon uses originates in Alberta, Canada. Northwest Natural Gas owns the main natural gas transmission pipeline. The network of transmission lines running through the county may be vulnerable to severe, but infrequent natural hazards, such as windstorm, winter storms, and earthquakes.

Seismic lifeline routes help maintain transportation facilities for public safety and resilience in the case of natural disasters. Following a major earthquake, it is important for response and recovery agencies to know which roadways are most prepared for a major seismic event. The Oregon Department of Transportation has identified lifeline routes to provide a secure lifeline network of streets, highways, and bridges to facilitate emergency services response after a disaster.²³

System connectivity and key geographical features were used to identify a three-tiered seismic lifeline system. Routes identified as Tier 1 are considered the most significant and necessary to ensure a functioning statewide transportation network. The Tier 2 system provides additional connectivity to the Tier 1 system, it allows for direct access to more locations and increased traffic volume capacity. The Tier 3 lifeline routes provide additional connectivity to the systems provided by Tiers 1 and 2.

The Lifeline Routes in the Valley Geographic Zone (which includes Polk County) consist of the following:

- Tier I: none in Polk County
- Tier II: OR 99W
- Tier III: OR 22 from OR 99W to Salem

Confederated Tribes of Grande Ronde

Confederated Tribes of Grande Ronde maintain their own services that are on tribal trust lands. Their facilities include the Confederated Tribes of the Grand Ronde Governness Building (9615 Grand Ronde Road, Grand Ronde) and Spirit Mountain Casino (27100 Salmon River Hwy, Grand Ronde).

Synthesis

The planning considerations seemingly most significant for the county are contingency planning for medical resources and lifeline systems due to the imminent need for these resources. As mentioned above, functionality of hospitals and dependent care facilities are a

²³ CH2MHILL, Prepared for Oregon Department of Transportation. Oregon Seismic Lifeline Routes Identification Project, *Lifeline Selection Summary Report*, May 15 2012.

significant priority in providing for Polk County residents. One factor that is critical to consider in planning is the availability of medical beds in local hospitals and dependent care facilities. In the event of a disaster, medical beds may be at a premium providing not just for the growing elderly population, but the entire county. Some of these facilities may run at almost full capacity on a daily basis, hospitals should consider medical surge planning and develop memorandums with surrounding counties for medical transport and treatment. Other facilities to consider are utility lifelines and transportation lifelines such as, airports, railways, roads and bridges with surrounding counties to acquire utility service and infrastructure repair.

While these elements are traditionally recognized as part of response and recovery from a natural disaster, it is essential to start building relationships and establishing contractual agreements with entities that may be critical in supporting community resilience.

DRAFT

Community Connectivity Capacity

Community connectivity capacity places strong emphasis on social structure, trust, norms, and cultural resources within a community. In terms of community resilience, these emerging elements of social and cultural capital will be drawn upon to stabilize the recovery of the community. Social and cultural capitals are present in all communities; however, it may be dramatically different from one city to the next as these capitals reflect the specific needs and composition of the community residents.

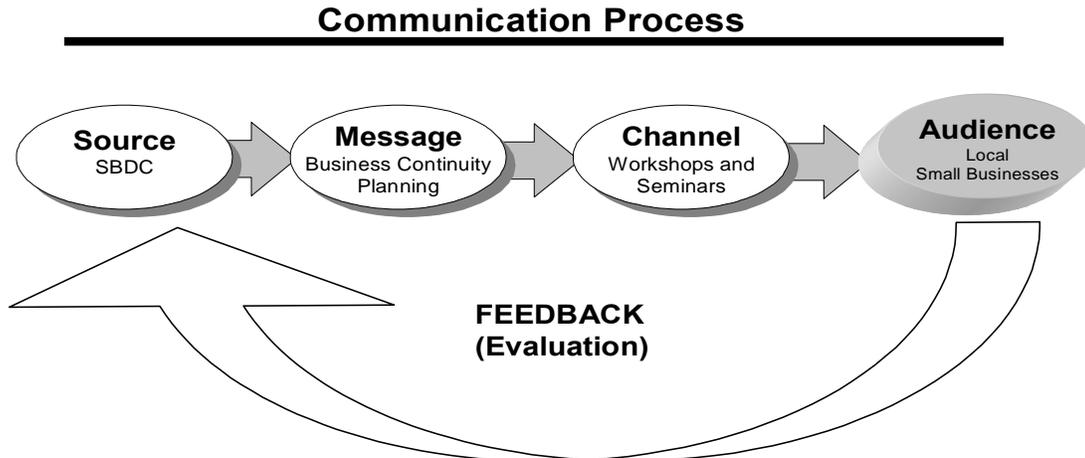
Social Systems and Service Providers

Social systems include community organizations and programs that provide social and community-based services, such as employment, health, senior and disabled services, professional associations and veterans' affairs for the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g. elderly, children, low income, etc.). The county can use existing social systems as resources for implementing such communication-related activities because these service providers already work directly with the public on a number of issues, one of which could be natural hazard preparedness and mitigation. The presence of these services are more predominantly located in urbanized areas of the county, this is synonymous with the general urbanizing trend of local residents.

The following is a brief explanation of how the communication process works and how the community's existing social service providers could be used to provide natural hazard related messages to their clients.

- There are five essential elements for communicating effectively to a target audience:
- The source of the message must be credible,
- The message must be appropriately designed,
- The channel for communicating the message must be carefully selected,
- The audience must be clearly defined, and
- The recommended action must be clearly stated and a feedback channel established for questions, comments and suggestions.

Figure B-6 Communication Process



Source: Adapted from the U.S. Environmental Protection Agency Radon Division’s outreach program

The following table provides a list of existing social systems within Polk County. The table provides information on each organization or program’s service area, types of services offered, populations served, and how the organization or program could be involved in natural hazard mitigation. The three involvement methods identified in the table are defined below:

- Education and outreach – organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.
- Information dissemination – organization could partner with the community to provide hazard related information to target audiences.
- Plan/project implementation – organization may have plans and/or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

The information provided in the table can also be used to complete action item worksheets by identifying potential coordinating agencies and internal and external partners.

Civic Engagement

Civic engagement and involvement in local, state and national politics are important indicators of community connectivity. Those who are more invested in their community may have a higher tendency to vote in political elections. The 2016 Presidential General Election resulted in 80.2% voter turnout in the county.²⁴ These results are relatively equal to voter participation reported across the State (80.3%).²⁵ Other indicators such as volunteerism, participation in formal community networks and community charitable contributions are examples of other civic engagement that may increase community connectivity.

²⁴ Oregon Blue Book, Voter Participation, <http://sos.oregon.gov/elections/Documents/statistics/participation-stats-11-2016.pdf>

²⁵ Ibid.

Cultural Resources: The cultural and historic heritage of a community is more than just tourist charm. For families that have lived in the county for generations and new resident alike, it is the unique places, stories, and annual events that make Polk County an appealing place to live. The cultural and historic assets in the county are both intangible benefits and obvious quality-of-life- enhancing amenities. Mitigation actions to protect these assets span many of the other systems already discussed. Some examples of that overlap could be seismic retrofit (preserving historic buildings and ensuring safety) or expanding protection of wetlands (protect water resources and beautify the county).

As part of the public outreach survey, county residents catalogued numerous cultural and historic assets including:

Parks and recreational facilities: Ballston Park, Buell Park, Buena Vista Park, Eola Heights Park, Mill Creek Park, Nesmith Park, Ritner Creek Park, Ritner Creek Bridge, Social Security Fishing Hole, Dallas Aquatic Center.

Environmental attractions: Valley of the Giants Nature Preserve, Baskett Slough National Wildlife Refuge.

Historic buildings and places: Beulah Methodist Episcopal Church; Brunk, Harrison, House; Cooper, James s. and Jennie M., House; Craven, Joseph and Priscilla, House; Davidson, Dr. John E. and Mary D., House; Domes, Walter J., House; Eldridge, Kersey C., House; Fort Yamhill Site; Graves-Fisher-Strong House; Harritt, Jesse and Julia, House; Howell, John W., House; Independence Historic District; Independence National Bank (Citizens Valley Bank); Parker School; Phillips, John, House; Polk County Bank; Pumping Station Bridge; Riley-Cutler House; Ritner Creek Bridge; Saint Patrick’s Roman Catholic Church (Methodist Episcopal Church, South); Sherman, Eleanor, House; Spring Valley Presbyterian Church; Well, George A., Jr., House; West Salem City Hall, Old (West Salem Library Building); Wheeler, J. A., House; Wilson, A.K., Building (Stafrin Drug Store/Greenwood Building)²⁶.

Public gathering places: Rock Creek campus, Cedar Mill library, Rock Creek Tavern.

Community Stability

Community stability is a measure of rootedness in place. It is hypothesized that resilience to a disaster stems in part from familiarity with place, not only for navigating the community during a crisis, but also accessing services and other supports for economic or social challenges.²⁷

Residential Geographic Stability

The table below estimates residential stability across the region. It is calculated by the number of people who have lived in the same house and those who have moved within the same county a year ago, compared to the percentage of people who have migrated into the region. Polk County overall has a geographic stability rating of about 89.2% (i.e., 89.2% of the population lived in the same house or moved within the county). Falls City has the

²⁶ "Oregon Historic Sites Database." Oregon Historic Sites Database. Accessed August 10, 2016. <http://heritagedata.prd.state.or.us/historic/>.

²⁷ Cutter, Susan, Christopher Burton, Christopher Emrich. "Disaster Resilience Indicators for Benchmarking Baseline Conditions". Journal of Homeland Security and Emergency Management.

highest geographic stability (92.8%) while Monmouth has the lowest (76.8%, due in large part to Western Oregon University). Countywide, about 11% of residents in 2015 lived outside of Polk County one year before.

Table B-26 Regional Residential Stability

Jurisdiction	Population	Geographic Stability	Same House	Moved Within Same County
Polk	76,484	89.2%	80.9%	8.3%
Dallas	14,631	90.7%	77.7%	13.0%
Falls City	988	92.8%	87.6%	5.2%
Independence	8,631	89.2%	77.8%	11.4%
Monmouth	9,823	76.8%	61.5%	15.3%

Source: Social Explorer, Table 130, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

Homeownership

Housing tenure describes whether residents rent or own the housing units they occupy. Homeowners are typically more financially stable but are at risk of greater property loss in a post-disaster situation. People may rent because they choose not to own, they do not have the financial resources for home ownership, or they are transient.

Collectively, about 64.3% of the occupied housing units in Polk County are owner-occupied; about 35.7% are renter occupied. Falls City (82.9%) has the highest rate of owner-occupied units. Monmouth (51.7%) and Independence (45.1%) have the highest rate of renter-occupied households. Falls City (9.2%) and Independence (8.4%) have the highest vacancy rates within the county. In addition, seasonal or recreational housing accounts for approximately 11% of the county's vacant housing stock.²⁸

Table B-27 Housing Tenure and Vacancy

	Housing Units	Owner-occupied		Renter-occupied		Vacant [^]	
		Estimate	Percent	Estimate	Percent	Estimate	Percent
Polk County	30,651	18,292	64.3%	10,166	35.7%	1,944	6.3%
Dallas	5,907	3,595	63.4%	2,072	36.6%	228	3.9%
Falls City	393	296	82.9%	61	17.1%	36	9.2%
Independence	3,200	1,610	54.9%	1,322	45.1%	268	8.4%
Monmouth	3,687	1,690	48.3%	1,810	51.7%	172	4.7%

Source: Social Explorer, Table 94, U.S. Census Bureau, 2011-2015 American Community Survey Estimates

* = Functional vacant units, computed after removing seasonal, recreational, or occasional housing units from vacant housing units.

According to Cutter, wealth increases resiliency and recovery from disasters. Renters often do not have personal financial resources or insurance to assist them post-disaster. On the other hand, renters tend to be more mobile and have fewer assets at risk of natural

²⁸ U.S. Census Bureau, 2011-2015 American Community Survey Estimates, Table B25004.

hazards.²⁹ In the most extreme cases, renters lack sufficient shelter options when lodging becomes uninhabitable or unaffordable post-disaster.

Synthesis

Polk County has distinct social and cultural resources that work in favor to increase community connectivity and resilience. Sustaining social and cultural resources, such as social services and cultural events, may be essential to preserving community cohesion and a sense of place. The presence of larger communities makes additional resources and services available for the public. However, it is important to consider that these amenities may not be equally distributed to the rural portions of the county and may produce implications for recovery in the event of a disaster.

In the long-term, it may be of specific interest to the county to evaluate community stability. A community experiencing instability and low homeownership may hinder the effectiveness of social and cultural resources, distressing community coping and response mechanisms.

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²⁹ Cutter, S. L. (2003). Social Vulnerability to Environmental Hazards. *Social Science Quarterly*.

Political Capacity

Political capacity is recognized as the government and planning structures established within the community. In terms of hazard resilience, it is essential for political capital to encompass diverse government and non-government entities in collaboration; as disaster losses stem from a predictable result of interactions between the physical environment, social and demographic characteristics and the built environment.³⁰ Resilient political capital seeks to involve various stakeholders in hazard planning and works towards integrating the Natural Hazard Mitigation Plan with other community plans, so that all planning approaches are consistent.

Regulatory Context: Oregon Statewide Planning Goal 7

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of 19 statewide planning goals that express the state's policies on land use and on related topics, such as citizen involvement, land use planning, and natural resources.

Most of the goals are accompanied by "guidelines," which are suggestions about how a goal may be applied. Oregon's statewide goals are achieved through local comprehensive planning. State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect. The local comprehensive plans must be consistent with the statewide planning goals. Plans are reviewed for such consistency by the state's Land Conservation and Development Commission (LCDC). When LCDC officially approves a local government's plan, the plan is said to be "acknowledged." It then becomes the controlling document for land use in the area covered by that plan.

Statewide Planning Goal 7

Goal 7: Areas Subject to Natural Disasters and Hazards has the overriding purpose to "protect people and property from natural hazards." Goal 7 requires local governments to adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards. Natural hazards include floods, landslides, earthquakes, tsunamis, coastal erosion, and wildfires.

To comply with Goal 7, local governments are required to respond to new hazard inventory information from federal or state agencies. The local government must evaluate the hazard risk and assess the:

- frequency, severity, and location of the hazard;
- effects of the hazard on existing and future development;
- potential for development in the hazard area to increase the frequency and severity of the hazard; and
- types and intensities of land uses to be allowed in the hazard area.

³⁰ Mileti, D. 1999. Disaster by Design: a Reassessment of Natural Hazards in the United States. Polk D.C.: Joseph Henry Press.

Local governments must adopt or amend comprehensive plan policies and implementing measures to avoid development in hazard areas where the risk cannot be mitigated. In addition, the siting of essential facilities, major structures, hazardous facilities and special occupancy structures should be prohibited in hazard areas where the risk to public safety cannot be mitigated. The state recognizes compliance with

Goal 7 for coastal and riverine flood hazards by adopting and implementing local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements.

Goal 7 Planning Guidelines

- In adopting plan policies and implementing measures for protection from natural hazards, local governments should consider:
 - the benefits of maintaining natural hazard areas as open space, recreation, and other low density uses;
 - the beneficial effects that natural hazards can have on natural resources and the environment; and
 - the effects of development and mitigation measures in identified hazard areas on the management of natural resources.
- Local governments should coordinate their land use plans and decisions with emergency preparedness, response, recovery and mitigation programs.

Goal 7 Implementation Guidelines

Goal 7 guides local governments to give special attention to emergency access when considering development in identified hazard areas.

- Consider programs to manage stormwater runoff to address flood and landslide hazards.
- Consider non-regulatory approaches to help implement the goal.
- When reviewing development requests in high-hazard areas, require site-specific reports, appropriate for the level and type of hazard. Reports should evaluate the risk to the site, as well as the risk the proposed development may pose to other properties.
- Consider measures exceeding the National Flood Insurance Program.

Existing Plans and Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.³¹

The Polk County NHMP includes a range of recommended action items that, when implemented, will reduce the county's vulnerability to natural hazards. Many of these

³¹ Burby, Raymond J., ed. 1998. Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.

recommendations are consistent with the goals and objectives of the county’s existing plans and policies. Linking existing plans and policies to the NHMP helps identify what resources already exist that can be used to implement the action items identified in the plan. Implementing the natural hazards mitigation plan’s action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the county’s resources. In addition to the plans listed below the county and incorporated cities also have zoning ordinances (including floodplain development regulations) and building regulations.

Existing plans that can incorporate mitigation actions include (for more information on these plans see the county [website](#)):

Table B-28 Legal and Regulatory Resources Available for Hazard Mitigation (Polk County)

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	Comprehensive Plan Maps	The Comprehensive Plan map, goals and policies are intended to serve as a guide for land use planning and development in Polk County.
	Natural Hazards Mitigation Plan (2017 – pending)	Directed mitigation activities for the planning cycle.
	Emergency Operations Plan (2017)	Identifies emergency planning, policies, procedures, and response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies.
	2001 Flood Hazard Plan Appendix 1	Directed floodplain development and land use.
	Transportation Systems Plan, 2009	This plan provides a balanced transportation system that includes the automobile, bicycle, rail, transit, air, walking, and transmission systems (for example, pipelines). It reflects existing land use plans, policies and regulations that affect the transportation system and includes a finance element.
	Corridor Refinement Plan (Highway 18)	The Corridor Refinement Plan shows that fatal crashes are a major highway problem and traffic volumes along this section of highway have more than doubled since 1994. The highway is expected to have an additional 50% increase in traffic over the next 20 years. Conditions that presently exist on summer weekends will expand and will occur on weekdays from spring to fall.
Programs	National Flood Insurance Program (NFIP)	Directed floodplain development and land use and provides flood insurance for residential, business, and public entities.
	Code Compliance	Building, zoning, and other nuisance violations.

Regulatory Tool	Name	Effect on Hazard Mitigation
	Program	
	Economic Development Program	Coordination of economic development and infrastructure development activities and administering grant programs.
	Polk County Water Needs Assessment Report, 2005	The objective of this report is to provide an analysis of future water supply strategies for the citizens of Polk County. Elements of this objective include the following: <ul style="list-style-type: none"> - Identify the county's future needs for water - Identify the most viable long term drinking water source - Develop a preliminary plan for production and delivery - Estimate the financial impacts - Discuss potential administrative options required for financing and operation
Policies (Municipal Codes)	Polk County Zoning Ordinances	http://www.co.polk.or.us/cd/planning/polk-county-zoning-ordinance
	Polk County Floodplain Zone, Zoning Ordinance, Chapter 178	Guides land use and development within the floodplain

Table B-29 Administrative and Technical Resources for Hazard Mitigation (Polk County)

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	County Engineer: Ken Husby County Planning: Sidney Mulder Planning Director: Austin McGuigan
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	County Engineer: Ken Husby
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	County Planning: Sidney Mulder Planning Director: Austin McGuigan
Floodplain manager	Austin McGuigan
Personnel skilled in GIS and/or HAZUS-MH	Dan Anderson
Director of Emergency Services	Dean Bender
Finance (grant writers, purchasing)	Austin McGuigan
Public Information Officers	Dean Bender

Table B-30 Financial Resources for Hazard Mitigation (Polk County)

Financial Resources	Effect on Hazard Mitigation
General funds	Available for mitigation projects
Authority to levy taxes for specific purposes	(Measure 5) w/ a cap w/ voter approval (cannot exceed cap)
Incur debt through general obligation bonds	No
Incur debt through special tax and revenue bonds	Yes
Incur debt through private activity bonds	Yes

Note: See Appendix D – Grant Programs for additional financial resources.

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Appendix C: Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon Military Department – Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigation*. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how an economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, law enforcement, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value from a public policy perspective, in assessing the positive and negative impacts from mitigation activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

Mitigation Strategy Economic Analyses Approaches

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the three methods is outlined below:

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the state Oregon Military Department – Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in Public Sector Mitigation Activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in Private Sector Mitigation Activities

Private sector mitigation projects may occur on the basis of one or two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchases. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Considering detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of those methods is the STAPLE/E approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a synthetic fashion. This set of criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process."

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?

- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or city board of commissioners, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private?)
- How will this action affect the fiscal capability of the community?
- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?

- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

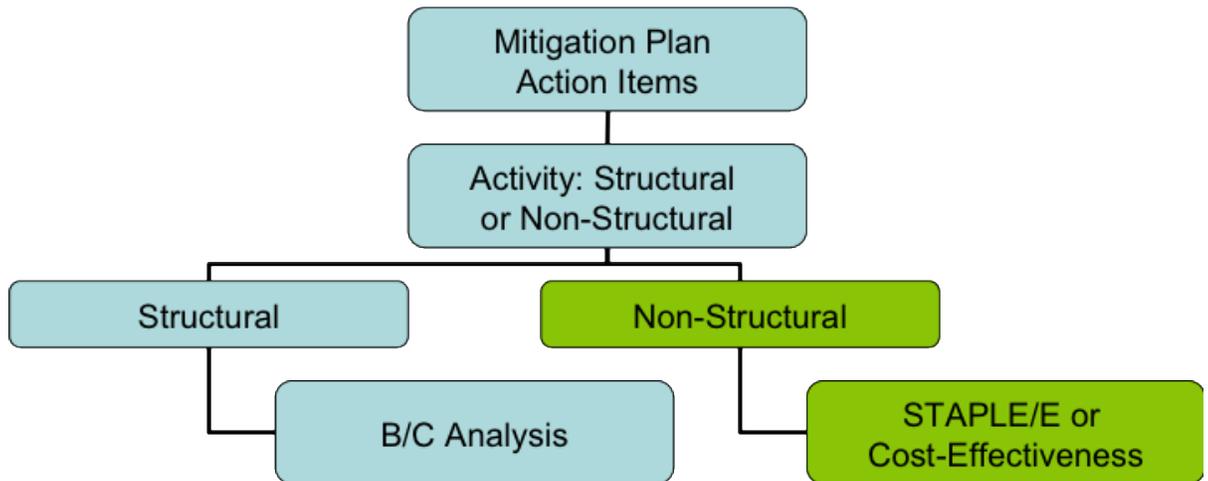
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed benefit/cost analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure C-1 Economic Analysis Flowchart



Source: Oregon Partnership for Disaster Resilience. 2005.

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation projects can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- **Determine the project cost.** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- **Estimate the benefits.** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- **Consider costs and benefits to society and the environment.** These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- **Determine the correct discount rate.** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the best activities given varying costs and benefits include net present value and internal rate of return.

- **Net present value.** Net present value is the value of the expected future returns of an investment minus the value of the expected future cost expressed in today's dollars. If the net present value is greater than the projected costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- **Internal rate of return.** Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes

- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies for Evaluating the Socio-Economic Consequences of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eidinger, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates, Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics, Inc., 1996

Federal Emergency Management Agency, *Report on the Costs and Benefits of Natural Hazard Mitigation*. Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in the City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects Volume V, Earthquakes*, Prepared for FEMA's Hazard Mitigation Branch, October 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olsen Associates, Prepared for Oregon Military Department – Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police – Office of Emergency Management, 2000.)

Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

APPENDIX D: GRANT PROGRAMS AND RESOURCES

Introduction

There are numerous local, state and federal funding sources available to support natural hazard mitigation projects and planning. The Oregon Natural Hazard Mitigation Plan includes a comprehensive list of funding sources (refer to Oregon NHMP Chapter 2 Section F(1)). The following section includes an abbreviated list of the most common funding sources utilized by local jurisdictions in Oregon. Because grant programs often change, it is important to periodically review available funding sources for current guidelines and program descriptions.

Post-Disaster Federal Programs

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

<http://www.fema.gov/hazard-mitigation-grant-program>

Physical Disaster Loan Program

When physical disaster loans are made to homeowners and businesses following disaster declarations by the U.S. Small Business Administration (SBA), up to 20% of the loan amount can go towards specific measures taken to protect against recurring damage in similar future disasters. <http://www.sba.gov/category/navigation-structure/loans-grants/small-business-loans/disaster-loans>

Pre-Disaster Federal Programs

Pre-Disaster Mitigation Grant Program

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. <http://www.fema.gov/pre-disaster-mitigation-grant-program>

Flood Mitigation Assistance Program

The overall goal of the Flood Mitigation Assistance (FMA) Program is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other National Flood Insurance Program (NFIP) insurable structures. This specifically includes:

- Reducing the number of repetitively or substantially damaged structures and the associated flood insurance claims;
- Encouraging long-term, comprehensive hazard mitigation planning;
- Responding to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development activities; and
- Complementing other federal and state mitigation programs with similar, long-term mitigation goals.

<http://www.fema.gov/flood-mitigation-assistance-program>

Detailed program and application information for federal post-disaster and pre-disaster programs can be found in the FY13 Hazard Mitigation Assistance Unified Guidance, available at: <https://www.fema.gov/media-library/assets/documents/33634>. Note that guidance regularly changes. Verify that you have the most recent edition.

For Oregon Military Department, Office of Emergency Management (OEM) grant guidance on Federal Hazard Mitigation Assistance, visit:

http://www.oregon.gov/OMD/OEM/pages/all_grants.aspx - Hazard_Mitigation_Grants

Contact: Angie Lane, angie.lane@mil.state.or.us

State Programs

Seismic Rehabilitation Grant Program

The Seismic Rehabilitation Grant Program (SRGP) provides state funds to strengthen public schools and emergency services buildings so they will be less damaged during an earthquake. Reducing property damage, injuries, and casualties caused by earthquakes is the goal of the SRGP. <http://www.orinfrastructure.org/Infrastructure-Programs/Seismic-Rehab/>

Community Development Block Grant Program

The Community Development Block Grant Program promotes viable communities by providing: 1) decent housing; 2) quality living environments; and 3) economic opportunities, especially for low and moderate income persons. Eligible activities most relevant to natural hazards mitigation include: acquisition of property for public purposes; construction/reconstruction of public infrastructure; community planning activities. Under special circumstances, CDBG funds also can be used to meet urgent community development needs arising in the last 18 months which pose immediate threats to health and welfare.

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

Oregon Watershed Enhancement Board

While OWEB's primary responsibilities are implementing projects addressing coastal salmon restoration and improving water quality statewide, these projects can sometimes also benefit efforts to reduce flood and landslide hazards. In addition, OWEB conducts watershed workshops for landowners, watershed councils, educators, and others, and conducts a biennial conference highlighting watershed efforts statewide. Funding for OWEB programs comes from the general fund, state lottery, timber tax revenues, license plate revenues, angling license fees, and other sources. OWEB awards approximately \$20 million in funding annually. More information at: <http://www.oregon.gov/OWEB/Pages/index.aspx>

Federal Mitigation Programs, Activities & Initiatives

Basic & Applied Research/Development

National Earthquake Hazard Reduction Program (NEHRP), National Science Foundation.

Through broad based participation, the NEHRP attempts to mitigate the effects of earthquakes. Member agencies in NEHRP are the US Geological Survey (USGS), the National Science Foundation (NSF), the Federal Emergency Management Agency (FEMA), and the National Institute for Standards and Technology (NIST). The agencies focus on research and development in areas such as the science of earthquakes, earthquake performance of buildings and other structures, societal impacts, and emergency response and recovery. <http://www.nehrp.gov/>

Decision, Risk, and Management Science Program, National Science Foundation.

Supports scientific research directed at increasing the understanding and effectiveness of decision making by individuals, groups, organizations, and society. Disciplinary and interdisciplinary research, doctoral dissertation research, and workshops are funded in the areas of judgment and decision making; decision analysis and decision aids; risk analysis, perception, and communication; societal and public policy decision making; management science and organizational design. The program also supports small grants for exploratory research of a time-critical or high-risk, potentially transformative nature. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423

Hazard ID and Mapping

National Flood Insurance Program: Flood Mapping; FEMA

Flood insurance rate maps and flood plain management maps for all NFIP communities. <http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

National Digital Orthophoto Program, DOI – USGS

Develops topographic quadrangles for use in mapping of flood and other hazards.
<http://www.ndop.gov/>

Mapping Standards Support, DOI-USGS

Expertise in mapping and digital data standards to support the National Flood Insurance Program. <http://ncgmp.usgs.gov/standards.html>

Soil Survey, USDA-NRCS

Maintains soil surveys of counties or other areas to assist with farming, conservation, mitigation or related purposes. http://soils.usda.gov/survey/printed_surveys/

Project Support

Coastal Zone Management Program, NOAA.

Provides grants for planning and implementation of non-structural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration.
<http://coastalmanagement.noaa.gov/>

Community Development Block Grant Entitlement Communities Program, US Department of Housing and Urban Development

Provides grants to entitled cities and urban counties to develop viable communities (e.g., decent housing, a suitable living environment, expanded economic opportunities), principally for low- and moderate- income persons.
http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/entitlement

National Fire Plan (DOI – USDA)

The NFP provides technical, financial, and resource guidance and support for wildland fire management across the United States. This plan addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability.
<http://www.forestsandangelands.gov/>

Assistance to Firefighters Grant Program, FEMA

FEMA AFGM grants are awarded to fire departments to enhance their ability to protect the public and fire service personnel from fire and related hazards. Three types of grants are available: Assistance to Firefighters Grant (AFG), Fire Prevention and Safety (FP&S), and Staffing for Adequate Fire and Emergency Response (SAFER).
<http://www.fema.gov/welcome-assistance-firefighters-grant-program>

Emergency Watershed Protection Program, USDA-NRCS

Provides technical and financial assistance for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas

damaged by severe natural hazard events.

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp>

Rural Development Assistance – Utilities, USDA

Direct and guaranteed rural economic loans and business enterprise grants to address utility issues and development needs.

http://www.rurdev.usda.gov/Utilities_Programs_Grants.html

Rural Development Assistance – Housing, USDA.

The RDA program provides grants, loans, and technical assistance in addressing rehabilitation, health and safety needs in primarily low-income rural areas. Declaration of major disaster necessary. <http://www.rurdev.usda.gov/HAD-HCFPGGrants.html>

Public Assistance Grant Program, FEMA.

The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President.

<http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit>

National Flood Insurance Program, FEMA

The NFIP makes available flood insurance to residents of communities that adopt and enforce minimum floodplain management requirements. <http://www.fema.gov/national-flood-insurance-program>

HOME Investments Partnerships Program, HUD

The HOME IPP provides grants to states, local government and consortia for permanent and transitional housing (including support for property acquisition and rehabilitation) for low-income persons. <http://www.hud.gov/offices/cpd/affordablehousing/programs/home/>

Disaster Recovery Initiative, HUD

The DRI provides grants to fund gaps in available recovery assistance after disasters (including mitigation).

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/dri

Emergency Management Performance Grants, FEMA

EMPG grants help state and local governments to sustain and enhance their all-hazards emergency management programs. <http://www.fema.gov/fy-2012-emergency-management-performance-grants-program>

Partners for Fish and Wildlife, DOI – FWS

The PFW program provides financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats.

<http://www.fws.gov/partners/>

North American Wetland Conservation Fund, DOI-FWS

NAWC fund provides cost-share grants to stimulate public/private partnerships for the protection, restoration, and management of wetland habitats.

<http://www.fws.gov/birdhabitat/Grants/index.shtm>

Federal Land Transfer / Federal Land to Parks Program, DOI-NPS

Identifies, assesses, and transfers available federal real property for acquisition for State and local parks and recreation, such as open space.

<http://www.nps.gov/nrcr/programs/flp/index.htm>

Wetlands Reserve program, USDA-NCRS

The WR program provides financial and technical assistance to protect and restore wetlands through easements and restoration agreements.

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands>

Secure Rural Schools and Community Self-Determination Act of 2000, US Forest Service.

Reauthorized for FY2012, it was originally enacted in 2000 to provide five years of transitional assistance to rural counties affected by the decline in revenue from timber harvests on federal lands. Funds have been used for improvements to public schools, roads, and stewardship projects. Money is also available for maintaining infrastructure, improving the health of watersheds and ecosystems, protecting communities, and strengthening local economies. <http://www.fs.usda.gov/pts/>